

## *In This Issue...*

**2** [President's Message](#)

**2** [Sky Watch Review](#)

*Hampton Academy  
Gilmanton School*

**3** [Society Activities](#)

*Four Planets and a Comet*

**4** [Object of the Month](#)

*February: NGC 1501*

**5** [Images of the Month](#)

*Lovejoy in the Evenings*

**6** [Featured Articles](#)

*Remembering Charles Young  
Stellafane Exotica*

**15** [The Regular Items](#)

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

## *Earth from near the Moon*



*Shown above is mankind's First View of the Earth from the vicinity of the Moon, courtesy of Lunar Orbiter 1 and NASA. This crescent Earth was photographed on August 23, 1966 at 16:35 GMT as the spacecraft was about to pass behind the Moon. All 5 Lunar Orbiters were successful in mapping the lunar surface to identify landing sites for the Apollo missions to come, but their data tapes were soon forgotten about.*

*Fast forward 20 years and JPL archivist **Nancy Evans** was faced with the decision on whether to scrap the tapes. She opted for preservation and started a small project with the help of colleagues to retrieve the data. But the specialized demodulation hardware needed to process the retrieved analog data was no longer available; they couldn't get the funding to rebuild the hardware and so, you guessed it – the 4 Ampex FR-900 tape drives, spare parts and documentation sat in Nancy Evans's garage, while the 1500+ tapes were warehoused. The archivist and the engineers moved on to other projects.*

*In 2004, Philip Horzempa was researching the history of the Lunar Orbiter program when he came across a 1996 memo by Mark Nelson (who had worked with Ms. Evans) and the two decided to restart the project. Dennis Wingo, Keith Cowing and Ken Zin pitched in to help the techno-archaeology effort. On November 13, 2008 NASA able to release a restored First View of the Earth from the vicinity of the Moon, shown below.*





### ***“Say Hi!”***

NHAS is known to the State of New Hampshire, has a tax-ID and by-laws and even a web presence with links showing up in Google searches, but if all the members were to quit, there would be no actual NHAS, just the shadows and scraps of a by-gone club, vanished like the Sumerians and Imperial Rome.

And it's not just membership which makes a club real: if our members just limited themselves to paying dues, the club would not be much better off. It's an involved member that makes a club more than an empty shell and a Web presence. NHAS has been lucky; there have always been enough involved members to make it rewarding for the members and a benefit to the people of New Hampshire. I'm confident that this will continue, but I would love to see more members at our meetings and sky-watches.

A club is fun when the other members are friendly. Unfortunately we're often busy at sky-watches and attentive at the monthly meetings and we can be strangers to one another.

The last time I was president, I asked for “One more.” I asked members to attend one more monthly meeting, go to one more sky-watch. This year you should keep doing that, of course, but my new slogan for this month is “Say Hi!” At a meeting or sky-watch, if you see a club member you don't know, walk up and introduce yourself!

***John Bishop***  
NHAS President

## ***Sky Watch Review***

### ***Hampton Academy, Hampton NH, January 22***

We estimate at least 40 or so students and parents attended on the backup date. It was a fun event despite the commercial lights of Hampton Beach. The eastern sky over the ocean was of course very dark.

NHAS was represented by **Paul Winalski**, **Gardner Gerry** and **Bob Russell** (a new member at his first skywatch). We showed Jupiter, M42, Comet Lovejoy, M35, M81 and M82 and a carbon star or two.

- ***Gardner Gerry***

### ***Gilmanton School, Gilmanton NH, January 23***

Finally we have been able to hold a skywatch for the Gilmanton school. We got a clear and not too cold night on the backup night. **Paul Winalski** gave the indoor talk and I helped out with observing. We had an enthusiastic crowd of students and parents estimated at 50-60. Long lines at both scopes kept us from jumping to lots of objects, Paul had his 14" dob on Comet Lovejoy and I had my C9.25 on M42. Later, when most had gone, we looked at M35, M81 and M82, and the very low crescent Moon. The school provided home-made oatmeal and chocolate chip cookies with hot chocolate to wash them down with and sent us home with a bag of a dozen cookies!

- ***Gardner Gerry***

*[Were **Snoopy** typing up this report, it would have begun: “It was a month of dark and stormy cold nights...”*

*The cold of the first half of the month was surpassed only by the blizzard of January 27, leaving the observing field behind the **Mary E. Bartlett Library** in Brentwood NH under 2 feet of snow, with the skywatch being cancelled on both backup dates. Spring, it would seem, can't come soon enough! –Ed.]*

### Four Planets and a Comet

It began as a whimsical exercise in spotting all four inner planets at one glance, naked eye – *Venus* and *Mercury* were in conjunction in the western skies just after sunset in early January, with *Mars* a bit above the pair and obviously the *Earth* below them all. **Paul Winalski** and I (in Pune, India) had a go at it, but then **Steve Pearsall** changed the rules. He upped the ante to include *Neptune* (near Mars) and also *Uranus* further up in Pisces. From there it was just a step to *Comet Lovejoy (C/2014 Q2)*, then in Taurus.



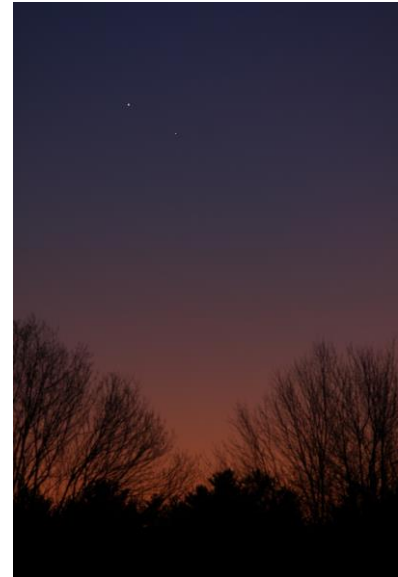
*Comet Lovejoy of the season, as seen at year's end. (Image: Dave Weaver)*

*in central Merrimack. It was dead obvious in the 9x50 finder. In the 14" TScope, it was significantly brighter and larger than it had been circa Jan. 1. There is a distinct core surrounded by a fuzzy sphere about 1/2° in diameter. All of this had a distinct greenish color. There was a faint tail trailing off. Definitely take the opportunity to observe Comet Lovejoy tonight if you can!*

Over the next few days he paid for the 20 minutes spent outside in single-digit temperatures, but as a true New Englander he remarked: "Colds are a dime a dozen. C2014/Q2 Lovejoy is a once-in-a-lifetime observing opportunity."

