the Skyscraper

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August 2019

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

In This Issue:

Seagrave Memorial Observatory Open Nights

Saturdays st 9:00 pm,
8:00 pm beginning August 24
weather & conditions permitting

Phases of the Moon

New Moon
August 1 03:12

First Quarter Moon
August 7 17:31

Full Sturgeon Moon
August 15 12:29

Last Quarter Moon
August 23 14:56

New Moon
August 30 10:37

Saturday, August 10, 7:00pm
at Seagrave Observatory

Water on the Moon: How did it get there, what does it mean, and can we use it?

One of the most exciting areas of research in lunar science over the past decade has been the recognition and quantification of water (OH and H2O) in returned lunar samples. Such results can place important constraints on the formation conditions and geologic evolution of the Moon, and water has been measured in a range of lunar materials, including basalt, anorthosite, agglutinate, and volcanic glasses. Though critical for piecing together the history of the Moon, the returned Apollo and Luna samples represent only a small fraction of the lunar surface. In addition, glass beads from the central regions of the numerous dark pyroclastic deposits, formed by volcanic fire fountain eruptions, have not been directly sampled. These larger glass-rich deposits may be more representative of lunar pyroclastic eruption processes on the Moon as a whole. Fortunately, there exist a variety of global datasets acquired by orbiting spacecraft, and remotely sensed compositional information for large scale pyroclastic deposits may provide a link to lab measurements of volcanic glasses in the Apollo collection. It has been previously shown that near-infrared (NIR) reflectance spectra of the lunar surface exhibit absorptions that are diagnostic of OH/H2O. At a global scale, these spectral signatures are largely consistent with formation of OH due to solar wind interactions with the lunar regolith, consistent with direct measurements of water in glasses that are formed during micrometeorite bombardment on the Moon. However, recent analyses of NIR data acquired by the Moon Mineralogy Mapper (M3) instrument have also revealed the presence of water absorptions in nearly all previously mapped pyroclastic deposits. This talk will present estimates of water in different lunar materials that comes from different sources, as well as discuss ongoing efforts to refine such estimates in order to bridge the gap between orbital data and 'ground truth' from returned samples. Whether or not these water bearing materials provide a potential resource that can be extracted for human use or the production of fuel for future space exploration will also be discussed.

Ralph Milliken received a B.S. in Geology from Indiana University in 2001, an M.S. in Geology from Brown Univ. in 2003 and his Ph.D. from Brown in 2006. He then spent 4 years at the Jet Propulsion Lab/Caltech as a postdoctoral scholar and then Research Scientist, where he worked on a variety of projects related to the exploration of Mars, including NASA's Mars Reconnaissance Orbiter. During that time Ralph also became involved in the landing site selection process for the Mars Curiosity rover, and he has been an active member of the rover science team since 2011.He is also the director of the NASA Reflectance Experiment Laboratory at Brown University, which measures the reflectance and thermal emission properties of geologic materials, both from Earth and beyond, in order to help compare lab measurements to those acquired by various spacecraft. Ralph is currently a collaborator on the Japanese Space Agency's Hayabusa2 asteroid mission, which continues to observe the near-Earth C-type asteroid Ryugu and will return samples to Earth in 2022. Ralph enjoys just about anything related to planetary science, space, and spending time outdoors.

President's Message

by Steve Hubbard

As you all know, the trustees have embarked upon an aggressive repair and renovation effort this summer. Much needed upkeep and upgrades are being done and overdue maintenance items are being addressed.

I was recently at the observatory for a Saturday night session. The trustees have been hard at work and have gotten off to a terrific start.

Repairs to the roof of the Alvan Clark dome have been done and a new handrail and handicapped bar have been placed in the stairwell. Repairs to the door to the main observing floor have been done and a new system to make it easier to open the upper door on the dome will soon be in place. Materials have been collected to replace the roofs on the 2 roll off building as well as siding where needed. In addition to all of this hard work, the trustees have done a fantastic job at keeping the grounds looking neat and well maintained. We owe them all a vote of thanks for all of their hard work this year.

As part of our upkeep and improvement efforts this year, we have been receiving very generous donations to help offset the cost of this work from our members. The numbers are still coming in, so I can't report any totals yet, but we are above our goal number. This allows us to consider other items that may have been lower on the priority list and really get ahead of where we were.

To all of you who so generously donated to Skyscrapers this year, THANK YOU! It is very gratifying to see so much support of from our members that will help us keep amateur astronomy in RI going for many years to come.

And don't forget! We have a member's star party at Seagrave Observatory set for Saturday, August 31 and Saturday September 21. August and September are usually a couple of the best months of the year for stargazing. Earlier nights, cooler but not cold and thankfully few mosquitoes. Hope to see you there!

Sharing the Universe

by Linda Bergemann

We are working diligently to enhance the experience for visitors to Seagrave Memorial Observatory on our weekly Open Nights. The Observatory Committee is prepared to staff the telescopes and discuss astronomy with visitors. We can do more if we have other members available to greet visitors; no observing experience is required. If you can help on just one Saturday night, please let me know when you are available. My goal is to have every member volunteer for least one open night during the year. Please contact me at lbergemann@aol.com if you can help.

All Skyscrapers events are posted on the Night Sky Network calendar at https://nightsky.jpl.nasa.gov/event-list.cfm?Club_ID=1044. This Events Calendar is also embedded on Skyscrapers' website for easy access. Clicking on a calendar entry brings up details of the event, as well as information on the sky for that date.

