



# the Skyscraper

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AMATEUR ASTRONOMICAL SOCIETY OF RHODE ISLAND \* 47 PEEPTOAD ROAD \* NORTH SCITUATE, RHODE ISLAND 02857 \* WWW.THESKYSCRAPERS.ORG

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## Saturday, July 12, 7pm at Seagrave Memorial Observatory

### 7:00pm Refreshments

Please bring a dessert or snack to share. Coffee and cold beverages will be provided.

### 7:30pm Member Presentations

#### Skyscrapers' Latest Field Trip to Harvard College Observatory by Steve Siok

On June 21, several Skyscrapers travelled to Cambridge, MA during the "Summer Solstice Celebration" at the Harvard Museums. The group visited the plate stacks at HCO, learning more about the rich history of the collection and how the images are being preserved. The next stop was the Great 15" Refractor and the 9" Alvan Clark telescopes in that complex. Included was a visit to the Collection of Historical Scientific Instruments on display at the Harvard museums of science and culture.

#### A visit to Mt. Palomar Observatory and the RTMC by Bob Horton

A few years ago, my wife and I attended the Riverside Telescope Maker's Astronomy Expo at Big Bear, and later drove down to Mt. Palomar to see the 200" telescope, where we were given the opportunity to go inside the dome of the Hale telescope and examine the workings of this huge telescope up close. I plan to show images taken at the RTMC, Big Bear Solar Observatory and Mt. Palomar.

### After Dark Observing

Member observing and a demonstration of the 16" Meade streaming into the meeting hall, if the skies are clear.

## Phases of the Moon

**First Quarter Moon**  
July 5 11:59

**Full Apollo Moon**  
July 12 11:25

**Last Quarter Moon**  
July 19 02:08

**New Moon**  
July 26 22:42





# President's Message

Bob Horton

What kind of observing program do you enjoy? Is your astronomical interest casual, and you're just looking up on a clear night? Perhaps you like to track down faint, deep-sky objects with your telescope, or perhaps it's looking for and identifying interesting features on the moon? Whatever your interest may be, please consider sharing your passion for astronomy with your fellow stargazers, either during our open house nights, or at our monthly meetings after the evening program.

We were able to enjoy clear skies at our June meeting, and, after a fine talk by Steve Hubbard, members and guests stayed on to do some observing through our telescopes, which made for a very enjoyable evening.

The gibbous moon was shining brightly, and we used the Clark telescope to track down some interesting geologic features on the moon. It's fairly common to look at the moon just casually with a telescope and marvel at the view. But on that night, we hunted down some small, ancient shield volcanoes not far from the Copernicus crater (located near the terminator), allowing us to see them with ideal lighting conditions provided by the lunar sunrise in that area. A great aid to identifying lunar features were some photographs provided by

Prof. Peter Schultz, and with these photos, everyone present was able to see the little volcanoes.

The point I am making is that if you take the time to share your astronomical interest with others, we will all benefit and expand our knowledge and enjoyment of astronomy. Prof. Schultz shared his interest in observing the moon, and then, a month later, we found ourselves looking for things we most likely overlooked for years. Looking at the moon that night was a lot of fun!

So please consider spending some time with your fellow observers on a Saturday night at Seagrave, or hang around after a meeting. Use one of the society's telescopes, or even better, please bring your telescope and set it up for the rest of us to check out. And whether it's observing faint deep-sky objects, the planets, or the moon, or perhaps taking astrophotos, please consider sharing your knowledge with the rest of us. If you do, I am willing to bet you will find the experience rewarding!

Robert Horton  
Skyscrapers, Inc.



Seeing conditions were not the best, but here is an image I took of an interesting area on the moon. The Crater Hortensius appears below the center, and just above it are 5 little bumps. These are ancient shield volcanoes, and the phase of the moon was just right for seeing them this past Saturday night at Seagrave Memorial Observatory. The view through the 8" Clark refractor was very nice and I had no trouble seeing the lunar domes. This image was taken using a 12" Meade SCT owned by Skyscrapers.



The Skyscraper is published monthly by Skyscrapers, Inc. Meetings are held monthly, usually on the first or second Friday or Saturday of the month. Seagrave Memorial Observatory is open every Saturday night, weather permitting.

## Directions

Directions to Seagrave Memorial Observatory are located on the back page of this newsletter.

## Submissions

Submissions to The Skyscraper are always welcome. Please submit items for the newsletter no later than **July 18** to Jim Hendrickson, 1 Sunflower Circle, North Providence, RI 02911 or e-mail to jim@distantgalaxy.com.

## E-mail subscriptions

To receive The Skyscraper by e-mail, send e-mail with your name and address to jim@distantgalaxy.com. Note that you will no longer receive the newsletter by postal mail.

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## Friday, July 11

### Celebrate the History of the Space Age at the URI Planetarium

University of Rhode Island Planetarium  
Upper College Road  
Kingston, RI

Friday, July 11th, 2014  
6:00 and 7:00 P.M.

Contact: Francine Jackson: 401-527-5558

Forty-five years ago this month, two American astronauts set foot on the surface on the Moon, as a part of one of the most ambitious programs ever created. This became the first of several trips to our nearest solar system neighbor. What was the impetus for such a project? How much preparation was needed to accomplish such a feat? Was this the “first step” to the future of space travel?

The University of Rhode Island will honor the work of all those who contrib-

uted to the first walk on the Moon with the showing of Dawn of the Space Age, considered one of the best planetarium shows ever written. Go back to the first beeps of Sputnik, to the progression which led to July 20th, 1969, and to the hope of manned exploration beyond the surface of the Earth.

Dawn of the Space Age will follow Saving the Night, a six-minute introduction to light trespass and its potential consequences; after the main program, you will be shown the Stars over the URI Campus, a live presentation showing the relevant seasonal constellations visible at this time.

Admission is only \$5.00, to benefit the University of Rhode Island planetarium fund.

The University of Rhode Island Planetarium is located on Upper College Road, on the Kingston campus, across from the

Art Center.

The University of Rhode Island Planetarium is available for programming for schools and other organizations. For more information, please contact Francine Jackson at 401-527-5558.



## On the 45th Anniversary of Apollo 11

Francine Jackson

History can mean different things to different people. For us as kids, it was memorization from a normally very dry text. But, as time passes, and we begin to get a little older, history seems to catch up on us, and we actually find ourselves becoming a generation in which historic actions are part of our times.

Witness Tom Brokaw’s “Greatest Generation,” those magnificent heroes who fought in World War II and the Korean War. Now in their 80s and 90s, they are fast becoming a part of the history future generations will only be able to read about in their school books. Whenever we hear about the actions taken by these men and women, we can only marvel at the strength they had to undergo what they had to in order to perform their duties to the best of their abilities. In addition, there were those who stayed home, but made a significant contribution to the war effort, such as Charles Nez, who died last month at age 93; he was the last of the 29 original code talkers, who created messages based on their Navaho language.

For many of us Baby Boomers, we had two incredible events to live through: the

Vietnam War, an action many of us try to forget, but can’t, and the Apollo program, which was to be our foot in the door to the expanding voyages into space. Forty-five years this month, many of us were glued to our television sets as the first two Americans, Armstrong and Aldrin, walked on our neighbor Moon. This amazing adventure, which had begun in the early part of the ‘60s with then-President John Kennedy’s announcement that we would be there by the end of the decade, and the entire country worked toward what was believed to be an impossible goal for such a short period of time.

But it happened. Despite the fatal fire of Apollo 1 in 1967, the largest body to leave the Earth, the Saturn V, brought the three astronauts, including Michael Collins, who could only look out the window of the orbiter, to the Moon in 1969, dropping two of them off, then returning all three back safely, all in the span of a week. Five other successful flights followed, but nothing could erase the eye-popping amazement of actually being able to watch the very first footsteps created by Man in July, ‘69.

Unfortunately, with the dismantling of

the Apollo program after the last flight, #17, in 1972, the farthest we have traveled off our home since then is about 200 miles overhead, first by means of the Space Shuttle, and now with the home-away-from-home International Space Station. This had been originally meant to be a lifting-off point to future missions away from Earth, but, with, at least as of now a potential lifetime only until the early 2020s, it seems as if for the Generation X’ers there doesn’t appear to be, except for robotic missions, much future in stepping off the Earth and reaching for the Star Trek/Wars that we were hoping to be aiming for at this time.

But, in the meantime, let’s take a moment to remember the feat of Armstrong, Aldrin and Collins, plus a moment of silence for Neil Armstrong, and recall the absolute excitement in seeing real-time images of the first humans to walk on the Moon 45 years ago this month. Yes, we do have the results of robotic missions returning breathtaking pictures and information all over the electromagnetic spectrum from much of our solar system, but nothing will ever replace watching footprints being made on a body other than Earth.

# Bill Luzader (1949-2014)

Dear Members & Friends of Skyscrapers, Inc.,

It is with deep regret and profound sadness that we inform you of the passing of Bill Luzader, who died unexpectedly on June 16, 2014. At this moment our thoughts go towards his family, beloved ones and friends.

Known to many of us as "Wild Bill", he was a long time friend of Skyscrapers. Bill loved life, loved astronomy, and loved to share his fascination of the universe with all that came in contact with him. Bill always had a smile on his face, a joke to tell, and an eagerness to always help out. For many years, at our annual AstroAssembly, Bill conducted a very popular "Astro Quiz", which was a marvelous blend of astronomical knowledge and silly humor. And at last year's event, he served as our Master of Ceremonies.

He taught physics and astronomy at a number of high schools, universities, and colleges, and served as teacher consultant to Project STAR at the Harvard-Smithsonian Center for Astrophysics.

Bill was a cherished friend of Skyscrapers, and will be sorely missed.

Sincerely,  
Bob Horton,  
President  
Skyscrapers, Inc.

It seemed only right to learn that Bill had died while many of us were at the 2014 International Planetarium Society meeting, as I had met him in Chicago, at the 1980 International Planetarium Society meeting. Because he and I were both from Southern New England - not many of us were - we quickly became friends, even riding home together, as Bill somehow hadn't made definite plans to return to Brockton, Mass., and I had driven.

It was also during the 1992 Planetarium Society that we all heard, for the first time, him talk of cats and a woman in the same sentence, a conversation that soon led to the fact that he had married the "cat lady."

Bill was probably the greatest example of the class clown, always with a retort leading to groans and eye rolls. But, mention astronomy, and his demeanor immediately changed; Bill would become the consummate professional. His knowledge of the subject was legendary, and his teaching skills were beyond compare, as evidenced by his many successful years at Brockton, Taunton and Plymouth high schools, plus Stars Around New England (SANE), when he became a part of the traveling planetarium genre.

Bill also was a figure within the amateur circles of the area, especially as



a member of Skyscrapers, Inc. For many years, his trivia quiz was the highlight of AstroAssembly.

The stars have become dimmer in the New England science community, and our hearts and thoughts go out to all of Bill's friends and family. Rest in peace, Bill.

Francine Jackson

Below are some notes from the planetarium society mailing list.

Bill Luzader passed away unexpectedly at his home in Brockton, MA, on Monday, June 16, at the age of 65. He will be missed greatly by his family and friends.