A triple-shadow transit by Callisto, Io and Europa was awaited near midnight on January 23, but was clouded out soon after Io's shadow started chasing Callisto's across the Jovian disc, the pair almost merging. Looking ahead to the evening of February 21, Mars and Venus will be in conjunction in the western skies, with an added bonus. The crescent Moon (just 3 days past New Moon) will be visible about 10° above the pair and at about 5:55pm EST the dark limb will begin an occultation of Uranus. Since this will be happening just over half an hour past sunset, Uranus might not be discernable by itself, but against the dark limb, it could very well be.

- **Ramaswamy**



*Venus and Mercury above the treeline of a Terrestrial backyard. Mars was well above this field (of view). (Image: Joe Dechene)*

The comet, discovered by **Terry Lovejoy** down under on August 17, 2014 with his 200mm SCT, was brightening through the first month of the year in New Hampshire skies. **Joe Derek** had seen it as a not-yet mag. 5 object in Lepus and Paul Winalski had his first serious look at it at the Nesmith Library skywatch on December. 29. Over the next 3 weeks, as the weather and other matters permitted, he observed the visitor. Paul's report of January 13:

*Around New Year's Day I had observed this comet when it was about 5th magnitude, low in the sky in Lepus. Sky conditions were hazy and the Moon was up. The comet was obviously visible nonetheless, with a distinct core, but with no observable color in Mr. T. (the 14" TScope) on that night.*

*The comet is now much higher, in Taurus, between the "V" of the Hyades and Alpha Ceti. It is a 4th magnitude object, but it wasn't naked eye from my home*



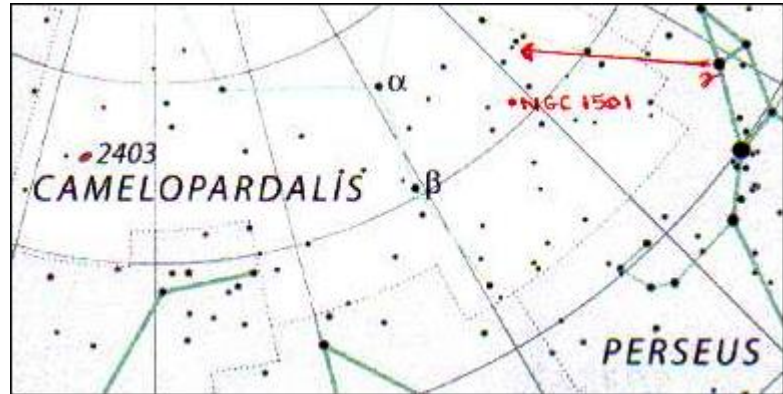
## NGC 1501 – Planetary Nebula in Camelopardalis

by Glenn Chaple

While Go-To technology has gained popularity with backyard astronomers who like to key their telescopes on a sky object with the push of a button, I prefer the no-frills star-hop mode of cosmic travel. Star-hopping lets me see enjoy celestial scenery I'd miss by traveling Go-To. I'll demonstrate my point with a star-hop to the planetary nebula NGC 1501 in Camelopardalis.

Camelopardalis isn't very kind to star-hoppers. This sprawling north circumpolar constellation contains just four stars brighter than 5<sup>th</sup> magnitude. A star-hop to any sky destination in Camelopardalis usually begins with a bright star in an adjacent constellation.

To find NGC 1501, we begin at gamma ( $\gamma$ ) Persei and trace a 12° path between a pair of 4<sup>th</sup> magnitude stars to Kemble's Cascade (refer to the finder chart at right).



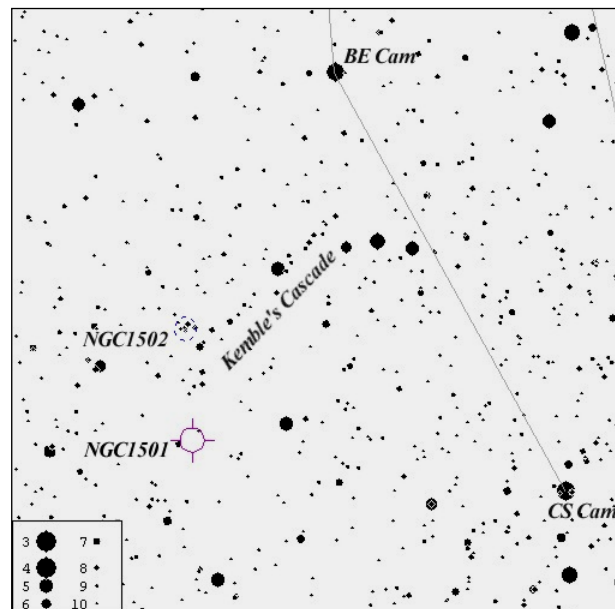
Generated by [www.constellation-guide.com](http://www.constellation-guide.com)  
(Courtesy: IAU and Sky & Telescope)

Kemble's Cascade is a stunning 2½° chain comprised of some 20 magnitude 7 to 9 stars. At its southwest end is the pretty open cluster NGC 1502, punctuated at the center with the eye-pleasing 7<sup>th</sup> magnitude twins that make up the double star Struve 485. A 1½° push south of NGC 1502 brings us to NGC 1501. Think of it – if we had traveled to NGC 1501 via Go-To technology, we'd have missed *three* delightful celestial showpieces!

NGC 1501 is a magnitude 11.5 planetary nebula located about 5000 light-years away. Its slightly oval disk, just under an arc-minute across, can be glimpsed (barely) in a 3-inch scope, but twice that aperture will be needed for a definite sighting.

With a 12-inch scope and dark-sky conditions, you should be able to make out the nebula's bluish hue and magnitude 14.5 central star.

*[Kemble's Cascade was the subject of Object of the Month last February. For the details on its discovery in 1980 by Fr. Lucian Kemble, refer to page 12 of the [January 2014 issue of the Observer](#). –Ed.]*



Kemble's cascade in Camelopardalis points us to NGC 1501.  
(Courtesy: [www.astrosurf.com](http://www.astrosurf.com))

*Lovejoy in the Evenings*



It was the one thing in the skies to brave single digit temperatures for.

On January 13 **Ed Ting** was out in 8°F weather (wind-chill not known) to capture a wide-angle image of the comet, with the Pleiades in play.

**Dave Weaver** has been imaging comet *C/2014 Q2 (Lovejoy)* since just after Christmas, as it has climbed up from below Orion. Working with his Canon EOS 6D (and 7D) at prime focus on TOA-130 (with flattener), he has been [posting his images at the Pictures Forum; go have a look!](#) He even cut down some trees in his backyard that were obscuring the view – anyone feel the *Lumberjack Song* coming along?

