



# the Skyscraper

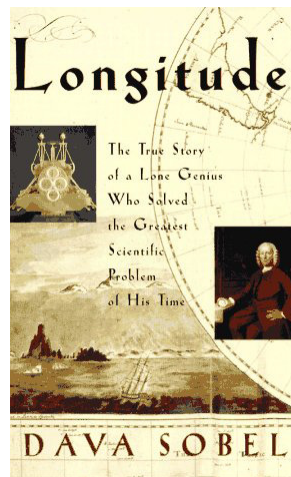
vol. 41 no. 9  
September 2014

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

## In this issue

- 2 Update on Alex Bergemann's Eagle Scout Project
- 4 Seagrave Memorial Observatory Centennial
- 8 September: Prime Time for Asteroid Hunting
- 8 Globular Cluster in Sagittarius M22
- 9 Capturing Neptune & Triton with a Small Telescope
- 16 Droughts, Floods and the Earth's Gravity, by the GRACE of NASA

## Friday, September 5, 7pm at North Scituate Community Center



### Longitude by Dava Sobel

The speaker for the September meeting of The Skyscrapers is Dava Sobel. She is a renowned author who writes popular expositions of science topics. She graduated from the Bronx High School of Science and Binghamton University. She is currently the Joan Leiman Jacobson Visiting Nonfiction Writer at Smith College in Northampton Mass. and is researching her next book, "The Glass Universe", at the Harvard College Observatory. Dava is an avid eclipse chaser and has seen eight total solar eclipses. Her books include "Longitude", "A More Perfect Heaven", and "Galileo's Daughter". If you own any of her books please remember to bring them so Dava can sign them.

Dava's topic for our meeting will be "Longitude: The true story of a lone genius who solved the greatest scientific problem of his time". The book describes John Harrison's decades long effort in the eighteenth century to convince the British Admiralty to adopt his chronometer as the method to determine longitude at sea and to award him the "Longitude Prize". The topic is currently special because we are celebrating the 300th anniversary of the Admiralty establishing the prize. "Longitude" was awarded the 1997 British Book of the Year in 1997.

Please note the meeting will be held at the Scituate Community Center, same time 7:00 PM. And as always please bring a dessert to share.

## AstroAssembly September 26 & 27 (see page 17)



## Members' Observing Night Friday September 19

### Phases of the Moon

**First Quarter Moon**  
September 2 11:11

**Full Harvest Moon**  
September 9 01:38

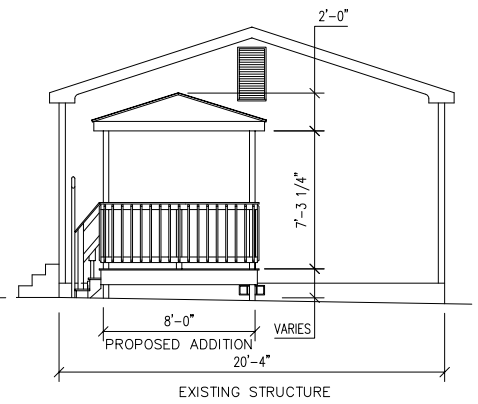
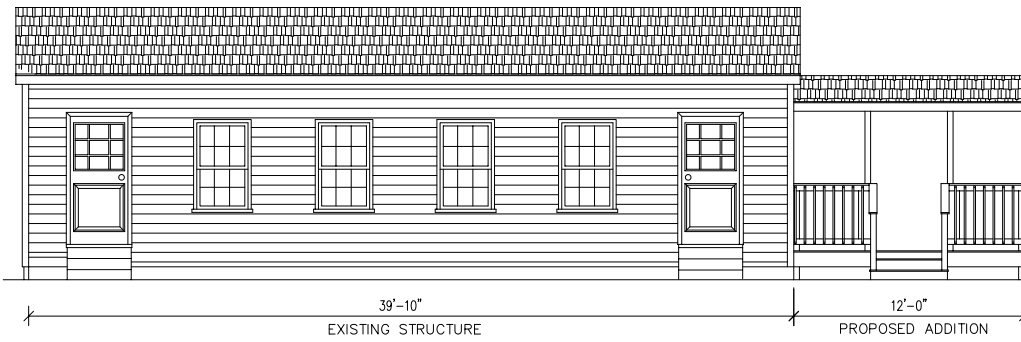
**Last Quarter Moon**  
September 16 02:05

**New Moon**  
September 24 06:14



## Seagrave Memorial Observatory Open Nights

**Saturdays at 8:00 pm**  
weather permitting



① ELEVATION  
SCALE 1/4" = 1'-0"

SEAGRAVE OBSERVATORY HALL		
DATE: 8/06/14	REVISED:	DRAWN BY: TPT
DWG.NO. E-1	Location: 47 PEEPTOAD ROAD NORTH SCITUATE, RI.	TITLE: PROPOSED 8' X 12' DECK

② ELEVATION  
SCALE 1/4" = 1'-0"

SEAGRAVE OBSERVATORY HALL		
DATE: 8/06/14	REVISED:	DRAWN BY: TPT
DWG.NO. E-2	Location: 47 PEEPTOAD ROAD NORTH SCITUATE, RI.	TITLE: PROPOSED 8' X 12' DECK

# Update on Alex Bergemann's Eagle Scout Project

Skyscrapers Members,

In Bob Horton's presidential notes for August he announced that our youngest member Alex Bergemann will build a 8x12 foot pavilion attached to the north side of the meeting hall for his Eagle Scout project. This structure will be used to provide a covered shelter to house grills during cook-outs and other events without the hassle of setting up tents.

While Alex has already received a donation of materials for a portion of the project, as well as some monetary donations, he has yet to reach his goal.

So, I would like to challenge Skyscrap-

ers members to help Alex reach his goal for this project.

Tina and I are making a contribution in the amount of \$100.

Please consider making a donation to this worthwhile project by making your check out to Skyscrapers (tax deductible), and put "Eagle Scout Project" in the memo line. Mail it to: Skyscrapers, Inc., 47 Peep-toad Road, North Scituate, RI 02857. Or if you prefer, bring it with you to the September monthly meeting.

Thank you.

Dave & Tina Huestis

## Upcoming Star Parties

**September 15, Seagrave Observatory.** Expecting a group of about twenty or so.

**October 3rd, Steere Farm Elementary, Burrillville RI.** This one is fairly large and they have always been very generous in donations.

**October 7 (pending), St. Luke's School, Barrington.** I'm told this event will host at least 65 people so I could really use help here.

Please let me know as to your availability and whether you can bring a scope. I will be bringing my Meade LX200 to the events in October. Matt White [ka1bqp@msn.com](mailto:ka1bqp@msn.com)



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 **September 19** to Jim Hendrickson, 1 Sunflower Circle, North Providence, RI 02911 or e-mail to [jim@distantgalaxy.com](mailto: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](mailto:jim@distantgalaxy.com). Note that you will no longer receive the newsletter by postal mail.