Sincerely, Steve Luzader

...(D)id you hear about Bill? I can't believe he passed away. - Kristin, Massachusetts

Bill Luzader was a gentleman in every sense of the word, a man with a sharp wit, an excellent sense of humor, and a colleague who was always ready to share. - Sam, Florida

A bright light goes out in the MAPS [Middle Atlantic Planetarium Society] sky. Bill was always a spirited call to arms in the war on science ignorance. He will be greatly missed at our gatherings. - Alan, Maine

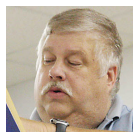
We will miss Bill and the passion and adventure he brought to our field. - Lee Ann, Virginia

I too mourn the passing of Bill. He and I enjoyed many comedic moments together. His quick wit always lifted the spirits of everyone he encountered. - Dave, Georgia

I will miss his energy and sense of humor! :-(- Kevin, New Jersey

Did you know he was a very good pianist? - Ed, Massachusetts

He was like a machine gun of creativity. He and I became great friends, and I always took great delight in greeting him with a hearty "Well, it's Lou Zader!" - Stephen, New Jersey



# Astronomical Potpourri in July

Dave Huestis

Summer months present unique challenges to stargazers. While the Milky Way and all its glory awaits exploration, one cannot begin to observe until 9:30 p.m. or later, and dawn's early light curtails viewing early in the morning. And depending upon the weather, summer haze can interfere with observing fainter objects like clusters and galaxies. Add the onslaught of pesky mosquitoes to that fairly narrow window, and some of us already start to think of the cooler days of Fall.

Despite these minor inconveniences, July does provide many interesting opportunities to enjoy the wonders of the heavens.

While Jupiter has been lost to view towards the western sky, Mars and Saturn can still be seen towards the southwest after sunset. Saturn's rings are outstanding. Since Mars' close approach of 57,406,300 miles on April 14, the Earth has been rapidly pulling away from this red planet. On July 1, Mars will appear as a small disk approximately 92,485,839 miles away us. Little detail will be visible on the rust-colored surface through small telescopes. However, some of the larger instruments at the local observatories may still reveal subtle dusky markings on its surface.

If you have trouble trying to locate these two planets in the sky, the Moon can help you to find each of them on two different nights. On July 5th a First Quarter Moon will pass below Mars. If the weather is clear, Seagrave Observatory will be open from 9:00-11:00 p.m. to offer views of this conjunction during our normal Saturday open night schedule. Saturn will also be visible that evening. Two nights later on the 7th the Moon will pass below Saturn. In both scenarios, an observer will be able to detect the Moon's eastward motion in a fairly short period of time.

For you early morning risers, Venus is the brilliant beacon in the eastern sky. By July 15, Mercury will be about six degrees to the lower left (seven o'clock position) of Venus. Mercury will be visible for several days before and after this conjunction. At that time, Venus' phase will appear like a waning gibbous Moon through a telescope, whereas Mercury will appear like a waning crescent.

While it may seem counter intuitive to

northern hemisphere residents, the Earth is at aphelion (farthest from the Sun) on July 3 at about 94,506,507 miles. It just so happens that the tilt of the Earth's polar axis has the northern hemisphere tipped toward the Sun at that time, providing more direct sunlight for us. At perihelion (Earth closest to the Sun) back on January 4, the Earth-Sun distance was 91,406,673 miles. The difference, just over three million miles (or 7 percent), has little effect on our planet. However, northern hemisphere summer is warmer than its southern hemisphere counterpart because of the fact that there is much more land mass north of the Earth's equator to absorb the solar radiation.

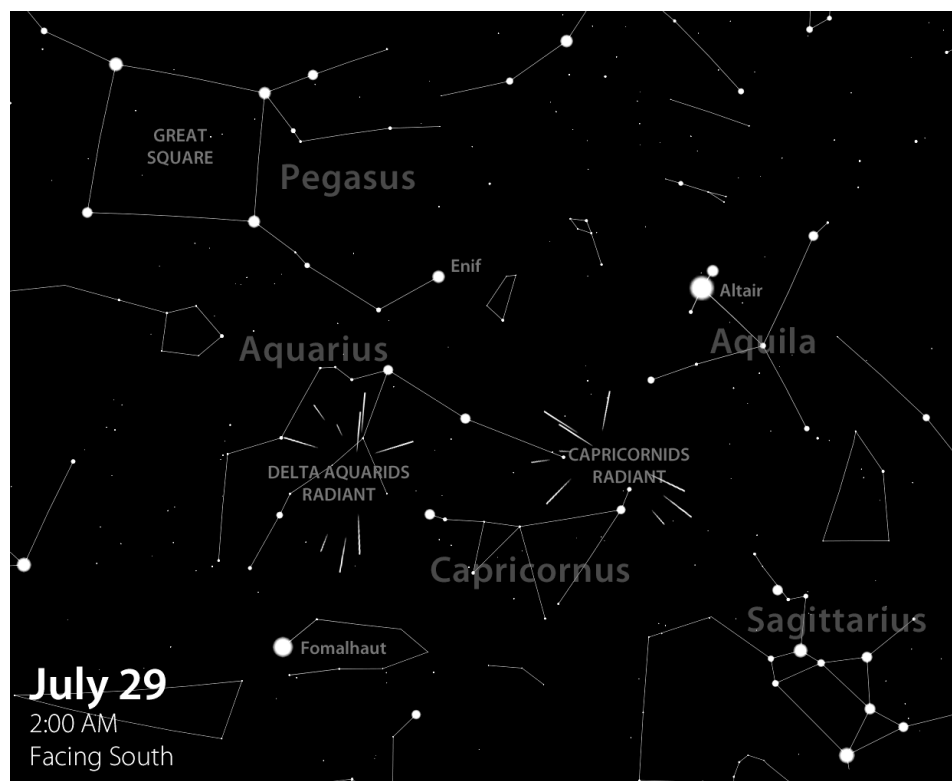
And finally, let's talk about meteor showers. Remember the hype for the new May Camelopardalids, forecast to exceed 100+ meteors per hour from 2:00-4:00 a.m. on May 24? Locally we were clouded out. But we didn't miss anything. The hype was more prolific than the display itself. The grandiose meteor display failed to materialize. The most meteors any observer saw was about 10-15 per hour during the predicted peak. Better luck next time (if there is a next time)!

For northern hemisphere meteor observers July is not very productive. Centered on

July 30 there are two meteor displays that are best seen from the southern hemisphere where the constellations that the meteors appear to radiate from are much higher in the sky. Regardless, between midnight and dawn on July 28, 29 and 30, you can glimpse members of both of these overlapping showers. Moonlight will not interfere, but the observing window is short due to dawn's early light beginning very early.

The first meteor shower, the Delta Aquarids, peak from July 28-30, with the morning of the 29th being the best time to observe. An observer well away from light-polluted skies can expect to see about 20 bright, yellow meteors per hour. Because these meteors nearly broods the Earth, their speed is a moderate 25.5 miles per second.

The second meteor shower you should observe comes a day later on the morning of July 30 with the peak of the Alpha Capricornid meteor shower. You will also see some Alpha Capricornids on the morning of the 29th as well. The Alpha Capricornids are also yellow meteors and are noted for producing brilliant fireballs. They are relatively slow cometary dust particles, hitting our atmosphere at around 15 miles per second. You can expect only 15 meteors per



hour.

Aquarius and Capricornus, the constellations from which these shooting stars appear to emanate, will be just less than halfway between the southern horizon and zenith (straight up) around 2:00 a.m. Make an effort to observe these meteor displays if it is clear. Do not wait for the Perseids on August 11-13, for a very bright Moon (Full on the 10th) will then severely hamper

observing this usually worthwhile meteor shower.

Though it doesn't get sufficiently dark to observe the heavens until after 9:15 p.m. or so during July, all of the local observatories will remain open during the summer months. Ladd Observatory (<http://www.brown.edu/Departments/Physics/Ladd/>) in Providence is open every clear Tuesday night. Seagrave Memorial Observatory in

North Scituate (<http://www.theskyscrapers.org>) is open every clear Saturday night. And if you wish to observe from the darkest skies in Rhode Island, make the journey to Charlestown and visit Frosty Drew Observatory (<http://www.frostydrew.org/>) on any clear Friday night. Please visit the respective websites for details.

As always, keep your eyes to the skies.



Abel 2218. Image credit: NASA, ESA, and Johan Richard (Caltech). Acknowledgement: Davide de Martin & James Long (ESA/Hubble).

from Fritz Zwicky in 1937. These foreground masses would lead to multiple images and distorted arcs of the same lensed background object, all of which would be magnified as well. It wasn't until 1979, however, that this process was confirmed with the observation of the Twin Quasar: QSO 0957+561. Gravitational lensing requires a serendipitous alignment of a massive foreground galaxy cluster with a background galaxy (or cluster) in the right location to be seen by an observer at our location, but the universe is kind enough to provide us with many such examples of this good fortune, including one accessible to astrophotographers with 11" scopes and larger: Abell 2218.

Located in the Constellation of Draco at position (J2000): R.A. 16h 35m 54s, Dec. +66° 13' 00" (about 2° North of the star 18 Draconis), Abell 2218 is an extremely massive cluster of about 10,000 galaxies located 2 billion light years away, but it's *also* located quite close to the zenith for northern hemisphere observers, making it a great target for deep-sky astrophotography. Multiple images and sweeping arcs abound between magnitudes 17 and 20, and include galaxies at a variety of redshifts ranging from  $z=0.7$  all the way up to  $z=2.5$ , with farther ones at even fainter magnitudes unveiled by Hubble. For those looking for an astronomical challenge this summer, take a shot at Abell 2218, a cluster responsible for perhaps the most glorious gravitational lens visible from Earth!

*Learn about current efforts to study gravitational lensing using NASA facilities: <http://www.nasa.gov/press/2014/january/nasa-fermi-makes-first-gamma-ray-study-of-a-gravitational-lens/>*

*Kids can learn about gravity at NASA's Space Place: <http://spaceplace.nasa.gov/what-is-gravity/>*



## A Glorious Gravitational Lens

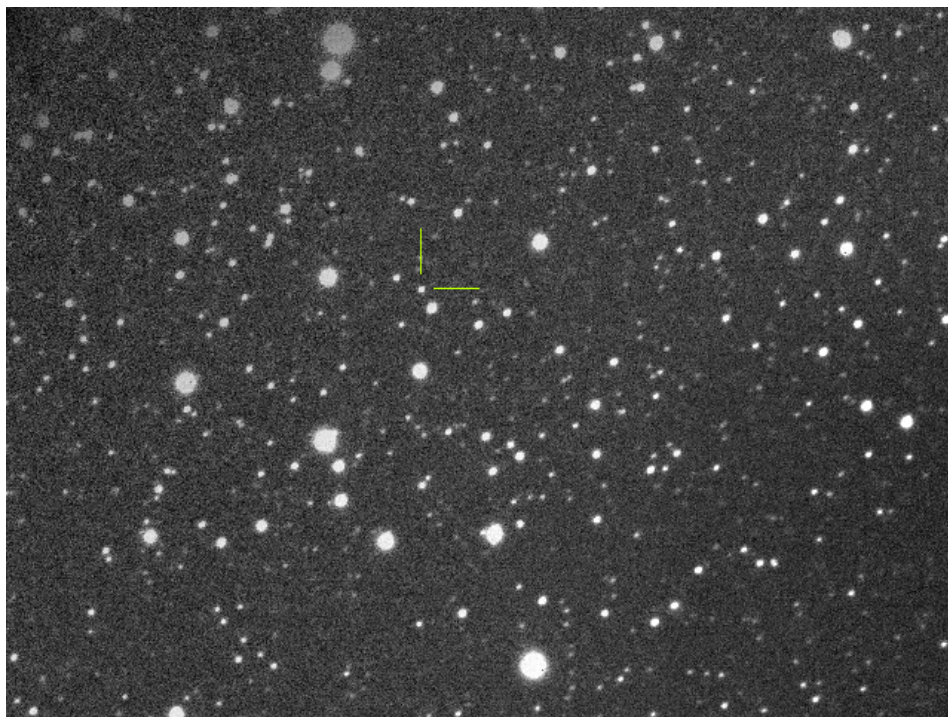
By Dr. Ethan Siegel

As we look at the universe on larger and larger scales, from stars to galaxies to groups to the largest galaxy clusters, we become able to perceive objects that are significantly farther away. But as we consider these larger classes of objects, they don't merely emit increased amounts of light, but they *also* contain increased amounts of **mass**. Under the best of circumstances, these gravitational clumps can open up a window to the distant universe well beyond what any astronomer could hope to see otherwise.

