the Skyscraper

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October 2017

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

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Skyscrapers Board Meetings

Third Monday of the Month
All Members Welcome

Phases of the Moon

Full Harvest Moon
October 5 18:40

Last Quarter Moon
October 12 12:25

New Moon
October 19 19:12

First Quarter Moon
October 27 22:22

Friday & Saturday, October 13 & 14

at Seagrave Observatory
& North Scituate Senior Center

AstroAssembly 2017

Highlighting Interesting Projects in Amateur Astronomy

Friday Night beginning at 7:pm at Seagrave Observatory

John Kocur: Great American Eclipse from South Carolina

Ronald Zincone: Two Decades of Astrophotography

Observing at Seagrave Observatory

All Day Saturday at Seagrave Observatory

Poster Session, Swap Tables, Solar Viewing, Astrophotography Contest, Homemade Telescopes, Famous Astro Bake-off Contest!

Jeff Padell: Solar Observing

Julie Seven Sage: Cubes in Space

Lunch at the Skyscrapers Grill

Francis O'Reilly: Amateur Telescope Making in South Africa

Al Sliski: Boller and Chivens 36-inch Telescope; Relocation & Restoration, APASS Telescope System Relocation at Cerro Tololo Inter-American Observatory

Stella Kafka: AAVSO: How to Contribute to Cutting-Edge Science

Saturday Night beginning at 5:15pm at North Scituate Senior Center

Reception: Antipasto bar (Evening Banquet (Pre-registration required)

Words of Welcome, Awards & Raffle Drawing

Mario E. Motta: WD1145+017

Upcoming Meetings

Friday, November 3 at Seagrave Observatory: Jonathan Pober, Brown University: Cosmology with very long wavelength radio waves
Saturday, December 9 at North Scituate Community Center: Meredith Hughes, Wesleyan University: Discs around newly formed stars

President's Message

by Steve Siok

Hello everyone,

Welcome to October! Cooler days and clearer nights. And as the humidity declines, the transparency and seeing improve. So take advantage of observing before it is time for coats and gloves.

October is a special month for Skyscrapers. It is again time for Astroassembly, once described by Ed Turco as "Skyscrapers Christmas". This year it take s place on October 13 and 14. Our theme is "Interesting projects some amateurs are accomplishing". Our talks will cover telescope making, imaging and Citizen Science. Our longtime friend, Mario Motta, will discuss the research he and Andrew Venderburg did on measuring the light curve of a white dwarf being orbited by a small planetoid. When the planetoid transits the star it creates a curve which shows that it is disintegrating as we observe. Andrew discovered the system in data returned by the Kepler satellite. Stella Kafka, the new director of the AAVSO, will discuss new ways you can contribute to variable star study. You can observe visually with your scope or you can image a star field and reduce magnitudes later. Visit the Skyscraper web site to see the entire lineup of talks. And remember to bring your 2017 solar eclipse tee shirt for the group photo of everyone in their shirts from all over the country!

Two weeks after Astroassembly, October 28, is International Observe the Moon night. Please come to Seagrave with your scope to observe the first quarter Moon and to share the experience with fellow Skyscrapers and the public. Kim Arcand, from the Center for Astrophysics, will join us and give a short talk about light. Festivities begin at 7:00 PM.

I want to remind you about two other ongoing events. Thursday October 19 is the day for the next CfA Open Night. Dr. Jonathan McDowell will talk about "Space Junk - The Traffic Crisis in Outer Space". Join us at Seagrave at 7:00 PM. We will live stream his talk.

Finally, the URI Honors Colloquium continues this month with three more talks on Tuesday evenings at 7:00 PM. You can watch at home on your computer. Just Google "URI honors colloquium 2017" and follow the prompts to "live stream" the talk. On October 10, the subject is "The Golden Age of Solar System Exploration", October 17 it is "The Origins of Cellular Life"; October 24 it is "Are we alone in the Universe". You can also stream previously recorded talks.

So have a happy and busy October. I hope to see all of you really soon.

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

Fall Workshops Series

Skyscrapers, Inc., has, for several years, offered introduction to astronomy workshops, usually during the spring and fall time frames. This year, we'd like to do it again, but have, if possible, different topics, and perhaps different persons enjoying the fun of sharing their love for astronomy with the general public. Or, if not, possibly those of you who had given these might have new and exciting ideas to share with the audience.

At the next board meeting, October 15th, this subject will be discussed. If any of you who would like to present to the public can make that date, at 7:00 P.M. at Seagrave Observatory, please come, and hopefully, we can begin a several-week series very soon.

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 **October 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.

Welcome the Season of Autumn with Cosmic Colors at the University of Rhode Island Planetarium

University of Rhode Island Planetarium
Upper College Road
Kingston, RI
Saturday, October 6th, 2017, 6:00 P.M.
Contact: Francine Jackson: 401-527-5558

As the new season of fall begins, thoughts turn to the beautiful colors all around us. But, how are we able to view these varied colors? What causes them? Cosmic Colors, an introduction to the way we see and feel, by means of the electromagnetic spectrum, will take you back to the days of Sir Isaac Newton, to the surface of Mars, and every place in between, to show you the origins and importance of such everyday phenomena as X-rays, microwaves and infrared waves, and their relation to the colors we love so much.