### President

Bob Horton [Robert\\_Horton@brown.edu](mailto:Robert_Horton@brown.edu)

### 1st Vice President

Kathy Siok [kathys5@cox.net](mailto:kathys5@cox.net)

### 2nd Vice President

Steve Siok [ssiok@cox.net](mailto:ssiok@cox.net)

### Secretary

Tina Huestis [qthuestis@gmail.com](mailto:qthuestis@gmail.com)

### Treasurer

Linda Bergemann [lbergemann@aol.com](mailto:lbergemann@aol.com)

### Members at Large

Pat Landers [pblanders5@gmail.com](mailto:pblanders5@gmail.com)

Matt White [ka1bqp@msn.com](mailto:ka1bqp@msn.com)

### Trustees

Conrad Cardano [cardanoc@verizon.net](mailto:cardanoc@verizon.net)

Jim Crawford [jrcrawford@cox.net](mailto:jrcrawford@cox.net)

Tom Thibault [DeepSpaceViewer@aol.com](mailto:DeepSpaceViewer@aol.com)

### Public Outreach Coordinator

Matt White [ka1bqp@msn.com](mailto:ka1bqp@msn.com)

### Public Relations Spokesperson

Francine Jackson [Francine\\_Jackson@brown.edu](mailto:Francine_Jackson@brown.edu)

### Observatory Committee Chairperson

Conrad Cardano [cardanoc@verizon.net](mailto:cardanoc@verizon.net)

### Membership Activities Coordinator

Pat Landers [pblanders5@gmail.com](mailto:pblanders5@gmail.com)

### Librarian

Alex Bergemann [astroalex@verizon.net](mailto:astroalex@verizon.net)

### Historian

Dave Huestis [dhuestis@aol.com](mailto:dhuestis@aol.com)

### Archivist

Jim Crawford [jrcrawford@cox.net](mailto:jrcrawford@cox.net)

### Editor

Jim Hendrickson [jim@distantgalaxy.com](mailto:jim@distantgalaxy.com)

## Friday, September 19

### Fall into the New Season with Cosmic Colors

University of Rhode Island Planetarium  
Upper College Road  
Kingston, RI

Friday, September 19th, 2014  
6:00 and 7:00 P.M.

Contact: Francine Jackson: 401-527-5558

With the new season of fall upon us, we will enjoy the beautiful colors of the new season. But, where do those colors come from? Why are they so beautiful? Cosmic Colors, a planetarium show created by the Great Lakes Planetarium Association, explores each major color, and its importance in life; also, colors are just a small portion of a huge electromagnetic spectrum. Come

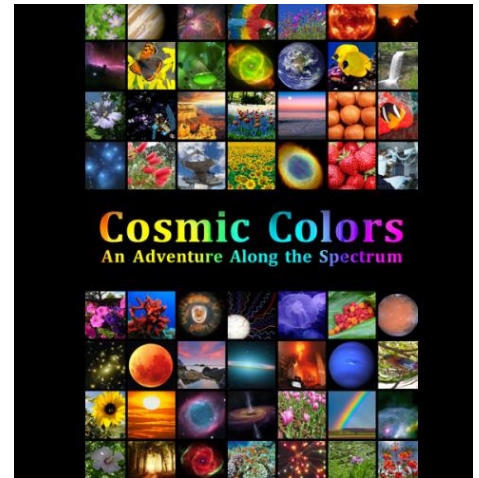
with us to enjoy the magic of the planetarium as it introduces you to the beauty of the rainbow, and beyond.

Cosmic Colors will follow Losing the Dark, 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 introducing the 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 Plan-



etarium is available for programming for schools and other organizations. For more information, please contact Francine Jackson at 401-527-5558.

Seeing the moon in a whole new light



**Calling all luna-lovers!**  
International Observe the Moon Night (InOMN) is an annual event that is dedicated to encouraging people to 'look up' and take notice of our nearest neighbor, the Moon. From looking at the Moon with a naked eye to using the most sensitive telescope, every year on the same day, people from around the world hold events and activities that celebrate our Moon.

**06  
SEPT  
2014**

[observethemoonnight.org](http://observethemoonnight.org)



### Library Book Sale Continues at AstroAssembly

Since the September monthly meeting will be held at the North Scituate Community Center, the Skyscrapers book sale will continue during our annual AstroAssembly convention. The books will be on display and available for purchase on Friday evening (Sept. 26) and during the day on Saturday (Sept. 27).

All are reasonably priced.

See Alex Bergemann or Dave Huestis if you are interested in any of the titles.

Also, the Skyscrapers library book cabinets are now located in the front of the meeting hall. Alex Bergemann, Ellsworth Starring and Dave Huestis recently have re-organized the books and arranged them in alphabetical order by author. They will be inventoried at a later date and a catalog will be provided on the Skyscrapers website.

In the newsletter and at each monthly meeting we will more actively promote the availability of these volumes for members to borrow.

Alex Bergemann and Dave Huestis

# Seagrave Memorial Observatory Centennial (1914-2014)

By Dave Huestis

Skyscrapers, Inc., the Amateur Astronomical Society of Rhode Island, is proud to announce the celebration of the 100th anniversary of Seagrave Memorial Observatory on Peptoad Road in North Scituate during our annual AstroAssembly 2014 convention (September 26-27). The former observatory of Frank Evans Seagrave (1860–1934), a famous Providence astronomer, has been under the stewardship of the Society since it was purchased in 1936.





Seagrave's first observatory, taken in 1939 by Professor Charles H. Smiley, founder of Skyscrapers

in Providence, Rhode Island. This great instrument was then the 3rd largest in New England, and was the largest in New England in private hands. The telescope was mounted in May 1878. Present at the dedication ceremony was none other than Alvan G. Clark, the famous telescope maker. Also present was Leonard Waldo, Assistant Director of Harvard College Observatory under E.C. Pickering, who thought the "complement of accessories attending the telescope could occupy the time of two competent observers."<sup>1</sup>

For many years Seagrave conducted serious scientific observations from his magnificent facility, including measurements of Saturn's ring system, comets, asteroids, novae, and variable and double stars. (In fact, Seagrave was awarded an honorary degree from Brown University on June 22, 1911, for his orbital calculations of Halley's comet in 1910.)<sup>2</sup>

## The Back Story

In 1876 Seagrave's father ordered an 8-inch (clear aperture) Alvan Clark refractor for his son's 16th birthday present. Two years later the telescope was delivered and an observatory was built in the backyard of the family residence at 119 Benefit Street

For reasons currently unknown, Seagrave sent the following letter<sup>3</sup> to Professor E.C. Pickering of Harvard College Observatory on October 19, 1903:

*Dear Sir,*

*Do you know of anybody that would like to buy an 8-inch equatorial telescope? I would like to sell mine if I could get a reasonable price for it. I thought that I would write to you before placing it in A Clark & Sons hands to sell. The telescope has clock work, micrometer, two sets of eyepieces, etc.*

*Yours etc,*

*F.E. Seagrave*

On November 2, 1903, Professor Pickering responded:<sup>4</sup>

*Dear Mr. Seagrave,*

*I regret that I know of no one who wants an 8-inch telescope, and can think of no better course to follow than to communicate with the Clarks, unless possibly to advertise in Popular Astronomy.*

*Very sincerely yours,*

*E. C. Pickering*

This situation provides a nexus in the



January 24, 1925 eclipse, Seagrave is to the far right.