August 3, 10 and 17 @ 9 PM; August 24 and 31 @ 8 PM: Open Nights at Seagrave Memorial Observatory. Hosts: Members of the Observatory Committee. Volunteers are needed to greet visitors. Contact Linda Bergemann at lbergemann@aol.com.

August 7 @ 8 PM: Stargazing at Chase Farm, 669 Great Road, Lincoln, RI 02865. 4 volunteers with telescopes are needed. Hosted by Francine Jackson. Contact Francine at francine_jackson@brown.edu if you are able to help.

August 15 @ 6 PM: Presentation at Greene Public Library, 179 Hopkins Hollow Road, Greene, RI 02827. An Introduction to Astronomy. Host: Dave Huestis. No additional help is needed.

August 23 @ 8 PM: Star Party at River Bend Farm Visitor Center, 287 Oak Street, Uxbridge MA 01569. Hosts: Jim Hendrickson and Francine Jackson. 4 volunteers with telescopes are needed. Contact Jim at hendrickson.jim@gmail.com if you are able to help.

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 **August 15** 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.

Lammas

by Francine Jackson

Of course, we're all familiar with the start of our four seasons, but dates that are often forgotten, or their significance, are the days that come virtually in the middle of the season: The cross-quarter days. For the most part, we have heard of them, at least most of them, although we don't normally place much stock in them. For our ancestors, however, the start of a season was a very important part of their lives; in addition, they placed the first half of a season as the "revving up" of it. After the center time, to them the season was then on its way out, ready to give way to the one to follow.

Some of these days may sound familiar, although not necessarily for the reason they should: For example, not too many of us have poles in our backyards to dance around on May 1st — May Day — but many don costumes or have candy ready just in case someone might want to play a trick on you October 31st — Halloween — and, of course, we all wait patiently for the cute, fluffy little rodent to be dragged out of his hole to decide for us what the weather will be throughout February and March.

But, what about the cross-quarter day for summer, approximately August 1st? According to Jon Underwood Bell, in his An Astronomer's Book of Days (and Nights), the original name for this day was Lughnasadh, citing the marriage of the Celtic Sun god Lugh to Danu, the Earth goddess, assuring the crops would grow and ripen.

In Christian culture, August 1st was the "Loaf Mass," which became "Lammas." Loaves of bread baked at this time were consecrated as the "feast of first fruits," the first food of the harvest. As this time was one of mainly farming, most people worked continuously during the long daylight hours, sometimes 'till exhaustion. The Lammas was a small break to this period — a chance for all to bake some bread and give thanks for the respite.

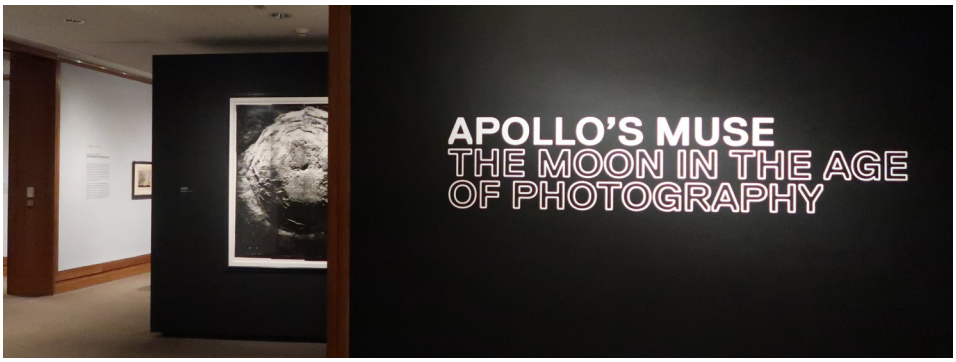
Francine Jackson is a NASA Solar System Ambassador, writes the weekly newsletter for Ladd Observatory and teaches astronomy at the Community College of Rhode Island. See more at http://theskyscrapers.org/francine-jackson

Apollo's Muse

by Francine Jackson

A recent section on a morning television show noted that the Metropolitan Museum of Art – Manhattan – had a temporary exhibit on the Moon, in honor of Apollo 11. Included in these several rooms are Daguerreotypes of the Moon, the Moon in art, dozens of lunar phases from Charles Le Morvan's Systematic Photographic Map of the Moon from 1914, two Trouvelot sketches, and many more. In addition, there are snippets from the 1902 *A Trip to the Moon*, Fritz Lang's *Woman in the Moon*, and the 1960 *Destination Moon*, where some of the script sounds quite familiar. You can even sit in front of an old wooden television and watch Walter Cronkite and Wally Schirra marvel at the first steps. There is much more to see, so plan to stay at least a couple hours. The exhibit will be at the Met until September 22nd.

If you can't make it there, there is a terrific complementary book, *Apollo's Muse*, which contains virtually everything on display. As a remembrance of the 50th anniversary of Apollo 11, this is a great souvenir of that most incredible time, when the world came together to witness what had been thought to be the impossible.



Share Your Apollo Memories

We're collecting your Apollo stories, recollections, photos and anecdotes. If we can gather enough of them, we'll put your memories together in a booklet form for keepsake memories and future generations. If you have anything to share, please send to Francine Jackson and Jim Hendrickson.
Francine_Jackson@brown.edu
hendrickson.jim@gmail.com

Splendid Saturn

by Dave Huestis

I hope the weather gods have provided a few clear nights since my Jupiter observing guide appeared last month. I finally observed Jupiter at a late June star party Skyscrapers members conducted for the Jesse Smith Memorial Library in Harrisville on June 28. The four Galilean moons were easily visible in all the telescopes, as were Jupiter's striking banded cloud tops. Regrettably the Great Red Spot was not visible that night, and my attempts to observe it since my last column have been thwarted for one reason or another. Fortunately, we have several more months to glimpse this perhaps dwindling storm.