The oldest style of telescope is the re-

fractor, where light from an arbitrarily distant source is passed through a converging lens. The incoming light rays—initially spread over a large area—are brought together at a point on the opposite side of the lens, with light rays from significantly closer sources bent in characteristic ways as well. While the universe doesn't consist of large optical lenses, **mass itself** is capable of bending light in accord with Einstein's theory of General Relativity, and acts as a *gravitational lens*!

The first prediction that real-life galaxy clusters would behave as such lenses came



This image of Pluto was captured early in the morning of June 28 from Seagrave Observatory with an Imaging Source DMK 21AU618 camera on a 130mm f/6 refractor. 29 seconds exposure.



## The Quest for Pluto

Jim Hendrickson

New Horizons is only a year away from its fleeting visit with our favorite dwarf planet. Seeing it through the eyepiece of a telescope may be challenging, but capturing it on camera may be easier than you think.

It has been eight years since the (now infamous) vote by the International Astronomical Union to issue a formal definition of "planet" which subsequently "demoted" Pluto to the classification of dwarf planet. There are still many people who do not accept this outcome, either upset about the ambiguity of one or more of the points of the definition itself, or simply being nostalgic--after all we all learned the solar system's nine planets early in our grade school years.

Whichever side of the debate you sit on, the fact is that now our solar system is known to have eight planets and a multitude of other types of objects. Sure most of these objects are small, dim points of light that lack the viewing spectacle that the planets provide (even Mercury and Neptune show *some* detail in amateur telescopes), but not being able to see much detail even with the world's largest telescopes make these minor planets all the more intriguing. Not the least of which, Pluto has only slowly revealed its secrets since

its discovery by Clyde Tombaugh in 1930 as our technological eyes have gradually improved over the years. What was once a cold, dark world visible only as a tiny point on a photographic plate is now known to hold a tenuous atmosphere and a system of no less than five moons. Much of the veil of mystery surrounding Pluto will be lifted a year from now when NASA's New Horizons mission sails past the dwarf planet at a blistering eleven kilometers per second. The spacecraft's motions and instrument operations near the closest approach in July 14, 2015 are being carefully choreographed to take advantage of every last second of opportunity to observe, and with its cameras straining to observe the known six objects in the Pluto system that are illuminated by only 1/1,000th of the sunlight that reaches Earth.

To see Pluto, however, you don't have to wait until next year. Pluto is well placed in our sky right now and beckons to anyone with a telescope, a camera, and a free night to take a journey to the Kuiper Belt.

Many years ago, I observed Pluto visually through Hank Renaud's 20-inch Dobsonian from the dark skies of Frosty Drew Observatory. In the days before smartphones, computer deep-sky atlases, go-to and digital cameras, we had nothing more sophisticated than a detailed finder chart published by one of the amateur astronomy magazines. "Yup, there it is!" we said as we compared the starfield in the eyepiece to the chart, identifying the one "star" that didn't belong. I have even heard other members of Skyscrapers make note that they had seen it in the 8-inch Clark refractor, back when Pluto was closer and our skies were darker.

Although actually spotting Pluto with a telescope is challenging, a small telescope with a tracking mount and almost any camera that can be set to take a long exposure may be all that is needed to spot it with your own equipment.

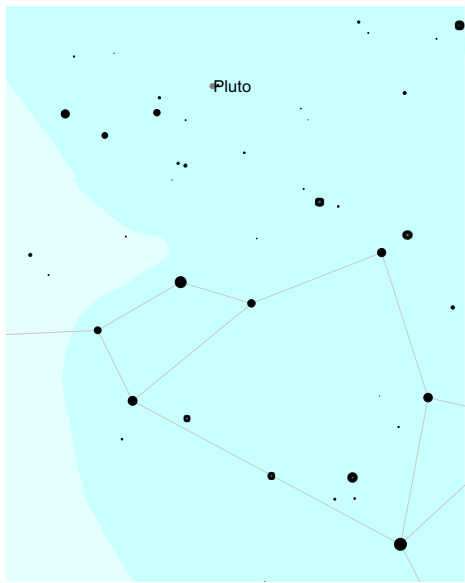
Pluto reaches opposition in our sky on July 5 when its tiny 2,350 kilometer sphere shines at a scant 14th magnitude from 31.5 astronomical units away (more than three times the distance to Saturn). Throughout July and August, Pluto will be visible all night, making this the best time to try to track down this tiny and mysterious world before New Horizons eliminates the need for us to use our imaginations to envision what it really looks like.

Pluto is currently travelling through eastern Sagittarius among some of the densest starfields of the Milky Way. Even though this would seem to make it more difficult to pick out Pluto, the presence of a large number of faint stars actually aids in locating it, presuming you have the proper charts.

Before beginning your photographic journey to the Kuiper Belt there are a couple of things you'll need to do first.

First and foremost, your telescope must be polar aligned and your setting circles or finder scope must be set accurately. If you're using a go-to scope, this can be done fairly quickly. I was using a 130mm f/6 refractor mounted on a "push-to" Losmandy mount which had to be polar aligned manually. Using just the polar finder scope I was able to get an alignment accurate enough for the exposures I was planning to take. I could have done a drift alignment to get better





accuracy, but I only had to tweak the position of the telescope twice with the electric slow motion controller during my hour-long session.

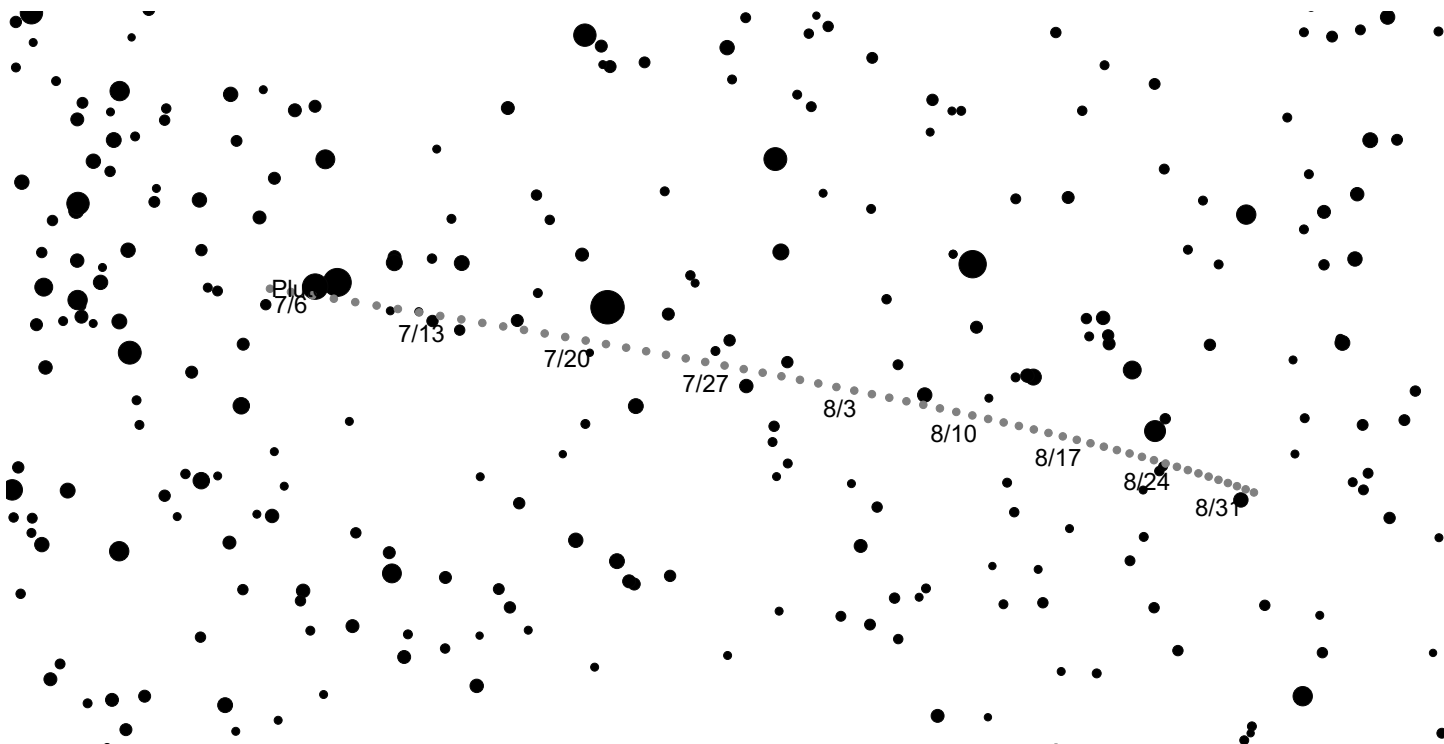
Second, point your telescope at Altair (or any bright star) and attach your camera. Focusing on a bright star will be far easier than trying to get focus on the starfield where Pluto is, where the brightest stars are only around 5th magnitude. Once you have Altair focused (a Bahtinov mask is handy for getting a good focus), lock your focuser and use your slow motion controls to center the star on the camera's sensor or viewfinder. If you have a go-to telescope, sync the drive on the star in order to refine your positioning. My finder scope has a 1.25" focuser so I was able to swap the standard

eyepiece with a 10mm crosshair eyepiece in order to refine its center position.

If you have a go-to scope, you're now good to go. Many scopes will have Pluto in their object database so you should be able to slew directly to it. If not, you can enter the coordinates which any sky app will be able to provide for you.

Using the finder charts, begin by locating the "teaspoon" asterism of Sagittarius and follow the line from 39 Sgr to 37 Sgr and continue along the same line about the same distance (about 100 arcminutes, or just over three Moon diameters). This will put Pluto within the field of view of even a small camera on long focal-length telescope. You'll probably see in your finder 5th magnitude 29 Sgr. Using this star as a hopping off point, Pluto will be 30 arcminutes just south of west (position angle 250°) at the end of July.

As a helpful tool in identifying Pluto on the images you'll be capturing, you can use the Variable Star Plotter on the AAVSO website (<http://www.aavso.org/vsp>) and print a chart for Pluto at the exact date and time of your planned observations. First, find Pluto on your favorite sky app and retrieve its right ascension and declination coordinates (2000 if available). Second, within the VSP, scroll down to Advanced Options and enter the coordinates into the appropriate fields. You don't need to worry about labeling the degrees, hours, minutes or seconds. Simply enter them as three



### VARIABLE STAR PLOTTER

**WHAT IS THIS?**

The Variable Star Plotter (VSP) is the AAVSO's online chart plotting program that dynamically plots star charts for any location on the sky, or for any named object currently in the Variable Star Index (VSI). By creating charts this way, every chart utilizes the most current data available. Through the use of unique Chart IDs generated by the Variable Star Plotter, one user can plot a chart, and another user in different part of the world can plot an identical chart by simply using the same Chart ID. The Variable Star Plotter is the tool you should use to create any chart that you would like to use.

**WHAT CAN I DO?**

By entering an object name or its coordinates on the sky, the Variable Star Plotter can produce a star chart for that object or location, and tailor it to your specific observing requirements. Many different parameters are adjustable via this interface, allowing you to get the perfect chart for the job. Customizable fields of view, print resolution, magnitude limit, and orientation can be set for any chart plotted, or these values can be autoassigned by selecting from one of the legacy chart scales familiar to many of our long-time observers. The charts produced by this tool include comparison star sequences for visual magnitude estimations.