Seagrave timeline. What would have happened if Seagrave had been successful in selling his telescope? While Charles Smiley would have most certainly still founded Skyscrapers in 1932, the timeline we trace back today would have been dramatically altered without Seagrave's Observatory as the Society's focal point.

A few years later, the installation of street lamps began to affect Seagrave's observations. A very comprehensive article in the Providence Sunday Journal on October 10, 1909, featured a glimpse into the deteriorating observing conditions from his Benefit Street observatory. "*Near the observatory, close to Bowen Street, are three large wooden structures which look exactly like the billboards which occasionally ornament vacant lots. These also have come in for their share of comment. One man stopped and looked at them earnestly. Then he said to a companion, 'This ain't no sort of place for them big billboards; no one ever comes down this street to look at 'em.'*"

*These billboards are screens placed by Mr. Seagrave to keep the light of the street lamps from shining in the observatory and interfering with his observations of the heavenly bodies. It is, he says, at the best of times not good 'seeing' in Providence, nor anywhere along the Atlantic coast."*

*Another reference noted that the coal dust hung over the city of Providence like a pall, also affecting the local seeing conditions. However, it wasn't until February 1914 that Seagrave put his instruments into storage, and a month later began to look for a piece of property to relocate.*

*Seagrave found some land on what is now Peepoad Road in North Scituate, where he constructed a new observatory and moved his 8-inch Clark refractor there in October 1914. A Providence Journal article on October 12, titled, "Seagrave Observatory is Nearly Complete: Telescopes Now Being Adjusted at North Scituate Building," provided an update on the work of setting up the telescope.*

*"Frank E. Seagrave has practically completed his astronomical observatory at North Scituate. The building has been finished for some time and his telescopes, which have been moved from his former observatory on Benefit Street, are mounted upon their cement foundations.*

*The adjustment of the two telescopes, one of 8½ and the other 3-inch diameter, has been in process since the first of the month. This delicate task is now finished, except the adjustment of the instruments to altitude and azimuth.*

*Mr. Seagrave finds conditions at North Scituate ideal for the purpose of astronomi-*

*cal observation. The view is sweeping and unobstructed and there is an entire freedom from reflected light which is always a serious hindrance to accurate observation from points within the limits of cities. In this respect, the new observatory possesses great advantage over the former location on Benefit Street."*

In 1925, Seagrave made a key observation of the January 24 total solar eclipse. The group observed totality for just five seconds, thereby defining a northern limit for the path of totality.<sup>5</sup>

Seagrave continued his research until his death in 1934.

## Skyscrapers Acquire Observatory<sup>6</sup>

Skyscrapers, founded in 1932 by Professor Charles Smiley of Brown University, purchased the facility in 1936. After some needed repairs, Skyscrapers held their first "open night" on January 15, 1937. This tradition continues to the present day, with the facilities open every clear Saturday night for public viewing.

Throughout the decades Skyscrapers continued to maintain Frank Seagrave's beloved observatory. However, in the middle to late 1960s the observatory fell into a state of disrepair and major upkeep was lacking. Fortunately a new generation of young astronomy enthusiasts sparked the revival of Skyscrapers, which in turn helped to initiate the resurrection of the observatory. The younger members had the energy and desire to make the necessary repairs to keep the observatory and Clark refractor in decent working order.

In 1976 it was necessary to completely renovate the dome. Though the deteriorating exterior plywood was removed, the underlying wooden supports that formed the cylindrical structure were sound. Sheets of corrugated fiberglass, a much lighter choice of material than any wood product that could have been used, were fastened to the support structure.

In addition, the Society needed to solve

a recurring problem. The observatory rotated on seven 5½-inch Civil War vintage cannon balls. These ball bearings, contained by conduit bent around them, were sandwiched between two well-greased curved cast iron tracks. The problem was that the wood beneath the bottom track was rotting away. This fact caused a cannon ball to bind when it encountered a lip at the joint where two sections of track met. The operator could not deliver enough torque to the wheel that turned the dome to get the ball up and over the "bump." The result: the dome jammed. Whenever that happened you were finished observing for the evening.

Furthermore, a more serious and rare side effect could also occur. Just before jamming, a cannon ball could pop out of its conduit. If you heard it hit the floor you were okay. It is reported that this incident had only happened once. As far as is known, no member or guest was ever injured due to this freak scenario. Imagine trying to explain that to your insurance company!

The solution came to member and engineer Steve Siok, who was inspired by the 21st Olympiad (1976 Summer Olympics) held in Montreal. He was watching a track and field event when the idea came to him. The dome's cannon balls could be replaced by 15, 16-pound shot puts, each within a ball cage and spaced equidistantly on the track. This dome work was carried out and completed during the summer of 1976.

While most, if not all, earlier repairs or renovations were made at Seagrave Memorial Observatory by Skyscrapers members under the direction of the board of Trustees, a contractor was hired in 1980 to replace the observatory roof and slit. And several times in the 1980s the observatory deck was replaced.

In November 1991 Skyscrapers acquired a grant to make major renovations to the observatory building. A second grant was awarded in November 1993, since there was still work to be done to the brick structure of the observatory. (The mortar was falling

1 Hager, Ernest R. (November 22, 1936). "New Quarters for Those Who Scan the Skies for Fun," Providence Sunday Journal, Section 6, Page 2. Re-quoted from a news item in 1914.

2 Smiley, Charles, "Frank Evans Seagrave." Popular Astronomy, November 1934, Vol. 42 No. 9, pp504-505.

3 Harvard University Archives, E.C. Pickering correspondence.

4 Ibid.

5 Frank Seagrave. "Short Eclipse Notes." Popular Astronomy, April 1925, Vol. 33 No. 4, p. 279.

6 The details for this section are derived from the archives of Skyscrapers, Inc. (1932-present) and firsthand experience of the author from January 1975 to present.

out and could be removed by using one's fingers.) To prepare for the major re-pointing necessary to guarantee the structural integrity of the building, the entire brick structure was sandblasted and power-washed inside and out. (Interestingly, the silo-shaped structure is composed of two concentric brick walls). A number of the original window openings were bricked over for security, and re-pointing proceeded. The final step involved coating the bricks with a sealant.

A portion of a final grant in November 1999 was used for further repairs to the dome. The observatory floor and deck were replaced, and repairs were made to the observatory dome roof and observing slit once again.

As Skyscrapers headed into the new millennium, the major renovations had all been completed. The observatory building looked and operated as it must have back in 1914 upon completion of its construction.

However, there was still more work to be accomplished to return Seagrave's observatory to its original condition. That task involved the reconstruction of the clock drive and the restoration of the Clark telescope.

The original flyball governor, an integral component of the weight-driven clock drive, was destroyed by vandals in October 1974. Beginning in 2003, Skyscrapers member Al Hall, armed with only a few remaining parts for scale, some 1960s vintage photos, and a lot of research, designed a replica of the governor using CAD software. The parts were then fabricated and assembled. Additional photos, which were discovered much later during the project, revealed how the weight drive was installed. After testing and minor modifications, the completed drive was re-dedicated on July 11, 2009.