I'm sure some of you couldn't resist an early look at Saturn, even if you had to wait much later in the evening for this beautiful ringed-planet to rise high enough into the sky to clear summer horizon haze. Perhaps sky conditions permitted you to obtain marginal views despite the planet's low altitude above the horizon within a couple of hours after sunset. Now that another month has passed, Saturn will have risen much higher into the southeast sky, thereby allowing for more favorable views. As promised at the end of July's column, here is a brief observing guide to Saturn (our solar system's most stunning planet.)

Simply mention the planet Saturn and immediately any child or adult will visualize a world surrounded by a system of rings. And if it weren't for Saturn's rings the disk of the planet could be considered boring, as its clouds are not as prominently colored as those are of Jupiter. With the exception of Titan, Saturn's largest moon, its other brighter moons are not as bright as Jupiter's either. The beauty of Saturn lies solely in its rings.

Back on July 9 Saturn was at opposition, rising as the sun set. This event also signaled Saturn's closest approach to the Earth for 2019—839,641,920 miles. By August 1 this distance has grown to 847,023,600 miles as the Earth pulls out ahead of Saturn in our respective orbits. Regardless of this ever-increasing distance from Earth during the remainder of our Saturn observing season, views of the planet never disappoint the casual stargazer or amateur astronomer.

When August begins, Saturn will be about 20 degrees above the southeast horizon at 9:00 p.m., nestled among the stars to the left of Sagittarius' "teapot handle" asterism. Saturn will continue to rise higher into the sky along a low arc until it reaches your north/south meridian around 11:00 p.m. At that time Saturn will be only 26 degrees above your southern horizon. For northern hemisphere observers summertime planetary observing is far from ideal because the ecliptic, the apparent path of the Sun and plane of the solar system, traces out a low arc across the sky during summertime nights. And since the planets can never stray from the ecliptic, they also will traverse this low arc.

Regardless, clear and turbulent-free atmospheric conditions can provide spectacular views of the Saturnian system. When you first acquire Saturn with a telescope, its rings will initially take your breath away. They are really an impressive spectacle to behold. The ring system is currently tilted 24 degrees toward the Earth providing us a view of the north face of the ring plane. With

the rings still being wide open (they were at their maximum tilt of 27 degrees two years ago), this configuration allows much detail to be seen. You'll understand what I mean as soon as you gaze at this splendid sight.

It is really amazing that Saturn's rings are visible at all, considering the planet's great distance from the Earth and the fact that the main A, B and C rings are only about 32 feet thick. Whereas other portions of the ring system are up to a couple of miles thick. The rings are composed of irregularly shaped dirty snowballs (99 percent water ice with some rocky material), ranging in size from grains of dust to pebbles. There are also some "boulders" as large as 30 feet across. These ring particles all orbit Saturn along the planet's equatorial plane. Look for gaps within the ring system.

You shouldn't have any difficulty seeing the gap between the primary "A" (outer) and "B" (inner) rings, called the Cassini Division. This region is only 2,175 miles wide. In comparison, the width of the "A" ring is 9,321 miles and the "B" ring is around 16,032 miles across. Saturn's rings are slowly de-orbiting and all will eventually "rain" down onto his cloud tops in 50 to 100 million years or so and cease to exist. So, you've got plenty of time to enjoy the view.

This configuration of the rings provides a stunning 3-D effect of the Saturnian system, and after opposition as our viewing angle changes a keen-eyed observer can look for the shadow of the rings upon Saturn's cloud tops as well as the shadow of Saturn onto its rings.

And finally, although Saturn has 62 confirmed moons (at last count), they are not as bright as those of Jupiter. One can also detect up to eight of Saturn's brightest moons in a dark moonless sky with the telescopes available locally. Readily apparent will be Titan, Saturn's largest moon (and larger than the planet Mercury), followed in order by size and brightness by Rhea, Iapetus, Dione, Tethys, Enceladus, Mimas and Hyperion

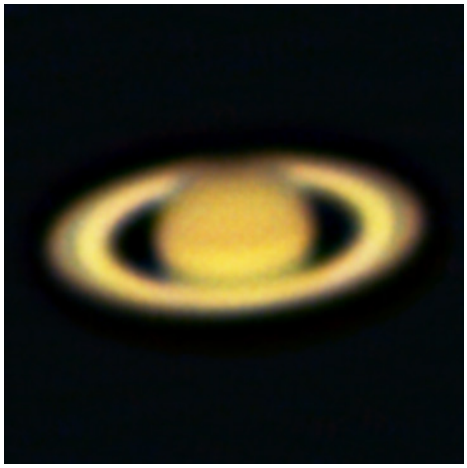


Image of Saturn on July 12 by Tom Thibault.

While a small two-inch telescope will reveal the beauty of Saturn, search out larger instruments available throughout Rhode Island to explore this exquisite ringed world in splendid detail. Seagrave Memorial Observatory in North Scituate (http://www.theskyscrapers.org) is open every clear Saturday night for observing. Ladd Observatory (http://www.brown.edu/Departments/Physics/Ladd/) in Providence is scheduled to reopen Tuesday, July 10, and every clear Tuesday thereafter. The Margaret M. Jacoby Observatory at the CCRI Knight Campus in Warwick (http://www.ccri.edu/physics/observatory.htm) is open every clear Wednesday night. Also consider visiting Frosty Drew Observatory (http://www.frostydrew.org/) in Charlestown on every clear Friday night. Please visit the respective websites for details. These observing sessions are free and open to the public.

