the Skyscraper

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June 2017

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

In This Issue:

Saturday, June 3
at Seagrave Observatory

2:00pm: Solar Observing

The Skyscrapers are going to be running a solar observing session from 2 to 4pm. This session is open to members and the general public.

We will be looking at the Sun using specially filtered telescopes and binoculars as well as CCD cameras hooked up to laptops. We will be observing the Sun in both white light (showing sunspots) and hydrogen Alpha, showing the chromosphere, prominences, and Flares. We will have several specialized solar telescopes for people to observe with and experienced amateur solar astronomers and photographers to answer your questions.

For further information or to volunteer to help contact Jeff Padell at jeffpadell@gmail.com

5:00pm: Skyscrapers Annual Potluck Dinner

Participants are asked to bring a dish to share - appetizers, casseroles, salads, desserts. Beverages, plates etc will be provided. There will be no grills available. Please contact Kathy Siok at kathys5@cox.net by June 1st to let us know what you plan to bring.

7:00pm: Featured Speaker Michael O'Shea

Michael O'Shea will talk about the Popscope sidewalk astronomy group in Boston.

A native of Chicago, Michael is passionate about higher education, student mobility, and community engagement. He previously worked as the EducationUSA Advisor with Fulbright Canada and the U.S. Embassy in Ottawa, helping Canadian students study in the United States. Michael holds a B.A. in Public Policy Analysis from Pomona College and an M.S.Ed. in Higher Education from the University of Pennsylvania. He holds dual Canadian and American citizenship.

Skyscrapers Board Meetings

Third Monday of the Month
All Members Welcome

Phases of the Moon

First Quarter Moon
June 1 12:42

Full Strawberry Moon
June 9 13:10

Last Quarter Moon
June 17 11:33

New Moon
June 24 02:31

President's Message

by Steve Siok

On behalf of Skyscrapers, I want to congratulate Josh Corr for completing an 8-inch Dobsonian telescope for his senior project at Portsmouth High School. As you may remember, Josh contacted Skyscrapers during the winter when he was looking for a mentor for this project. He asked for one, but he got several members who worked with him during the past few months. Those individuals provided him with advice as well as giving him items for his telescope. Bob Horton donated a refigured 8" mirror and the secondary and spider, Steve Siok provided the Sonotube, Jim Crawford gave him the finder scope.

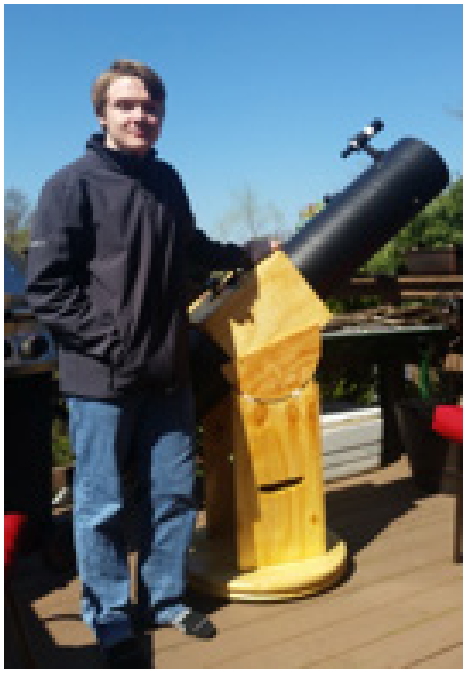
While he was working on this project, Josh visited the observatory with his family and also talked to Bob at Ladd. Josh visited Jim Crawford's personal observatory in Middletown for observing. Steve Siok met with Josh and his dad multiple times to discuss construction plans and details about problems he encountered.

Two weeks ago, Josh defended his project before a board of six faculty at Portsmouth High School and was given approval for job well done. He had first light just a few days ago at his home. Josh said:

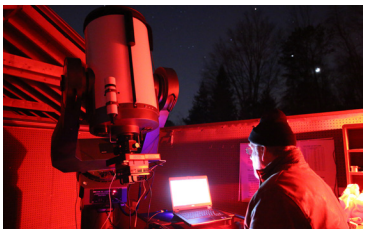
" I had tried out my telescope. The f ratio was only off about an inch and a half so I adjusted what I could and it works great. I have some balance problems to fix but other than that it's doing great. I have only seen Jupiter and its moons but it looked fantastic!"

Josh plans to attend Valparaiso University in Indiana where he will study Physics next fall.

Steve Siok is president of Skyscrapers, Inc. See more at http://www.theskyscrapers.org/steve-siok



Spring 2017 Astronomy Workshop Series



June 23, 8:00 P.M.: Astrophotography

RESCHEDULED FROM AN EARLIER DATE

This evening will introduce you to taking images with a CCD camera, but you can bring with you any photographic equipment you might own. Note: Space is limited, and this workshop is weather dependent. If cloudy it will be rescheduled. If interested, please contact Bob Horton at shootingsta98@gmail.com.

Bob Horton and Jim Hendrickson have been photographing the sky for decades, and are always willing to impart their knowledge to others.

