



the Skyscraper

vol. 46 no. 12
December 2019

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

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**Skyscrapers
Board Meeting**
Monday, December 9, 7pm at
Ladd Observatory
All Members Welcome

Phases of the Moon

First Quarter Moon
December 4 06:58

Full Cold Moon
December 12 05:12

Last Quarter Moon
December 19 04:57

New Moon
December 26 05:13

Saturday, December 14, 5:00pm at North Scituate Community House

The Apollo Lunar Module in Detail by John Kocur

5:00 PM Pot Luck Dinner**

**Participants are asked to RSVP (kathys5@cox.net) with the type of food they plan to bring. Categories include: appetizers, main dishes, side dishes, desserts.

Cold drinks, coffee, plates, etc. will be provided.

Please bring an extension if you need to plug in an appliance.

All are welcome!

6:15 PM Speaker John Kocur

In celebration of the 50th anniversary of the Apollo 11 mission, on Saturday, December 14 at the Scituate Community Center, Skyscraper member John Kocur will give a PowerPoint presentation about the Apollo Lunar Module. He will cover many interesting and little known facts about the Apollo 11 lunar lander, it's development, systems, hardware, equipment, mission, and the future of new missions. Many rare photos and researched details will be displayed.

John, an avid amateur astronomer, is a long time member of Skyscrapers and has a passion for the manned exploration of space since the beginning of the NASA Mercury program. His interest and knowledge will touch on topics and facts that will give everyone a new view of what it took to get to the Moon.



**Seagrave Memorial Observatory
Open Nights**

Saturdays at 7:00 pm
weather & conditions permitting

President's Message

by Steve Hubbard

As I look back on 2019, it's been the usual mixed bag for us New England astronomers. Overall, the weather improved over that in 2018 such that we didn't have to cancel any meetings due to rain storms or snow. Astroassembly this year had some of the best weather I can remember.

Then, just as we were going into a prolonged stretch of decent weather this Fall, the EEE virus threat hit. We had to close the observatory as a precaution for many weeks. I guess that's what happens when you have an observatory next to a pond and down the street from a horse stable or 2, sigh...

We are going into the winter now and the cold, snow and ice will limit our opportunities for a while. That's hard, but in looking towards 2020, I see some other opportunities ahead that are something to look forward to.

One of the things I'm most enthused about is the upcoming opposition of Mars in October. Mars will be much higher in the sky for us here in the northern hemisphere and will be well placed in Pisces when at it's closest. It will shine brightly at magnitude -2.6 and will be 22.4 arcseconds across. That is almost as good as it was a couple of years ago. It will just be a lot easier for us to

see and above so much of the murk along the horizon. Let's hope that this time there won't be a planet straddling all obscuring dust storm to block out the details!

Another observing opportunity for us will be on December 21 when Jupiter and Saturn join together in a so called "Great Conjunction." This hasn't happened since the year 2000. Both planets will be only 7 arcminutes apart and will look like a very bright object in the west after sunset.

There are some other things to look forward to in 2020, but for me these so far are the highlights. Hopefully 2020 will bring us many other opportunities and wonderful celestial highlights to share.

See you at our annual Holiday Gala on Saturday, December 14!

Jim Hendrickson Wins AstroLeague Webmaster Award

by Francine Jackson

Congratulations are in order to Jim Hendrickson who was awarded the Astronomical League's First Place Webmaster Award for 2019. With over 300 astronomical societies and 18,000 members to choose from, Jim's work on the Skyscrapers website was deemed outstanding.

Jim is also Skyscrapers, Inc.'s, newsletter editor. Thanks for your great work for the organization!