Saturn is the true "Lord of the Rings."

Dave Huestis is Skyscrapers Historian and has been contributing monthly columns to local newspapers for nearly 40 years. See more at http://theskyscrapers.org/dave-huestis

Poor Prospects for Perseids

by Dave Huestis

While the Geminid meteor shower of mid-December reigns supreme as the northern hemisphere's most productive display of shooting stars, August's Perseids, coming in a close second, are the most widely observed meteor shower of the year. Why? Warm temperatures find families spending more time outdoors during the summer season enjoying cookouts, camping, or any other assortment of late evening activities. Normally 60+ green, red or orange Perseids can be observed per hour during peak activity. Unfortunately, for 2019 a waxing gibbous Moon (Full on the 15th) will severely hamper observing this meteor shower which peaks on the night of August 12-13.

However, while moonlight will wash out all but the brightest meteors before midnight on the night of the 12th, once the Moon sets around 3:48 a.m. that will leave just over an hour of dark sky observing time before dawn's early light begins to brighten the sky. Somewhat helpful is the fact that Perseus, the constellation from where the meteors appear to radiate (known as the radiant point), is completely opposite the sky from the Moon. This circumstance could help extend your window of opportunity to an hour or two before the Moon sets! Hey, I'm trying my best to be optimistic here!!

Just around midnight Perseus can be found about halfway above the northeast horizon. To locate Perseus, use the constellation Cassiopeia as your guide. This star pattern looks like a sideways capital "M" or "W."

The Perseid meteors are about the size of a thumb nail as they plunge into Earth's atmosphere at 134,222 miles per hour (37 miles per second) and disintegrate. You know you've seen a Perseid if you can trace the path of that meteor back to the radiant point. If peak night is cloudy you can try your luck on the nights before and after. The Moon will still be an issue however and the number of potential meteors will also be much lower as the Earth will no longer be passing through the denser regions of the meteor stream.

Good luck and clear skies.

Dave Huestis is Skyscrapers Historian and has been contributing monthly columns to local newspapers for nearly 40 years. See more at http://theskyscrapers.org/dave-huestis

It is with great sadness we must inform everyone on the passing of long-time Skyscrapers member and dear friend Gerry Dyck.

He passed on the morning of July 23 due to sudden cardiac arrest. In recent months his heart had been operating at only 20%.

Please keep his wife Helga and the entire family in your thoughts.

Gerry's spirit with live long in our memory.

No calling hours or funeral service will be held.

Helga plans to have a memorial service sometime in September.

Skyscrapers will host a tribute to Gerry at AstroAssembly.

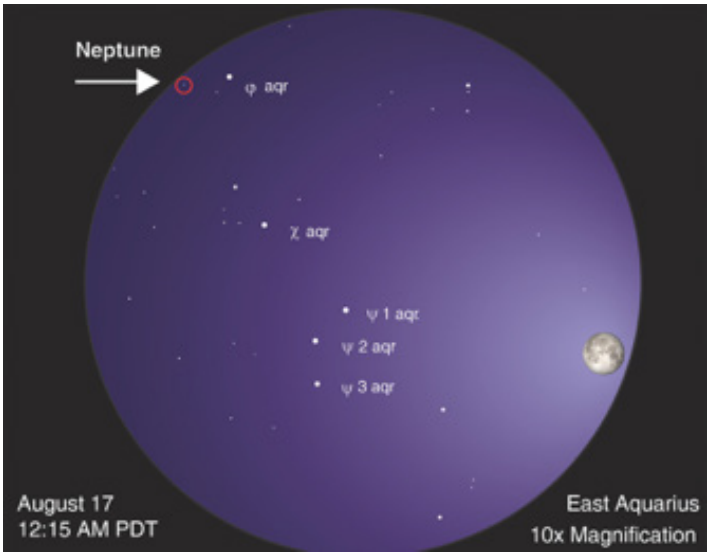
NASA Night Sky Notes:

Chill Out: Spot an Ice Giant in August

By David Prosper

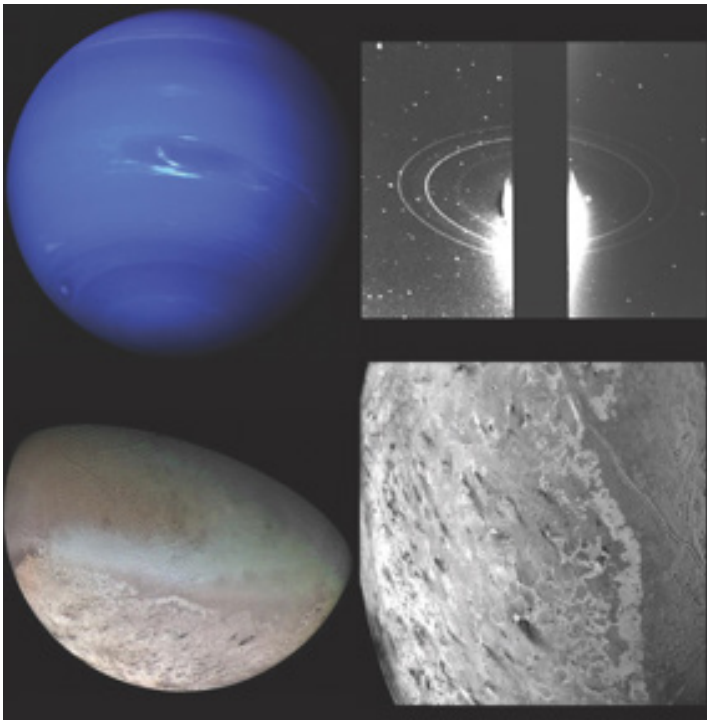
Is the summer heat getting to you? Cool off overnight while spotting one of the solar system's ice giants: Neptune! It's the perfect way to commemorate the 30th anniversary of Voyager 2's flyby.

