



the Skyscraper

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October 2019

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

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AstroAssembly: Saturday, October 5

Saturday Program

All day at Seagrave Memorial Observatory
Poster Session, Swap Table (please bring your own table),
Solar Viewing, Astrophotography Contest, Homemade Tele-
scopes (bring yours), and the Famous Astro Bake-off Contest.

10:30am - Southern Skies: A trip below the equator to see an eclipse, the southern Milky Way and even a llama or two by Steve Hubbard

11:15am - The Next Generation of Amateur Telescope Making by Zane Landers

12:00pm - Lunch at the Skyscrapers Grill

1:15pm - Stars Through the Araucanias: Mapuche-Pewenche Ethno-astronomy by Roger Fu

2:30pm - Chile 2017-2018 Astronomical Trip by Ed Ting

3:45pm - We Have Always Had Our Eyes Turned Skyward - Art, Culture and Inclusion in the Democratization of Space by Prathima Muniyappa

Saturday Evening Program

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

5:30pm - Evening Banquet – Italian-style Buffet Dinner catered by Quik Stop Deli (pre-registration required)

6:45pm - Words of Welcome, Gerry Dyck Tribute, Awards, Raffle Drawing

7:30pm - What Will Mars 2020 Tell Us About the Planets? by John Mustard

9:00pm - Observing at Seagrave Observatory

Seagrave Memorial Observatory Open Nights

Saturdays at 7:00 pm
weather & conditions permitting

Phases of the Moon

First Quarter Moon
October 6 03:10

Full Hunters Moon
October 14 04:33

Last Quarter Moon
October 22 02:41

New Moon
October 28 18:26

October Meteor Showers

by Dave Huestis

If recent events during the last few months are any indicator, Chicken Little may have been right. The sky is falling. The sky is falling. Back on July 24 at approximately 2:44 a.m. EDT, a soccer ball-sized meteor entered the Earth's atmosphere above Lake Ontario and became a bright fireball as it disintegrated. Click on this link: <http://spaceweather.com/archive.php?view=1&day=25&month=07&year=2019>. Fragments of this "space invader" most likely reached the ground. That same day, at around 11:04 p.m. a similar object was sighted along the east coast from Virginia to Maine. But wait! There's more. The very next day a previously unknown asteroid estimated to be 187-427 feet across zipped past the Earth at 11:22 a.m., travelling around 45,000 miles per hour. Talk about close encounters! That one would have wreaked havoc had it collided with the Earth.

There's a lot of space debris that the Earth passes through on its journey around the Sun. The vast majority are harmless remnants of comets or small pieces of asteroids. Everyday the Earth is bombarded with this material, and with greater frequency security cameras are recording the demise of the brightest of these visitors to our planet. After careful examination of eyewitness accounts, astronomers can determine the orbit of these bodies and determine if they are

associated with a particular meteor shower. Two meteor showers were in progress at the time of the fireball reports. Many folks were lucky to view such a "fiery" display.

While bright fireballs are chance sightings, you can improve your odds at seeing shooting stars if you can observe a meteor shower from a dark sky location when the event is at its peak activity. During October we are fortunate to have both a minor and a major meteor shower to try our luck.

First up on the night of October 8-9 is the minor display of shooting stars called the Draconids. This shower currently only produces ten or less yellowish slow-moving meteors per hour. A waxing crescent Moon (First Quarter on the 5th) will brighten the sky somewhat and unfortunately won't set until about 2:30 a.m. on the 9th.

However, unlike most shooting star displays, the Draconids are best observed between sunset and midnight when the constellation Draco is highest in the northern sky. All you have to do is find Ursa Major (the Big Dipper asterism). Draco will be above it. While the meteors will emanate from this region of the sky, scan east and west up to zenith (directly overhead). These particles are fairly slow moving, hitting our atmosphere at only 12.5 miles per second. Draco stretches between Ursa Major and Polaris, the pole star, which is the end star in Ursa Minor (Little Bear), the Little Dip-

per asterism handle. This shower of particles is debris shed by periodic Comet 21 P/ Giacobini-Zinner. As the night progresses watch the northern sky rotate around Polaris. By morning twilight, Draco's head will be sitting due north about 20 degrees above the horizon.