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 **June 15** to Jim Hendrickson, 1 Sunflower Circle, North Providence, RI 02911 or e-mail to jim@distantgalaxy.com.

E-mail subscriptions

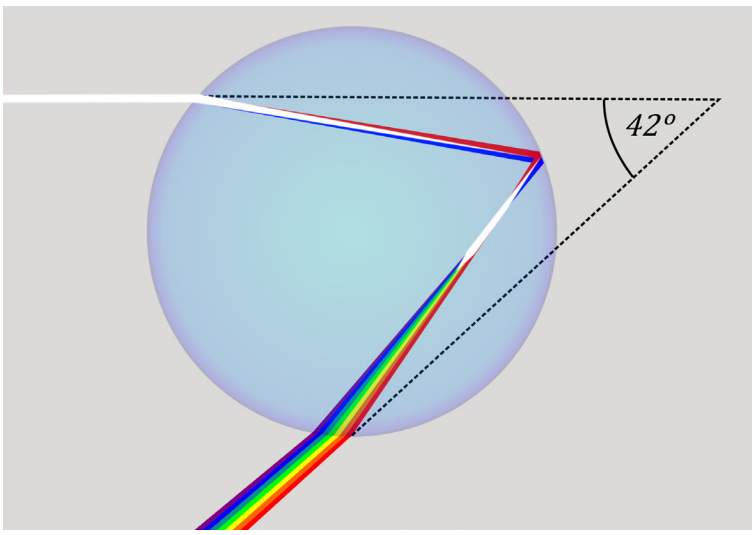
To receive The Skyscraper by e-mail, send e-mail with your name and address to jim@distantgalaxy.com. Note that you will no longer receive the newsletter by postal mail.

Rainbow over Seagrave Observatory

by Francine Jackson

At one of our recent workshops, mine, in fact, we were witness to one of Nature's most beautiful sights: A rainbow. And, not only the incredible primary set of colors, but a secondary, where the normal grouping of color is reversed.

As many of us are aware of how a rainbow is created, by light passing through a droplet of water and having some of the light reflected off the back and some of it is refracted, we'll just remind you that, to see one, all we have to remember is two things: The Sun has to be shining, and it must be raining at least a little bit, so go outside and get wet, turn your back to the Sun, and hopefully you'll be seeing one of Nature's most incredible phenomena.



One of the more unusual features of observing a rainbow is that no two people see the same one. Each person, standing at just a slightly different position, sees it differently; but, it doesn't matter, as the results are the same.

Fortunately, that evening, several (hundred) images of it were taken by several of our members, as it was visible for us for quite some time.

In addition to being an absolutely beautiful part of our sky, it is written that the rainbow has a major significance: According to the Bible, a rainbow is a reminder to us that the world was destroyed by water once already. It will not happen again. Although the rain we've been experiencing recently does seem rather excessive, we can, by observing rainbows, remind ourselves that the watery inconvenience is only temporary. Enjoy their beauty.

Francine Jackson is Skyscrapers Public Relations Spokesperson, writes the weekly newsletter for Ladd Observatory and serves as planetarian at the University of Rhode Island. See more at http://theskyscrapers.org/francine-jackson

Summer is for Saturn

by Dave Huestis

Just about everyone's favorite planet has been in the news lately. I'm talking about that beautiful ringed world Saturn. The Cassini spacecraft, launched in 1997, has been orbiting Saturn since 2004, making a multitude of passes of the planet and some of his moons. Thousands of detailed images have been taken, as well as a wide variety of scientific measurements.

However, the end is near for Cassini. On September 15 the craft will descend into Saturn's cloud tops and disintegrate. This dramatic end to a very successful exploration of the Saturnian system was developed many years ago by NASA JPL mission planners. But wait. There's more!

Beginning on April 26 the spacecraft made the first of a total of 22 passes through the 1500-mile gap between Saturn and his innermost known ring. It performed this maneuver at around 77,000 mph. Check out the video on this web site:

http://bit.ly/2rhtL4u

The spacecraft was oriented so its 13 foot in diameter antenna was pointed in the direction of motion, acting as a "deflector," in anticipation of running into any dust particles along the trajectory. At Cassini's speed colliding with even a small speck could compromise the integrity of the spacecraft. As luck would have it, not much dust was detected, prompting Project Manager Earl Maize of NASA's JPL to say, "The region between the rings and Saturn is 'the big emp-ty,' apparently."

Your exploration of Saturn can begin immediately. However, on June 15 this exquisite world will be at its closest distance to the Earth for 2017—still a distant 840,320,000 miles. When the Sun sets Saturn will be rising. This phenomenon is called an opposition, since the planet will be opposite the Sun in our sky. This event will herald a summer of Saturn observing.

Saturn can be found in the constellation of Ophiuchus, a rather obscure sky pattern between Scorpius and Sagittarius. Though Ophiuchus is actually a zodiacal constellation (which means the sun passes through it), it is not one of the twelve official zodiacal constellations. That's a story for another column. Bright Saturn is to the left of the scorpion and to the right of the archer, sitting amongst the pale haze of stars that is our Milky Way Galaxy. This milky haze rises like steam from the "teapot" asterism of Sagittarius.