Neptune is too dim to see with your unaided eye so you'll need a telescope to find it. Neptune is at opposition in September, but its brightness and apparent size won't change dramatically as it's so distant; the planet is usually just under 8th magnitude and 4.5 billion kilometers away. You can see Neptune with binoculars but a telescope is recommended if you want to discern its disc; the distant world reveals a very small but discernible disc at high magnification. Neptune currently appears in Aquarius, a constellation lacking in bright stars, which adds difficulty to pinpointing its exact location. Fortunately, the Moon travels past Neptune the night of August 16th, passing less than six degrees apart (or about 12 Moon widths) at their closest. If the Moon's glare overwhelms Neptune's dim light, you can still use the its location that evening to mark the general area to search on a darker night. Another Neptune-spotting tip: Draw an imaginary line from bright southern star Fomalhaut up to the Great Square of Pegasus, then mark a point roughly in the middle and search there, in the eastern edge of Aquarius. If you spot a blue-ish star, swap your telescope's eyepiece to zoom in as much as possible. Is the suspect blue "star" now a tiny disc, while the surrounding stars remain points of white light? You've found Neptune!



Finder chart for Neptune. This is a simulated view through 10x50 binoculars (10x magnification). Please note that the sizes of stars in this chart indicate their brightness, not their actual size. Moon image courtesy NASA Scientific Visualization Studio; chart created with assistance from Stellarium.

Neptune and Uranus are ice giant planets. These worlds are larger than terrestrial worlds like Earth but smaller than gas giants like Jupiter. Neptune's atmosphere contains hydrogen and helium like a gas giant, but also methane, which gives it a striking blue color. The "ice" in "ice giant" refers to the mix of ammonia, methane, and water that makes up most of Neptune's mass, located in the planet's large, dense, hot mantle. This mantle surrounds an Earth-size rocky core. Neptune possesses a faint ring system and 13 confirmed moons. NASA's Voyager 2 mission made a very close flyby on August 25, 1989. It revealed a dynamic, stormy world streaked by the fastest winds in the solar system, their ferocity fueled by the planet's surprisingly strong internal heating. Triton, Neptune's largest moon, was discovered to be geologically active, with cryovolcanoes erupting nitrogen gas and dust dotting its surface, and a mottled "cantaloupe" terrain made up of hard water ice. Triton is similar to Pluto in size and composition, and orbits Neptune in the opposite direction of the planet's rotation, unlike every other large moon in the solar system. These clues lead scientists to conclude that this unusual moon is likely a captured Kuiper Belt object.



Clockwise from top left: Neptune and the Great Dark Spot traced by white clouds; Neptune's rings; Triton and its famed icy cantaloupe surface; close of up Triton's surface, with dark streaks indicating possible cyrovolcano activity. Find more images and science from Voyager 2's flyby at bit.ly/NeptuneVoyager2 Image Credit: NASA/JPL

Discover more about Voyager 2, along with all of NASA's past, present, and future missions, at nasa.gov

This article is distributed by the NASA Night Sky Network, a coalition of hundreds of astronomy clubs across the US dedicated to astronomy outreach. Visit nightsky.jpl.nasa.gov to find local clubs, events, stargazing info and more.

Open Cluster in Scutum: Messier 11 (NGC 6705)

by Glenn Chaple for LVAS

Mag: 5.8 Size: 14′

If prolonged squinting at our recent spate of Observer's Challenge 11th magnitude galaxies has left you with a severe case of eye strain, you'll appreciate this month's "eye-opener" - the open cluster Messier 11. Slightly brighter than 6th magnitude, M11 is visible to the unaided eye from dark-sky locations.

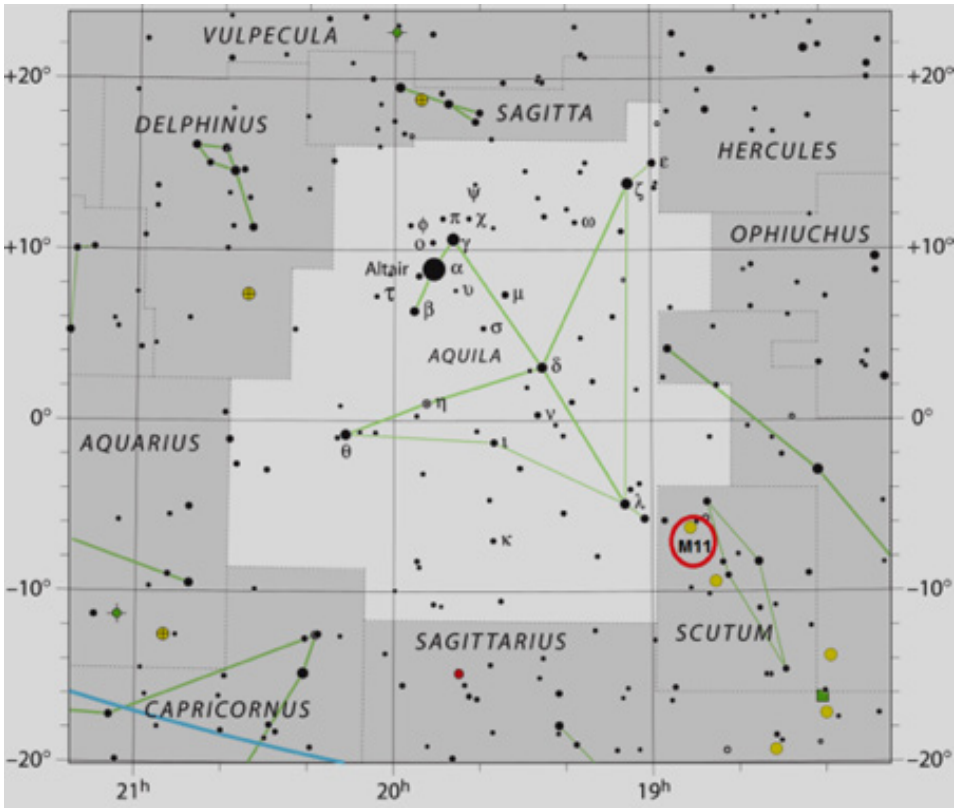
M11 is a small (only about ¼ degree in diameter) but rich stellar assemblage. It contains nearly 3000 stars, 500 of which are magnitude 14 or brighter.