Canon T3i, 50 mm lens stopped down to f/2.8, cropped. (Image: Ed Ting)



EOS 6D single frame

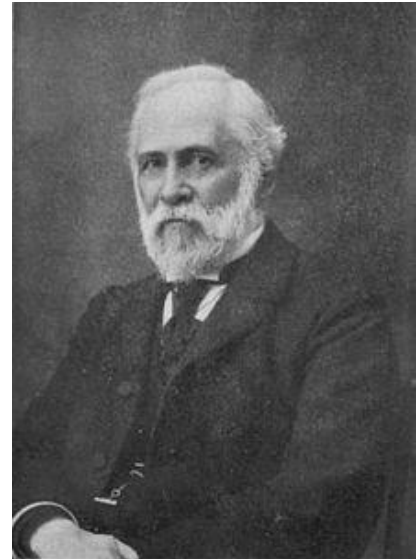
(Image: Dave Weaver)



## Remembering Charles Augustus Young

He was born in Hanover, New Hampshire on December 15, 1834 and died in his hometown on January 3, 1908. He graduated from Dartmouth College at the head of his class in 1853 and returned in 1866 to teach for more than a decade. He was one of the pioneers of the emerging branch of solar physics and helped mature spectroscopy as a tool to uncover secrets of the Sun. But above all, he wrote books on astronomy that became classic texts used in schools, colleges and universities throughout the world.

January 15 was the anniversary of the death of John Dobson, the popularizer of Sidewalk Astronomy in the second half of the 20<sup>th</sup> century who spent 23 years as a monk with the Ramakrishna Order in San Francisco. Almost 90 years earlier, **Charles Augustus Young** studied a year at the theological seminary in Andover, Mass. with the notion of becoming a missionary. But an invitation to become professor of mathematics and astronomy at the Western Reserve College in Hudson, Ohio changed his life and career in 1857. He went on to teach at Dartmouth College and Princeton University as well, in a successful academic career spanning 48 years. He taught more than two generations of budding astronomers (Henry Norris Russell was one of his students at Princeton), he wrote scientific papers and gave public lectures at many venues to promote astronomy in the second half of the 19<sup>th</sup> century, just when astronomy was undergoing a renaissance in the United States.



*Charles A. Young in 1897.*  
(Credit: Wikimedia Commons)



Prof. Young's Residence, Hanover N. H.

*The Young residence on College St, Hanover circa 1870, with Shattuck Observatory in the background. (Courtesy: Frank J. Barrett Jr., from his private collection.)*

For Charles Young, an academic career was probably in the genes. His maternal grandfather, Ebenezer Adams, was professor of mathematics and natural philosophy at Dartmouth from 1810 to 1833, and was succeeded in the chair by his son-in-law, Ira Young. A year later Charles was born, destined to succeed his father (after a lapse of eight years) in 1866. The elder Young, largely through his own efforts, helped establish the Shattuck Observatory at Dartmouth, and made a trip to Europe in 1853 to examine foreign observatories and secure instruments, taking young Charles with him. Ira Young died in 1858.

In the summer of 1857, the newly minted Professor Young married Augusta Mixer in Concord, New Hampshire. It was a happy union of almost 44 years, and their daughter Clara Adelaide (known as Addie) and sons Charles Ira and Frederick Albert were all born in Hudson, Ohio. In 1862 he left his academic duties to serve as a captain in the 85<sup>th</sup> regiment of Ohio. He did not see service in battle, having been responsible mostly for guarding prisoners, but the Civil War years took a toll on his health. After the war he accepted the position of professor of natural philosophy and astronomy at Dartmouth College, and the Young family moved back to Hanover in the spring of 1866.

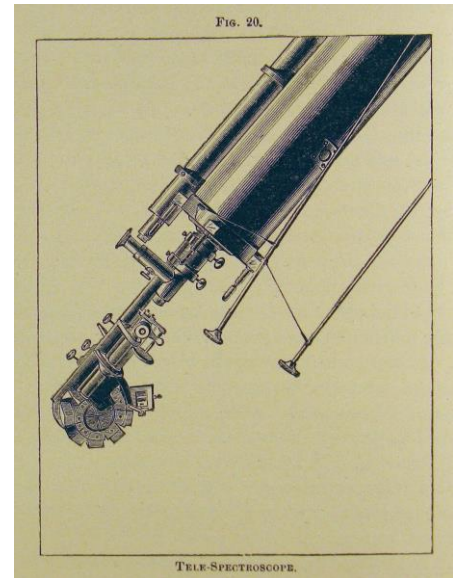
## Spectroscopy in Astronomy

The appointment was quite beneficial to Prof. Young; the Shattuck Observatory was at his disposal, there was an excellent collection of optical equipment available to teach with, and it also left him sufficient time for researches that defined his next few years. Spectroscopy was increasingly being used in astronomy by 1860 and he realized that it was as important to the science as the telescope had been 250 years prior. While the telescope brought distant objects optically nearer for observation, the spectroscope broke down the light from those objects and could reveal their chemical composition and physical condition, and even their (radial) velocity with respect to Earth.

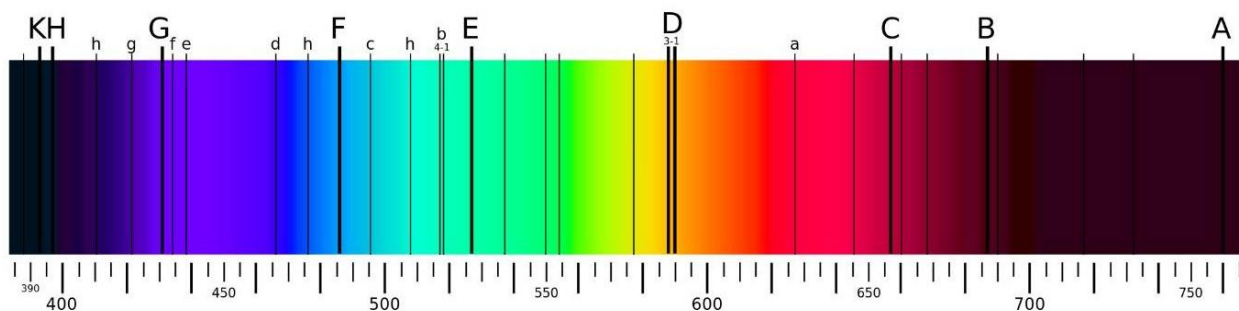
The *dispersion* of the light was the job of a prism or a train of prisms (or a diffraction grating). This was situated between a *collimator* and a *view-telescope* (so called to distinguish it from the main telescope). If the object being looked at was a point of light, like a star, the dispersed view through the view-telescope would be a streak of light, blue at one end, red at the other. However, if a line of light was presented to the prisms, parallel to their edges (or the rulings on a grating), a colored band of light or *spectrum* resulted; it could show markings not obvious in a streak of light. The collimator housed a *slit* and a lens to get the light to the prisms. Looking at a spectrum through a view-telescope rather than the naked eye had obvious benefits; the substitution of a camera generated photographic evidence for more analysis later.