To observe as much detail as possible you should wait until Saturn, or any astronomical object, rises well enough above the horizon to minimize atmospheric turbulence. Depending upon your observing location you may also have to wait until later in the evening for Saturn to clear your local tree-line or neighbor's house. If you don't consider the latter, the police may pay you a visit.

When you first acquire Saturn with a telescope its rings will initially take your breath away. They are really an impressive sight to behold. The ring system is tilted 26-plus degrees toward the Earth providing us with a view of the north face of the ring plane. With the rings so "wide open," this configuration allows much detail to be seen. You'll understand what I mean as soon as you gaze at this splendid sight. The rings will continue to open until October when they will be at their maximum "openness" or tilt of about 27 degrees.

It is really amazing that Saturn's rings are even visible at all, considering the planet's great distance from the Earth and the fact that the main rings are only about 32 feet thick, with other portions of the ring system up to about two-thirds of a mile thick. The rings are composed of irregularly shaped dirty snowballs, ranging in size from grains of dust to the size of pebbles. There are also some "boulders" as large as several feet across. They all orbit Saturn along the planet's equatorial plane. Look for gaps within the ring system.

Though Saturn is a gas giant a little smaller than Jupiter, it does not exhibit the prominent bands and zones in its cloud tops as its larger cousin does. Not much detail can be observed at all on Saturn's disk. In fact, if it weren't for Saturn's ring system, this planet would be quite a boring destination for most amateur astronomers and the public alike.

A keen-eyed observer can look for the shadow of the rings upon Saturn's cloud tops. The configuration of the rings provides a stunning 3-D effect of the Saturnian system. One can also detect up to eight of its brightest moons in a dark moonless sky with the telescopes available locally. So now through about mid-November treat yourself and your family and friends to wonderful views of Saturn. And while you do so, imagine you're a stowaway aboard Cassini as it traverses that 1500 mile gap between Saturn and his rings. Your view from here on Earth won't be as spectacular, but Saturn will still knock your socks off. You won't be disappointed.

And finally, the Summer Solstice arrives at 12:24 a.m. EDT (Eastern Daylight Time) on June 21.

Spend some quality time this summer exploring the many astronomical pleasures provided by the local observatories

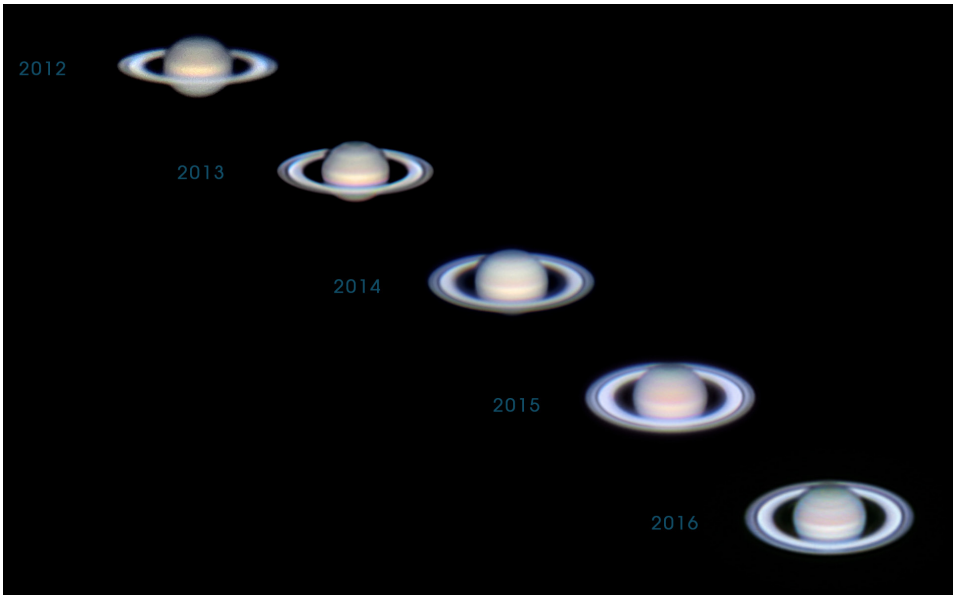


Image is a composite compiled by Scott MacNeill, director of Frosty Drew Observatory in Charlestown. He imaged Saturn during successive oppositions(close approaches) from 2012 to 2016 to show the changing tilt of the rings.

throughout Rhode Island. Marvel at Saturn's rings and moons from any of the following facilities. Seagrave Memorial Observatory (http://www.theskyscrapers.org) in North Scituate is open every clear Saturday night. Ladd Observatory (http://www.brown.edu/Departments/Physics/Ladd/) in Providence is open every clear Tuesday night. 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. Frosty Drew Observatory (http://www.frostydrew.org/) in Charlestown is open every clear Friday night. Check the respective websites for open times.

Keep your eyes to the skies.