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 **December 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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Decoding the Star of Bethlehem

by Francine Jackson

A lot of planetariums still spend several weeks before the holiday season putting together their annual Star of Bethlehem (SOB) or Star of Wonder (SOW) show, trying their best to determine a natural rationale for what the Magi were said led them to the creche. Of course, many astronomical phenomena have been canceled out, either as too rapid, such as a meteor, something that could have been seen and reported more than just by these travelers, a comet for instance, but that, had it been visible, would have not moved as a “guiding light,” plus it would most likely have been documented by others, or a supernova, which likewise would not have moved around the sky to be used as a pointer. The most ideal situation, according to modern lore, is a conjunction of planets, a couple of which have been documented to occur around the time of the Birth. The two major candidates are a triple conjunction of Jupiter and Saturn, with Mars joining the pair at the last, around 8-6 B.C., or one involving Jupiter and the star Regulus, the heart of Leo, the Lion, which, at the last, included the addition of Venus, making for a striking arrangement, about 2-1 B.C.

Planets have been often considered the natural occurrence of choice, if indeed it did happen, for several reasons, including the fact that the Magi were, according to legend, astrologers, who carefully ob-

served the sky, and the conclusion, even to this day, that the general population really doesn’t notice typical celestial phenomena, as noted by a former astronomy professor, who received a call one morning, stating she had seen a UFO the night before, and wanted him to identify it for her. As it was in the western sky, and Venus was very prominent, he informed her as such. The next morning, she called again, swearing the object was still there. Again, he told her it was Venus. The next morning, she called again. This time, he asked her, “Where is it

with respect to the planet Venus?” She never called again.

All of us at Skyscrapers hope you are enjoying the beauty of the sky, and that your holiday season is the best ever.