Soon thereafter permission was granted from the Trustees to undertake a complete restoration of the Clark refractor itself. Under the direction of Al Hall and Dick Parker, with the help of about a dozen Skyscrapers members, the telescope was completely disassembled and each part carefully cataloged, measured and meticulously cleaned. The brass was lacquered to prevent oxidation and the metal tube was painted brick red. During September 2010 the telescope was reassembled. The restored telescope and accompanying replicated flyball governor and weight-driven clock drive

were now as pristine as the day they were delivered to the Seagrave residence in 1878.

At last the Society could concentrate on fulfilling its mission to educate members and the public on the science of astronomy.

Frank E. Seagrave would be very pleased to know that his observatory on Peep-toad Road would still be functional a century after its construction. The Skyscrapers organization takes extreme pride as owners of this beautiful and uniquely designed facility. Future generations of amateur astronomers and the public alike will have access to a well-maintained Alvan Clark refractor and a magnificent observatory thanks to the hard work and dedication of the members of Skyscrapers, Inc., The Amateur Astronomical Society of Rhode Island.

This article is dedicated to all past and present Skyscrapers members who have devoted their time and effort to preserve this lasting legacy and tribute to Frank Evans Seagrave. Future generations of stargazers will benefit from their hard work.

Explore in detail the rich history of Frank E. Seagrave, his 8-inch Alvan Clark refractor, his observatories and Skyscrapers, Inc. elsewhere on this website.





# September: Prime Time for Asteroid Hunting

Francine Jackson

Although the number of asteroids we have is now up in the hundreds of thousands, many of those have been discovered by automated searches, within the past several decades; however, before the 1970s, finding a new little object was more a matter of search and search and search... To try their best, hopeful observers always looked most prominently around the ecliptic in the middle of the night, as away from the Sun as they could get. The best time to do so was in September, near Pisces and other nearby constellations which are relatively "star-poor," making it the best time to discover a new object. Also, Jupiter, our largest

planet and the one on the outer boundary of our major asteroid belt, has its perihelion there. This allows it to align some of their orbits with its own, giving many of them their own perihelia in this similar region. Because of this, of the first 1,940 asteroids discovered, 344 were found during September, more than twice the average of any other month.

Not surprisingly, the two worst months were June, with 65, and December with only 75. There seem to be two good reasons for this discrepancy: First, both months are when the Milky Way is most prominent around midnight; and second, the differ-

ences in observing time. June nights are very short, and December nights are too cold to stay outside for very long periods of time just to look for something that may or may not be there.

At present, we are losing the two major asteroids (or asteroid and dwarf planet), Ceres and Vesta, that we've had for the last several months, so, before we lose them totally, take a last look before they leave our sky, and, maybe, just maybe, you might be fortunate enough to find an undiscovered minor body. Happy observing.



## Globular Cluster in Sagittarius

### M22

Glenn Chapple

On early evenings in September, the constellation Sagittarius arches above the southern horizon, its rich deep-sky treasures accessible to those of us who inhabit mid-northern latitudes. One of the more spectacular of these cosmic splendors is the globular cluster M22. Its discovery is attributed to the German astronomer Abraham Ihle, who came across it on August 26, 1665 while observing Saturn.

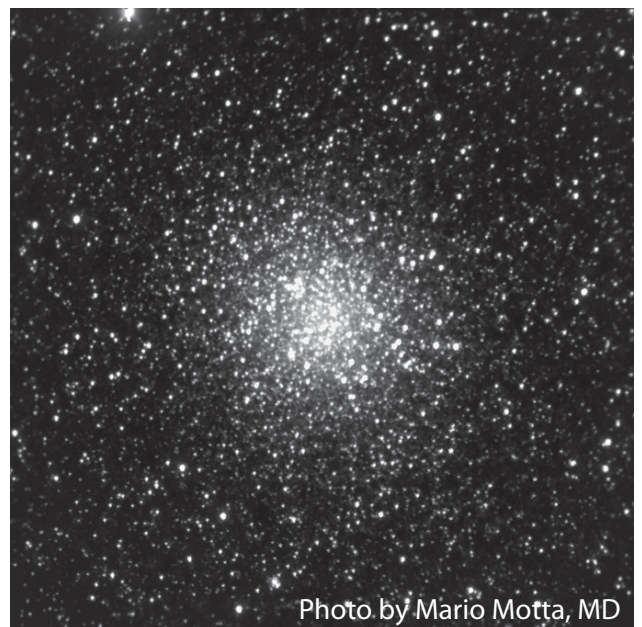
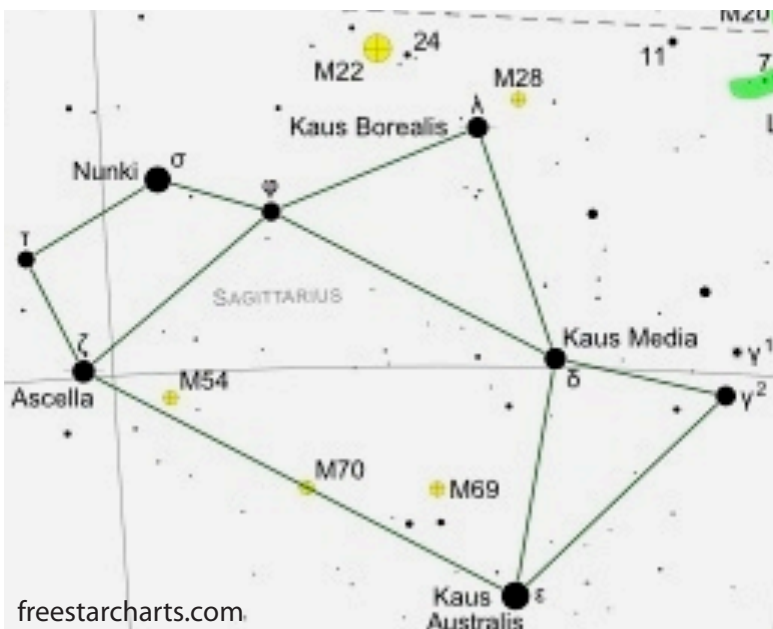
Among globular clusters, M22 is exceeded in brightness and apparent size only

by omega Centauri and 47 Tucanae. Much of its grandeur results from its nearness to the earth. At a distance of 10,500 light years, it's over two times closer than the much-heralded M13. In reality, M13 is half again as large and contains several hundred thousand stars, compared to M22's estimated 70,000.

I've always been a proponent of small telescopes for backyard astronomy, but had to admit that large aperture scopes are the way to go should you want to resolve the

stars in a globular cluster. M22 is an exception. I've resolved it quite nicely with a 4-inch f/4 RFT (an Edmund Astroscan) and a magnifying power of just 74X. Naturally, to view M22 in all its glory you'll want to use a large instrument and 2 or 3 times that magnification.

M22 is relatively easy to locate, if you use the "Teapot" of Sagittarius as a guide. In binoculars and finderscopes, it appears as a 5th magnitude smudge just 2½ degrees northeast of Kaus Borealis (Lambda [λ] Sagittarii) - a 3rd magnitude star that forms the top of the Teapot's lid. Next time you're visiting M13, drop southward and give M22 a look-see. Which do you prefer?