When Isaac Newton examined sunlight with a prism in 1666, he used a (circular) beam and did not notice any discontinuities. In 1812, while examining a spectrum of solar light produced by a slit, Joseph von Fraunhofer noticed a number of dark lines. Sensing that they could be used to standardize wavelengths, he accurately measured the positions of 324 of the more than 500 dark lines he could see, labelling the most prominent ones with Letters that are still used today. He commented on the D<sub>1</sub>-D<sub>2</sub> doublet's similarity with a bright pair he could see in a flame spectrum in his laboratory, but did not pursue the matter further.

Had he done so, we might know him today for much more than the dark solar spectrum lines, the achromatic objective lens and the German equatorial mount.



*Spectroscope attached to the refractor at the Shattuck Observatory, used by Prof. Young. For details, see the illustration on next page. (Reproduction of Fig. 20 on page 74 of "The Sun" – revised edition of 1896.)*



*The Fraunhofer Lines, with wavelengths marked in nanometers.*

*(Credit: Wikimedia Commons)*

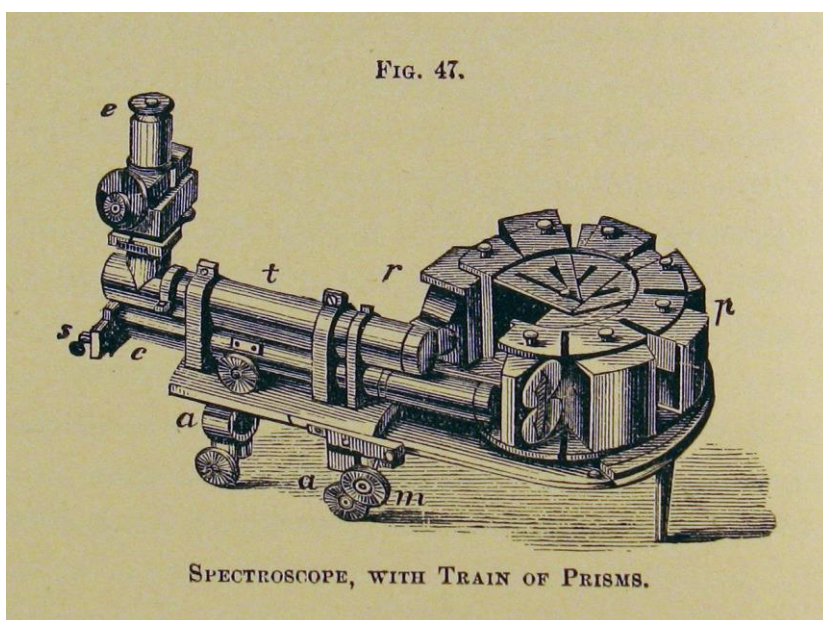
By 1853 Anders Jonas Ångström had deduced that an incandescent gas emits luminous rays of the same spectral characteristics as those it can absorb from white light, the fundamental principle of spectrum analysis. It has been said that Ångström would have ranked as one of the founders of spectroscopy but for the fact that his papers were published in Swedish, and not in German or French. He started studying the solar spectrum in 1861, and by 1868 had definitive measurements of more than 1000 dark lines.

But as history records it, the principles of spectrum analysis were spelled out in 1858 by Gustav Kirchhoff and Robert Bunsen – there is the continuous spectrum of white light, there are the bright lines characteristic of elements in the Periodic Table in gaseous form (emission lines) and there are the dark lines characteristic of the same when lime-light passes through the gaseous elements (absorption lines). These were also called *reversed* lines, since Kirchhoff considered the dark Fraunhofer lines seen in the solar spectrum to be the reversed equivalents of the bright lines of various elements he generated in his laboratory. “Reversal” as a term was used to indicate the flip from positive to negative, and vice versa. By 1860 Kirchhoff had produced the first detailed map of the solar spectrum, while his partner (of the Bunsen burner fame, if not flame) set about identifying spectroscopic lines of elements not yet known to mankind.

The story of the units and scale of wavelengths is a bit muddled at this stage. Whereas today we talk of nanometers (nm) or Ångström units (Å, with  $10 \text{ \AA} = 1 \text{ nm}$ ), Kirchhoff's scale appears to be non-linear and backwards, in the sense that the numbers increase towards the blue end of the spectrum. Young called it "purely arbitrary and not even self-consistent throughout." Not much is known about how it was arrived at, but in 1870 the K scale was still in use. It was soon superseded by the more logical Ångström scale.

### *Spectroscopic Notes*

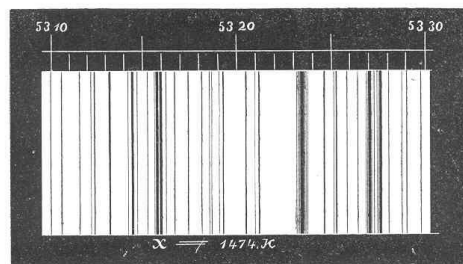
In 1869, Charles Young started publishing a series of eight monographs in the journal of the Franklin Institute (in Philadelphia, named after Benjamin Franklin). He called them *Spectroscopic Notes*. With his 5-prism spectroscope attached to a 4-inch equatorially mounted refractor at the Shattuck Observatory, he had been studying the Sun's chromosphere and prominences; the first 3 Notes were on the results of such investigations. The fourth was about the spectrum of a sunspot, where he found the Fraunhofer C and F lines (H-alpha and H-beta) reversed and many other lines widened. He also detected lines of Titanium for the first time, as well as some Calcium lines. On Sept. 22, 1870, he saw the Sodium doublet (D<sub>1</sub>-D<sub>2</sub>) reversed and noted somewhat casually: "At the same time the C and F lines were also reversed, but with the great dispersive power of my new spectroscope, I see this so often in solar spots that it has ceased to be remarkable." The reference is to the new spectroscope from Alvan Clark and Sons, designed by Prof. Young, that had a train of six prisms passing light first through the lower half and then, by means of a pair of reflections at the end of the train, doubling back through the upper half of the same set of prisms. A total of 43 surfaces were involved in the path, refracting or reflecting, between the slit in the collimator and the eye. This new spectroscope, which served him and his successors well for more than 20 years, was the subject his fifth Note, while the eighth and last Note was in praise of its craftsmanship.