Cosmic Colors, a planetarium program for audiences of all ages, will be shown at the URI Planetarium, Upper College Road, on the URI campus, at 6:00 P.M. Admission, to benefit the URI Planetarium Memorial fund, is $5.00. Cosmic Colors will be preceded by a 6-minute award-winning presentation on light pollution, Losing the Dark, and will be followed by a live segment showing the Skies above the URI campus.

Come and see the beauty of color!

The University of Rhode Island Planetarium is available for programs of many varied topics of astronomical interest for all age groups. For more information, please call 401-527-5558.

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

International Observe the Moon Night at Seagrave Observatory

Saturday, October 28: 7:00pm

Skyscrapers, Inc. will be hosting International Observe the Moon Night at Seagrave Observatory on Saturday, October 28 beginning at 7pm. Bring your telescope and camera to observe and photograph the first quarter Moon and hear a presentation by Kim Arcand from the Chandra X-Ray Observatory & Harvard-Smithsonian Center for Astrophysics.

Orionid Meteor Shower, Distant Planets and Other Sky Events

by Dave Huestis

The most important astronomical news I have for you this month concerns the August 21 solar eclipse. Many folks visited the local libraries and Seagrave Observatory to successfully observe the partial eclipse with telescopes and hundreds of solar eclipse glasses. Clouds did interfere somewhat depending upon one's location throughout the state, but I've heard nothing but positive feedback from individuals who attended these programs.

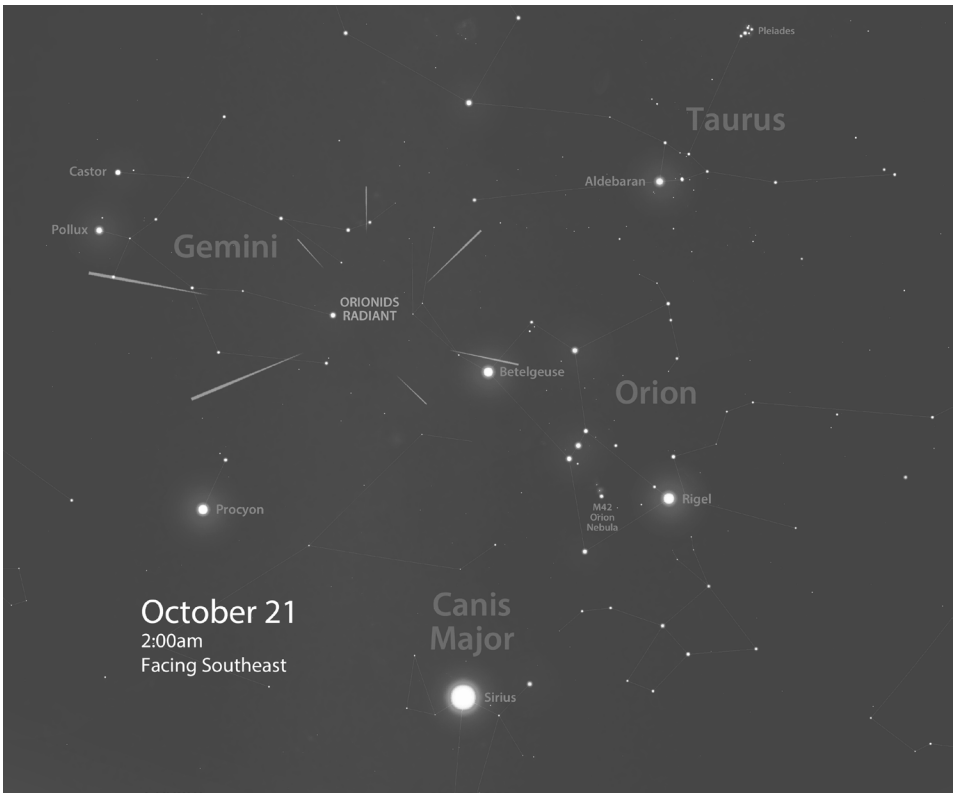
The news media, both print and broadcast, did an excellent job of covering the event from Seagrave Observatory. The Woonsocket Call published a great follow-up article the following day, and WPRI 12's T.J. Del Santo did a segment from Seagrave on eclipse day. Though I wish I could have been a part of the Rhode Island experience, my wife and I observed two minutes and 35.9 seconds of totality from Adams, Tennessee. This was my third successful total eclipse. And it was spectacular. I hope to write a special column soon about our adventure. The journey to the event began well before our drive into the shadow zone.

I must also give many thanks to my brother Glen for setting up his telescope on the Bryant campus in my absence. Many people stopped by to observe the partial phases safely through his scope and with the eclipse glasses I provided. A good time was had by all.

Now we start planning for the 2024 total solar eclipse!