**HOW CAN I GET HELP?**

For detailed instructions on using VSP, consult the Help Guide. We also provide a GET\_method.cgi for embedding charts in your website or custom software. If you need further assistance, you can email us at [aaavso@aavso.org](mailto:aaavso@aavso.org).

**PLOT A QUICK CHART...**

WHAT IS THE NAME, DESIGNATION, OR AUID OF THE OBJECT?  
Required if no coordinates are provided below

CHOOSE A PREDEFINED CHART SCALE  
A is Jupiter, B is Saturn, G is Uranus, I is Neptune, J is Pluto.

(Select one... ▾)

CHOOSE A CHART ORIENTATION

Visual  Reversed  CCD

DO YOU WANT A CHART OR A LIST OF FIELD PHOTOMETRY?

Chart  Photometry Table

**PLOT CHART**

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**ADVANCED OPTIONS**

DO YOU HAVE A CHART ID?  
A Chart ID will allow you to reproduce prior charts

**PLOT ON COORDINATES**  
Required if no name is provided above

18 51 32  RIGHT ASCENSION  
-20 19 57  DECLINATION

WHAT WILL THE TITLE FOR THIS CHART BE?  
Displayed at the top-center of the chart

Pluto 2014 07 12

WHAT COMMENTS SHOULD BE DISPLAYED ON THE CHART?  
Displayed beneath the chart star field

**MISCELLANEOUS OPTIONS**

30  FIELD OF VIEW \*  
15  MAGNITUDE LIMIT \*  
300  RESOLUTION \*

WHAT NORTH-SOUTH ORIENTATION WOULD YOU LIKE?

North Up  North Down

WHAT EAST-WEST ORIENTATION WOULD YOU LIKE?

East Right  East Left

WOULD YOU LIKE TO DISPLAY A DSS IMAGE ON THE CHART?  
If Yes, retrieves and displays an image from the Digitized Sky Survey

No  Yes

WHAT OTHER VARIABLE STARS SHOULD BE MARKED?

None  GCVS only  All

WOULD YOU LIKE ALL MAGNITUDE LABELS TO HAVE LINES?  
If Yes, this will force lines to be drawn from all magnitude labels to the stars

No  Yes

HOW WOULD YOU LIKE THE OUTPUT?  
If HTML, headers/footers and other meta information will be shown

HTML  Printable

WOULD YOU LIKE A BINOCULAR CHART?  
Binocular charts omit comparison star labels not useful for binocular viewing

No  Yes

WOULD YOU LIKE A STANDARD FIELD CHART?  
Standard field charts omit comparison star labels not included in the standard field

No  Yes

**RESET ALL** **PLOT CHART**

Settings in VSP for producing a Pluto finder chart.

pairs of digits. For example at midnight on July 13, Pluto is at 18h 51m 32 sand Dec -20° 19m 57s, so enter the coordinates imply as 18 51 32 and -20 19 57. Third, set the

plotting options. I used 30 (minutes) in the Field of View setting and set the magnitude limit to 15 (nearly a full magnitude fainter than Pluto). If you're going to view the chart on a screen, 72 DPI is sufficient but for printing a setting of 300 is more appropriate.

I found it useful to have a second VSP chart plotted for a wider field of view and lower magnitude limit to help match what I was seeing in the finder.

It is also helpful to know your camera's field of view. For this, I used Starizona's Pixel Resolution & Field of View Calculator ([http://starizona.com/acb/ccd/calc\\_pixel.aspx](http://starizona.com/acb/ccd/calc_pixel.aspx)).

Once you are confident that you are centered on Pluto, set your camera's ISO or gain settings to the highest and take increasingly longer exposures until you can begin to distinguish the starfield, comparing it with the VSP chart. With any luck, you will now see Pluto in your image, simply by finding the "star" that isn't on the chart. Be sure to save this image as your first confirmation and use your telescope's slow motion controls to center your target.

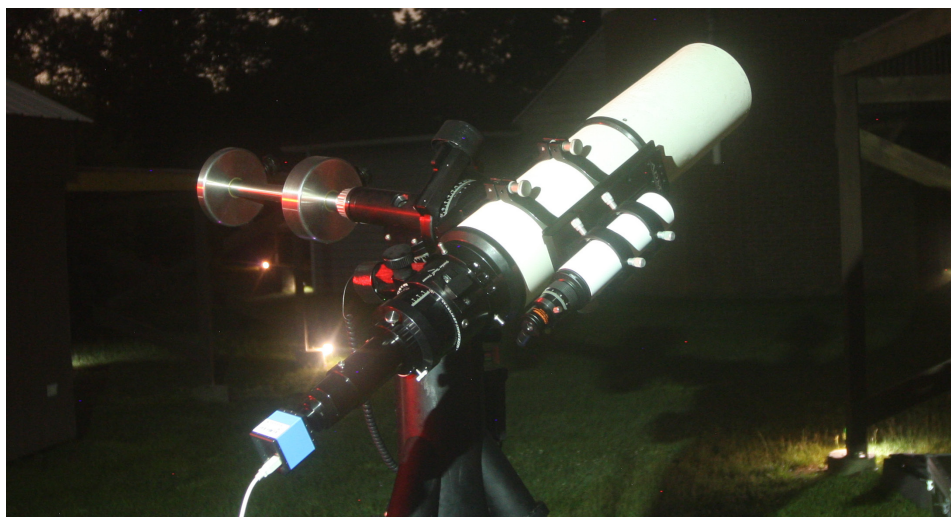
Now you can experiment with your camera settings to produce a better image. Reduce the ISO/gain to reduce the noise, and increase your exposure time. You may find

that if your polar alignment wasn't perfect then your shutter speed will have an upper limit before the stars in the image become little dashes. Play with your settings until you get the most satisfactory result.

You may want to plan for future observations by moving the center of the image to account for Pluto's anticipated movement in the sky, so that when you take a second image a few days or weeks from now, you'll be able to overlay and blink the two images to show the motion of Pluto.

Once you've gotten the best image you're going to get, cap the scope and take a dark frame. My camera's field of view was so small that I didn't think it necessary to take a flat field but you may want to use one if you're using an SLR camera, or you can crop out any vignetting during processing.

Good luck on your Pluto quest, and please submit any images you do capture for publication in a future issue of *The Skyscraper*.



The imaging setup, Imaging Source DMK 21AU618.AS camera on 130mm f/6 refractor on G11 mount. A 50mm finder with a 10mm crosshair eyepiece (25x) made finding the field easy.





## Wishing Star Observatory

Pete Peterson

All amateur astronomers wish for the convenience and versatility that only an observatory will provide. After years of planning and spousal negotiation the Wishing Star Observatory has become a reality.

Given the proximity of neighbors, a dome was the only way I'd be able to protect my night vision. And here in Rhode Island a full shelter is most welcome in mid-winter. I teach classes in Backyard Astronomy through the local community schools, so I'd originally planned on building a 10-foot dome. Various locations throughout the small back yard had been studied, chosen

and then later rejected for one reason or another. After having repeatedly consulting with the town Building Inspector, some architect friends and the spouse, we'd settled upon integrating the observatory with a raised deck running from the back of the house to an ideal location pretty much in the middle of the back yard.

In 2005, as the design solidified, but before I had drawn up the dome construction details, along came PolyDome, with their announcement that they'd be manufacturing an 8-foot polyethylene dome (the Explora-Dome) for the introductory price of

an astonishing \$395! I got my order in so fast that the Internet sizzled.

The design itself was a bit of a challenge. I needed to fit myself, a 14" Meade SCT and more than a half-dozen adults into an observatory with an 8' diameter dome. The dome's bottom shutter opening must be low enough to allow viewing at my lowest horizon (a constraint on building height). The scope pier must be low enough to allow comfortable visual observing at my lowest horizon while high enough to also allow visual observing at zenith – all while seated in an observing chair. The structure should be small enough so as to not overwhelm the house or the small yard.

The 45° corners on the eastern wall visually minimizes the 10'X10' building base structure as seen from the street (this is a corner lot). And by going with a flat roof, cutting down the dome's skirt, using low profile roller wheels and fabricating my own mounting ring Wishing Star was to have an absolute maximum of possible standing shoulder room, 51" of comfortable headroom for seated guests, and a dome slot beginning only 13" higher.

Six months after having started the design layout, I again visited the town's building inspector. Originally he wasn't sure which way to jump, as there was nothing regarding observatories in the building code. I'd been in many times clarifying boundary and construction constraints and his visage changed from "oh no, not you again" to "thank goodness this is over" when I laid the construction permit application and drawing set on his desk. A week later, in late April of 2006, we had our building permit.

Construction started immediately – with the demolition of a small rear porch. Home Depot's *Decks 1-2-3* book emphasized that precise layout was critical, so I probably had used more batterboards than a housing contractor would have used for an entire sub-division.

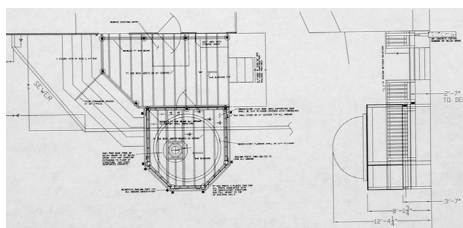
Because of the irregular shape of the deck and observatory 13 footings were required. And Code required that they be dug at least 42" deep! The rental post hole auger was a godsend, but after a day of digging the footings I'd been knocked on my can multiple times and felt like I'd been 10 rounds with a gorilla.

That entire long hot summer was devoted to digging and to pouring concrete. I lost count of how many bags of ready-mix I ran through a circa 1950 Sears mixer I borrowed from a neighbor, but the pier itself used about a skid all by itself.

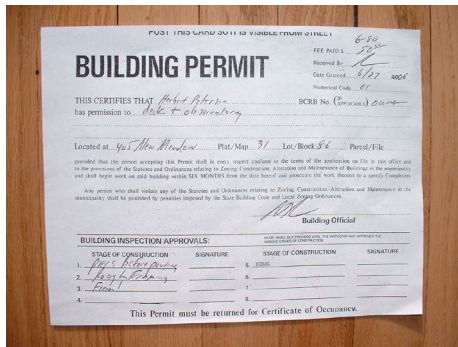
Construction of the deck and the adjoining structure itself went relatively quickly. While my old 10" table saw got a lot of use, a new high-end Milwaukee Sawzall turned out to be the tool of choice for most of the work. The one challenging area was the cutout in the 3/4" plywood forming the observatory roof and mounting ring. It quickly became obvious that cutting 8' circles with a jig saw would be a lifetime commitment. And the Sawzall cut was hard to control. Securing my old router to a 4' board produced about 3/4 of a beautiful semi-circle in a 3/4" sheet of plywood before the router smoked. The answer was a top-end high amperage professional router that made the cuts effortlessly (and that I resold to a carpenter the following week).

With the help of neighbors, the dome was placed in mid-November 2006, and 1<sup>st</sup> light occurred a month later. Since then a lot of "finish work has been done – wiring, paneling, flooring and landscaping. Except for a diagonal computer table built into one corner, a comfortable bench now runs completely around the interior.

Does it work? You betcha! The dome is dry, and so strong that you can pound on it with a baseball bat. When the hinged lower shutter section is closed one's eyes can achieve full dark adaptation regardless on neighborhood lighting. I've comfortably seated as many as nine guests the day/night of the neighborhood open house, viewing Venus by daylight and Jupiter in the dark. They simply play musical chairs and shift one space counterclockwise after each individual views. Setup time from opening the door to observing or imaging is only 3 minutes. What's not to like?