Using 10X50 binoculars on a hazy and humid summer evening, I had no trouble spotting M11 just southwest of a sleigh-shaped asterism comprised of the stars 14, 15, lambda (λ), and 12 Aquilae, plus eta (η) and beta (β) Scuti. It took on a grainy appearance when viewed with my 4.5-inch f/8 reflector – especially when averted vision was used. No need for averted vision when I turned my 10-inch f/5 reflector on M11! A grainy haze became a splash of dozens of stars brighter than 12th magnitude. A 9mm Nagler wide-field eyepiece, which yielded 139X and a 0.6 degree field, provided the best view

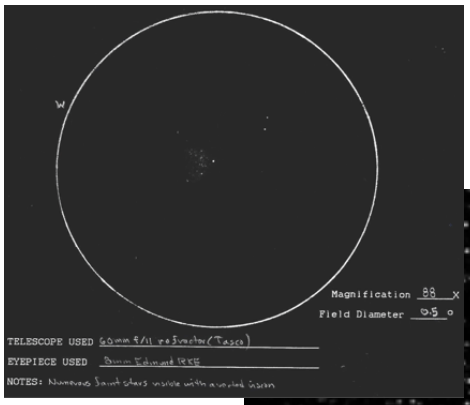
So what sort of challenge would a naked eye cluster offer? Where M11 is concerned, I'd focus on its nick-name, the "Wild Duck" Cluster. The moniker arises from the cluster's supposed V shape, reminiscent of a flock of migrating ducks. I just don't see it, and the images by Mario Motta and Doug Paul bring to mind a circular flock of starlings or blackbirds. What do you see?

M11 was discovered by the German astronomer Gottfried Kirch in 1681 and catalogued by Messier in 1762. It lies about 6200 light years away.

The purpose of the LVAS Observer's Challenge is to encourage the pursuit of visual observing. It is open to everyone that is interested, and if you are able to contribute notes, drawings, or photographs, the LVAS will be happy to include them in our monthly summary. If you would like to contribute material, submit your observing notes, sketches, and/or images to either Roger Ivester (rogerivester@me.com) or Fred Rayworth (queex@embarqmail.com). To find out more about the LVAS Observer's Challenge or access past reports, log on to rogerivester.com/category/observers-challenge-reports-complete.

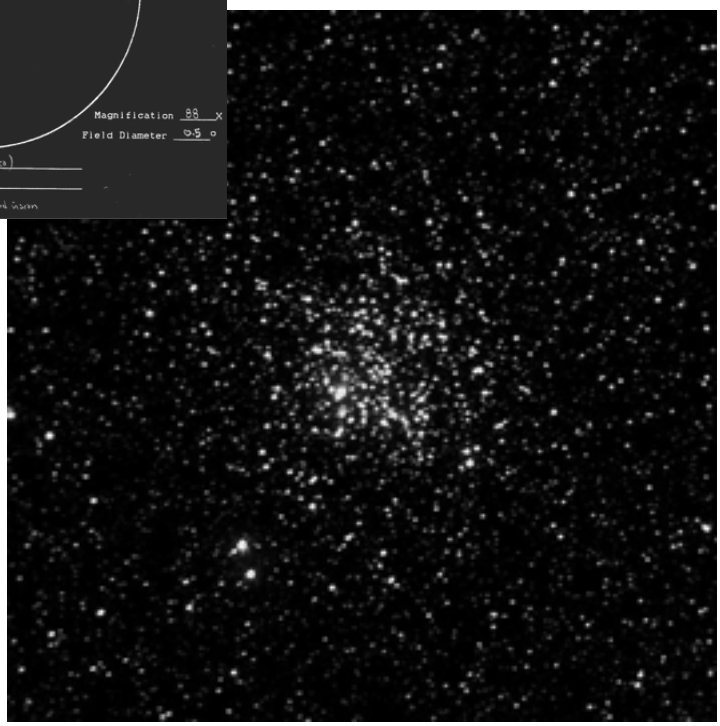


www.messier-objects.com, IAU, and Sky and Telescope



Sketch by Glenn Chaple (ATMoB)

Mario Motta, MD (ATMoB)



The Sun, Moon & Planets in August

This table contains the ephemeris of the objects in the Solar System for each Saturday night in August 2019. Times in Eastern Daylight Time (UTC-4). Ephemeris times are for Seagrave Observatory (41.845N, 71.590W).