Great American Total Solar Eclipse on August 21, 2017. Countdown: 82 days as of June 1, 2017.

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

Spiral Galaxy in Draco
NGC 6015

by Glenn Chaple for LVAS

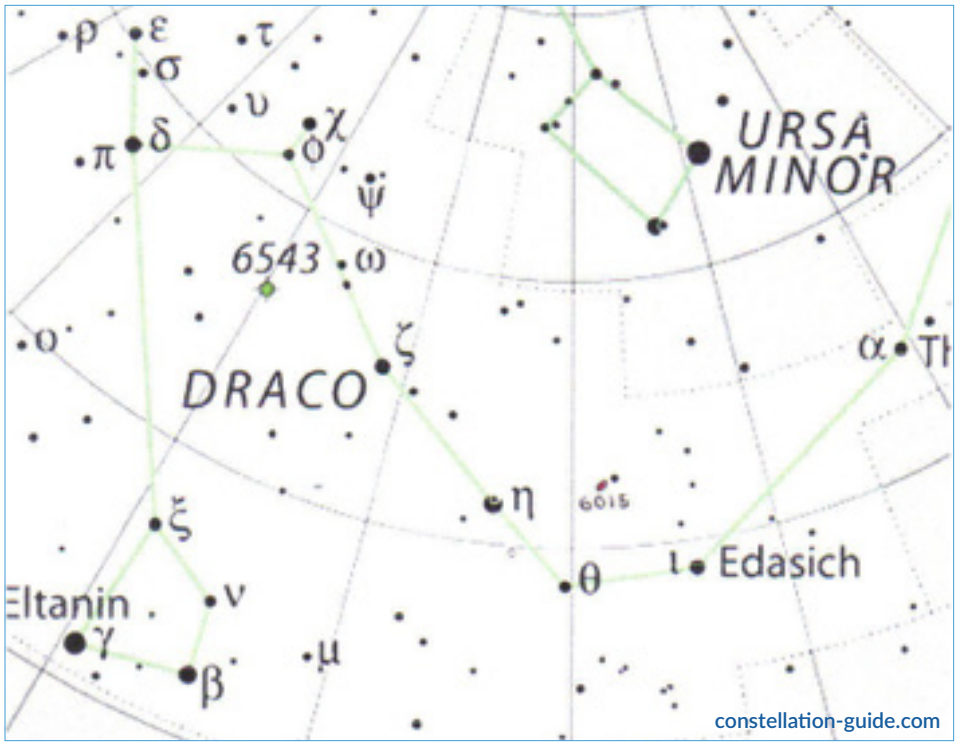
Mag. 11.1; Size 5.4' X 2.3'

his month's LVAS Observer's Challenge, the spiral galaxy NGC 6015 in Draco, was discovered by William Herschel on the evening of June 2, 1788. Herschel catalogued each of his finds into eight categories. This one was designated H.III 739 - the 739th object in Herschel's Category III (Very faint nebulae).

And there's the challenge. What is the smallest scope that can capture this 11th magnitude galaxy, and how much detail can be picked up with large-aperture instruments? You'll find NGC 6017 by concentrating on an area about one-half degree ESE of a 5th magnitude star that forms a parallelogram with eta (η), theta (θ), and iota (ι) Draconis.

Estimates of the distance to NGC 6015 vary from 38 million to 50 million light years. If we accept a median distance, the galaxy is approximately ¾ the diameter of our Milky Way.

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 lvastronomy.com/observing-challenge.



May Reports

Minutes of the board of directors meeting, May 15 2017

Meeting commenced about 7pm.

In attendance: Steve Hubbard, Steve and Kathy Siok, Lloyd Merrill, Jim Hendrickson, Tracy Prell, Francine Jackson, Bob Horton, Matt Oulette, Jeff Padell, Linda Bergemann

June Meeting: To be held on Saturday June 3. Solar observing to be organized by Jeff Padell to run from 2 to 4pm. This will also be our annual pot luck meeting. Main speaker to be Michael O'Shea who does sidewalk astronomy in The Boston area. Jeff will work to coordinate people who have solar telescopes. Mrs. Siok will head coordinate the food for the June meeting. There will not be any grills, we will provide drinks and paper goods.

Brief interruption by Mrs. Siok: At this point, the male half of our ruling diarchy, Mr. Siok was berated by the female half of our ruling diarchy for not being clear about what was being talked about.

7:21 interruption for a rocket launch live broadcast: The meeting was stopped briefly for a launch by SpaceX of an Inmarsat satellite. Meeting was re commenced at 7:27pm.

Local August eclipse program: Jeff Padell and Tracy Prell will be in the area for the August 21 eclipse. They will head up the program locally. There was discussion about whether we should have the program at Seagrave Observatory or the Scituate Community house. The sun will be about 70% covered in our area. President Siok will do a presidential announcement or independent email to canvass the membership to see who will be around to help out with whatever efforts we make.

Trustees: There will be a work session at the observatory on Saturday May 20. There was discussion about possibly grinding down the stumps from the dead trees by the entrance driveway and replace them with arbor vitae trees. An inventory of all of our property was done a few weeks ago. The area of the basement below the Clark Telescope was cleaned up and organized. The grey cabinet will now house all telescope related items.