*The Alvan Clark spectroscope (1870). The light passes from slit (s) via collimator (c) through the train of prisms (p) near their base, is then reflected by rectangular prism (r) to the upper 'deck' and returns to the view-telescope (t), finally reaching the eye (e). Traversing the 6 prisms twice, the dispersive power is 12 times that of a single prism. Weighing just 14 lbs., the instrument was a compact 15"x6"x5". (Reproduction of Fig. 47 on page 202 of "The Sun" – revised edition of 1896.)*

### *The 1869 Eclipse*

On August 7, 1869, a Total eclipse of the Sun was observed from Iowa under the auspices of the US Naval Observatory, by among others, Prof. Young in Burlington and Prof. William Harkness in Des Moines. Both saw a faint green bright line in the coronal spectrum. It was measured to be 1474 K on the Kirchhoff scale, or about 5316 Å. At first Young thought it to be a green line of Iron, as did Norman Lockyer (though Fr. Angelo Secchi believed it to be a Hydrogen line). It didn't improve matters when in 1876 Prof. Young was able to split the 1474 K line and while one component was indeed an identifiable Iron line, the other continued to mystify the scientific world.



*The 1474 K coronal line, co-discovered by Prof. Charles A. Young in 1869. (Reproduction of Fig. 93 on page 258 of "The Sun" – revised edition of 1896.)*

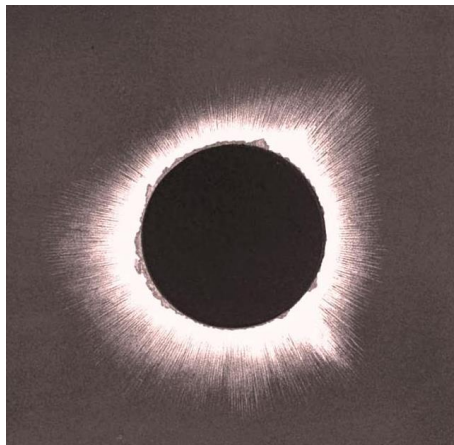


By 1893, measurements with Rowland diffraction gratings had placed the coronal green line at about 5303 Å. Since it and a few other detected lines were not found in any terrestrial spectrum, the line was believed by Young and others to indicate the presence of “Coronium” (referred to as a new element in his book: *The Sun*, but tagged in a table with a question mark!). Charles Young could have never imagined that the Coronium puzzle would outlive him by more than 3 decades. It was 1939 before Bengt Edlen proved that it was an Iron line after all: Fe XIV, a line of Iron ionized 13-fold at a temperature of more than a million degrees, in conditions not reproducible on Earth.

### *The 1870 Eclipse*

On November 1, 1870, a party of sixteen left US shores to observe the Sun during the Total eclipse set to occur across southern Europe on December 22. Six of them, headed by Professors Peters and Watson were headed for Sicily, while the rest headed by Prof. Winlock converged on Jerez, Spain. Other prominent members of this team were Professors Langley, Pickering and Young. Alvan Clark Jr. was also on board. They sailed to Liverpool on the *Abyssinia*, a 2-week voyage that was termed “a rough crossing” by Charles Young. After spending 12 days in England meeting Norman Lockyer and others, they set sail on the *Poonah* for Lisbon and Gibraltar, where on December 6, it snowed for the first time in 36 years! The last leg was a short one and a “beautiful passage” as the *London* reached Cadiz by Dec. 9; 3 days later they were in Jerez. Young’s spectroscope was assembled the next day.

If the dark lines in the solar spectrum were being caused by the passing of (white) light from the Sun’s photosphere through a gaseous envelope containing certain elements, then a spectrum of the envelope itself should show the corresponding bright lines. The opportunity to isolate this layer on the Sun arose at every Total solar eclipse, at the moment the disc of the Sun had been obscured by the disc of the Moon, with the solar atmosphere still visible just beyond the lunar limb. With the slit of the spectroscope carefully adjusted tangentially to the solar disc, it should, in theory, be possible to see the bright line equivalents of the Fraunhofer lines.



*The corona on December 22, 1870, imaged from Syracuse, Sicily. (Courtesy: US Naval Observatory, Credit: Wikimedia Commons)*



*The assembled Winlock party awaits the moment of totality above Jerez, Spain. (Photograph from the Rauner Special Collections Library, ML-49, Box 3, Folder 22)*

On December 22, they were fortunate to observe the eclipse through a break in the clouds. The lines of the solar spectrum that had remained dark as usual for the most part were suddenly and completely transformed into brilliant colored lights that flashed for a couple of seconds and then faded quickly. This “reversal” was seen both by Charles Young and his assistant Mr. Pye who was using his own spectroscope. Prof. Young summarized his discovery of the reversing layer of the Sun: “*The most interesting spectroscopic observation of the eclipse appears to me to be the ascertaining, at the base of the chromosphere, and, of course, in immediate contact with the photosphere, of a thin layer, in whose spectrum the dark lines of the ordinary solar spectrum are all reversed.*”

That the reversing layer was quite thin was deduced from the duration of the reversed spectrum, of about 2 seconds – the motion of the lunar disc would only cover a thickness of about 500 miles in that time.

During the eclipse of August 9, 1896 the flash spectrum was finally photographed using a prismatic camera by William Shackleton of the Royal College of Science, a member of the Sir George Baden-Powell expedition to Novaya Zembla, Russia. All the Fraunhofer dark lines had been reversed and were bright and Charles Young's discovery of the reversing layer had been photographically confirmed.

On August 1, 2008, the city of Jerez de la Frontera, Spain unveiled a plaque to commemorate the discovery. The citation in Spanish reads in part: *In memory of the 138th anniversary of the eclipse of the Sun on December 22, 1870 (and) of the discovery by Charles Augustus Young of the reversing layer of the solar corona. The place, the Olivier de Buena Vista, was located in this vicinity.*

This eclipse was a member of Saros 120, and over the next 164 years members of this cycle of 2-minute long Total eclipses have gone thrice around the globe. On March 20, 2015 the next event will be visible along a track crossing the North Atlantic. It will make landfall only at the Faroe Islands and Svalbard.



*The Jerez commemoration plaque.*  
(Credit: Wikimedia Commons)

### The Books

There were many other findings about the Sun by Charles Young; he studied all the planets (including Uranus and the recently discovered Neptune), he observed the Transit of Venus in 1882, and he even analyzed the spectrum of firefly light, but his books merit special mention. There were five text-books in all, one on the Sun and the rest on principles of astronomy. All were written and published during his Princeton years (1877-1905).