But let's not rush things. There are many other astronomical events to observe during the rest of the year. So let's start with October. For you early risers during twilight on the morning of the 5th look due east to see brilliant Venus. However, binoculars or a small telescope will reveal a much dimmer Mars towards the lower right. This event is called a planetary conjunction. Venus and Mars will be about a half-moon diameter apart. This is the closest they've been since 1995. Through a telescope Venus will appear in a gibbous phase, and no detail will be discernible on Mars' small disk.

As dawn begins on the 15th, a waning crescent Moon will occult (pass in front of) Leo's brightest star Regulus. Here in Rhode Island blue-white Regulus (21st brightest star in our sky) will disappear behind the sunlit limb (left) of the Moon at approximately 5:49 a.m. While binoculars can provide a better view than one's eyes alone, a telescope and medium magnification will enhance the experience as the star slowly winks out behind the lunar profile. Regulus will reappear along the Moon's dark limb at approximately 6:45 a.m. Sunrise is around 6:58 a.m.



If you have not observed Saturn this season, then by all means get yourself to a telescope to do so. You've only got another month or so to view this beautiful ringed-world. And knowing how lousy the weather can be around southern New England, I would suggest visiting any of the local observatories during their public observing nights the next clear night they are open. You don't want to miss the magnificent rings that are currently tilted almost 27 degrees to our line of sight, allowing great detail to be seen.

And don't neglect the more distant worlds of Uranus and Neptune during October as well. On the 19th Uranus will be at its closest to the Earth for this year—about 1,760,000,000 miles. That's farther than Westerly for you northern Rhode Island stargazers!

The August Perseid meteor shower was somewhat hampered by the Moon, and for me the clouds rolled in to spoil the view sometime before the midnight hour. However, as soon as I stepped outside I saw a fairly bright meteor blaze across the sky. October provides us another opportunity to watch for shooting stars. On the night of the 20-21, the Orionid meteor shower peaks. Conditions will be ideal, as a waxing crescent Moon, only 1 day past New Moon, will set soon after the Sun. This scenario will leave a dark sky for the entire night, letting us observe as many meteors as possible. All you'll have to do to maximize your viewing experience is to find a suitable location well away from light pollution.

The Orionid meteor shower occurs when the Earth passes through the remnants of Halley's Comet. The shower is named for Orion, the constellation from where the meteors appear to radiate. Orion rises around 10:00 p.m. The radiant point is not far from the bright red super giant star Betelgeuse. One can expect about 20 or so yellow and green meteors per hour between

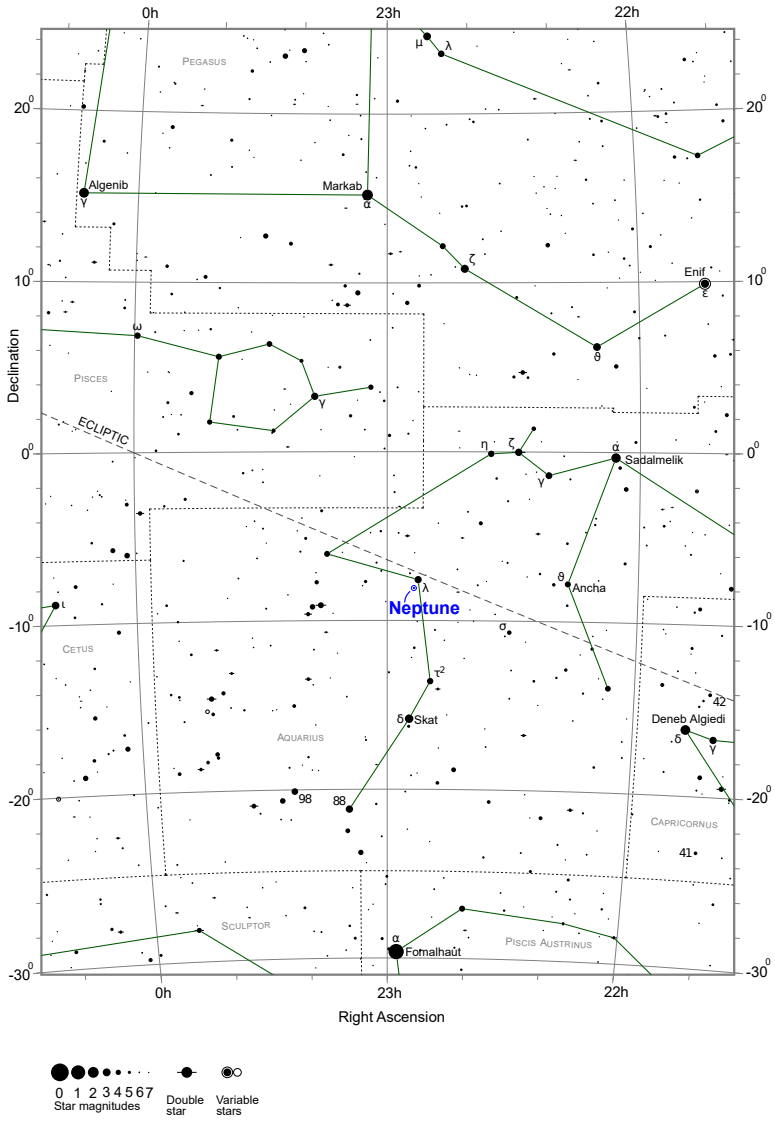
midnight and dawn's early light. The Orionid meteors disintegrate in our atmosphere around 41.6 miles per second, and they are also noted for producing fireballs that create persistent dust trains as they blaze across the sky. And with moonlight not affecting the shower's performance this year, we can only hope the weather cooperates for this shooting star display. Orion can be found high in the southeast sky at 3:00 a.m. (See accompanying star map.)