Planning:



The Building Inspector scratched his head over this one, but the permit was eventually issued.



The first truckload of Explora-Domes pulled up, oh happy day!



Rear porch demolished.



Carrie tried it out for size....



Rear landing demolished.



I'd been cautioned that the foundation layout is critical. So I laid out batter boards galore.



I lasted about 1/2 hour before my son took over for the rest of the day.



Because of the irregular shape of the deck and observatory 13 footings were required. And Code required that they be dug at least 42" deep! The rental post hole auger was a godsend, but after a day of digging the footings I'd been knocked on my can multiple times and felt like I'd been 10 rounds with a gorilla.



This is a circa 1950 Sears mixer I borrowed from a neighbor - for more than a month of pouring. I lost count of the number of bags of ready-mix used.



Now it's time to work on the pier

foundation. It's 6' deep.



The 18" culvert pipe goes into the hole. The welded up reinforcing bar goes into the culvert pipe. The steel pier will go on top of the concrete base.



Many many bags of ready-mix later.....



The whole summer was devoted to digging and pouring. Now the structure goes up relatively quickly. Below is status

on the AM of 10/03/06:



Things were slow in the office on 10/04 so I took the afternoon off to do a bit more work. The deck leading out to the observatory already has a half-dozen joists in place. And the beams around the observatory structure are now in place and ready for floor joists as well.



And here's where we're at after the Columbus day weekend. "Framing is complete except for some blocking still to be done on the main deck.



Tomorrow the Building Inspector will be here, and then comes stairs to the deck, the decking, and the observatory floor & structure frame. I passed the inspection

and things are moving quickly now.

10-25-06

work schedule.



19 Oct 06 The decking is down and most of the floor is down. The 400-pound top pier section is installed and aligned, and Dave helped me mount the 14" this evening so that I could confirm correct observatory wall height while still being able to view at my lowest horizon. Once the floor is finished the walls are next.



By evening of 10/27 the walls are complete, the 2X8 roof support beams are in place, and the first 2 sections of 3/4" plywood roof are in place. (The center beam was there just to swing the cutout radius. Rain's forecast so the timber was placed on the beam to provide runoff for the tarp that will be used to cover the structure. Halloween, and now the double 3/4" plywood roof's on.



The weekend of 18-19 Nov was dry. Thank goodness. There's a new coat of gray rubber on the roof, topped by a coat of white rubber. It needs another coat or two, but the forecast is workable for the earlier part of the coming week. As you can see tar paper has been added, drip edges have been installed, and I've made a start at the vinyl siding. I hope to be ready for the dome by the 22nd.



22 Oct 06 - That's the walls sitting on the deck.



Here's an interior view thru the door.



The observatory was "domed" the night of Nov 27th. Before the first snow. There's still a huge amount of work to do, including fabricating a door, adding stairs and railings to both sides of the deck and latticework around the bottom of the whole structure. The lattice work must be removable as I'm planning on using the underside for storage.



Walls are half done on afternoon of



Here's the structure on 11-11-06 with the dome ring fabricated & mounted, the dome rollers installed, and the first coat of rubber roof painted on. Unfortunately the roof didn't cure before the rain came, and most of the water soluble roof coating washed off. We had a cold and rainy week where little work could be done, since the roof is the "critical path" element in the

This structure really looks strange and it's becoming quickly apparent it needs the aesthetic touches that my architect fiend recommended early on. This will include running a false railing around the structure to provide horizontal lines to make it appear less vertical. Right now it's like a tower!

And bushes around the bottom will probably help too - although its too late to

plant this year.



Here's the status as of Dec 12th. Front stairs finished. Front railing finished. Skirt partially complete. It's starting to look real.



But it looks better with a door (taken 24 Dec 06)



January 9, 2007. The structure is finally complete - except for plantings which will have to wait until spring. The 14" is already

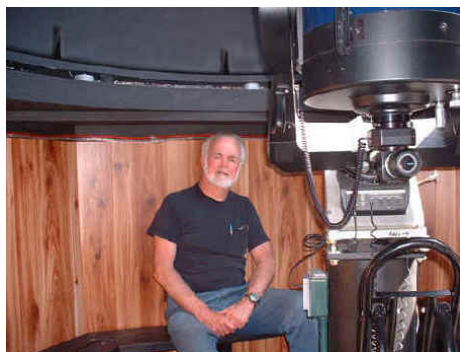
mounted and the pier polar aligned.



And finally railings are installed on the stairways to provide full compliance with local codes. The observatory was blessed by the Building Inspector on 19 Jan 07.



May '07 - Foundation plantings make a big difference. The observatory looks very much like it belongs in the neighborhood now. Close-up of plaque.



July 1, 2007 - The interior is complete.

And on the four hundred and twenty seventh day, he rested.

### 2013 Dome Replacement

My flat roof had been sealed with white rubber paint, and over the years a few cracks allowed water to damage parts of the structure. Since roof repair was going to require some serious effort anyway an upgrade opportunity presented itself. This was the condition of Kenny Conca's old

Technical Innovations 10' dome before Dave and I purchased/disassembled it in August 2013. This was the alternative dome that, when new, was out of my budget range back when Wishing Star was being built!



Note how the epoxy seams had turned black and rock-hard and ugly. After disassembly and trucking it back to Barrington, the first step was a much needed power wash.



In an effort to reduce the neighborhood "footprint" and maintain my horizon over the dome shutter sill, it was necessary to reduce the 14" height of the base, shown here in its original installation.

New roof going on, as of Friday, 9/20/13



Rich S came by to lend a hand, and this was our initial attempt at cutting down the base. Turns out that fiberglass can really eat up steel saw blades.

Take two. This time with an abrasive blade on the table saw. Cut thru the glass smooth as butter.



Off with the old 8" Exploradome that has served me so well for the past 7 years. The original base ring is still sound 😊

After about 60 hours of chipping the ugly off and retouching chisel damage with new gel coat, Dave's compounding the gel coat to restore the finish.



Work in progress. Wall sections replaced and old roof removed. New roof going on.

Tuesday, Oct 8th - a final layer of gel-coat applied to the roof.



It's been 2 months now since acquisition of Kenny's old dome and the work has been very time consuming. The failure of the first roof was at the joint between the plywood and the drip edge. Nothing wrong with the concept, so new drip edges were cut.



Fairing the roof after 2 layers of fiberglass. The glass runs from the roof down the drip edges so those seams won't open up this time.



This brings us up to today, Sunday October 6, 2013. Here's my friend Bill's wife loading the Exploradome to its new home. (She's a professional engineer, and it's the dump truck belongs to her company.)



Old owner, new owners.

September weather was exceptional with every day a working day. Many many hours of work, as anticipated. But the new roof's about ready for installation of the dome base.



Wednesday, Oct 9th - the roof's completed and the base ring's being assembled, glued & lag bolted in place.

Before disassembly it was noted that the roller system wheels were a bit low and the dome scraped on the centering rollers making it difficult to turn. And some centering rollers were jammed. The centering rollers have been modified to remain free and the main support rollers have been replaced with slightly larger conveyor roller wheels that I've modified



to fit. It was a late night modifying rollers but I think the dome will rotate dependably.



Thursday, Oct 10th - The dome support ring's been assembled over the base ring. Lookin' good.

Now Dave & I focus on compounding and waxing the last unfinished parts.

Frid



ay, Oct 11 - Dave's been working for weeks refinishing the dome. Now it's time to assemble the dome quadrants.



It's going quickly now. Rich came by to lend a hand and the first dome section's mounted.



The two hemispheres are now up and positioned with spacing timbers to establish precise shutter spacing.

George arrived with his camera, and he's taken over the photo documentation. Everything's up with all parts flying in formation. Very good news - the dome rotates with virtually no effort at all! Much easier than the smaller previous dome, probably due to the fancy double bearing support rollers.



November 2013 While there's a whole heck of a lot more interior elbow room the overall visual impact on the neighborhood isn't noticeable. The scope and computer reinstalled and checked out. Back in full operating mode at long last 😊



New & improved Wishing Star. The replacement dome works flawlessly.



# My New "Rubbermaid" Observatory

Steve Hubbard

I've been an amateur astronomer for a bit over 40 years. I first got the bug in my late teens when I joined an Astronomy club in my high school and shortly thereafter found Seagrave Observatory and The Skyscrapers.

When I wanted to go observing and use one of my telescopes, I always faced the ordeal of the packing, assembly, disassembly and re packing that I'm sure many of us are familiar with. The views and fun I had were certainly worth it, but the thought of the ordeal to make it happen sometimes prevented me from going out as much as I should have.

In the 1990's I built a simple 12 foot by 12 foot roll off roof building in my backyard to house a 16" reflector. This was based very much on the same design as the buildings we use at Seagrave and I have had a couple of decades of great experiences because of it. Whenever I felt like observing, I could go out and get everything going within just a few minutes. I could observe for 5 minutes or 5 hours without worry about packing everything up at the end when I was tired. The ease of use meant that I was doing more astronomy than ever even with rather badly light polluted skies.

There were some deficiencies with the building that I lived with however. One of them was that since money was tight when I erected it, my observatory had walls made out of 4 foot half sections of plywood sheets. This made the space between the floor and roof trusses short and to get in to get the roof ready to roll back meant that I had to bend over uncomfortably. The other problem came about as a result of a shift in my observing habits. Over time, my skies began to deteriorate and get more light polluted. Objects that had been fairly bright and easy to see in the past in my 16" scope got fainter and less interesting. I began to get frustrated and started to go out less and less.

Thankfully technology came to the rescue in terms of modified video cameras. I started using a 10 inch Meade SCT and a MallinCam and found a whole new interest because the MallinCam showed me incredible real time views that magically seemed to cut right thru the light pollution. Unfortunately for my 16 inch, this and the fact that it was getting just too heavy and dif-

ficult to lug around meant that I sold it. I gradually moved to a bigger 12 inch Meade SCT inside my building which just barely fit inside.

Late last year, I had the chance to get a used 14 inch Meade in great condition. I jumped at the chance and somehow managed to squeeze it in to my roll off, but at this point the roof was just too low and it was time to think about an alternative.

I wanted something that had a higher roof so that I didn't have to bend over in-

side and that would work better with the 14 inch. I considered taking the roof off of what I had and somehow raising it and the rails that the roof would roll off on. I considered a pre fab type of building like a small dome that you can buy, a pre fab roll off building or maybe a modified shed.

After a lot of thought and research, I began to settle on some sort of modified garden shed. There are actually quite a few out there and a great place that I go to for advice and ideas is the forum section of





“Cloudy Nights.” I was able to track down some threads on the Observatory section from people who had posted there about what they had done to use a garden shed and modify it for an observatory. What I especially liked was that for a set price, you could get an easy to build kit that came pretty much complete and almost ready to go.

What I didn't like so much was the idea of having to modify the shed to remove the roof. I saw some options where a shed was put up on a frame, mounted to a set of wheels and the building itself could be moved out of the way. That seemed like a possibility, but I was concerned about structural issues due to have to have one side modified to get around the telescope pier. I also wasn't enthused about having to deal with building a frame to put the roof panels on and setting that on rollers either.

Somehow in the course of my searching for ideas I happened on this web site:

<http://www.jemartool.com/astro/observatory/observatory.htm>

Here was my answer!! The guy who built this found the answer to using a prefab type garden shed and avoiding anything to do with moving either the roof of the build-

ing. I was able to get in touch with him and learned that he used a prefab shed made by the Rubbermaid corporation. I learned that his Rubbermaid observatory has been in use thru harsh Michigan weather for over 10 years. It is still going strong, doesn't leak and holds up through hot or cold Michigan weather with so far, no deterioration.