In 1872, Prof. Young delivered a lecture at Yale Scientific Club on "The Sun and the phenomena of its atmosphere." The notes became the basis of his contribution to the International Scientific Series of publications: "*The Sun*," which was published in 1881 and went through many editions thereafter. In 1888, he produced his definitive work: "*A Textbook of General Astronomy*." It was used in colleges and universities across the country and translated into many European languages. A simpler version of the text appeared in 1890 as "*The Elements of Astronomy*" and was followed by a version for very young pupils (with no mathematics): "*Lessons in Astronomy*." The need was felt for yet another text-book intermediate to "General" and "Elements" and so in 1902 appeared: "*Manual of Astronomy*." A later edition was revised by his niece, Anne S. Young, professor of astronomy at Mount Holyoke College.

Perhaps the ultimate compliment to his books was paid by three of his students at Princeton. When Henry Norris Russell, Raymond Smith Dugan and John Quincy Stewart wrote their own two-volume textbook in 1927, they simply called it: "*Astronomy: A Revision of Young's Manual of Astronomy*."

### The Final Years

The death in January 1901 of his wife Augusta devastated him, as did tragedies involving his elder son Ira and his son-in-law Hiram Hitchcock (who also taught at Dartmouth). In 1904, upon turning 70, Charles Young resigned his post at Princeton; the letter of resignation was addressed to Woodrow Wilson, then the President of (only) Princeton. In May 1905 Young returned to Hanover, where his widowed daughter Addie and her son Charles Young Hitchcock looked after him. Poor health did not permit him to work much after his retirement. The death of his daughter in September 1907 was another blow; after a brief attack of pneumonia, he died peacefully at home on January 3, 1908.

On that day a Total eclipse of the Sun of more than 4 minutes duration was in progress across the central Pacific, the 46<sup>th</sup> member of Saros cycle 130 that made landfall (at the very end) on the west coast of Costa Rica.



The next member of that Saros cycle will appear on March 9, 2016 to again cross the Pacific, this time from west of Indonesia to north of Hawaii.

If you do chase this particular Shadow of the Moon next year on land or at sea, remember to raise a glass and toast **Charles Augustus Young!**

### *Personal Notes*

The “*Book of the Month*” at the September 2014 NHAS Business Meeting was “*Lessons in Astronomy*,” presented by Larry LaForge. His neighbor had come across a copy in her attic, and knowing Larry’s interest in the subject, passed it on to him. I can’t thank him enough for the introduction. I soon acquired my own copy, a later revision, and then *The Sun* and *General Astronomy*. It was not just Prof. Young’s New Hampshire connection, it was his style of presentation and his care in not interpreting evidence too freely that motivated me to journey up to Hanover. The excellent biographical memoir by Edwin B. Frost helped a lot; Prof. Frost was not a student of Charles Young, but he too graduated from and later taught at Dartmouth in the 1890s. He went on to become the director of Yerkes Observatory, succeeding George Hale and also edited the *Astrophysical Journal* for 30 years (from 1902).

I would like to thank Lora Leligdon of the Kresge Library (Dartmouth College) for her help in locating the papers of Prof. Young archived at the Rauner Special Collections Library, and for answering my many procedural questions. I have spent only a day at the Rauner so far, concentrating on the 1870 notebook (Rauner Special Collections Library: ML-49, Box 1, Folder 10), and I am very much in debt of Dr. Morgan Swan and his colleagues at the Rauner for their help with the material. It was a privilege to read the log of the long journey to Spain. Thanks also to Mary White of the Lowe Library for information regarding the Young family gravesites, and to historian Frank J. Barrett Jr. for details about the Youngs and the Hitchcocks of Hanover, and for photographs from his archives. And last, and far from least, I want to thank Julia Griffin, Town Manager of Hanover, as well as William Desch and Adriane Coutermarsh of the Hanover Public Works Department for their help in locating Prof. Young’s final resting place. To me, it was as important a place to get to as the Rauner Special Collections Library at Dartmouth College.

- *Ramaswamy*



*The Shattuck Observatory, circa 1865.  
(Courtesy: Frank J. Barrett Jr., from his private collection)*



*The Shattuck Observatory today, 150 years on.  
(Photo: Ramaswamy)*



## Stellafane Exotica

Coverage of the 2014 edition of **Stellafane** in [the July 2014 Observer](#) was obliged to leave out snapshots of some exotic scopes on display. Before we get too far down the new year, it is time to re-visit some of the noteworthy exhibits. The photographs on this and the next two pages are a grab-bag of sorts, shot by **Ted Blank, Joe Dechene, Rob Mack and John Rose**. Thank you, gentlemen!



*The Joe Derek Big Dob (above) made its inaugural appearance at Stellafane in 2005, and has returned many times since to be looked at and admired. As for the other Dob (above right), possibly Roger Greenwood's, it has been said that when you buy an Obsession, your own scope modification party has just begun. Normand Fullum's exquisite Dob shown is below (center) with its maker strumming serenely away in the neighborhood (left). Joe Derek and Mark Daley inspect it intently (right).*







*One more look at the Fullum Dob (above), if only to admire the craftsmanship of the eyepiece rack and its shadow. A very odd Newtonian, all crutches and cans and a cooking bowl for the mount, and yet perfectly balanced to attract inquiring minds (right).*



*A wide-open, single-truss, stripped-tree-branch and leaf-motif design. Even the collimation could feel a breeze.*





*Not a bino-viewer, but a bino-scope (left), made out of a pair of (possibly) 8" Coultter OTAs. Apparently the view was great! Meanwhile, a bowling ball had been put to good use, with a Poncet tracking platform (right). Only one toe-saver was supplied.*



*An Alvan Clark Refractor on display in front of the Pink House. In the view of some, the modern Astro-Physics and Takahashi refractors with their high-tech glasses and newer coatings probably work better, but they will never quite be a Clark refractor.*



## ***NHAS January 2015 Business Meeting Report***

The monthly business meeting was held at St. Anselm College, Manchester NH on January 9th, with our President **John Bishop** presiding. The Treasurer's report by "**Rags**" follows on the next page.

### ***President's Report***

The First Friday skywatch at MSDC made the front page of the *Concord Monitor* on January 6, complete with a photo of [Mike Townsend showing a visitor an interesting celestial object](#).

NHAS participation in the First Night celebrations at Portsmouth on New Year's Eve was also very successful – 10 hours in 10+ F temperatures with steady lines of visitors taking in views of the Moon, Jupiter and other objects. **Gardner Gerry, Andy Jaffe, "Rags" and Nori Odoi, Curt Rude and Tom Cocchiaro** were joined by **Jim Moe** and his friend **Liz** to operate the many telescopes. [See [last month's Observer](#) for a report by Nori Odoi. –Ed.]