In conclusion, please remember that the local observatories are open for you to explore the beauty of our universe. Be sure to check their respective websites for public observing schedules and closures. If you step outside your home and note that it is overcast/rainy, then it is likely the observatories will be closed for the evening. Seagrave Memorial Observatory (http://www.theskyscrapers.org) in North Scituate is open every clear Saturday night. (Note: Seagrave will be closed on October 14 due to our annual AstroAssembly convention.) Ladd Observatory (http://www.brown.edu/Departments/Physics/Ladd/) in Providence is open every 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 Thursday night. And our good friends down at Frosty Drew Observatory (http://frostydrew.org) in Charlestown open every clear Friday night.

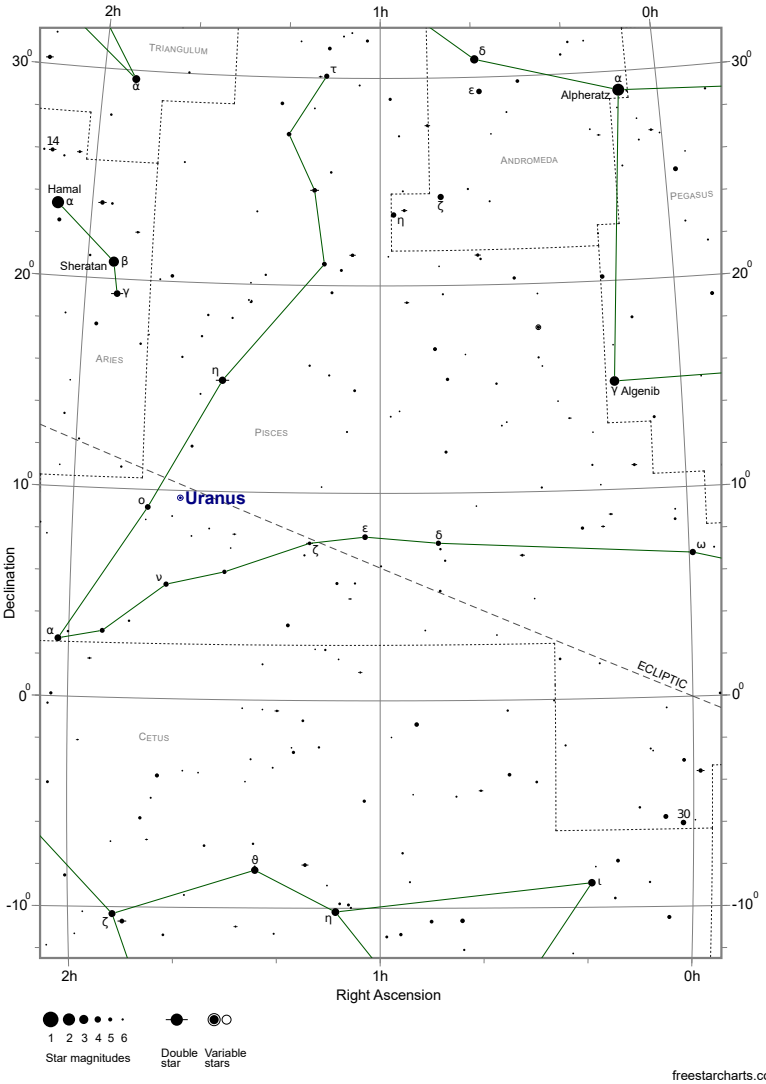
Keep your eyes to the skies.

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

Neptune - October 2017



Uranus - October 2017



Messier 15 (NGC 7078) & Pease 1

by Glenn Chaple for LVAS

Messier 15 (NGC 7078) – Globular Cluster in Pegasus (Mag. 6.2; Diam. 18′)
Pease 1 – Planetary Nebula in M15 (Mag. 14.9[p]; Diam. 1″)

As difficult as last month's LVAS Challenge (NGC 6905) was to locate, this month's target, the globular cluster Messier 15, is a breeze to find. It lies 4° NW of the 2nd magnitude star Enif (epsilon [ε] Pegasi) and, at magnitude 6.2, can be glimpsed with the unaided eye from dark-sky locations. It's visible in binoculars as an out-of-focus star and in small-aperture scopes as a small roundish haze.