# Capturing Neptune & Triton with a Small Telescope

Jim Hendrickson

Mars and Saturn, which have been part of our sky since early Spring, are now departing in the west, leaving us with a vast expanse of sky devoid of bright planets, until Jupiter rises amongst the stars of Cancer, the crab before dawn. While we may not have any bright planets to view in our evening sky, this is the time of year that we can turn our gaze to our outermost planet, Neptune.

Neptune is the only planet not visible to the naked eye (Uranus can be seen under the right conditions) but it doesn't require sophisticated equipment to track it down. With a good finder chart and a pair of 50mm binoculars it should be easy to spot as long as the Moon is not nearby.

Neptune's most revealing feature will be

its blue hue, owing to methane gas in its upper atmosphere absorbing the red wavelengths of sunlight. Even in large telescopes, don't expect distant Neptune to reveal very much surface detail, but under steady skies you may notice slight limb darkening on its tiny 2.4 arcsecond disk, giving it a distinct 3-dimensional appearance.

One enticing thing Neptune does offer, however, is its largest moon Triton. This large moon, similar in size and composition to Pluto, is within reach of a 12-inch telescope under ideal seeing conditions. At its closest, Triton shines at magnitude 13.5 and can be seen as far away as 16 arcseconds from Neptune.

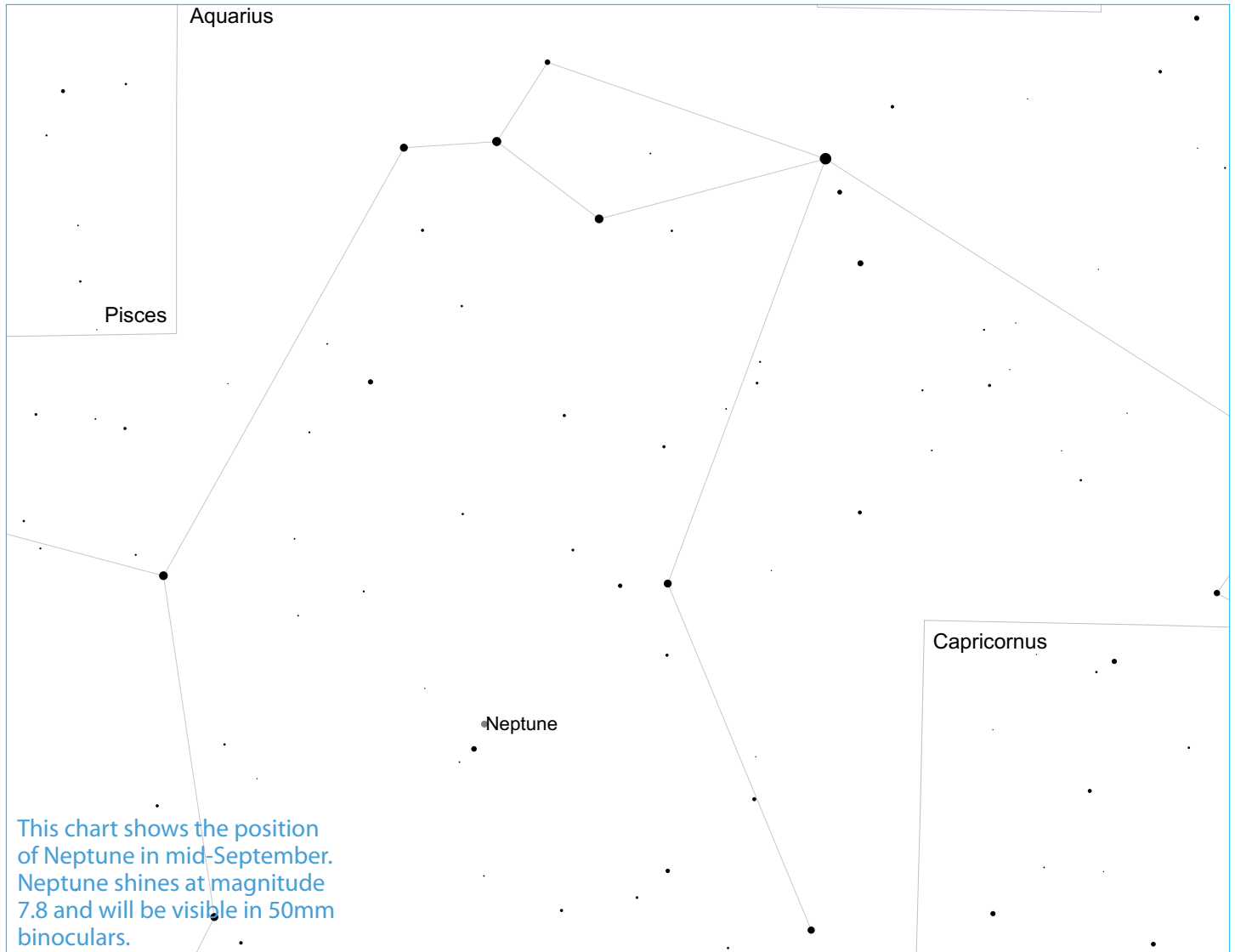
If your telescope isn't large enough to spot Triton but you do have a tracking



mount and a camera, you can try to capture an image of it.

The image above was captured with a 130mm telescope operating at  $f/24$  with a Canon SLR camera and an 8 second exposure at ISO 12800. Triton is clearly visible above and to the right of Neptune.

Can you capture Triton with a smaller telescope?



This chart shows the position of Neptune in mid-September. Neptune shines at magnitude 7.8 and will be visible in 50mm binoculars.