The major meteor shower of the month is the Orionids on the night of October 21-22 when the Earth passes through the remnants of Halley's Comet. While the Orionids are generally a decent shooting star display producing a peak rate of about 20 or so yellow and green meteors per hour between midnight and dawn's early light, a bright last quarter Moon residing in the nearby constellation of Cancer will certainly reduce that forecast number. Moon rise is at about 11:00 p.m. on the 21st, so it will be overshadowing all but the brightest of the meteors, though a few can be observed before the moon rises. As an added bonus, please notice the cluster of stars to the Moon's upper right—it's the Beehive Cluster. Use binoculars for an enhanced view.

The meteors appear to radiate out of the sky just above Orion's head (hence the name of the shower) and not far from the bright red super giant star Betelgeuse, which marks his right shoulder. The Orionid meteors disintegrate in our atmosphere around 41.6 miles per second, and they are also noted for producing fireballs that cre-



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.

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ate persistent dust trains as they blaze across the sky. This redeeming attribute could mitigate the Moon's interference somewhat. While Orion is an easy star pattern to identify, at 3:00 a.m. this giant constellation will be found high in the southeast sky.

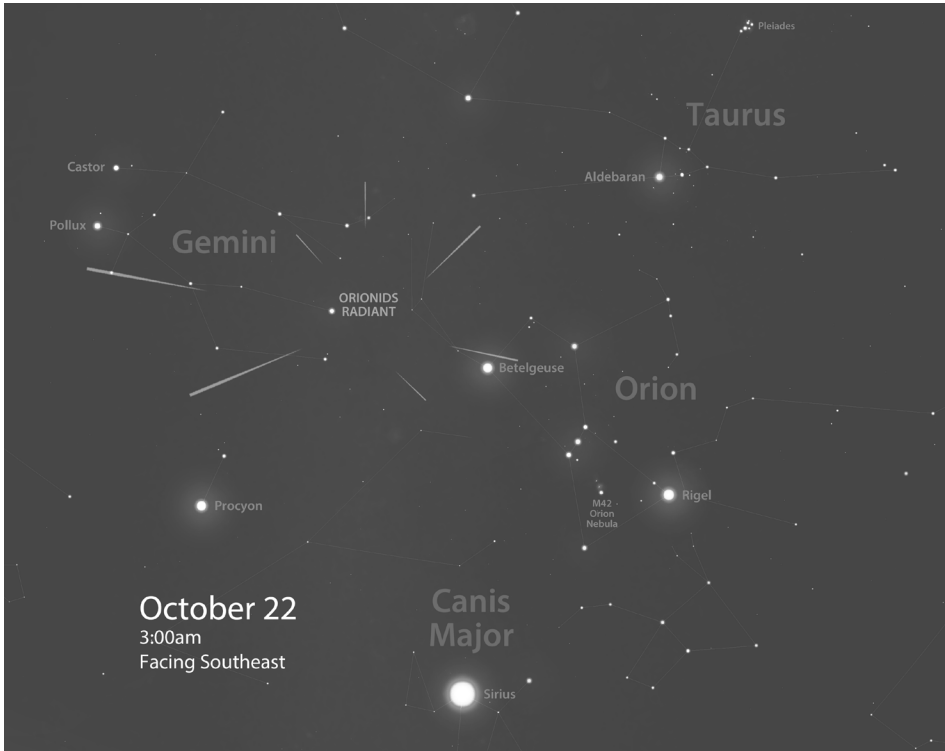
Try to observe from a dark-sky location

if you can. Also try to block the Moon from view as well. Get comfortable in a chaise lounge chair. Settle in for a couple of hours of observing. Hopefully there will be a few bright fireballs to keep you from falling asleep! All you'll have to do to maximize your viewing experience is to find a suitable

location well away from light pollution.