Telescopes in the 4 to 6-inch aperture range will resolve the outer portions of M15, but even much larger instruments will have difficulty resolving the core. That's because Messier 15 is quite possibly the densest globular cluster in the Milky Way. Half of its estimated 200,000 stars are concentrated within a 10 light year radius from the core. The jury is still out on whether this high concentration is due to the gravitational pull of a massive centrally-located black hole or merely the cumulative gravitation of the stars themselves.

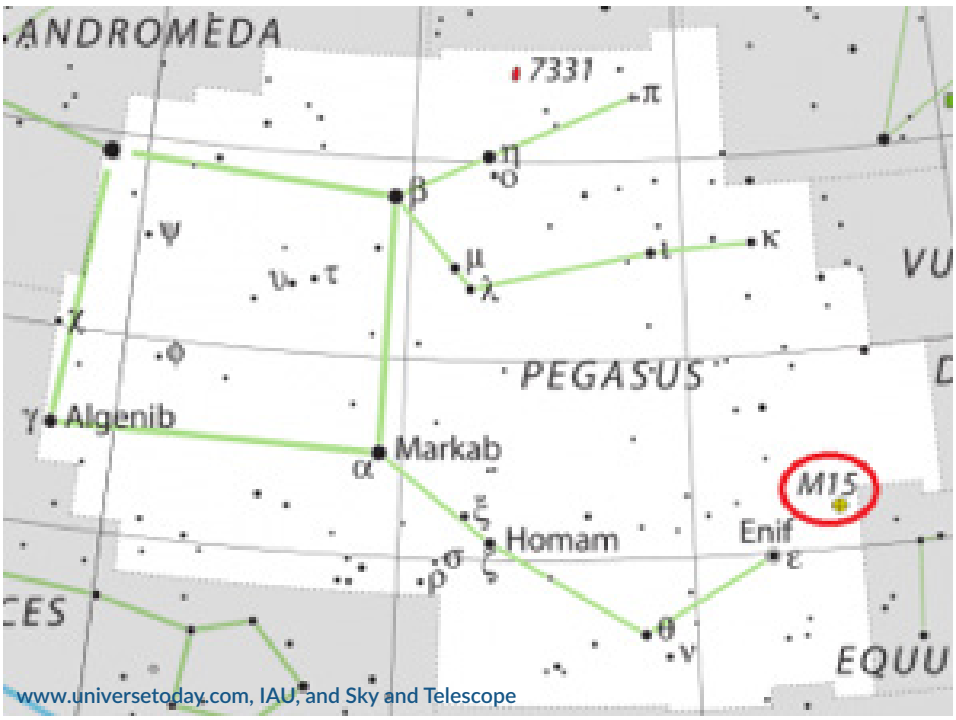
If you own a large-aperture scope, try your luck with the embedded planetary nebula Pease 1. In his book Cosmic Challenge, author Phil Harrington includes this planetary in a chapter devoted to "monster-scope" challenges. Discovered in 1928, it's one of just four planetary nebulae inhabiting a globular cluster and the 'easiest" to capture visually. Those fortunate enough to have notched this 15th magnitude object have used scopes typically with apertures of 14 inches and up, although Pease 1 has reportedly been sighted in 8-inch instruments. With a diameter of just 1 arc-second, Pease 1 mandates near-perfect seeing conditions and a magnifying power in excess of 300X. An accurate finder chart like the one found on the messier.seds website (www.messier.seds.org/more/m015_ps1fc.html) is a must, as is an OIII filter to help you confirm the sighting. As you flicker the OIII filter back and forth between eye and eyepiece, Pease 1 will retain its brightness while surrounding stars fade noticeably.

M15 was discovered by the Italian astronomer Jean-Dominique Maraldi on the night of September 7, 1746 during observations of Comet de Chéssaux and independently by Messier about 18 years later. It lies about 34,000 light years away and is some 175 light years in diameter. Spectroscopic analysis shows that Messier 15 is approaching us at a rate of 66 mi (107km)/sec.

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.

Mario Motta, MD

M15 and Pease 1 (pinkish object near top left) Hubble image

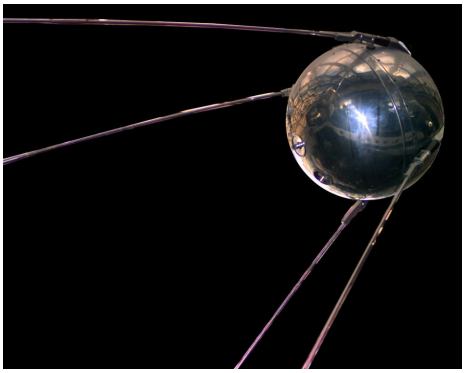


www.universetoday.com, IAU, and Sky and Telescope

60th Anniversary of Sputnik

by Francine Jackson

In his 1981 autobiography *Danse Macabre*, horror writer Stephen King recounts an afternoon at the movies with his friends, when suddenly the film stopped, the lights all came up, and the theater manager walked out on to the stage to inform his audience that the Russians has just launched a satellite into space. The date: October 4, 1957. This event is said to have inspired



"profound fear in him," and was, for him, his "personal introduction to 'real horror.'"