The key to this building is the fact that the roof panels are made out of strong, yet lightweight plastic and have ridges that allow them to be popped in and out of a central metal roof ridge rail. No big modifications needed, no extensive assembly needed either.

As soon as this all clarified in my head, I went on line and ordered a Rubbermaid 7.5 foot by 10 foot “Big Max” shed from Walmart. Within a week 2 large boxes weighing close to 500 pounds total had been dropped onto my yard. During the time that I was waiting for the delivery of my new shed (observatory), I started in on the task of taking apart the old building down to the 12 foot by 12 foot floor. This was accomplished over the course of part of about 3 days of hard physical labor. The teardown revealed a number of rotted areas, carpenter ant colonies and other prob-

lems. Repairs or demolishing of the old building was overdue and came just in the nick of time before it all fell down around my head some night!

Once this was done, it was time to open the boxes from Rubbermaid. Despite the overall weight, the individual pieces were not heavy and the whole thing was easy to move and set up in stages. To put the new Rubbermaid building up involved putting floor panels that came with it in place and cutting a section out around the telescope pier. To secure the panels, I used heavy duty, 4 inch long screws that interlocked the floor sections and drove them into the wooden leftover floor underneath. The wall panels snap into place in grooves on the floor and lock into each other with grooves and raised sections along the edges. There were only a few screws needed to place the eaves on either end of the building. Most of this just snaps together. To place the roof panels into the central rails involved bending up and opening the channel that the roof panels snap into with a pair of plyers all along the length on each side just a bit. I also modified the tops of the wall panels where there were ridges meant to snap into grooves under the roof panels to





hold them into place. I cut the ridges down so that the roof panels would fit in snugly, but not lock into place such that they couldn't be removed. While I have been very impressed with the strength and rigidity of the building once it was all together, since I didn't fully lock the roof panels in place the way they were meant to, I added some additional reinforcement with corner braces on each wall and along the junctions of the walls and floor. As a last step, I used Thompson's water seal on the deck under the building which extends past the walls and works great as an extra surface to walk around on.

I added some garage door handles and rings to the walls and roof panels to make handling easier and to allow for securing the roof panels in place when they were on. I use heavy duty bungee cords in various places between the rings on the walls and roof and there are metal "U" bolts that slide

into place in the corners that came with the building that hold everything in place. To deal with heat buildup, there are 2 gable vents at either end of the shed and I put a fan in one end to help blow out some of the heat at the very top.

So... how does this all work so far? I would have to say that I am EXTREMELY pleased with my new "Rubbermaid Observatory." It takes me just about 5 minutes to open everything up to start observing, there are no leaks and so far no issues with wind causing problems with the roof panels. The roof panels are light enough to handle easily. There is plenty of room and the building itself fits in better with the backyard being less conspicuous that what was there before. I am also quite pleased with the fact that I could do away with the rails, wheels and other issues with a roll off and that the new building takes up much less yard space.

The only issue I have now is the fact that

while the central ridge roof rail is technically removable, it is very long and unwieldy. I have ended up painting the bottom flat black and leaving it in place. This may surprise some of you, but I have found that with a width of just 2 inches, when the telescope is pointing in an area where the rail interferes, there is no noticeable issue with either a visual view or imaging of any objects that the rail bisects. I was pleasantly surprised by this and just leave the rail in place anytime I observe. Besides, most of what I see is no where near where the rail is anyway, so in the overall scheme of things having the rail stay in place is really no big deal. This really has turned out to be one of the best improvements to my observing situation that I have made in a long time. I am hoping that the building holds up over the next few years of harsh New England weather, so far the signs are good!



2014-06-28 00:24:17  
MallinCam XTreme - Color CCD  
Exposure: 46 sec., AGC: Manual 6  
M27

2014-06-27 23:45:59  
MallinCam XTreme - Color CCD  
Exposure: 14 sec., AGC: Manual 6  
M13

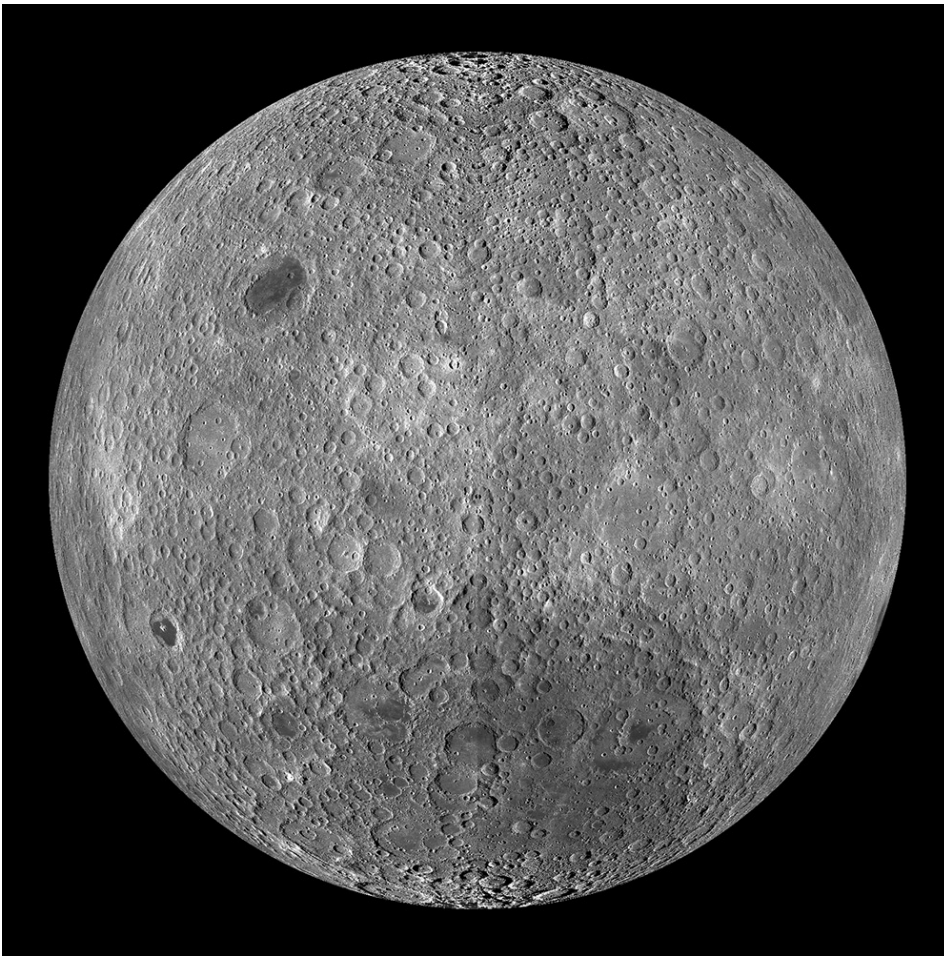


Here's my latest attempt at Saturn from June 22. 60 sec avi with a ZWO color imager with my 14" Meade SCT and using a 1.5X Uranoport barlow. Processed with ASI2 and GIMP. Steve Hubbard

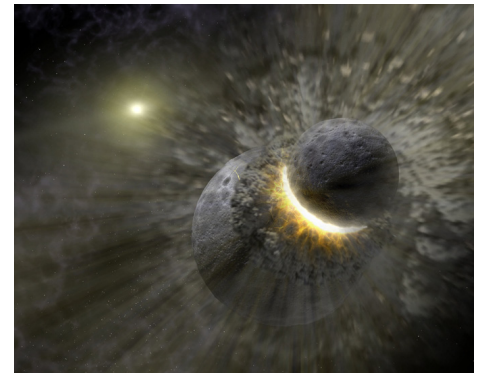
Here is my latest image from Friday night, June 27. The seeing was fair, I was able to get a bit more processing out of this one and I think I've got the color adjusted a bit better. Steve Hubbard



International Space Station over Seagrave Observatory on June 20. Image by Jim Hendrickson.

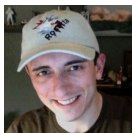


ly revisited the 2003-2009 HUDF survey and included more recent observations in ultraviolet wavelengths, creating what is now called “the most colorful view of the universe” which shows not only galaxies but also the active star formation within them. [Read more here.](#)



### Oxygen Supports Our Moon’s Violet Origin

Let’s get back to the moon for a moment, because who doesn’t love the moon? (Except when it’s getting in the way of some star gazing, of course!) Currently the most-accepted hypothesis of the moon’s origin is a collision between the early Earth and a Mars-sized protoplanet -- nicknamed Theia -- over four and a half billion years ago. While such an event obviously can’t be “proven” (not that science is in the business of proving things) the current state of the Earth and moon system support this Giant Impact Hypothesis, even down to oxygen isotopes recently measured in lunar samples returned by Apollo astronauts. It seems our moon may be a bit of a mongrel, made up of about half Earth and half Theia. [Read more here.](#)



## What's Up in Space News?

Jason Major

Happy Summer! If you’re like me you’re looking forward to some warm weather and weekends filled with outdoor activities and backyard get-togethers with family and friends. But while we’re cooking on our grills and inflating the pool toys\* there are plenty of hardworking robots and satellites scattered across the Solar System who aren’t taking any time off in their exploration duties. Here are some of the most recent discoveries they – and their busy teams of scientists and engineers – have made about our family of planets and the amazing Universe we live in: *\*If you personally have a pool, feel free to invite me over.*

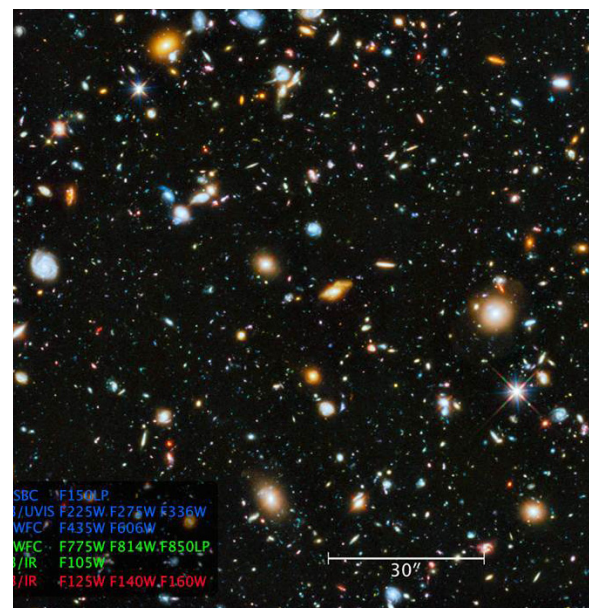
### Earth’s Heat Warmed the Man in the Moon

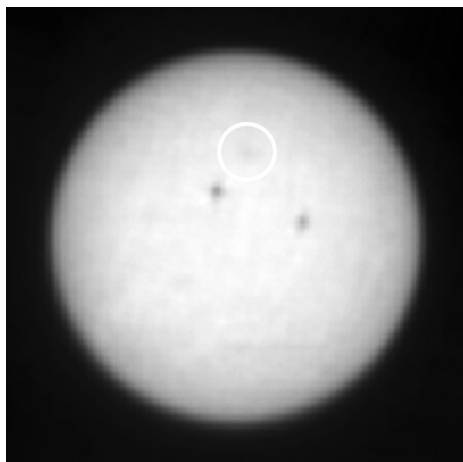
Ever wonder why there just so happens to be a “man in the moon” (or a rabbit, if you’re lagomorphically inclined) on side of the moon that faces us but not on the other? It’s true, the lunar farside is covered with rugged highlands and craters but no-

ticeably lacking in the giant dark, solidified lava flows that make up the nearside “seas.” As it turns out, it was the heat from Earth left over from the catastrophic collision that formed the moon that helped to keep the near side crust thin, allowing meteorite impacts to more easily release subsurface magma. [Read more about the solution to this 50-year-old mystery here.](#)