Don't forget to visit the local Rhode Island observatories to get great views of the heavens. Jupiter and Saturn will still be visible in October. Seagrave Memorial Observatory (<http://www.theskyscrapers.org>) in North Scituate is open every clear Saturday night. (Note: Seagrave will be closed on Saturday, October 5.) 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 Wednesday night. Frosty Drew Observatory (<http://frostydrew.org>) in Charlestown is open every clear Friday night. Be sure to check their respective websites for public observing schedules and closures, especially since the EEE virus threat may cancel outdoor observing sessions..

Let's hope Mother Nature will cooperate to provide us with clear skies for all of our observing adventures.



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>

Francine Jackson Receives Award from Middle Atlantic Planetarium Society

Francine Jackson has been awarded the 2019 Distinguished Service Award from the Middle Atlantic Planetarium Society (MAPS). The Distinguished Service Award is MAPS's highest honor and is a special recognition for outstanding, long-term service and dedication to the planetarium field on a local, regional, or national basis. Awardees exhibit qualities of leadership, inspiration, vision, commitment to excellence, and a passion for the planetarium community.

Francine has been a member of Middle Atlantic Planetarium Society for 40 years and serves on the organization's Education Committee.

Francine has coordinated planetarium programs for over 45 years and has served at many institutions including University of Rhode Island, Cormack Planetarium in Providence, and Hayden Planetarium in New York.

Congratulations, Francine!



Update on Finding HMS Endeavour

by Francine Jackson

It was a privilege recently to be invited to a press conference at Goat Island, for an announcement of the work being done by the Rhode Island Marine Archaeology Project (RIMAP), the Australian National Maritime Museum (ANMM) and Silent-World Foundation (SWF), concerning the identification of one of the ships sunk in Narragansett Bay.

During the Revolutionary War, in order to prevent needed supplies from reaching the colonists, the British in 1778 sank several of their own ships to create a blockade. One of the amazing aspects of this sinking was that the ships weren't just hit with cannon fire, but sailors deliberately punched holes in the bottoms of each ship, in order to have them literally drop into the water.

For many years, it has been believed that one of these ships was the Lord Sandwich, a British supply ship that had been purchased from their Navy. If so, for the Australians, this was a very important part of their his-

tory.

Commanded by Captain James Cook, as a part of a three-year round-the-world expedition, this ship, then named the Endeavour, in March of 1770 reached what is now Australia, and claimed it for Great Britain. For the Australians, this act is equal to the 1620 landing of the Mayflower. Because of this, the country has sent divers to work with those from RIMAP and SWF, in attempts to confirm whether one specific ship is indeed this historic vessel. Artifacts have been retrieved, and its construction as seen by the divers is making this ship, lying right off the coast of Goat Island, a good candidate for the Endeavour.

For astronomical historians, this find would also be of great importance, as the Endeavour left Great Britain to observe the 1769 transit of Venus on the island of Tahiti. As the actual distance between the Sun and the Earth (the astronomical unit) was not known in the 18th century, it was believed

observing a Venus transit could most accurately determine this very number, and the observations taken during this time aided astronomers in attempting to learn this important figure.

Based on designs from the 18th century, the Australian government is planning on sailing a model of the Endeavour around a portion of the country in 2020, in honor of this historic anniversary; but, to know the original ship has in fact been identified here in Rhode Island waters would be a tremendous discovery, both for Australia and for science historians.



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>



The remnants of the Lord Sandwich ex HMS Endeavour are believed to be just south of the eastern approach of the Newport Bridge.

Higher Orbits STEM Conference Provides Opportunities for Local Students to Participate in Space Projects

by Tracy Prell

Higher Orbits is bringing their "Go for Launch!" program for all 8th through 12th grade students to Rhode Island on Nov 2nd and 3rd! This event will be held at the Tech Collective located at 188 Valley Street in Providence, Rhode Island.

Go For Launch is a multi-day program (not overnight) that uses space exploration as a platform to launch student involvement in science, technology, engineering and math (STEM), STEAM (art), teamwork, communication and leadership.