The object in question was a beach-ball-sized polished metal sphere, with four external radio antennae. It was visible all around the Earth, and was responsible for the so-called Space Race, the Cold War, and ultimately the lunar landings pushed by President John Kennedy.

The little ball was launched during the International Geophysical Year, interesting, as President Dwight Eisenhower in 1955 had suggested the U.S. would be prepared to launch a satellite that year, also; but, it wasn't to be. During its time in space, Sputnik zoomed around the Earth at 18,000 miles per hour, making an orbit every 96 minutes. Its beeping signals, which were captured by amateur radio operators around the world, continued for three weeks, until its batteries wore out. The satellite itself reentered our atmosphere on January 4th, 1958, after completing 1440 orbits around the Earth. Its 70 million mile trek changed the course of American history and technology, leading to one of the most important missions in history, the American push for human lunar exploration. Stephen King was right. Sputnik was a game-changer, not only for him, personally, but for the American scientific direction in the decade of the 1960s.

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

Skyscraper Monthly Meeting

September Reports

September 8, 2017

Meeting started with a welcome by President Steve Siok at 7:40pm.

Steve asked anyone at the observatory for the first time to stand and be welcomed.

Trustees Report: Some minor repairs of the roll off roof buildings have been done. There is a security system in place now. Jim Crawford demonstrated it on the screen at the front of the meeting hall.

AstroAssembly: Kathy Siok went over the program. There are no volunteers so far for the Friday evening program, Steve Siok outlined all of the speakers we have lined up. The banquet will be an Italian buffet provided by the same caterer we've been using for the past few years. It will be held at the Senior center, which was the old Chopmist Hill Inn. Jeff Norwood of Camera Concepts might possibly be coming. Still to be confirmed.

Public Events: Francine Jackson reported that there is a program at the URI planetarium titled " Cosmic Colors." There is a request from a scout group for a program on 10/26/2017 with maybe 25 to 30 scouts. There is an observing opportunity at River Bend Farm in Uxbridge on Friday, September 15. This is not a Skyscraper sponsored event. This will go from sunset to roughly 9:30pm.

Library Telescopes: Linda Bergemann reported that E. Greenwich and N. Kingston have their scopes. Coventry bought 2 on their own. Linda did the needed modifications for them. Warwick bought 2 also and is looking to us for modifications and training.

Presidential Announcements: There is an honors colloquium coming up soon on Tuesday evenings at URI. The topic will be " Origins, life the Universe and Everything." This can be live streamed or you can attend in person. Steve Siok outlined each of the speakers.

There are monthly talks at Harvard CFA. These have been so popular that it has become difficult to get tickets to attend in person. The talks are live streamed and we will set up live streaming in our meeting hall. These will occur on September 21, October 19 and November 16. If you want to attend, try to arrive by 7:15pm.

Upcoming speakers: Ian Dell'Antonio is still finalizing speakers for November and December. The December meeting will be our annual Holiday meeting and will be on the second Saturday of December, the 9th.

Respectfully submitted, your humble society secretary, Steve Hubbard

Total Solar Eclipse image sequence by Dave Huestis, Tennessee.