### Hubble Creates the Most “Colorful” View of the Cosmos

If you’ve ever seen the famous Hubble Ultra Deep Field [image](#), you know how insanely amazing it is. In just a tiny sliver of sky it reveals nearly ten thousand individual galaxies, some as they appeared less than a billion years after the birth of the universe. Astronomers have recent-



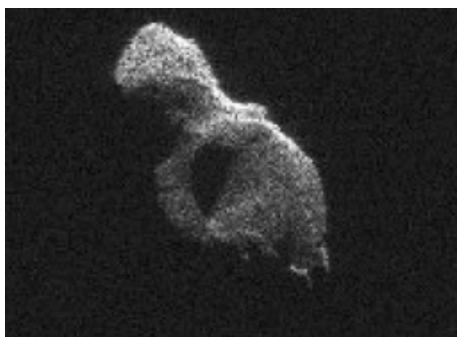


### Curiosity Spotted Mercury From Mars

If you've ever seen Mercury in the early evening or morning sky you know what a challenge it can be, a tiny point of light competing with the glare from the sun – when it's visible at all. But on June 3 NASA's Curiosity rover managed to catch a glimpse of the innermost planet from Mars, and while it was passing across the face of the sun, too! It was the rover's first time imaging Mercury, and also the first observation of a solar transit from another planet. [Watch an animation of the event and read more here.](#)

### Telescopes Team Up to Image an Asteroid "Beast"

Asteroids pass by our planet nearly every day. Most are less than a few dozen feet across and keep a fair distance, but on June



8 a good-sized one came relatively close: 2014 HQ124 passed just about three lunar distances, and is about the length of a Nimitz-class aircraft carrier. While it was never thought that there would be any danger of an impact, astronomers used the opportunity to obtain some of the best images ever of a near-Earth asteroid by combining the power of two giant radar telescopes located three thousand miles apart. And while HQ124 was being called "the Beast" before its approach, after the images were obtained its true beauty was revealed. [Read more here.](#)

### New Horizons Wakes Up for the Summer

It may be time for summer vacation for lots of schoolkids here on Earth, but for New Horizons it's time to get back to work! The Pluto-bound spacecraft awoke from a five-month-long nap on Father's Day, June 15, and after a full systems and instrument check will begin to do some science obser-

ventions as it nears the home stretch of its July 2015 pass by Pluto... some of which will result in an actual rotation animation of the dwarf planet and its moon, Charon! Also, on August 25, New Horizons will pass the orbit of Neptune (although not near the planet itself) which just happens to be the 25th anniversary of Voyager 2's close approach back in 1989. After that, it's into "Pluto space!" [Read more here.](#)

It really has been a busy month in space exploration and those were only just a few of the recent news stories! There were lots more, including:

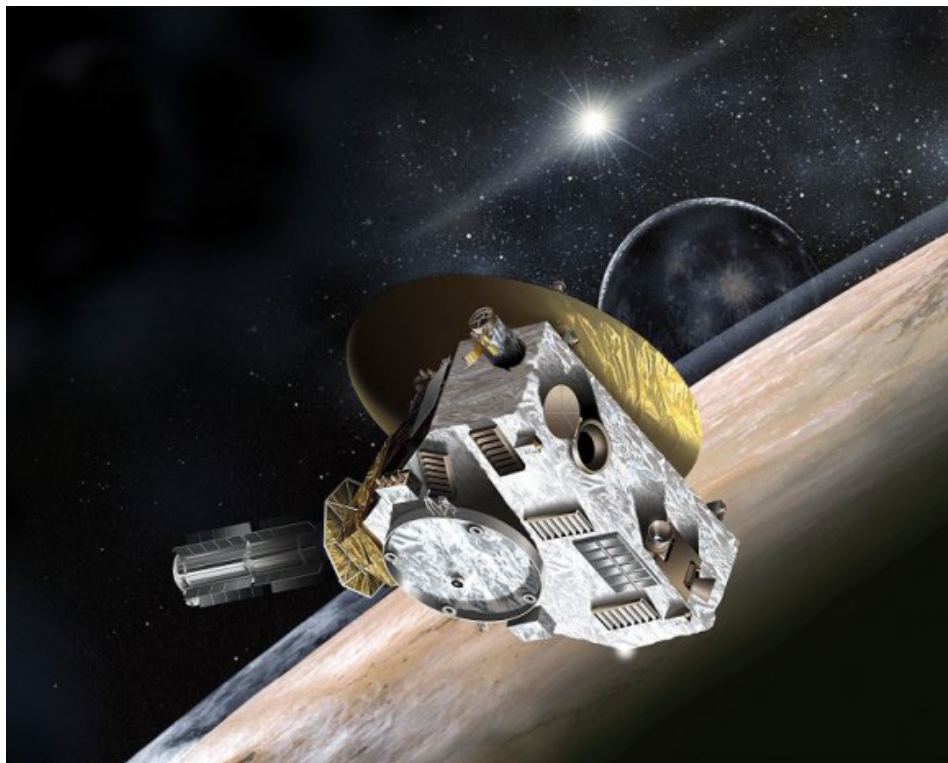
...Jupiter's Great Red Spot [has become not-so-great](#), two [new exoplanets](#) were discovered "only" 13 light-years away, the sun blasted off [three x-class flares](#) in 24-hours, the Space Station [beamed down a video](#) via laser beam, any lunar water collection will likely have to [wait until nighttime](#), Hubble is [put to task](#) to find New Horizons' next target, Italy is [sending espresso to the ISS](#) (what else?), huge amounts of water are [hiding inside Earth's mantle](#), the ALMA observatory [cut through cosmic dust](#) to find "dark" gamma-ray bursts, and NASA's [Cassini spacecraft](#) is celebrating ten years in orbit around Saturn! (Where does the time go?)

And, just for fun, the next time someone tells you the Apollo landings were faked [you can send them this](#). (Not that there's any hope for such people, but it's good to be prepared just in case.)

Do you have any questions about these stories or want to know where you can learn more? Feel free to contact me at [jpmajor@me.com](mailto:jpmajor@me.com), and follow me on Twitter [@JPMajor](#) and on Facebook as [Light-In-The-Dark](#). Ad astra!

*Jason is a freelance graphic designer and a space news blogger currently living in Warwick, RI. He writes for Universe Today, Discovery News, and on his blog [Light-In-The-Dark.com](#). He has also been featured on National Geographic News, Space.com, io9.com, PhysOrg, NBC News Cosmic Log, and has attended several launch events at NASA's Kennedy Space Center.*

*Images and links from this article are available at <http://www.theskyscrapers.org/july-2014-space-news>*



## JUNE REPORTS



## Secretary

Tina Huestis

### Skyscrapers June Meeting Minutes – 6/7/2014

President Bob Horton called the Skyscrapers' June meeting to order at 7:11PM, following the summer potluck picnic.

**President, Bob Horton:** Bob welcomed all those present and gave first-time visitors a brief history of the organization. • He mentioned that the observatories would be open following the business meeting and speaker and that both the Moon and Saturn would be visible. Of particular note, Bob explained that the terminator would come near the crater Copernicus, which would create favorable lighting conditions to see the shield volcanoes on the Moon.

**Treasurer, Linda Bergemann:** Linda noted that Russell Chaplis was in attendance at last month's meeting. Voted into membership at the June 7 meeting were: Tom Rinaldi (of Riverside, RI) and Russell Chaplis (of Rutland, MA). • Al Caldarone (of Chepachet, RI) and Joseph Filocco (of Greenville, RI) will be introduced at the July meeting. • Not present for vote were Mark Sweberg (of Warwick), Taylor Iascone (of Johnston) and William Kraimer (of Niantic, Connecticut).

**Trustee, Tom Thibault:** Tom briefly recounted the substantive work that was completed to the meeting hall thus far: cleanup and removal of the soiled/old ceiling insulation, closing up of roof/eave access (to squirrels/rodents), and interior painting. The total funds spent on necessary routine maintenance items was \$1,700. Tom also reported that on April 26, he, and fellow Trustees Conrad Cardano, and Jim Crawford walked the observatory grounds and inspected the buildings to identify further maintenance and safety issues, some of which will be relatively easy repairs whereas some others would require time and resources. In addition, the trustees are contemplating an interior redesign of the meeting hall (e.g., north wall shelving unit, repurposing of library cabinetry). The Trustees will present a motion at the July meeting with details on plans for addressing high priority safety issues, additional maintenance items, and renovations. The



Steve Hubbard

motion will be for \$3,500, which includes the \$1,700 already spent on work to the meeting hall.

**2<sup>nd</sup> Vice President, Steve Siok:** Steve reminded the membership that he is coordinating a free outing on June 21 to visit the Harvard Smithsonian Center for Astrophysics (CFA) at 60 Garden Street in Cambridge. • Skyscrapers members and guests are invited. • Planned tours will be of: the CFA, the 15-inch Great Refractor, the 9-inch Clark, the historical plate stack collection, and the DASCH (Digital Access to a Sky Century at Harvard) scanner. • Travel up to Cambridge is on your own. The group will meet at the CFA. Dinner will be at a Chinese restaurant in Harvard Square. • Later that night the Museum of Antique Instruments is holding a free Summer Solstice celebration and the Amateur Telescope Makers of Boston (ATMs) will be set up for observing (weather permitting). • Send an email to Steve Siok if interested in going.

**1<sup>st</sup> Vice President, Kathy Siok:** Kathy reported that Astro-Assembly is scheduled for the last weekend of September (the 26<sup>th</sup> – 27<sup>th</sup>) because of the Jewish holy day. She is working on speakers and will be reporting on that progress in upcoming meetings. • Kathy reminded everyone that the Saturday summer schedule will continue into July, but the meeting will be held one week later (on the 12<sup>th</sup>) due to the 4<sup>th</sup> of July holiday. Speaker is TBD. • However, the August 2<sup>nd</sup> meeting will still be held on Friday night and will feature Dr. David Kipping. • She recommends that everyone should always

read the Skyscrapers' newsletter carefully and to check the website, because unexpected programming changes could occur. • She noted that September 5th's meeting is on a Friday night and will be held at the Community Center in North Scituate. Well-known author Dava Sobel will be the guest speaker. • November will be Alan Powers' presentation, "NASA Helps Giordano Bruno Find New Worlds."

Steve Siok introduced the evening's presenter: member Steve Hubbard — amateur astronomer since the early 1970s, telescope maker, astrophotographer, and Stellafane award winner.