### ***Other Reports***

#### ***EOC: (Scott McCartney)***

Looking for a co-chair to fill the seat vacated by **Rich Schueller**. Meetings will now be held on the **3rd** Thursday of every month, at the same location.

There is only one request pending for an LTP scope, from Milton Mills. **Pete Smith** and **Steve Rand** are in process of re-shooting one of the instructional videos and generating DVDs with all six clips. 150 DVDs will be created to distribute to all libraries with LTPs, current and in the future. At Steve's suggestion, information will be handed out at future skywatches on laminated bookmarks. Members will get a look at these at the next Business Meeting.

#### ***Membership: (Curt Rude)***

Will be doing a survey to collect input and feedback concerning what works and doesn't.

### ***Astronomy Shorts***

**Gardner Gerry:** Continue to emphasize member inreach. The skywatches at Benedictine Park were successful and we should schedule more of these.

**Tom Cocchiaro:** Do Astro 101-201 presentations and get them onto video, or get access to the *Aldrich Astronomical Society* presentations.

**Curt Rude:** Give training on use of the Losmandy Titan mount at YFOS. Also arrange winter and summer get-togethers similar to the Messier Marathons.

**Scott McCartney:** Start a formal observing program for NHAS Astronomy League members.

**Larry LaForge:** Paying speakers might generate more interest.

### ***Book of the Month***

**John Bishop** presented "*Celestial Sleuth*" by Donald W. Olson, a look at the use of forensic astronomy to solve mysteries in art, history and literature.

### ***The Evening Presentation***

**Gardner Gerry** presented a slide-show of *NHAS Imaging: Past and Present*. Slides were grouped by the subject matter: Lunar, Planets and Deep Sky. 64 images were shown, with quite a few new ones, some wonderful older images that were just too good not to include, and also some examples of images improved years later by the reworking the old data with new software and techniques. [A report on a *PixInsight* workshop held for NHAS members can be found in the [August 2013 Observer](#); it includes the example of Gardner's reworked Flame Nebula image. –Ed.]



*M82 and M81, as presented by Gardner Gerry.*

*(Image: John Buonomo)*

## NHAS Treasurer's Report

(as of January 6, 2015)

<b>Starting Checking Balance:</b>	<b>\$14,009.89</b>	<b>Membership</b>	<b>86</b>
<b>Deposits:</b>		<b>Single + Family</b>	
Membership	724.40	Cash Renewals:	11x30.00+1x10.00 340.00
Donations	163.44	Cash New Members	0x30.00+0x10.00 0.00
Interest	0.38	PayPal Renewals:	6x28.83+0x 9.61 172.98
Calendar sales	49.00	PayPal New Members:	7x28.83+1x 9.61 211.42
Ted Blank (reimbursement/signs)	265.00	<b>Total:</b>	<b>24 \$724.40</b>
PayPal for Astronomy magazine	65.38	<b>Current Members:</b>	<b>110</b>
PayPal for Sky & Telescope	95.07	[13 Family memberships; 46 members paid by PayPal]	
<b>Total:</b>	<b>\$1,362.67</b>	<b>New Members:</b>	
<b>Expenses Paid:</b>		Tim Moody	Lee NH
Rackspace Cloud (Web site)	52.02	Jan Nedelka	Dover NH
Cynric Company, LLC (Plowing)	349.80	Nicolas Brodich	Wilmot NH
Kalmbach Publishing	68.00	Matt Gold	Greenland NH
(Astronomy mag. for members)		Thomas "Lee" Collier	Chester NH
Sky Publishing (S&T/members)	98.85	David Valcourt	Hampstead NH
<b>Total:</b>	<b>\$568.67</b>	Carl Thunberg	Hopkinton NH
<b>Current Checking Balance:</b>	<b>\$14,803.89</b>	<b>Donations:</b>	
<b>Petty Cash:</b>	<b>\$100.00</b>	David Weaver, Nashua NH	GEN 30.00
<b>Current Cash Balance:</b>	<b>\$14,903.89</b>	Pete and Gerry Smith, Milford NH	GEN 39.14
<b>EOC Share:</b>	<b>\$6,675.02</b>	Epping School District, Epping NH	GEN 94.30
		<b>Total:</b>	<b>\$163.44</b>

## Contact Information

### How to join NHAS

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

Send Email to: [info@nhastro.com](mailto:info@nhastro.com)

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

### How to contribute to the Observer

Email articles and snapshots to the Editor:

[ramax.astro@yahoo.com](mailto: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](#)



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

**Custodian:** Pete Smith  
**Contact:** [psastro60@gmail.com](mailto:psastro60@gmail.com)

*Equipped with:*

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

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

**How to Borrow a Loaner Scope in 3 Simple Steps**

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

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

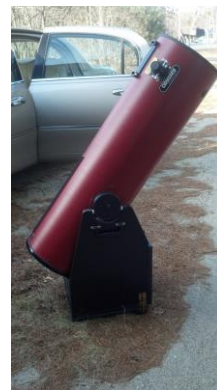


**Orion XT6 – 6" Newtonian on a Dobson mount**

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

*Equipped with:*

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



**Coulter Odyssey 10" Newtonian on a Dobson mount**

**Custodian:** "Rags" Gilmore  
**Contact:** [nhas@ragnorok.net](mailto:nhas@ragnorok.net)

*Equipped with:*

Telrad finder with a dew shield  
 26mm TeleVue Plössl and 15mm Celestron Plössl in a case  
 A Planisphere and a Moon map  
 Richard Berry's "Discover the Stars"

*Also available, independently of the telescope and in a separate slip-case:*

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



**Meade 8" Newtonian on a Dobson mount**

**Custodian:** Pete Smith  
**Contact:** [psastro60@gmail.com](mailto:psastro60@gmail.com)

*Equipped with:*

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



**Orion XT10 Newtonian on a Dobson mount**

**Custodian:** Pete Smith  
**Contact:** [psastro60@gmail.com](mailto:psastro60@gmail.com)

*Equipped with:*

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



### Regional Astronomy Clubs

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

**Amateur Astronomical Society of Rhode Island** (North Scituate, RI)  
[www.theskyscrapers.org](http://www.theskyscrapers.org)