The security cameras were discussed again. There is still some work to do before they are installed. Jeff Padell has done some work on the 12" Meade to install a new dovetail mount so that people can attach a guidescope or camera. Jeff has also installed a new dovetail on the 16" Meade telescope. Jeff had donated all of this material to the society.

The lawn mowing tractor was checked out and started up.

Treasurer report: Lloyd reported that 52 people have renewed their dues with us. The preferred method of payment is paypal, then mailing checks and finally bringing a check to a meeting.

Library Telescope project: Linda Bergemann is heading this up. She has acquired 3 telescopes and has most of is needed to modify them. Linda still needs to work on the instruction booklet. The telescopes have been purchased from Cornerstones of Science in Maine. There will be some sort of label on the telescopes to identify them as having been provided by Skyscrapers. The 3 initial telescopes have been donated by Linda and Steve and Kathy Siok. The 3 libraries slated to get these first telescopes are in E. Greenwich, N. Kingstown and Charlestown. We will see how this goes and then review and decide how many more to get from there.

Francine Jackson, outreach coordinator: Francine is a NASA Solar system ambassador and as such will be getting a couple of hundred pairs of eclipse glasses. Francine has been approached by some librarians to help them gather resources about the eclipse. Linda Bergemann will talk with Cornerstones of Science about any resources that they may have.

Blackstone Heritage Corridor: Jim Hendrickson suggested that we take advantage of the link to this and have a "GO" event. Maybe in September, would be done at Seagrave Observatory. Jim will look into what it would take to sign up for an event. We are already in their "GO" guide.

Proposed Burrillville power plant: There was more discussion around the letter that Jim Hendrickson wrote to express concerns about the plant. In the end, Steve Siok decided not support this letter due to concerns about the society taking a political position. It was suggested that if any members have concerns that they would be welcome to write their own letters individually.

Cardinal Directions within our buildings: Tracy Prell suggested that we post cardinal directions in our meeting hall and observatory buildings to help visitors orient themselves with the sky. Tracy will look into possible lights that would work for us.

Meeting was adjourned at 9pm.

Respectfully submitted, the humble Skyscrapers society secretary, Steve Hubbard.

Astronomy Nights at River Bend Farm

Joshua Bell is one of the rangers at Blackstone River Valley National Historical Park and contacted us suggesting that Skyscrapers might be interested in attending the upcoming Night Sky Programs to be held at River Bend Farm.

The park has partnered with local Civil Air Patrol Squadrons to run the program. They'll be explaining basic stuff to visitors like how telescopes work and what it is that they'll be looking at. They'll have some beginner telescopes, but folks should feel free to bring their own. The following dates are scheduled: June 16 — 9:00-10:00pm • July 14 — 9:00-10:00pm • August 11 — 8:30-9:30pm • September 15 — 7:30-8:30pm • October 20 — 6:30-7:30pm

If we have poor weather an email will be sent out that day to let you know that the program has been postponed until the next evening (Saturday). If both days give us bad weather, we'll just have to wait until the following month.

Please don't hesitate to contact Josh with any questions at joshua_bell@nps.gov

The Fizzy Seas of Titan

By Marcus Woo

With clouds, rain, seas, lakes and a nitrogen-filled atmosphere, Saturn's moon Titan appears to be one of the worlds most similar to Earth in the solar system. But it's still alien; its seas and lakes are full not of water but liquid methane and ethane.

At the temperatures and pressures found on Titan's surface, methane can evaporate and fall back down as rain, just like water on Earth. The methane rain flows into rivers and channels, filling lakes and seas.

Nitrogen makes up a larger portion of the atmosphere on Titan than on Earth. The gas also dissolves in methane, just like carbon dioxide in soda. And similar to when you shake an open soda bottle, disturbing a Titan lake can make the nitrogen bubble out.

But now it turns out the seas and lakes might be fizzier than previously thought. Researchers at NASA's Jet Propulsion Laboratory recently experimented with dissolved nitrogen in mixtures of liquid methane and ethane under a variety of temperatures and pressures that would exist on Titan. They measured how different conditions would trigger nitrogen bubbles. A fizzy lake, they found, would be a common sight.

On Titan, the liquid methane always contains dissolved nitrogen. So when it rains, a methane-nitrogen solution pours into the seas and lakes, either directly from rain or via stream runoff. But if the lake also contains some ethane—which doesn't dissolve nitrogen as well as methane does—mixing the liquids will force some of the nitrogen out of solution, and the lake will effervesce.

"It will be a big frothy mess," says Michael Malaska of JPL. "It's neat because it makes Earth look really boring by comparison."

Bubbles could also arise from a lake that contains more ethane than methane. The two will normally mix, but a less-dense layer of methane with dissolved nitrogen—from a gentle rain, for example--could settle on top of an ethane layer.

In this case, any disturbance—even a breeze—could mix the methane with dissolved nitrogen and the ethane below. The nitrogen would become less soluble and bubbles of gas would fizz out.