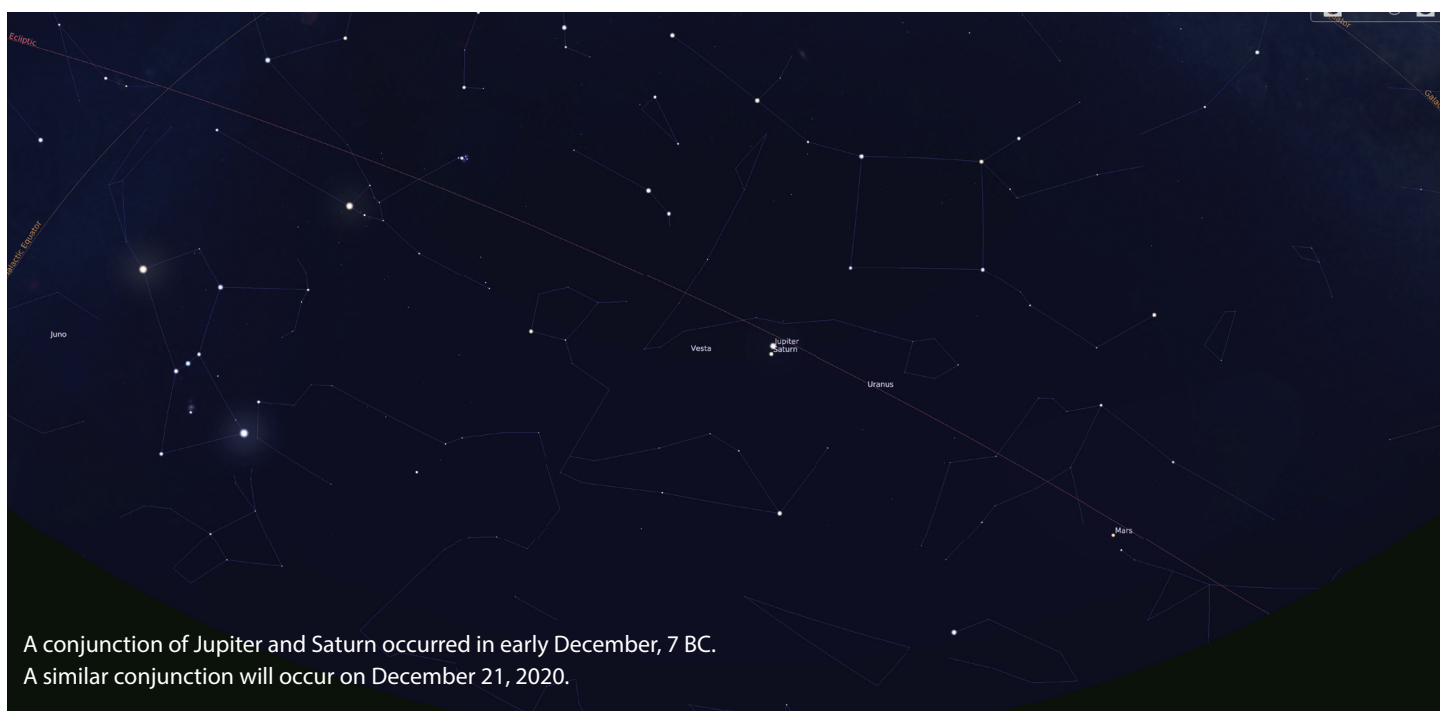


Francine Jackson is a NASA Solar System Ambassador, writes the weekly newsletter for Ladd

Observatory and teaches astronomy at the Community College of Rhode Island. See more at <http://theskyscrapers.org/francine-jackson>



This simulated view from Stellarium shows a very close conjunction of Venus and Jupiter on the evening of June 17, 2 B.C.



Geminid Meteor Shower Mooned Out and Other Celestial Offerings

by Dave Huestis

As quickly as it started, 2019 will soon be in the history books. I for one am happy to see it go. A cloudy and rainy spring, hot and humid heat waves during the summer, then the EEE mosquito threat have conspired to prevent casual stargazers and amateur astronomers alike from enjoying the night sky and all the wonders it holds. It would be great if we could end the year on a high note, but the sky gods are not smiling down on us for December.

Though the Geminids are the best meteor shower of the year, peaking on the night of December 13-14, the Full Moon on the 12th will overwhelm all but the brightest meteors. To complicate matters further on the peak night, that bright moon will be sitting right in the middle of the Gemini constellation. While you won't require my usual star map to find Gemini, the proximity of the Moon to the region of the sky from where the meteors appear to radiate (near Gemini's brightest stars, Castor and Pollux), will certainly reduce your meteor count.

However, one does not have to look directly at Gemini to catch a few of the brightest shooting stars. In fact, the Geminids are fairly bright and also have a reputation for producing exploding meteors called fireballs. My point: if the weather cooperates on peak night do not give up on the Geminids. You might just glimpse a few bright Geminids as they enter our atmosphere at 21.75 miles per second.

Later in the month don't forget that the Winter solstice begins at 11:19 p.m. on the 21st. Notice how low an arc the Sun travels across the sky. After this date and time the Sun's arc will rise higher and higher each day as it appears to travel northward in our sky, reaching the Vernal Equinox (Spring) on March 19, 2020, at 11:50 p.m. EDT (Eastern Daylight Time). The apparent shift of the Sun's position in the sky is the result of the Earth's fixed axial tilt of 23.5 degrees as it revolves around the Sun. See my column Reason for the Seasons (<http://www.theskyscrapers.org/reason-for-the-seasons>) to refresh your knowledge on this topic.

Also, as we approach the holiday season, many folks often ask me about the mystery of the Christmas Star. An unabridged ver-

sion of my latest treatise on this topic can be found on the Skyscrapers website <http://www.theskyscrapers.org/mystery-of-the-christmas-star> for your examination.

Unfortunately, as we move into December, Jupiter will set soon after sunset, and Saturn will follow within 90 minutes. Since the local observatories don't open until 7:00 p.m., these beautiful worlds will be unobservable. However, there are a wide variety of other objects to view. As long as the observatory grounds are accessible, the telescopes will be available for you to explore "deep sky" objects within the brightest constellations of the night sky. The Orion Nebula and the Andromeda Galaxy will be well placed for exploration. Many open star clusters and beautiful double stars will await your scrutiny. And our solar system's two outermost planets, Uranus and Neptune, will show as small blue-green orbs in the telescopes available. Knowledgeable sky interpreters will be on hand to introduce you to these and other celestial wonders. Be sure to visit each observatory's website prior to setting out for a field trip to these facilities, as wintry conditions can force unexpected closures.