Object	Date	RA	Dec	Const	Mag	Size	Elong	Phase(%)	Dist(S)	Dist(E)	Rise	Transit	Set
Sun	**3**	8 51.4	17 37.7	Cnc	-26.8	1891.1	-	-	-	1.01	05:41	12:52	20:02
	10	9 18.2	15 42.3	Cnc	-26.8	1893.1	-	-	-	1.01	05:48	12:51	19:53
	17	9 44.6	13 34.5	Leo	-26.8	1895.4	-	-	-	1.01	05:56	12:50	19:44
	24	10 10.5	11 16.3	Leo	-26.8	1898.0	-	-	-	1.01	06:03	12:48	19:33
	31	10 36.1	8 49.2	Leo	-26.8	1900.8	-	-	-	1.01	06:10	12:46	19:22
Moon	**3**	10 36.7	12 06.4	Leo	-9.6	2004.4	27° E	5	-	-	08:32	15:24	22:03
	10	16 55.8	-20 35.9	Oph	-12.3	1859.4	118° E	73	-	-	16:34	21:21	02:06
	17	22 55.1	-12 13.6	Aqr	-12.5	1763.5	163° W	98	-	-	20:41	02:09	07:43
	24	4 15.9	16 57.7	Tau	-11.8	1840.0	86° W	46	-	-	23:53	07:16	14:48
	31	11 09.7	9 08.0	Leo	-7.3	2008.6	9° E	1	-	-	07:23	14:03	20:32
Mercury	**3**	7 41.7	18 04.1	Gem	1.3	9.2	17° W	18	0.38	0.73	04:30	11:41	18:52
	10	7 59.6	19 09.9	Cnc	0.0	7.5	19° W	40	0.34	0.89	04:17	11:33	18:49
	17	8 38.1	18 47.7	Cnc	-0.8	6.3	17° W	67	0.31	1.08	04:31	11:46	19:00
	24	9 29.6	16 17.5	Leo	-1.3	5.5	11° W	89	0.31	1.24	05:06	12:10	19:13
	31	10 23.6	11 56.4	Leo	-1.9	5.0	4° W	99	0.34	1.34	05:50	12:36	19:21
Venus	**3**	8 39.9	19 25.6	Cnc	-3.8	9.8	3° W	100	0.72	1.73	05:25	12:41	19:58
	10	9 15.0	17 11.4	Cnc	-3.8	9.8	2° W	100	0.72	1.73	05:42	12:49	19:55
	17	9 49.3	14 33.8	Leo	-3.8	9.8	2° E	100	0.72	1.73	05:59	12:55	19:51
	24	10 22.8	11 36.7	Leo	-3.8	9.8	3° E	100	0.72	1.73	06:16	13:01	19:45
	31	10 55.5	8 24.1	Leo	-3.8	9.8	5° E	100	0.72	1.72	06:33	13:06	19:38
Mars	**3**	9 32.5	15 47.8	Leo	1.8	3.5	10° E	100	1.66	2.65	06:31	13:32	20:33
	10	9 49.8	14 20.0	Leo	1.7	3.5	8° E	100	1.66	2.66	06:27	13:22	20:17
	17	10 07.0	12 47.7	Leo	1.7	3.5	6° E	100	1.67	2.67	06:22	13:11	20:00
	24	10 24.0	11 11.5	Leo	1.7	3.5	3° E	100	1.67	2.67	06:18	13:01	19:43
	31	10 40.8	9 31.8	Leo	1.7	3.5	1° E	100	1.67	2.68	06:13	12:50	19:26
1 Ceres	**3**	15 56.8	-20 31.5	Sco	8.4	0.5	111° E	97	2.82	2.29	15:10	19:54	00:38
	10	15 59.8	-20 59.1	Sco	8.5	0.5	105° E	97	2.82	2.38	14:47	19:30	00:12
	17	16 03.8	-21 27.8	Sco	8.6	0.5	99° E	97	2.83	2.48	14:26	19:06	23:46
	24	16 08.8	-21 57.2	Sco	8.7	0.5	94° E	97	2.83	2.58	14:06	18:44	23:22
	31	16 14.7	-22 27.0	Sco	8.8	0.5	88° E	97	2.84	2.68	13:46	18:22	22:58
Jupiter	**3**	16 53.5	-22 07.3	Oph	-2.3	42.4	124° E	99	5.28	4.64	16:13	20:50	01:27
	10	16 53.0	-22 07.9	Oph	-2.2	41.5	117° E	99	5.28	4.74	15:45	20:22	00:59
	17	16 53.1	-22 09.5	Oph	-2.2	40.7	111° E	99	5.28	4.83	15:18	19:55	00:32
	24	16 53.9	-22 12.0	Oph	-2.1	39.9	104° E	99	5.27	4.93	14:51	19:28	00:05
	31	16 55.4	-22 15.5	Oph	-2.1	39.0	98° E	99	5.27	5.04	14:25	19:02	23:39
Saturn	**3**	19 07.2	-22 15.4	Sgr	0.2	18.2	155° E	100	10.05	9.12	18:27	23:03	03:40
	10	19 05.4	-22 18.9	Sgr	0.2	18.1	148° E	100	10.05	9.17	17:57	22:34	03:10
	17	19 03.8	-22 22.1	Sgr	0.2	17.9	141° E	100	10.05	9.24	17:29	22:05	02:41
	24	19 02.5	-22 24.8	Sgr	0.3	17.8	134° E	100	10.05	9.32	17:00	21:36	02:12
	31	19 01.5	-22 27.0	Sgr	0.3	17.6	127° E	100	10.05	9.41	16:32	21:08	01:43
Uranus	**3**	2 17.7	13 14.2	Ari	5.8	3.6	94° W	100	19.84	19.74	23:26	06:17	13:07
	10	2 17.8	13 14.7	Ari	5.8	3.6	101° W	100	19.84	19.63	22:59	05:49	12:40
	17	2 17.8	13 14.4	Ari	5.8	3.6	107° W	100	19.84	19.51	22:31	05:22	12:12
	24	2 17.6	13 13.3	Ari	5.7	3.6	114° W	100	19.83	19.40	22:03	04:54	11:45
	31	2 17.3	13 11.5	Ari	5.7	3.7	121° W	100	19.83	19.30	21:36	04:26	11:17
Neptune	**3**	23 18.5	-5 36.0	Aqr	7.8	2.3	142° W	100	29.94	29.13	21:36	03:18	09:00
	10	23 17.9	-5 39.7	Aqr	7.8	2.3	149° W	100	29.94	29.06	21:08	02:50	08:32
	17	23 17.3	-5 43.7	Aqr	7.8	2.4	156° W	100	29.93	29.01	20:40	02:22	08:03
	24	23 16.7	-5 48.0	Aqr	7.8	2.4	163° W	100	29.93	28.97	20:12	01:54	07:35
	31	23 16.0	-5 52.5	Aqr	7.8	2.4	170° W	100	29.93	28.94	19:41	01:21	07:02
Pluto	**3**	19 32.9	-22 10.5	Sgr	14.2	0.2	161° E	100	33.85	32.89	18:52	23:29	04:06
	10	19 32.3	-22 12.6	Sgr	14.3	0.2	154° E	100	33.86	32.94	18:24	23:01	03:38
	17	19 31.7	-22 14.5	Sgr	14.3	0.2	147° E	100	33.86	33.00	17:56	22:33	03:09
	24	19 31.2	-22 16.3	Sgr	14.3	0.2	140° E	100	33.87	33.08	17:28	22:05	02:41
	31	19 30.7	-22 18.0	Sgr	14.3	0.2	134° E	100	33.87	33.17	17:00	21:37	02:13