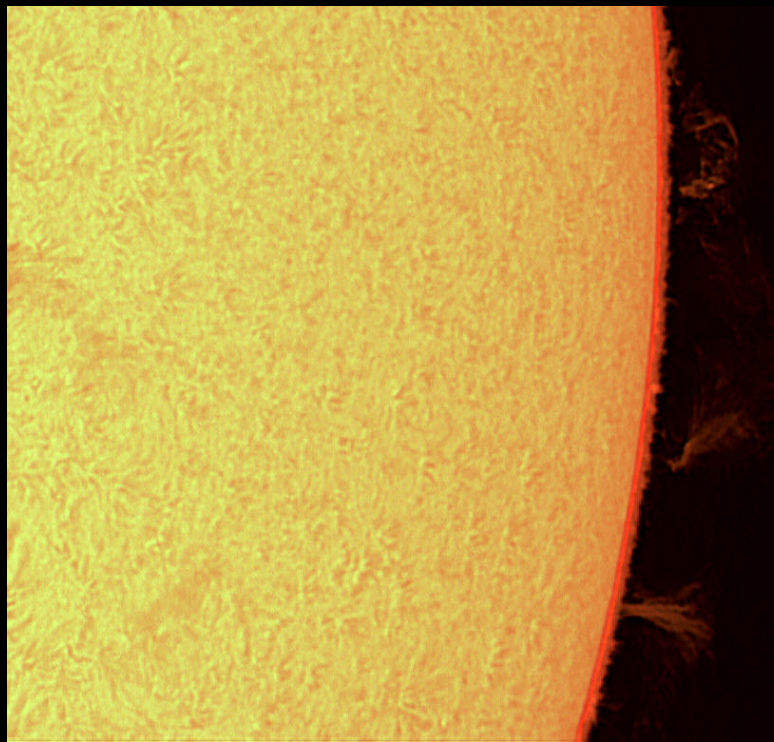
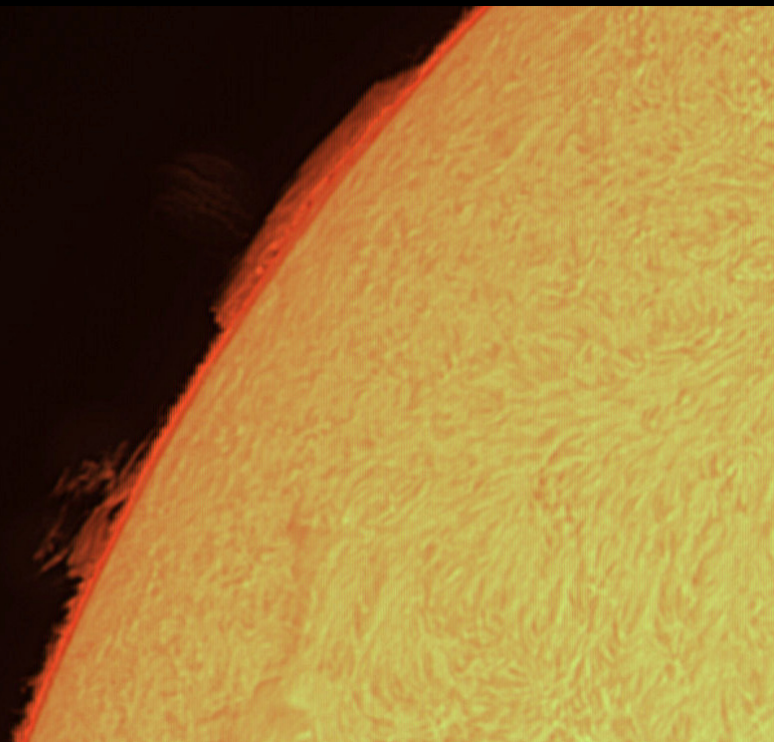
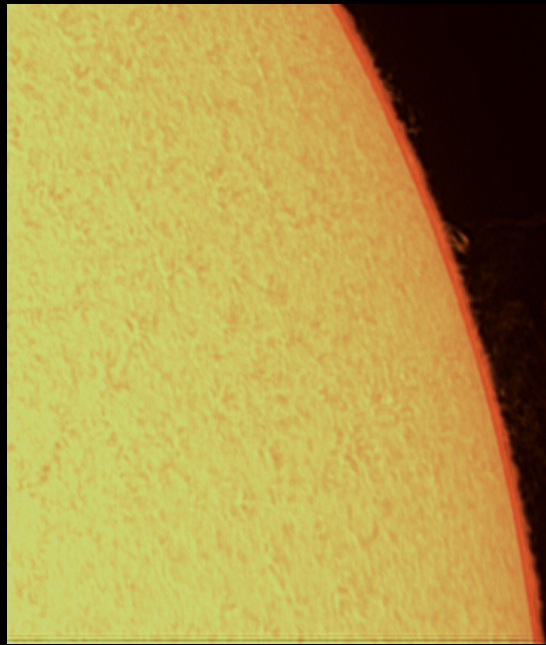
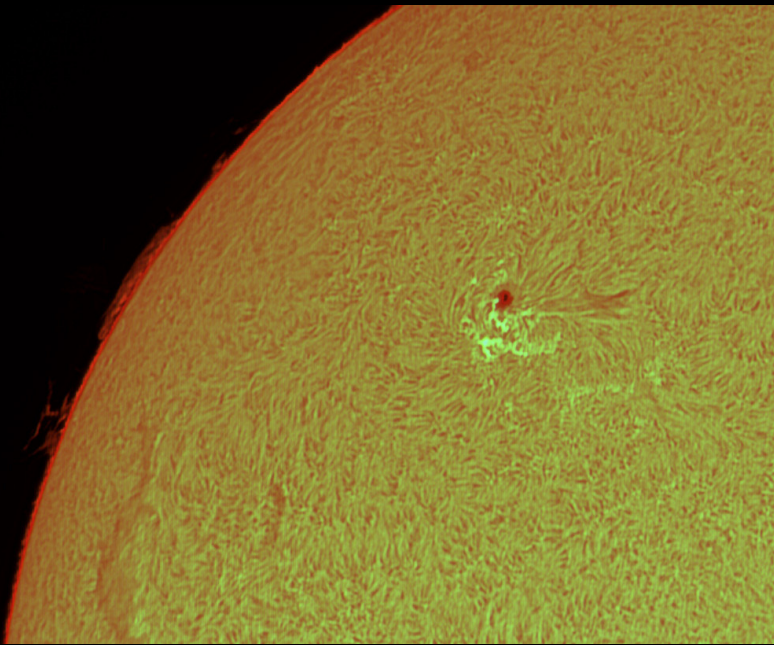
Milky Way from Bartlett, New Hampshire  
by Tom Thibault



Here's a project I'm working on. Cocoon nebula. Right now I'm concentrating on acquisition taking longer exposure and checking tracking. This image is 15X300 second images calibrated with bias, flat and dark frames. I've now have taken a set of 600 second darks frames and plan to go deeper in hopes to get more definition and less grain. In Photoshop I'm using just very basic level and curve sequences to try and bring out detail. Once I get my acquisition skills nailed down I hope to get better with post processing in PS. Lloyd Merrill