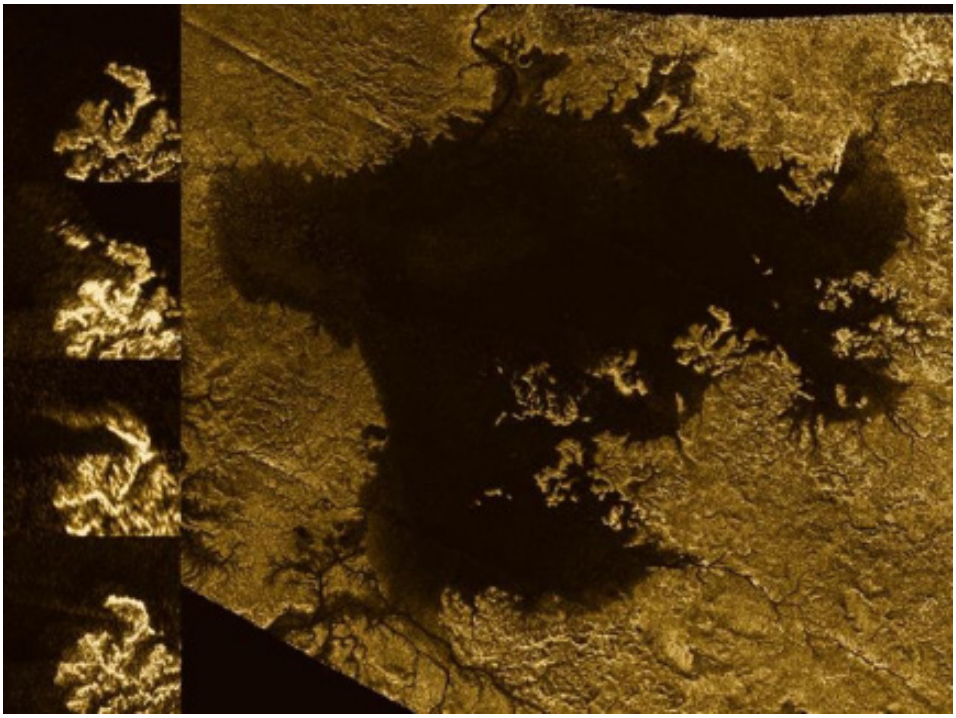
Heat, the researchers found, can also cause nitrogen to bubble out of solution while cold will coax more nitrogen to dissolve. As the seasons and climate change on Titan, the seas and lakes will inhale and exhale nitrogen.

But such warmth-induced bubbles could pose a challenge for future sea-faring spacecraft, which will have an energy source, and thus heat. "You may have this spacecraft sitting there, and it's just going to be fizzing the whole time," Malaska says. "That may actually be a problem for stability control or sampling."

Bubbles might also explain the so-called magic islands discovered by NASA's Cassini spacecraft in the last few years. Radar images revealed island-like features that appear and disappear over time. Scientists still aren't sure what the islands are, but nitrogen bubbles seem increasingly likely.

To know for sure, though, there will have to be a new mission. Cassini is entering its final phase, having finished its last flyby of Titan on April 21. Scientists are already sketching out potential spacecraft—maybe a buoy or even a submarine—to explore Titan's seas, bubbles and all.

To teach kids about the extreme conditions on Titan and other planets and moons, visit the NASA Space Place: https://spaceplace.nasa.gov/planet-weather/



Radar images from Cassini showed a strange island-like feature in one of Titan's hydrocarbon seas that appeared to change over time. One possible explanation for this "magic island" is bubbles. Image credits: NASA/JPL-Caltech/ASI/Cornell