The Sun, Moon & Planets in October

This table contains the ephemeris of the objects in the Solar System for each Saturday night in October 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	**7**	12 51.2	-5 29.4	Vir	-26.8	1920.3	-	-	-	1.00	06:49	12:34	18:17
	14	13 17.0	-8 08.0	Vir	-26.8	1924	-	-	-	1.00	06:57	12:32	18:06
	21	13 43.2	-10 41.1	Vir	-26.8	1927.8	-	-	-	1.00	07:05	12:30	17:55
	28	14 09.9	-13 06.4	Vir	-26.8	1931.6	-	-	-	0.99	07:13	12:30	17:45
Moon	**7**	2 01.4	6 26.0	Psc	-12.7	1946.6	163° W	98	-	-	19:52	02:48	09:53
	14	8 48.4	15 50.8	Cnc	-11.5	1897.7	71° W	34	-	-	01:15	08:31	15:38
	21	14 40.2	-11 10.8	Lib	-8.1	1799.5	15° E	2	-	-	08:39	14:04	19:23
	28	20 29.2	-18 20.8	Cap	-11.8	1808	91° E	51	-	-	14:24	19:35	00:51
Mercury	**7**	12 48.0	-3 45.5	Vir	-1.4	4.8	2° W	100	0.40	1.40	06:43	12:32	18:20
	14	13 31.6	-8 57.4	Vir	-1.1	4.7	4° E	99	0.43	1.42	07:18	12:48	18:17
	21	14 14.1	-13 41.5	Vir	-0.7	4.7	8° E	98	0.46	1.42	07:51	13:03	18:14
	28	14 56.4	-17 49.2	Lib	-0.4	4.9	12° E	95	0.47	1.39	08:22	13:18	18:12
Venus	**7**	11 28.4	4 55.7	Leo	-3.8	11.1	23° W	92	0.72	1.52	04:51	11:11	17:31
	14	12 00.5	1 35.1	Vir	-3.8	10.9	21° W	93	0.72	1.55	05:08	11:16	17:23
	21	12 32.4	-1 49.5	Vir	-3.8	10.8	20° W	94	0.72	1.57	05:24	11:20	17:15
	28	13 04.6	-5 13.8	Vir	-3.8	10.6	18° W	95	0.72	1.60	05:41	11:25	17:08
Mars	**7**	11 25.2	5 01.4	Leo	1.8	3.7	24° W	98	1.67	2.53	04:46	11:07	17:27
	14	11 41.5	3 16.1	Vir	1.8	3.7	26° W	98	1.67	2.50	04:41	10:55	17:09
	21	11 57.7	1 30.2	Vir	1.8	3.8	29° W	98	1.67	2.47	04:36	10:44	16:51
	28	12 13.9	-0 15.8	Vir	1.8	3.9	31° W	98	1.66	2.43	04:31	10:33	16:34
1 Ceres	**7**	8 31.4	22 55.6	Cnc	8.7	0.4	69° W	97	2.62	2.80	00:41	08:13	15:44
	14	8 41.2	22 44.8	Cnc	8.7	0.5	74° W	97	2.62	2.71	00:24	07:55	15:26
	21	8 50.5	22 35.9	Cnc	8.6	0.5	79° W	96	2.61	2.61	00:06	07:37	15:07
	28	8 59.3	22 29.7	Cnc	8.5	0.5	84° W	96	2.61	2.52	23:48	07:18	14:47
Jupiter	**7**	13 50.2	-10 14.2	Vir	-1.5	30.7	15° E	100	5.44	6.40	08:05	13:30	18:55
	14	13 55.9	-10 46.2	Vir	-1.5	30.6	10° E	100	5.44	6.42	07:46	13:09	18:32
	21	14 01.7	-11 18.0	Vir	-1.5	30.6	5° E	100	5.44	6.43	07:26	12:47	18:08
	28	14 07.6	-11 49.4	Vir	-1.5	30.6	1° W	100	5.44	6.43	07:06	12:25	17:44
Saturn	**7**	17 28.1	-22 10.7	Oph	0.5	15.9	69° E	100	10.06	10.38	12:30	17:07	21:44
	14	17 30.2	-22 13.4	Oph	0.5	15.8	62° E	100	10.06	10.49	12:05	16:42	21:19
	21	17 32.5	-22 16.1	Oph	0.5	15.6	56° E	100	10.06	10.59	11:40	16:17	20:54
	28	17 35.1	-22 18.7	Oph	0.6	15.5	49° E	100	10.06	10.68	11:15	15:52	20:28
Uranus	**7**	1 41.2	9 51.3	Psc	5.7	3.7	167° W	100	19.91	18.94	18:41	01:19	07:56
	14	1 40.2	9 45.3	Psc	5.7	3.7	174° W	100	19.91	18.92	18:13	00:50	07:28
	21	1 39.1	9 39.1	Psc	5.7	3.7	179° E	100	19.91	18.92	17:45	00:22	06:59
	28	1 38.0	9 33.0	Psc	5.7	3.7	171° E	100	19.91	18.93	17:16	23:53	06:30
Neptune	**7**	22 55.2	-7 54.9	Aqr	7.8	2.3	148° E	100	29.95	29.09	17:00	22:33	04:07
	14	22 54.6	-7 58.3	Aqr	7.8	2.3	141° E	100	29.95	29.16	16:32	22:05	03:38
	21	22 54.1	-8 01.1	Aqr	7.8	2.3	134° E	100	29.95	29.25	16:04	21:37	03:10
	28	22 53.7	-8 03.5	Aqr	7.8	2.3	127° E	100	29.95	29.34	15:36	21:09	02:42
Pluto	**7**	19 12.8	-21 46.3	Sgr	14.3	0.2	93° E	100	33.42	33.35	14:13	18:52	23:30
	14	19 13.0	-21 46.8	Sgr	14.3	0.2	86° E	100	33.43	33.48	13:45	18:24	23:03
	21	19 13.3	-21 47.1	Sgr	14.3	0.2	79° E	100	33.43	33.60	13:18	17:57	22:36
	28	19 13.7	-21 47.2	Sgr	14.3	0.2	72° E	100	33.43	33.72	12:51	17:30	22:09

Cassini Says Goodbye

By Teagan Wall

On September 15th, the Cassini spacecraft will have its final mission. It will dive into the planet Saturn, gathering information and sending it back to Earth for as long as possible. As it dives, it will burn up in the atmosphere, much like a meteor. Cassini's original mission was supposed to last four years, but it has now been orbiting Saturn for more than 13 years!

The spacecraft has seen and discovered so many things in that time. In 2010, Cassini saw a massive storm in Saturn's northern hemisphere. During this storm, scientists learned that Saturn's atmosphere has water vapor, which rose to the surface. Cassini also looked at the giant storm at Saturn's north pole. This storm is shaped like a hexagon. NASA used pictures and other data from Cassini to learn how the storm got its six-sided shape.