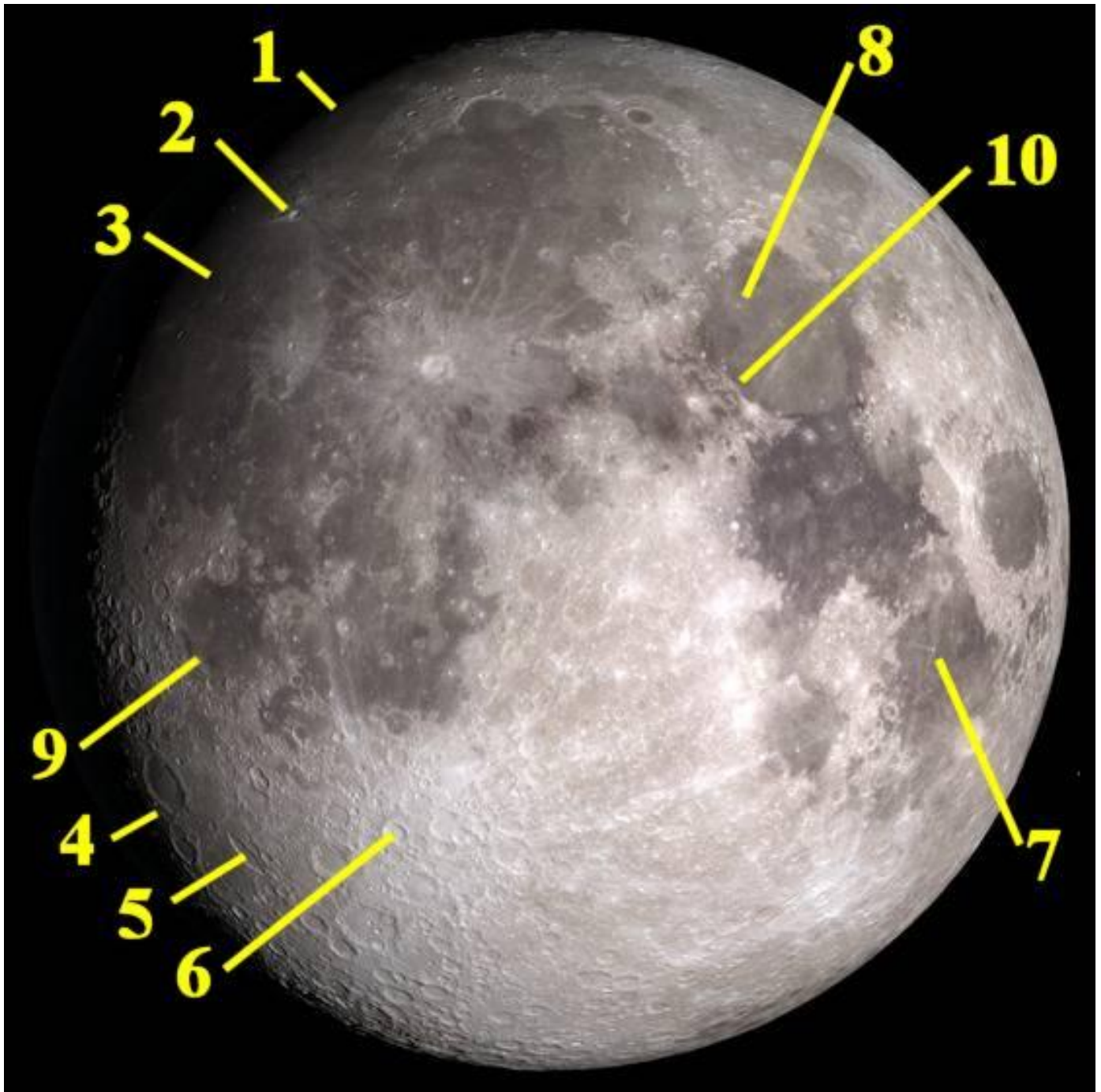
Lunar Image using Meade 1000mm 4in f/10 sct lens and NIKON D5100 dslr. Shot on Mon. night 9-1-14 by Bob Derouin





Sun in H-alpha  
August 30, 2014  
by Steve Hubbard

## International Observe the Moon Night 2014



The above map depicts the Moon as it will appear at approximately 10:30 PM EDT and 7:30 PM PDT on International Observe the Moon Night, September 6, 2014. With the terminator (the line between the day and night side of the Moon) near the western edge of the Moon, we will be able to see detail in the topographic relief of a number of fascinating features in this area. However, most of the Moon's visible surface will experience the flatter lighting associated with the approaching full Moon phase. While this flat lighting makes viewing topographic relief much more difficult, it enhances our ability to see features that are distinguished by their albedo, or amount of reflectance. See the reverse side for a description of selected observing targets.

### Selected Features for InOMN 2014

Mons Rümker – A large complex of overlapping, low, shield volcanoes. (1)

Aristarchus Plateau – An exceptional region of impact craters (Aristarchus, Herodotus) and volcanic features such as Schroter's Valley, the greatest of the Moon's sinuous rilles, formed by a river of lava. (2)

Marius Hills – A cluster of many small volcanic domes and cones. (3)

Wargentín – After it formed from an impact, lava erupted from cracks on the floor of this 84 km-wide crater, filling it to its rim. It now resembles a plateau more than a crater. (4)

Schiller – Most lunar craters are round but Schiller is exception. Highly elongated at 179x71 km, it may have been formed by an asteroid impacting at a very low angle. Some have even suggested that it marks where a former moon of the Moon spiraled into the lunar surface. (5)

The Rays of Tycho – 65 million years ago, an asteroid slammed into the Moon, forming the crater Tycho and sending sprays of light-colored pulverized rock across wide areas of the Moon's surface. How far can you trace these bright rays? (6)

The Rays of Messier – A very low-angle impact formed the crater Messier, sending a spray of light, pulverized rock preferentially away from the direction from which the impacting asteroid came. (7)

Linne – This small (2.4 km wide) crater is normally quite inconspicuous. But near full Moon, it is seen to be surrounded by a bright patch that has caught observers' attention for many years. (8)

Mare Pyroclastic Deposits – Near full Moon, the darker basaltic lava rock of the lunar mare or seas stands out particularly well from the lighter rock of the lunar highlands. This is seen well through binoculars or even with the unaided eye. Through a telescope, a number of mare show even darker patches of pyroclastic deposits. These widespread deposits of ash came from later eruptions of volcanic fire fountains. See southern Mare Humorum (9), and southwest Mare Serenitatis (10).

Mons Rümker

Aristarchus Plateau

Marius Hills

Wargentín

Schiller



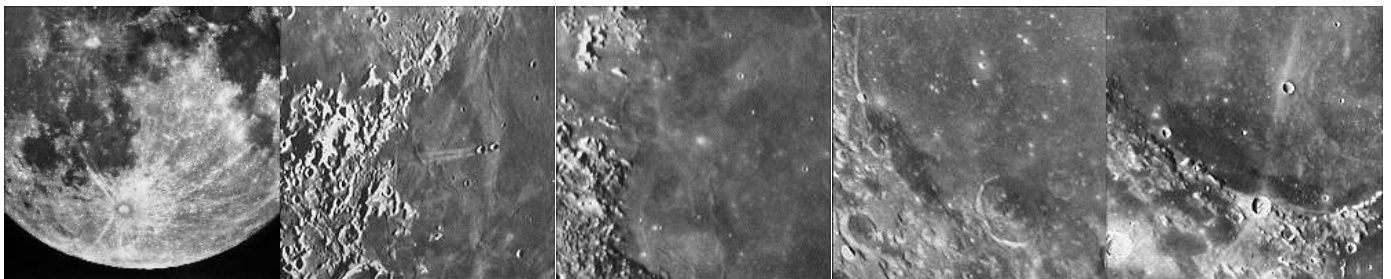
Tycho

Messier

Linne

Humorum

Serenitatis





Venus & Jupiter Conjunction taken at around 5:30 am on 8/18/14 from Cathedral Ledge in North Conway NH. Dave Huestis and I met there to view the event. It was great and the following sunrise was spectacular. By Tom Thibault



# Droughts, Floods and the Earth's Gravity, by the GRACE of NASA

By Dr. Ethan Siegel

When you think about gravitation here on Earth, you very likely think about how constant it is, at  $9.8 \text{ m/s}^2$  ( $32 \text{ ft/s}^2$ ). Only, that's not quite right. Depending on how thick the Earth's crust is, whether you're slightly closer to or farther from the Earth's center, or what the density of the material beneath you is, you'll experience slight variations in Earth's gravity as large as 0.2%, something you'd need to account for if you were a pendulum-clock-maker.