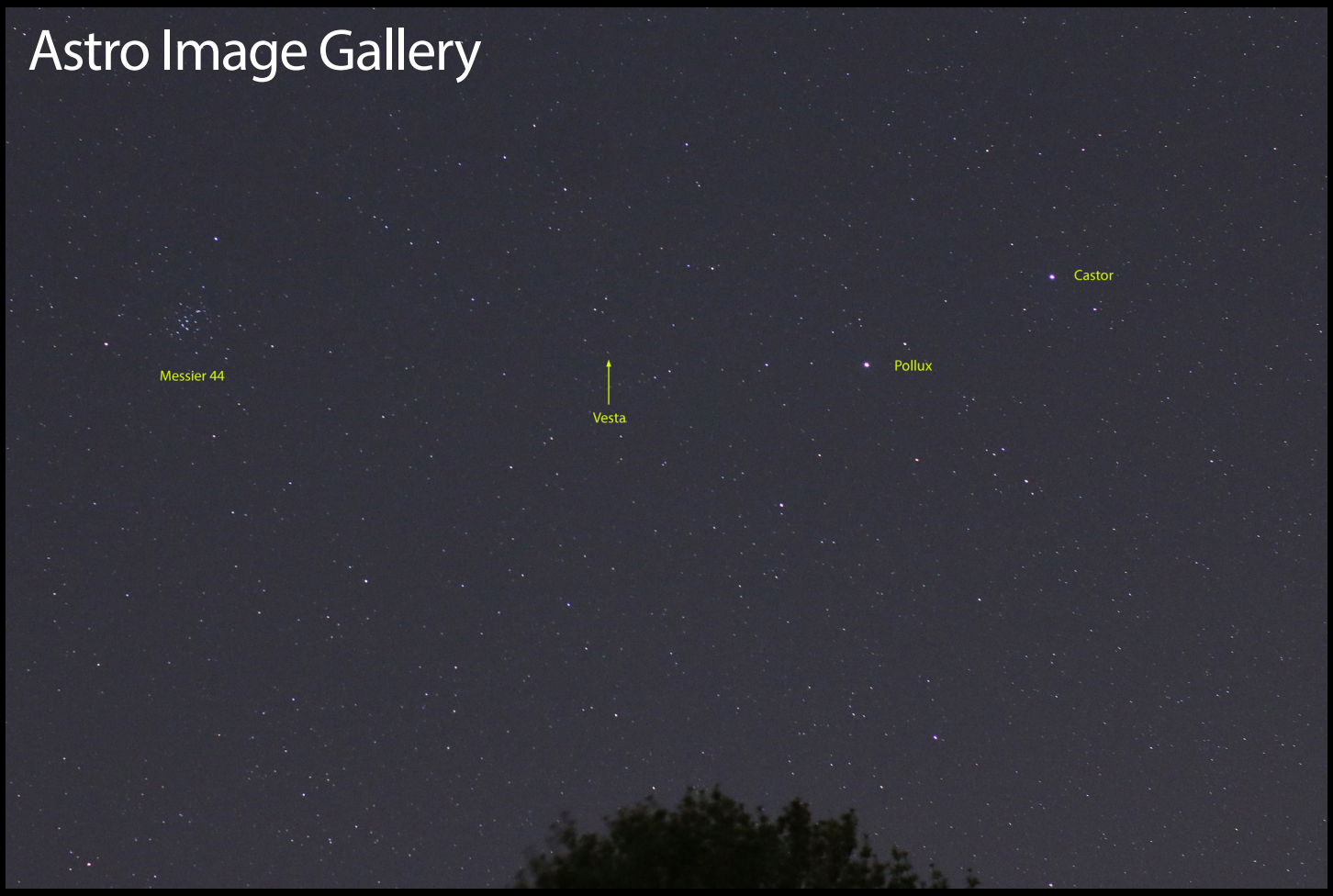
This article is provided by NASA Space Place. With articles, activities, crafts, games, and lesson plans, NASA Space Place encourages everyone to get excited about science and technology. Visit spaceplace.nasa.gov to explore space and Earth science!

The Sun, Moon & Planets in June

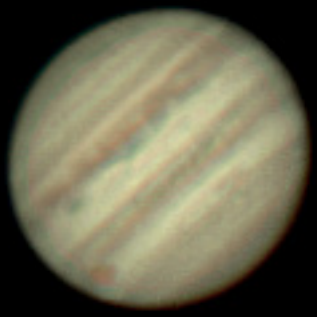
This table contains the ephemeris of the objects in the Solar System for each Saturday night in June 2017. All times are in Eastern Daylight (UTC-4). Ephemeris times are for Seagrave Observatory (41.845N, 71.590W).