And finally, I am always looking for a great sky scene that you can easily image with just a simple camera. Just after sunset

on December 28, look towards the southwest sky. A waxing crescent Moon will be a mere three degrees (6 full moon diameters) from brilliant Venus. This event definitely merits being recorded.

Seagrave Memorial Observatory (<http://www.theskyscrapers.org>) in North Scituate is open to the public every clear Saturday night. However, in December Seagrave will be closed on the 14th. Ladd Observatory (<http://www.brown.edu/Departments/Physics/Ladd/>) in Providence is open every clear Tuesday night. However, Ladd will be closed on Christmas Eve (24th) and New Year's Eve (31st). 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. However, this observatory will be closed on Christmas Day night (25th) and New Year's Day night (Jan 1). Frosty Drew Observatory (<http://www.frostydrew.org/>) in Charlestown is open every clear Friday night year-round.

Happy holidays and clear skies to all.



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>



Southwestern sky, December 28, 45 minutes after sunset.

Vesta: The Brightest Asteroid

by Jim Hendrickson

We're often asked by visitors at observatory open nights which planets are visible in the evening sky. Mars rises rather early in the morning sky, and just after sundown, Venus shines brilliantly as our Evening Star, but still sets rather early. Jupiter, Saturn and Mercury spend December beyond the Sun, mostly hidden from our view, leaving our prime observing hours devoid of naked-eye planets.

But wait, there's more! Our solar system has more to offer than just its eight planets. There are a myriad of other, smaller bodies circling the Sun--dwarf planets, asteroids, and comets. And some of these "smaller" bodies aren't so small, and are fairly easy to see. While our skies haven't been graced by a bright comet in some time, there are always a dozen or so of the larger asteroids within easy reach of small telescopes or even binoculars. While they generally will not be naked-eye visible, some of them often appear brighter than Neptune's magni-

tude 8..

This month we'll take a look at the second-largest of the main-belt asteroids: 4 Vesta. While Vesta is somewhat smaller than the largest of the asteroids, 1 Ceres (which is now classified as a dwarf planet), its surface reflectivity, known as albedo, is significantly higher, and it orbits a bit closer to the Sun than Ceres does, making it the brightest of the main-belt asteroids when it is near opposition, which it reached this year on November 12.

Vesta will be visible high in the sky for the next several months as it completes its retrograde loop through the tail of Cetus before traveling eastward back through Taurus in early 2020.