**Amateur Telescope Makers of Boston**  
(Westford, Mass.)  
[www.atmob.org](http://www.atmob.org)

**Astronomy Society of Northern New England** (Kennebunk, Maine)  
[www.asne.org](http://www.asne.org)

**Gloucester Area Astronomy Club**  
(Gloucester, Mass.)  
[www.gaac.us](http://www.gaac.us)

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

**Northeast Kingdom Astronomy Foundation** (Peacham, VT)  
[www.nkaf.org](http://www.nkaf.org)

**North Shore Astronomy Club**  
(Groveland, Mass.)  
[www.nsaac.org](http://www.nsaac.org)

**Penobscot Valley Star Gazers**  
(Bangor, Maine)  
[www.gazers.org](http://www.gazers.org)

### Online Live Observatories

**Astronomy Live** (broadcasts)  
[www.astronomylive.com](http://www.astronomylive.com)

**SLOOH** (Tenerife, Canary Is.)  
[www.slooh.com/about.php](http://www.slooh.com/about.php)

**Worldwide Telescope**  
[www.worldwidetelescope.org](http://www.worldwidetelescope.org)

### Magazines

**Astronomy**  
[www.astronomy.com](http://www.astronomy.com)

**Sky & Telescope**  
[www.skyandtelescope.com](http://www.skyandtelescope.com)

### Astronomy Gear

**Adorama**  
[www.adorama.com](http://www.adorama.com)

**Agena AstroProducts**  
[www.agenaaastro.com](http://www.agenaaastro.com)

**Astromart**  
(Used equipment and advice)  
[www.astromart.com](http://www.astromart.com)

**Astronomy-Shoppe**  
(in Plaistow, NH 03865)  
[www.astronomy-shoppe.com](http://www.astronomy-shoppe.com)

**Celestron**  
[www.celestron.com](http://www.celestron.com)

**Cloudynights**  
(Used equipment, Articles, Forums and Reviews)  
[www.cloudynights.com](http://www.cloudynights.com)

**Explore Scientific**  
[www.explorescientific.com](http://www.explorescientific.com)

**High Point Scientific**  
[www.highpointscientific.com](http://www.highpointscientific.com)

**Kendrick Astro Instruments**  
[www.kendrickastro.com](http://www.kendrickastro.com)

**Lunt Solar Systems**  
[www.luntsolarsystems.com](http://www.luntsolarsystems.com)

**Meade Instruments**  
[www.meade.com](http://www.meade.com)

**Oceanside Photo & Telescope**  
[www.optcorp.com](http://www.optcorp.com)

**Orion Telescopes**  
[www.telescope.com](http://www.telescope.com)

**ScopeStuff**  
[www.scopestuff.com](http://www.scopestuff.com)

**TeleVue**  
[www.televue.com](http://www.televue.com)

**Vixen Optics**  
[www.vixenoptics.com](http://www.vixenoptics.com)

**William Optics**  
[www.williamoptics.com](http://www.williamoptics.com)

### Astronomy Web Sites

**CalSky**  
(Sky Calendar to plan Observing)  
[www.calsky.com](http://www.calsky.com)

**Free Star Charts**  
(Star Charts for MM, Planets etc.)  
[www.freestarcharts.com](http://www.freestarcharts.com)

**Heavens Above**  
(on Satellites, Spacecraft, Planets)  
[www.heavens-above.com](http://www.heavens-above.com)

**NASA**  
[www.nasa.gov](http://www.nasa.gov)

**Dark skies Observing Sites**  
(Horizons and Clear Sky information)  
[www.observingsites.com](http://www.observingsites.com)

**ScopeReviews**  
(Reviews by Ed Ting, NHAS)  
[www.scopereviews.com](http://www.scopereviews.com)

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

**SpaceWeather**  
(Solar activity, Asteroid passes)  
[www.spaceweather.com](http://www.spaceweather.com)

### Computer Software

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

**Celestia**  
[www.shatters.net/celestia](http://www.shatters.net/celestia)

**Computer Aided Astronomy** (Free)  
[www.astrosurf.com/c2a/english/](http://www.astrosurf.com/c2a/english/)

**Earth Sky Tonight**  
[www.earthsky.org/tonight](http://www.earthsky.org/tonight)

**SkyMap Online**  
[www.skymaponline.net](http://www.skymaponline.net)









**Starry Night**  
(many versions, Novice to Expert)  
[www.starrynight.com](http://www.starrynight.com)

**Stellarium** (Free)  
[www.stellarium.org](http://www.stellarium.org)

**WinStars** (Free)  
[www.winstars.net/english/](http://www.winstars.net/english/)

Event	Date	Time	Location
First Friday Skywatch for MSDC	Friday, February 6	7:00pm	MSDC, Concord NH
Rey Center Skywatch	Saturday, February 7	6:30pm	Waterville Valley NH
NHAS Business Meeting	Friday, February 13	7:30pm	MSDC, Concord NH
Milton Free Public Library Skywatch	Saturday, February 14	6:30pm	13 Main Street, Milton Mills NH
EOC Meeting	Thursday, February 19	6:30pm	Manchester City Library, Manchester NH
Maple Avenue Elementary Skywatch	Thursday, February 19	6:30pm	16 Maple Avenue, Goffstown, NH
Coffee House Night at YFOS	Saturday, February 21	5:00pm	YFOS
Sidewalk Astronomy Skywatch	Saturday, February 28	6:00pm	Market Square, Portsmouth NH
Maple Avenue Elementary Skywatch (backup date)	Thursday, March 5	6:30pm	16 Maple Avenue, Goffstown, NH
First Friday Skywatch for MSDC	Friday, March 6	5:00pm	MSDC, Concord NH
NHAS Business Meeting	Friday, March 13	7:30pm	St. Anselm College, Manchester NH
EOC Meeting	Thursday, March 19	6:30pm	Manchester City Library, Manchester NH
Coffee House Night at YFOS	Saturday, March 21	5:00pm	YFOS
Rey Center Skywatch	Saturday, March 21	7:30pm	Waterville Valley NH
Josiah Carpenter Library Presentation And LTP Demonstration	Tuesday, March 24	5:00pm	23 Oneida Street #1, Pittsfield, NH
Sidewalk Astronomy Skywatch	Saturday, March 28	6:00pm	Market Square, Portsmouth NH

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

Date	Time	Lunar Phase
Tuesday, February 3	6:09pm EST	 Full moon
Wednesday, February 11	10:50pm	 Last quarter
Wednesday, February 18	6:47pm	 New moon
Wednesday, February 25	12:14pm	 First quarter
Thursday, March 5	1:05pm	 Full moon
Friday, March 13	1:48pm EDT	 Last quarter
Friday, March 20	5:36am	 New moon
Friday, March 27	3:43am	 First quarter

**Credits**

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

*Frank J. Barrett Jr., Ted Blank, John Bishop, John Buonomo, Glenn Chaple, Adriane Coutermarsh, Joe Dechene, William Desch, Gardner Gerry, "Rags" Gilmore, Julia Griffin, Lora Leligdon, Rob Mack, Scott McCartney, Steve Rand, John Rose, Pete Smith, Morgan Swan, Ed Ting, Dave Weaver, Mary White and Paul Winalski.*