Object	Date	RA	Dec	Const	Mag	Size	Elong	Phase(%)	Dist(S)	Dist(E)	Rise	Transit	Set
Sun	**3**	4 44.7	22 18.2	Tau	-26.8	1892.2	-	-	-	1.01	05:12	12:44	20:16
	10	5 13.5	23 00.2	Tau	-26.8	1890.5	-	-	-	1.02	05:10	12:45	20:21
	17	5 42.6	23 22.4	Tau	-26.8	1889.2	-	-	-	1.02	05:10	12:47	20:24
	24	6 11.7	23 24.3	Gem	-26.8	1888.2	-	-	-	1.02	05:11	12:48	20:25
Moon	**3**	12 04.2	1 54.3	Vir	-12.1	1850.6	107° E	65	-	-	14:40	20:48	02:48
	10	17 38.5	-19 28.1	Oph	-12.5	1766.2	173° W	100	-	-	20:20	01:18	06:14
	17	23 28.1	-6 23.0	Aqr	-12.0	1845.3	96° W	55	-	-	00:59	06:52	12:53
	24	6 02.0	18 33.6	Ori	-5.7	2002.9	4° W	0	-	-	05:53	13:25	20:56
Mercury	**3**	3 24.9	16 31.4	Tau	-0.5	6.1	20° W	70	0.37	1.1	04:19	11:26	18:34
	10	4 16.5	20 23.4	Tau	-1.0	5.5	14° W	85	0.33	1.22	04:28	11:51	19:16
	17	5 17.9	23 27.3	Tau	-2.0	5.2	6° W	97	0.31	1.3	04:48	12:26	20:04
	24	6 24.9	24 42.1	Gem	-2.3	5.1	3° E	99	0.31	1.32	05:23	13:05	20:48
Venus	**3**	1 42.7	8 14.2	Psc	-4.2	24.3	46° W	49	0.73	0.7	03:09	09:42	16:16
	10	2 09.1	10 21.2	Cet	-4.2	22.5	46° W	53	0.73	0.75	03:00	09:41	16:23
	17	2 36.8	12 30.1	Ari	-4.1	20.9	45° W	56	0.73	0.81	02:52	09:41	16:31
	24	3 05.7	14 36.0	Ari	-4.1	19.6	45° W	60	0.73	0.86	02:45	09:42	16:41
Mars	**3**	5 55.1	24 18.6	Tau	1.7	3.7	16° E	99	1.59	2.54	06:15	13:54	21:32
	10	6 15.5	24 18.4	Gem	1.7	3.7	14° E	99	1.60	2.56	06:08	13:46	21:25
	17	6 35.8	24 08.1	Gem	1.7	3.6	12° E	100	1.61	2.58	06:01	13:39	21:17
	24	6 55.8	23 48.2	Gem	1.7	3.6	10° E	100	1.61	2.6	05:55	13:32	21:08
1 Ceres	**3**	4 52.3	21 45.2	Tau	8.5	0.3	2° E	100	2.71	3.72	05:23	12:50	20:17
	10	5 04.8	22 16.3	Tau	8.5	0.3	2° W	100	2.70	3.72	05:06	12:35	20:04
	17	5 17.4	22 43.6	Tau	8.6	0.3	6° W	100	2.70	3.71	04:49	12:20	19:51
	24	5 30.2	23 07.3	Tau	8.7	0.3	10° W	100	2.69	3.69	04:32	12:05	19:38
Jupiter	**3**	12 51.1	-3 55.5	Vir	-2.1	40.4	121° E	99	5.45	4.87	14:58	20:46	02:34
	10	12 50.8	-3 55.7	Vir	-2.0	39.6	114° E	99	5.45	4.96	14:31	20:19	02:07
	17	12 51.1	-3 59.3	Vir	-2.0	38.8	107° E	99	5.45	5.06	14:04	19:51	01:39
	24	12 51.9	-4 06.3	Vir	-1.9	38.1	101° E	99	5.45	5.17	13:37	19:25	01:12
Saturn	**3**	17 40.2	-21 59.5	Oph	0.0	18.3	167° W	100	10.06	9.07	21:01	01:39	06:16
	10	17 38.0	-21 58.7	Oph	0.0	18.3	174° W	100	10.06	9.05	20:31	01:09	05:47
	17	17 35.8	-21 58.0	Oph	0.0	18.3	178° E	100	10.06	9.04	20:01	00:39	05:17
	24	17 33.6	-21 57.2	Oph	0.0	18.3	171° E	100	10.06	9.05	19:27	00:05	04:43
Uranus	**3**	1 41.4	9 54.4	Psc	5.9	3.4	46° W	100	19.92	20.62	03:00	09:39	16:17
	10	1 42.5	10 00.6	Psc	5.9	3.4	52° W	100	19.92	20.53	02:34	09:12	15:51
	17	1 43.5	10 06.2	Psc	5.9	3.4	58° W	100	19.92	20.44	02:07	08:46	15:24
	24	1 44.4	10 11.2	Psc	5.9	3.5	65° W	100	19.92	20.33	01:40	08:19	14:58
Neptune	**3**	23 03.2	-7 02.0	Aqr	7.9	2.3	88° W	100	29.95	29.96	01:24	07:01	12:37
	10	23 03.4	-7 01.4	Aqr	7.9	2.3	95° W	100	29.95	29.84	00:57	06:33	12:10
	17	23 03.4	-7 01.4	Aqr	7.9	2.3	102° W	100	29.95	29.73	00:29	06:06	11:43
	24	23 03.4	-7 02.0	Aqr	7.9	2.3	108° W	100	29.95	29.61	00:02	05:38	11:15
Pluto	**3**	19 21.6	-21 16.8	Sgr	14.2	0.3	144° W	100	33.34	32.52	22:39	03:20	08:01
	10	19 21.1	-21 18.5	Sgr	14.2	0.3	150° W	100	33.35	32.46	22:11	02:52	07:32
	17	19 20.4	-21 20.3	Sgr	14.2	0.3	157° W	100	33.35	32.41	21:43	02:23	07:04
	24	19 19.8	-21 22.2	Sgr	14.2	0.3	164° W	100	33.35	32.38	21:15	01:55	06:36

Astro Image Gallery



During a brief clearing on April 28, Jim Hendrickson captured this wide-field view of Cancer & Gemini with asteroid 4 Vesta shining at 7th magnitude from Seagrave Observatory.



It cleared off late on April 13 and seeing conditions were decent for Bob Horton to capture this image of Jupiter through his 12.5" F5.

Messier 3 by Jeff Padell, taken on May 16 using ASI174mm camera. 20 8-second exposures stacked

Directions to Seagrave Memorial Observatory

www.theSkyscrapers.org

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.

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