But surprisingly, the amount of water content stored on land in the Earth actually changes the gravity field of where you are by a significant, measurable amount. Over land, water is stored in lakes, rivers, aquifers, soil moisture, snow and glaciers. Even a change of just a few centimeters in the water table of an area can be clearly discerned by our best space-borne mission: NASA's twin Gravity Recovery and Climate Experiment (GRACE) satellites.

Since its 2002 launch, GRACE has seen the water-table-equivalent of the United States (and the rest of the world) change significantly over that time. Groundwater supplies are vital for agriculture and provide half of the world's drinking water. Yet GRACE has seen California's central valley and the southern high plains rapidly deplete their groundwater reserves, endangering a significant portion of the nation's food supply. Meanwhile, the upper Missouri River Basin—recently home to severe flooding—continues to see its water table rise.

NASA's GRACE satellites are the only pieces of equipment currently capable of making these global, precision measurements, providing our best knowledge for mitigating these terrestrial changes. Thanks

to GRACE, we've been able to quantify the water loss of the Colorado River Basin (65 cubic kilometers), add months to the lead-time water managers have for flood prediction, and better predict the impacts of droughts worldwide. As NASA scientist Matthew Rodell says, "[W]ithout GRACE we would have no routine, global measurements of changes in groundwater availability. Other satellites can't do it, and ground-based monitoring is inadequate." Even though the GRACE satellites are nearing the end of their lives, the GRACE Follow-On satellites will be launched in

2017, providing us with this valuable data far into the future. Although the climate is surely changing, it's water availability, not sea level rise, that's the largest near-term danger, and the most important aspect we can work to understand!

Learn more about NASA's GRACE mission here: [http://www.nasa.gov/mision\\_pages/Grace/](http://www.nasa.gov/mision_pages/Grace/)

Kids can learn all about launching objects into Earth's orbit by shooting a (digital) cannonball on NASA's Space Place website. Check it out at: <http://spaceplace.nasa.gov/how-orbits-work/>

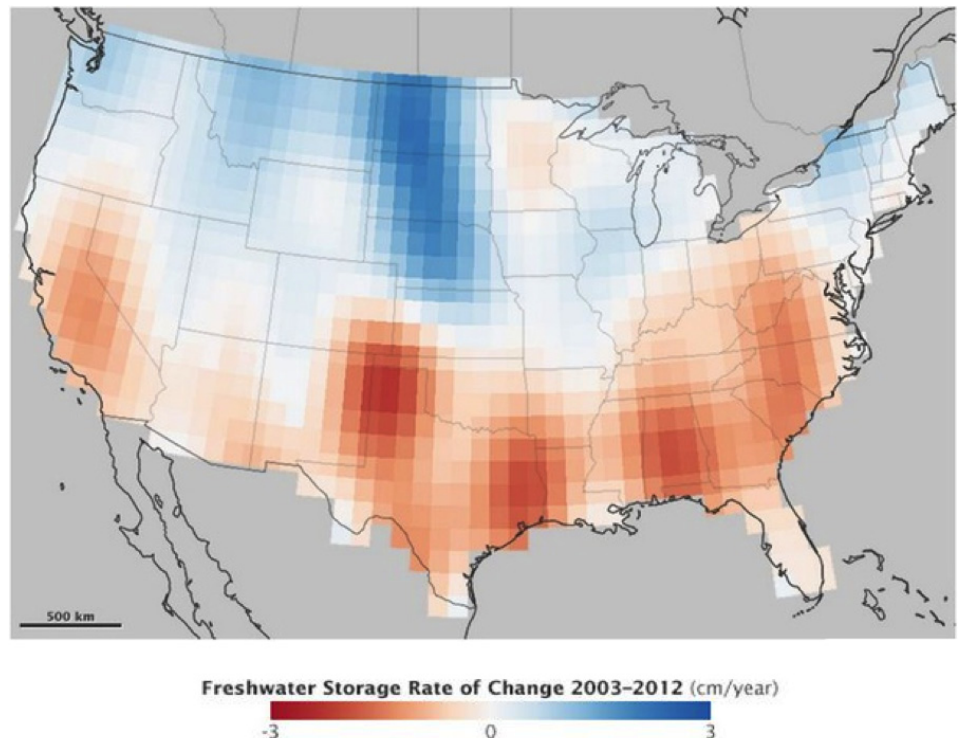


Image credit: NASA Earth Observatory image by Jesse Allen, using GRACE data provide courtesy of Jay Famigleitti, University of California Irvine and Matthew Rodell, NASA Goddard Space Flight Center. Caption by Holli Riebeck.





# AstroAssembly 2014

Celebrating 100 Years of Seagrave Observatory

September 26 & 27

47 Peepoad Road North Scituate, Rhode Island

[www.theskyscrapers.org/astroassembly2014](http://www.theskyscrapers.org/astroassembly2014)

**Friday Evening Talk & Stargazing:** Seagrave Observatory 7PM

***“The Lost Villages of Frank Seagrave’s Scituate and Building of the Reservoir”***

*Ray Wolf, Scituate Historian*

**Saturday Program** All day at Seagrave Observatory

Poster Session, Swap Tables (please bring your own table), Solar Viewing

Astrophotography Contest, Homemade Telescopes (bring yours!!)

Famous Astro Bake-off Contest!!

10:00am **Poster Session begins.** Please contact Steve Siok ([ssiok@cox.net](mailto:ssiok@cox.net)) to present

12:00pm Lunch at the **Skyscraper Grille**

1:15pm ***“The 100<sup>th</sup> Anniversary of Seagrave Observatory”***

David Huestis, Skyscraper Historian

2:30pm ***“The Korkosz Brothers and Their Amazing Starball”***

Rich Sanderson, Director Springfield Planetarium

3:45pm ***“Searching for Earth 2.0 and Cosmological Fossils with the Giant Magellan Telescope”***

Dr. Andrew Szentgyorgyi, Center for Astrophysics

**Saturday Evening Program at North Scituate Community Center**

5:15pm **Reception (Hors d’oeuvres and soft drinks served)**

6:00pm **Evening Banquet (Pre-registration required)**

7:15pm **Words of Welcome, Awards, Raffle Drawing**

7:30pm **Special Presentation**

8:00pm ***“A Retrospective of the Science of Astronomy in 1914”***

Dr. Owen Gingerich, Center for Astrophysics

Name \_\_\_\_\_

\_\_\_\_\_ Registrations X \$25 each = \$ \_\_\_\_\_  
(Members \$20 each)

Address \_\_\_\_\_

\_\_\_\_\_ Registrations (Free) Children under 14

\_\_\_\_\_

\_\_\_\_\_ Banquet Tickets @ \$25 = \$ \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ Banquet Tickets @ \$15 = \$ \_\_\_\_\_  
for Children under 14

**Send completed form and check (Made payable to Skyscrapers Inc.) to:**

*Linda Bergemann 41 Ross Hill Road, Charlestown, RI 02813-2605*

# 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