Cassini also looked at some of Saturn's moons, such as Titan and Enceladus. Titan is Saturn's largest moon. Cassini carried a lander to Titan. The lander, called Huygens, parachuted from Cassini down to the surface of the moon. It turns out, Titan is quite an exciting place! It has seas, rivers, lakes and rain. This means that in some ways, Titan's landscape looks a bit like Earth. However, its seas and rivers aren't made of water—they're made of a chemical called methane.

Cassini also helped us learn that Saturn's moon Enceladus is covered in ice. Underneath the ice is a giant liquid ocean that covers the whole moon. Tall geysers from this ocean spray out of cracks in the ice and into space, like a giant sneeze. Cassini flew through one of these geysers. We learned that the ocean is made of very salty water, along with some of the chemicals that living things need.

If there is life on Enceladus, NASA scientists don't want life from Earth getting mixed in. Tiny living things may have hitched a ride on Cassini when it left Earth. If these germs are still alive, and they land on Enceladus, they could grow and spread. We want to protect Enceladus, so that if we find life, we can be sure it didn't come from Earth. This idea is called planetary protection.

Scientists worry that when Cassini runs out of fuel, it could crash into Titan or Enceladus. So years ago, they came up with a plan to prevent that from happening. Cassini will complete its exploration by diving into Saturn—on purpose. The spacecraft will burn up and become part of the planet it explored. During its final plunge, Cassini will tell us more about Saturn's atmosphere, and protect the moons at the same time. What an exciting way to say goodbye!

To learn more about Saturn, check out NASA Space Place: https://spaceplace.nasa.gov/all-about-saturn

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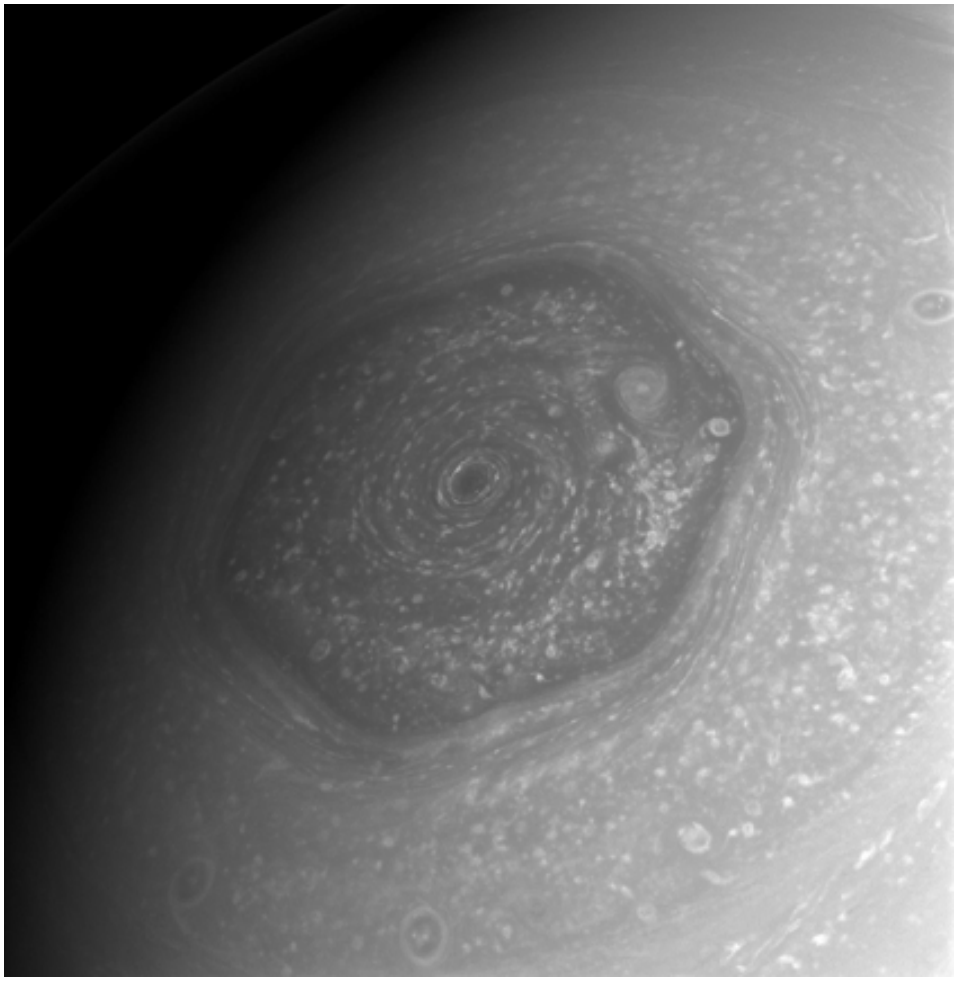

This image of the hexagonal storm on Saturn's north pole was taken by Cassini in 2013. Image credit: NASA/JPL-Caltech/Space Science Institute

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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