NASA astronaut Wendy Lawrence along with founder and president of Higher Orbits Michelle Lucas will involve and work with students for two full days of STEM and STEAM activities to have their ideas compete with other students from around the country to have their science project launched to the International Space Station (ISS).

Seven student science projects have already been launched to the ISS aboard SpaceX Falcon 9, Northrop Grumman Antares and Orbital ATK rockets - Rhode Island we're next!

Students (schooled or home-schooled) from all states are invited to register for this event. Students must attend both days which begins at 8 am until 6 pm. Food,

snacks, drinks, bottled water and space swag will provided to all registered students!

We'll gladly provide financial assistance to those students that would like to attend but have a financial need.

Please share this information with family, friends, teachers, schools, libraries, local businesses as well as our local and state government agencies so that all students and parents are aware of this exciting opportunity. This is the first time in our state's history that a NASA astronaut along with Michelle Lucas will spend two full days of exciting and inspiring our students in STEM and STEAM.

We're also looking for sponsors to provide scholarships for our students, hotel accommodations and rental cars for both astronaut Wendy Lawrence and Michelle Lucas from November 1-4, as well as caterers/restaurants to provide breakfast, lunch, snacks, drinks and bottled water for the students and staff. So if you know a business that would like to partner with us, please have them contact me and we'd be more than happy to add their logo to our website as well as other incentives depending upon their level of support. We expect to have between 75-100 students attend our

event!

Scan the QR Code on the image with your smartphone or visit us at <https://tinyurl.com/y2g8ygnn> to view our event flyer, brochure and to register your child for this event!

Visit our website home page www.higherorbits.org and watch the short, but informative video created by Michelle Lucas to learn more about our program.

If you'd like to help sponsor a student, you can write a check and mail to:

Higher Orbits
PO Box 4092
Leesburg VA 20177

Or visit our website to make a donation: <https://higherorbits.org/donate/>

Higher Orbits is an educational non-profit organization. Their EIN number is 46-3550618

If you have any additional questions, please contact Tracy Prell.

This is an very exciting opportunity for our students to work with a NASA astronaut - Lets make it happen!

Higher Orbits We launch Student's Science Projects to the International Space Station

**All 8th - 12 Grade Students
Go For Launch! Nov 2nd and 3rd**

At Tech Collective
188 Valley St Providence, Rhode Island

NASA Astronaut
Wendy Lawrence

Higher Orbits
Michelle Lucas

Wendy is a Navy Capt, Pilot
and Veteran of four Space Shuttle
Missions

Michelle is a former ISS
Flight Controller
and Astronaut Instructor

Register Today
www.higherorbits.org

GO FOR LAUNCH!
Tech Collective
Nov 2 - 3rd, 2019
Rhode Island

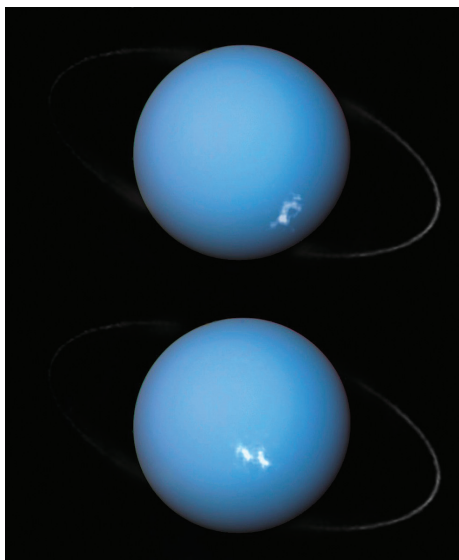
NASA Night Sky Notes: Find Strange Uranus in Aries