**Speaker, Steve Hubbard:** Steve's talk, "Dance of the Polar Lights" began with a short video of the solar disc and magnetic field lines. He explained that the Sun's flares and prominences can unleash energetic solar particles. When these energetic particles encounter the Earth's magnetic shield, they interact and produce the aurora borealis, or northern lights. He noted that the northern lights are now the focus of popular destination trips. He and his wife, Sue, traveled to Alaska on one such tourism group, led by Bob Berman (author of "The Sun's Heartbeat"). Steve's presentation included a light-hearted look at how to select items for your "bucket list" — make sure that they are not easy targets and also have extreme temperatures. His Alaskan adventure fit the bill, since they traveled 4,382 miles and endured conditions of -14 degrees Fahrenheit. The trip was a success, and Steve showed outstanding images of the northern lights as seen from Fairbanks (the Golden Heart





# Treasurer

## Linda Bergemann

Cash Flow YTD as of June 19, 2014  
(4/1/14 through 6/19/14)

### INFLOWS

|                                  |                   |
|----------------------------------|-------------------|
| Donation                         |                   |
| Misc Donation                    | \$655.00          |
| Refreshment Donation             | \$23.00           |
| <b>TOTAL Donation</b>            | <b>\$678.00</b>   |
| Dues                             |                   |
| Contributing                     | \$10.00           |
| Family                           | \$60.00           |
| Junior                           | \$15.00           |
| Regular                          | \$493.35          |
| Senior                           | \$222.90          |
| <b>TOTAL Dues</b>                | <b>\$801.25</b>   |
| Misc Income                      |                   |
| Interest Inc                     | \$6.18            |
| <b>TOTAL Misc Income</b>         | <b>\$6.18</b>     |
| Star Party Donations             | \$38.00           |
| Subscription Income              |                   |
| Sky & Telescope                  | \$32.95           |
| <b>TOTAL Subscription Income</b> | <b>\$32.95</b>    |
| FROM PayPal Account              | \$226.68          |
| <b>TOTAL INFLOWS</b>             | <b>\$1,783.06</b> |

### OUTFLOWS

|                                    |                   |
|------------------------------------|-------------------|
| Contingency                        |                   |
| Speakers Fees                      | \$100.00          |
| <b>TOTAL Contingency</b>           | <b>\$100.00</b>   |
| Corporation, State Fee             | \$20.00           |
| Postage and Delivery               | \$14.35           |
| Printing and Reproduction          | \$10.70           |
| Refreshment Expense                | \$20.29           |
| Subscription Payments              |                   |
| Sky & Telescope                    | \$32.95           |
| <b>TOTAL Subscription Payments</b> | <b>\$32.95</b>    |
| Trustee Expense                    |                   |
| Capital Equipment                  | \$184.89          |
| Property Maintenance               | \$1,858.91        |
| <b>TOTAL Trustee Expense</b>       | <b>\$2,043.80</b> |
| Utilities                          |                   |
| Electric                           | \$55.23           |
| Porta-John                         | \$198.00          |
| Propane                            | \$80.25           |
| <b>TOTAL Utilities</b>             | <b>\$333.48</b>   |
| TO Checking                        | \$226.68          |
| <b>TOTAL OUTFLOWS</b>              | <b>\$2,802.25</b> |
| <b>OVERALL TOTAL</b>               | <b>\$1,019.19</b> |

### Cash and Bank Accounts - As of 6/19/14

|                            |             |
|----------------------------|-------------|
| Capital One Bank           | \$12,344.65 |
| Checking                   | \$10,087.02 |
| PayPal                     | \$130.78    |
| <b>TOTAL Bank Accounts</b> |             |

City) and Chena Hot Springs. Steve's exciting trip included a dog sled ride and a dip in a natural hot spring. In conclusion, Steve also gave a brief "show & tell" of his new backyard observatory, constructed using prefabricated outdoor shed materials.

The meeting adjourned at 8:20. Submitted by Tina Huestis, Secretary.

## Board of Directors Meeting – 6/19/2014

**Attendees:** Alex Bergemann, Linda Bergemann, Conrad Cardano, Ed Haskell, Jim Hendrickson, Bob Horton, Dave Huestis, Tina Huestis, Francine Jackson, Pat Landers, Kathy Siok, Steve Siok, and Tom Thibault.

**Bob Horton, President:** Bob called the meeting to order at 7:05PM at Seagrave. To begin, he asked Alex Bergemann to present his Eagle Scout proposals for discussion and vote.

**Alex Bergemann:** Alex explained that he is the first of his Harmony Troop 11 to seek an Eagle Scout designation. In pursuit of that goal, he selected Skyscrapers as the recipient of his Eagle Scout project, which will be to build a covered structure (approved in a prior meeting of the Board). • Alex presented two options for vote: a gazebo to be erected atop the existing octagonal cement slab (former Crawford dome site) or a rectangular covered deck attached to the Meeting Hall's north-facing exterior wall. • After discussion, the Board voted in favor of the 8x12-foot rectangular deck. • Alex will handle fundraising to cover all expenses (e.g., materials, permit) as well as coordinate the labor of the Boy Scouts and other volunteers in its assembly.

**Tina Huestis, Secretary:** Tina noted that the minutes from June's monthly meeting will be published in the upcoming newsletter. • She said that it was brought to her attention that there may be a communications gap for the few members not on our email distribution. With the upcoming schedule of summer meetings fluctuating on weekend nights/locations, and the possibility of the printed newsletter experiencing postal delays, there is concern that these members may not have the most current meeting information. It was agreed that the Secretary should send hand-written postcards to those members without email addresses to alert them of any monthly meet-

ing changes.

**Linda Bergemann, Treasurer:** Linda noted that the Treasurer's report will be published in the newsletter. • She reported that income, beginning from the start of the fiscal year up to the date of the last report, was \$1,783.06 and expenses were \$2,802.25. • She explained that, even though expenses were greater than income for this time period, the Society was quite solvent. • Linda also informed those present that reminders for dues/renewals were sent out, as was agreed at the last Board meeting. • She has completed filing both the Society's IRS forms for the year and completed the State's corporation filing. • Linda researched the PayPal account and learned that our nonprofit status was not listed, which has now been changed to reflect the 2.2% lower fee. • Lastly, she reported that members wishing to receive the discount for *Astronomy* magazine can contact her for an online code, whereas the *Sky & Telescope* magazine's reduced subscription is direct and members can do it themselves (without assistance by the Treasurer).

**Kathy Siok, 1st Vice President:** Kathy reported on upcoming monthly meeting programs. • Members will be invited to talk about their visits to observatories at the Saturday, July 12, meeting. Also there will be a members' observing night, weather permitting. • Dr. David Kipping is the August 1 (Friday night) presenter. • Dava Sobel will be the speaker for September 5 (held at the North Scituate Community Center). • November 7 will feature Alan Powers.

**Steve Siok, 2nd Vice President:** Steve announced that the Astro-Assembly banquet arrangements have been finalized. Unfortunately, due to the change in date (to the last weekend in September), the regular caterer is not available. Another vendor has been lined up and a menu is being planned that will feature simple foods. The banquet ticket cost is expected to be either \$16 – \$17. • Speakers are still being finalized. Confirmed thus far are David Huestis and Rich Sanderson. • Jim Hendrickson will work with Steve on creating the AstroAssembly flyer, to be finished in time for Stellafane.

**Dave Huestis, Historian:** Dave showed a mockup of the 4x6-inch commemorative postcard, which will be given out free to all Astro-Assembly attendees. It showcased four photographs of the observatory, from historic to the present. The reverse side is

still being developed. • Dave will contact Print Makers for coffee mug options and pricing. • He also informed the Board that his centennial article will be published online as an *Astronomy* magazine guest blog. Dave is working on additional outlets for publication. • Discussion arose over the possibility of a tie-in with our centennial and the Scituate Art Festival. Skyscrapers could staff an exhibit/table/telescopes at the event as well as open up Seagrave for tours. This outreach could attract new members and offer an opportunity for fundraising, (e.g., sell coffee mugs). • Dave informed those present that he was interviewed by Chelsea Priest from Channel 6 on the Camelopardalids meteor shower. They filmed a short TV segment with him at Seagrave. Dave said that he mentioned Astro-Assembly to Chelsea and she expressed interest in covering the story that day. He plans to follow up with her closer to the date of the event.

**Pat Landers, Membership Activities Chair:** Pat reported that, since the July 12 monthly meeting will include a members' observing night, another one is not planned for that month. Bob said that he will encourage members in his President's Note to bring their telescopes to the July meeting. • Pat explained his plans to hold three members' observing sessions over the August/September and October/November time frame, details TBD. • It was noted that Pat should coordinate with Matt to ensure that star parties and members' observing nights do not present any calendar conflicts.

**Trustees:** Conrad reported that Jim Crawford worked at Seagrave during the week and completed the ceiling clean-up. • Conrad proposed to the Board that we sell the 10-inch Meade telescope. He noted that the scope has been available to members as a loaner, with little use. It was felt that the optics were still pretty good. The Board voted in support of selling the telescope. Suggestions were made to run a silent bid/auction with a reserve price/minimum \$500 price or perhaps raffle it off at the Scituate Art Festival (if Skyscrapers

exhibited there). • Conrad reported that the Observatory committee met just before the May monthly meeting. They are working on producing a list of objects that can be seen from the scopes at Seagrave. The lists will be laminated and will include descriptions/photos to assist the public. By August, the committee will create lists for the rest of the year and will get feedback on how these worked in actual use. A suggestion was made to incorporate our logo and repurpose them as handouts at open nights. • The recent approval by the membership to replenish the \$3,400 funds was discussed briefly. It was agreed to continue using the methodology that the Treasurer has set up in regard to handling such budgetary expenses.

**Francine Jackson, Public Relations Spokesperson:** Francine reported that she and Jim Hendrickson were collaborating to get Frank Seagrave named as a celestial body. It was noted that an asteroid was named after Professor Smiley and that it would be fitting for Seagrave to be likewise recognized, especially now during this centennial year. Francine adapted biographical material about Frank Seagrave from the website into a one-page supporting document, which she circulated for review. • The President said he would send an email in support of the project to that naming committee.

**Bob Horton, President:** Bob noted that he will ask for volunteers to coordinate refreshments. He expressed thanks to Kathy Siok for assuming this responsibility for so long. It was suggested to include a recurring reminder in the newsletter encouraging members to bring refreshments/food items to the monthly meetings. • Bob reopened the discussion (tabled from the May Board of Director's meeting) to modify the requirement that new members must be present in order to be voted in. The Board debated back and forth on this issue, but in the end, it was decided to table the discussion.

Meeting adjourned at 9:20PM

Submitted by Tina Huestis - Secretary

## Next Board Meeting

Thursday, July 17, 7pm  
Seagrave Observatory





Trustees work session, Saturday June 28



# Directions to Seagrave Memorial Observatory

## **From the Providence area:**

Take Rt. 6 West to Interstate 295 in Johnston and proceed west on Rt. 6 to Scituate. In Scituate bear right off Rt. 6 onto Rt. 101. Turn right onto Rt. 116 North. Peeptoad Road is the first left off Rt. 116.

## **From Coventry/West Warwick area:**

Take Rt. 116 North. Peeptoad Road is the first left after crossing Rt. 101.

## **From Southern Rhode Island:**

Take Interstate 95 North. Exit onto Interstate 295 North in Warwick (left exit.) Exit to Rt. 6 West in Johnston. Bear right off Rt. 6 onto Rt. 101. Turn right on Rt. 116. Peeptoad Road is the first left off Rt. 116.

## **From Northern Rhode Island:**

Take Rt. 116 South. Follow Rt. 116 thru Greenville. Turn left at Knight's Farm intersection (Rt. 116 turns left) and follow Rt. 116. Watch for Peeptoad Road on the right.

## **From Connecticut:**

- Take Rt. 44 East to Greenville and turn right on Rt. 116 South. Turn left at Knight's Farm intersection (Rt. 116 turn left) and follow Rt. 116. Watch for Peeptoad Road on the right.
- or • Take Rt. 6 East toward Rhode Island; bear left on Rt. 101 East and continue to intersection with Rt. 116. Turn left; Peeptoad Road is the first left off Rt. 116.

## **From Massachusetts:**

Take Interstate 295 South (off Interstate 95 in Attleboro). Exit onto Rt. 6 West in Johnston. Bear right off Rt. 6 onto Rt. 101. Turn right on Rt. 116. Peeptoad Road is the first left off Rt. 116.



47 Peeptoad Road  
North Scituate, Rhode Island 02857