Skyscrapers at Apollo 50th Anniversary WaterFire

by Ronald Zincone

Hey Skyscrapers:

It was a pleasure and fun working as a team with you folks at the WaterFire Apollo event. I stayed until 11 pm and continued to show people Jupiter and its moons through my telescope and I passed out the remaining Skyscraper's / Moon flyers. Hopefully, we will get some new members to join. This WaterFire event is a great example of what Skyscrapers needs to do going forward in our future as an astronomy club. We must get out to the masses and do good PR and educate.

Many people were thrilled looking at Jupiter through my scope but especially the kids! Bob's astro images were a huge hit and what a great job the boy scout troop 1 did of their Saturn V rocket. I have attached some pics from the event.

Enjoy!

AstroAssembly 2019

October 4th and 5th

47 Peeptoad Road, North Scituate, Rhode Island

Friday Evening

at Seagrave Observatory

6:00 PM *Open House and Refreshments*
7:30 PM *Short Talks*
9:00 PM *Stargazing*

Contact Bob Horton at Robert_Horton@Brown.edu if you wish to give a talk.

All Day Saturday

at Seagrave Observatory

Poster Session, Swap Table (please bring your own table), Solar Viewing, Astrophotography Contest, Homemade Telescopes (bring yours), and the Famous Astro Bake-off Contest.

10:30 AM **Steve Hubbard, President, Skyscrapers, Inc. -** "Southern Skies: A trip below the equator to see an eclipse, the southern Milky Way and even a llama or two"

Noon **Lunch at the Skyscrapers Grill**

1:15 PM **Roger Fu, Harvard University -** "Stars Through the Araucanias: Mapuche-Pewenche Ethnoastronomy"

2:30 PM **Ed Ting, New Hampshire Astronomical Society -** "Chile 2017-2018 Astronomical Trip"

3:45 PM **Prathima Muniyappa, MIT Space Exploration Initiative, Indigenous Cosmologies Working Group - "**We Have Always Had Our Eyes Turned Skyward - Art, Culture and Inclusion in the Democratization of Space"

Saturday Evening

at North Scituate Baptist Church, 619 W Greenville Rd (Route 116), North Scituate, RI 02857

Reception & Antipasto Bar (pre-registration required)

Evening Banquet – Italian-style Buffet Dinner catered by Quik Stop Deli (pre-registration required)

Words of Welcome, Awards, Raffle Drawing

7:30 PM **Professor John Mustard, Department of Earth, Environmental and Planetary Sciences, Brown University -** "What Will Mars 2020 Tell Us About the Planets?"

Times of specific activities are subject to change. For up-to-date program information, see http://www.theSkyscrapers.org/astroassembly2019

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:** 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.

_____ Registrations x $25 each = $ _____

_____ Registrations (Skyscrapers Member) x $20 each = $ _____

_____ Registrations (Children under 14) Free _____

_____ Banquet Tickets x $25 each = $ _____

_____ Banquet Tickets (Children under 14) x $15 each = $ _____

Total = $ _____

Name _____

Address _____

_____

Email _____

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

www.theSkyscrapers.org

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SKYSCRAPERS INC.

47 Peeptoad Road
North Scituate, Rhode Island 02857