By David Prosper

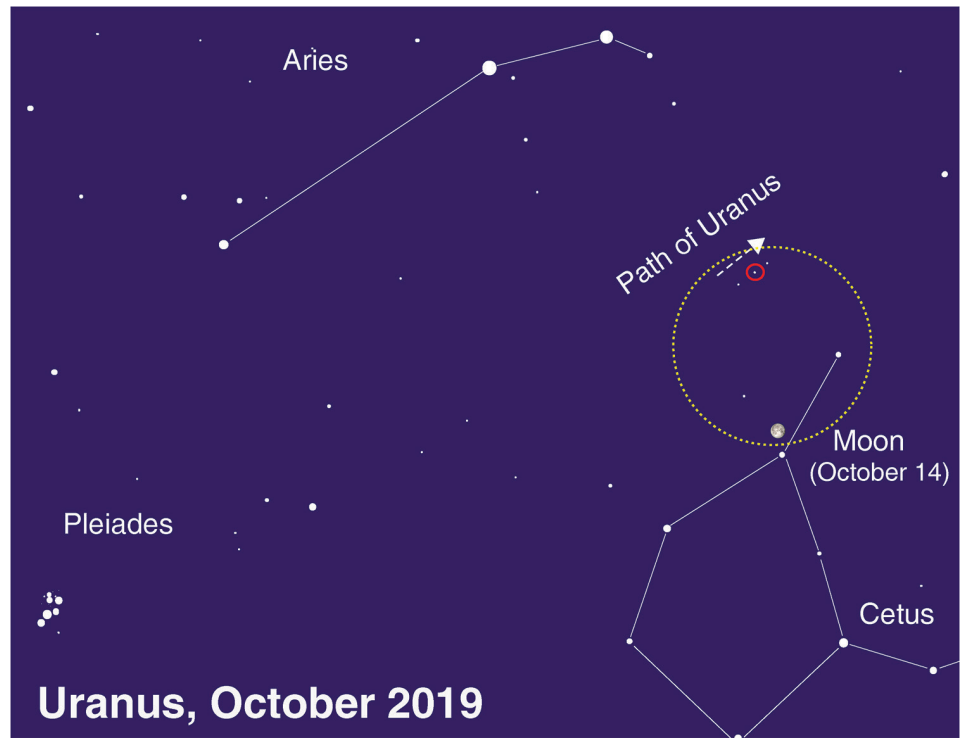
Most of the planets in our solar system are bright and easily spotted in our night skies. The exceptions are the ice giant planets: Uranus and Neptune. These worlds are so distant and dim that binoculars or telescopes are almost always needed to see them. A great time to search for Uranus is during its opposition on October 28, since the planet is up almost the entire night and at its brightest for the year.

Search for Uranus in the space beneath the stars of Aries the Ram and above Cetus the Whale. These constellations are found west of more prominent Taurus the Bull and Pleiades star cluster. You can also use the Moon as a guide! Uranus will be just a few degrees north of the Moon the night of October 14, close enough to fit both objects into the same binocular field of view. However, it will be much easier to see dim Uranus by moving the bright Moon just out of sight. If you're using a telescope, zoom in as much as possible once you find Uranus; 100x magnification and greater will reveal its small greenish disc, while background stars will remain points.

Try this observing trick from a dark sky location. Find Uranus with your telescope or binoculars, then look with your unaided eyes at the patch of sky where your equip-



Composite images taken of Uranus in 2012 and 2014 by the Hubble Space Telescope, showcasing its rings and auroras. More at bit.ly/uranusauroras Credit: ESA/Hubble & NASA, L. Lamy / Observatoire de Paris



The path of Uranus in October is indicated by an arrow; its position on October 14 is circled. The wide dashed circle approximates the field of view from binoculars or a finderscope. Image created with assistance from Stellarium.

ment is aimed. Do you see a faint star where Uranus should be? That's not a star; you're actually seeing Uranus with your naked eye! The ice giant is just bright enough near opposition - magnitude 5.7 - to be visible to observers under clear dark skies. It's easier to see this ghostly planet unaided after first using an instrument to spot it, sort of like "training wheels" for your eyes. Try this technique with other objects as you observe, and you'll be amazed at what your eyes can pick out.

By the way, you've spotted the first planet discovered in the modern era! William Herschel discovered Uranus via telescope in 1781, and Johan Bode confirmed its status as a planet two years later. NASA's Voyager 2 is the only spacecraft to visit this strange world, with a brief flyby in 1986. It revealed a strange, severely tilted planetary system possessing faint dark rings, dozens of moons, and eerily featureless cloud tops. Subsequent observations of Uranus from powerful telescopes like Hubble and Keck showed its blank face was temporary, as powerful storms were spotted, caused by

dramatic seasonal changes during its 84-year orbit. Uranus's wildly variable seasons result from a massive collision billions of years ago that tipped the planet to its side.

Discover more about NASA's current and future missions of exploration of the distant solar system and beyond at nasa.gov verse 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.

Spiral Galaxy in Pegasus: NGC 7448

by Glenn Chaple for LVAS

Mag: 11.4 Size: 2.7' X 1.2'

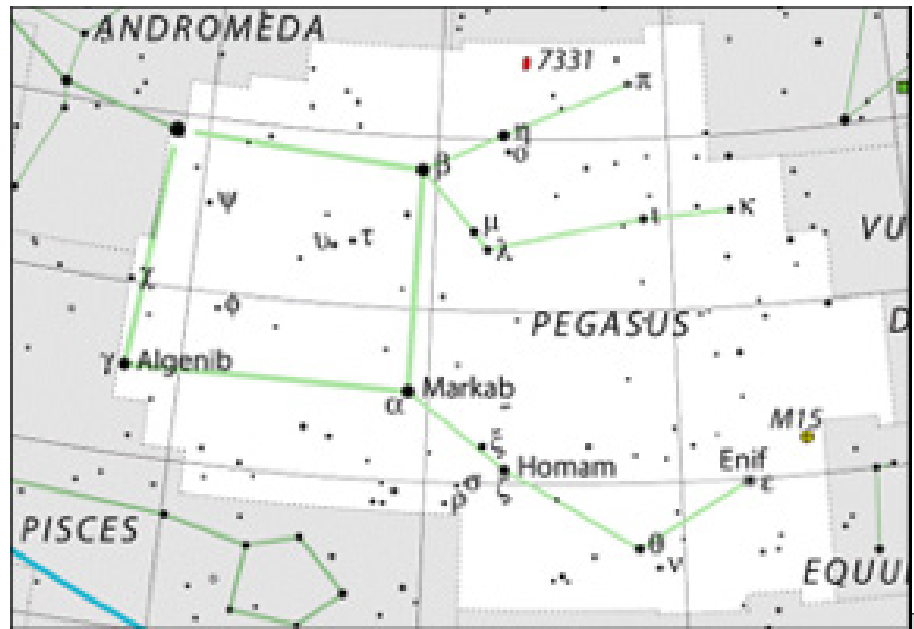
As promised last month, we leave the relatively easy Messier stuff behind and return to the realm of the faint fuzzies – in this case the spiral galaxy NGC 7448 in Pegasus. When William Herschel discovered it on October 16, 1784, he assigned it the Herschel Catalog designation H2512 – his 251st Class II entry. The Class II category was reserved by Herschel for what he considered to be “Faint Nebulae”. As such, it is a visual challenge for owners of modest-sized telescopes.

Viewed with my 10-inch f/5 reflector under magnitude 5 skies, NGC 7448 was a ghostly presence – a rather faint averted vision sight. I sensed an oval shape with a NW/SE orientation – an impression verified by descriptive notes in Volume 1 of Kepple and Sanner’s Night Sky Observer’s Guide and images sent by Doug Paul and Mario Motta.

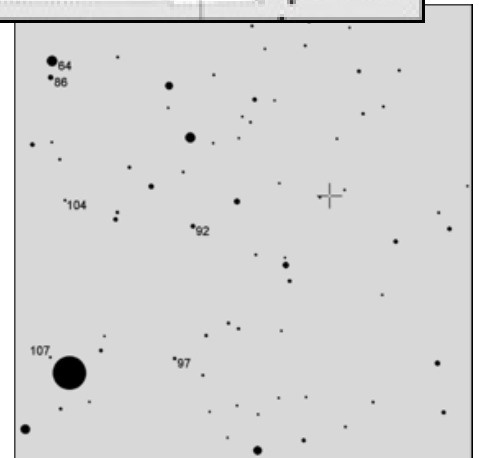
Motta’s image shows bright detached segments surrounding the inner disk. Because of these, Halton Arp included NGC 7448 in his Atlas of Peculiar Galaxies with the designation Arp 13.

The 2000.0 coordinates for NGC 7448 are 23h00m, +15°59’. Star-hoppers can work with the finder charts below, which show its location 1 ½ degrees WNW of Markab (alpha [α] Pegasi). NGC 7448 is approximately 80 million light years from Earth and is about 60,000 light years in diameter.

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.



Above: www.constellation-guide.com (from IAU and Sky & Telescope). Right: Chart created using AAVSO’s Variable Star Plotter (VSP). North is up on a 2-degree field; limiting magnitude of field stars (decimals omitted). Bright star at lower left is Markab (alpha [α] Pegasi). The location of NGC 7448 is shown with a “+”.



NGC 7448 (Image by Mario Motta, MD)
Taken with 32 inch scope SBIG STL
1001E camera, 5 min subs, 60 min total.

NGC 7448 (Image
by Doug Paul)
Cannon 80D, 600mm f4.0 lens
(150mm aperture), iso 800,
71x30 sec = 35.5 minutes, plate
scale 1.3 arc-sec/pixel, north up.





Milky Way, Jupiter & Saturn from New Hampshire by Bob Horton.



Fly me to the Moon - Jeff Padell captured the Collings Foundation's B-17 Flying Fortress flying over Plymouth Airport.

© Jeff Padell
Photography

The Sun, Moon & Planets in October

This table contains the ephemeris of the objects in the Solar System for each Saturday night in October 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	5	12 42.2	-4 32.1	Vir	-26.8	1918.7	-	-	-	1.00	06:47	12:34	18:21
	12	13 07.8	-7 12.2	Vir	-26.8	1922.7	-	-	-	1.00	06:54	12:32	18:10
	19	13 33.8	-9 47.4	Vir	-26.8	1926.5	-	-	-	1.00	07:02	12:31	17:59
	26	14 00.3	-12 15.7	Vir	-26.8	1930.2	-	-	-	0.99	07:10	12:30	17:49
Moon	5	18 13.0	-23 20.7	Sgr	-11.7	1855.1	82° E	43	-	-	14:14	18:55	23:37
	12	0 01.1	-6 00.5	Psc	-12.5	1782.3	159° E	97	-	-	18:05	00:11	06:26
	19	5 37.3	21 04.1	Tau	-12.3	1852.1	121° W	76	-	-	21:11	04:51	12:36
	26	12 14.3	2 57.6	Vir	-9.9	1967.7	30° W	7	-	-	05:00	11:18	17:25
Mercury	5	13 58.5	-13 40.2	Vir	-0.1	5.5	21° E	82	0.47	1.23	08:40	13:52	19:03
	12	14 33.9	-17 27.8	Lib	0.0	5.9	23° E	75	0.46	1.14	09:02	13:59	18:55
	19	15 06.0	-20 24.2	Lib	0.0	6.5	25° E	64	0.43	1.03	09:18	14:03	18:47
	26	15 30.5	-22 09.8	Lib	0.2	7.5	24° E	49	0.40	0.90	09:22	13:59	18:36
Venus	5	13 35.3	-9 05.0	Vir	-3.8	10.2	14° E	97	0.72	1.65	07:59	13:28	18:57
	12	14 08.1	-12 22.5	Vir	-3.8	10.4	16° E	96	0.72	1.63	08:16	13:33	18:50
	19	14 41.7	-15 25.8	Lib	-3.8	10.5	17° E	96	0.73	1.61	08:34	13:40	18:44
	26	15 16.2	-18 10.2	Lib	-3.8	10.7	19° E	95	0.73	1.59	08:52	13:47	18:40
Mars	5	12 03.5	0 40.5	Vir	1.8	3.6	11° W	100	1.66	2.63	05:50	11:55	17:59
	12	12 20.0	-1 08.8	Vir	1.8	3.6	13° W	100	1.66	2.61	05:46	11:44	17:41
	19	12 36.6	-2 57.8	Vir	1.8	3.6	16° W	99	1.65	2.59	05:41	11:33	17:24
	26	12 53.3	-4 46.1	Vir	1.8	3.7	18° W	99	1.65	2.56	05:37	11:22	17:07
1 Ceres	5	16 55.0	-24 47.5	Oph	9.1	0.4	64° E	97	2.86	3.16	12:20	16:45	21:10
	12	17 04.8	-25 11.2	Oph	9.1	0.4	59° E	98	2.87	3.25	12:04	16:27	20:51
	19	17 15.1	-25 32.7	Oph	9.2	0.4	55° E	98	2.87	3.33	11:48	16:10	20:32
	26	17 25.7	-25 51.6	Oph	9.2	0.4	50° E	98	2.88	3.41	11:33	15:53	20:13
Jupiter	5	17 11.2	-22 42.5	Oph	-1.9	35.4	67° E	99	5.26	5.56	12:26	17:01	21:35
	12	17 15.8	-22 48.6	Oph	-1.8	34.8	61° E	99	5.26	5.66	12:03	16:38	21:12
	19	17 20.8	-22 54.6	Oph	-1.8	34.2	56° E	99	5.25	5.75	11:41	16:15	20:49
	26	17 26.2	-23 00.2	Oph	-1.8	33.7	50° E	99	5.25	5.84	11:20	15:53	20:27
Saturn	5	19 01.3	-22 30.8	Sgr	0.5	16.6	93° E	100	10.04	9.95	14:14	18:50	23:26
	12	19 02.3	-22 30.0	Sgr	0.5	16.5	86° E	100	10.04	10.06	13:48	18:24	22:59
	19	19 03.6	-22 28.7	Sgr	0.5	16.3	79° E	100	10.04	10.18	13:22	17:57	22:33
	26	19 05.3	-22 26.8	Sgr	0.6	16.1	73° E	100	10.04	10.29	12:56	17:32	22:07
Uranus	5	2 13.6	12 52.5	Ari	5.7	3.7	156° W	100	19.83	18.91	19:12	02:01	08:50
	12	2 12.6	12 47.3	Ari	5.7	3.7	163° W	100	19.83	18.87	18:43	01:32	08:21
	19	2 11.5	12 41.7	Ari	5.7	3.7	170° W	100	19.83	18.84	18:15	01:04	07:52
	26	2 10.4	12 36.0	Ari	5.7	3.7	178° W	100	19.83	18.83	17:47	00:35	07:23
Neptune	5	23 12.5	-6 14.5	Aqr	7.8	2.4	155° E	100	29.93	29.02	17:21	23:00	04:40
	12	23 11.9	-6 18.3	Aqr	7.8	2.3	148° E	100	29.93	29.08	16:53	22:32	04:12
	19	23 11.4	-6 21.6	Aqr	7.8	2.3	141° E	100	29.93	29.15	16:25	22:04	03:43
	26	23 10.9	-6 24.6	Aqr	7.8	2.3	134° E	100	29.93	29.24	15:57	21:36	03:15
Pluto	5	19 29.6	-22 23.1	Sgr	14.3	0.2	99° E	100	33.89	33.72	14:42	19:18	23:54
	12	19 29.7	-22 23.4	Sgr	14.4	0.2	92° E	100	33.90	33.84	14:15	18:51	23:27
	19	19 29.9	-22 23.6	Sgr	14.4	0.2	85° E	100	33.90	33.97	13:47	18:23	22:59
	26	19 30.2	-22 23.5	Sgr	14.4	0.2	78° E	100	33.91	34.09	13:20	17:56	22:32

Directions to Seagrave Memorial Observatory

From the Providence area:

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

From Coventry/West Warwick area:

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

From Southern Rhode Island:

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

From Northern Rhode Island:

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

From Connecticut:

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

From Massachusetts:

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



47 Peeptoad Road
North Scituate, Rhode Island 02857