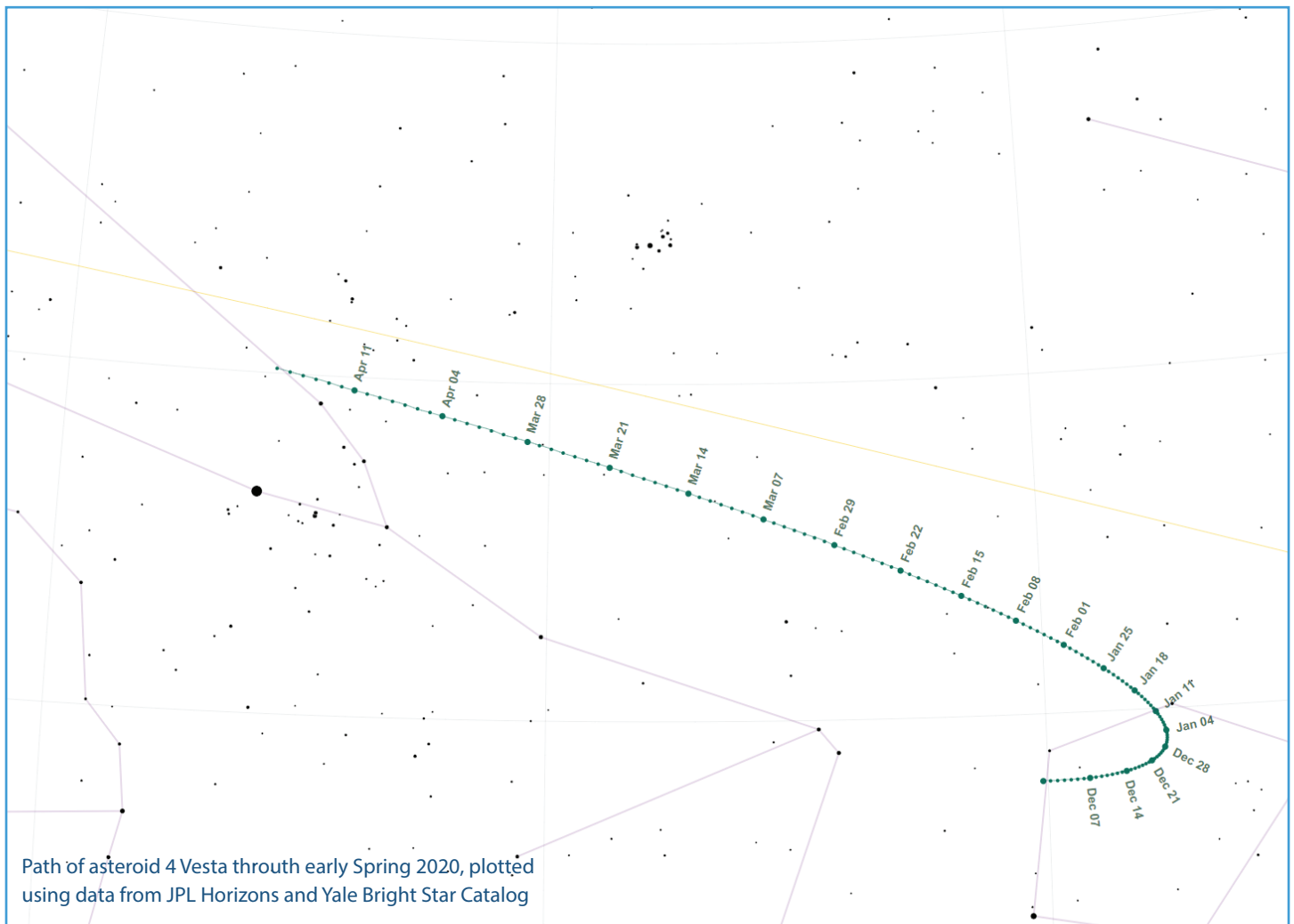
Because it is a relatively small object (compared to the planets) and we're now moving away from it, it dims significantly over time, so your best opportunity to observe it with binoculars is during the next few weeks. At the beginning of December,

it will be a magnitude 6.7 point of light, and by the end of the year it fades to magnitude 7.4, after which your best time to view it will be nights when there is no moonlight to interfere. But, speaking of the Moon, you can watch a waxing crescent Moon pass within 2° below Vesta (mag 8.2) on leap day evening, February 29.

Further into the new year, in early April, Vesta joins the Hyades cluster in Taurus as it sinks toward the western horizon. Though it will be fairly dim by this time (around magnitude 8.5), it will make for a stunning photographic opportunity, especially with brilliant Venus within the Pleiades cluster nearby.



Jim Hendrickson is newsletter and web editor and has been a member for 20 years. See more at <http://theskyscrapers.org/jim-hendrickson>



Path of asteroid 4 Vesta through early Spring 2020, plotted using data from JPL Horizons and Yale Bright Star Catalog

NASA Night Sky Notes: The Orion Nebula: Window Into a Stellar Nursery

By David Prosper

Winter begins in December for observers in the Northern Hemisphere, bringing cold nights and the return of one of the most famous constellations to our early evening skies: Orion the Hunter!

Orion is a striking pattern of stars and is one of the few constellations whose pattern is repeated almost unchanged in the star stories of cultures around the world. Below the three bright stars of Orion's Belt lies his sword, where you can find the famous Orion Nebula, also known as M42. The nebula is visible to our unaided eyes in even moderately light-polluted skies as a fuzzy "star" in the middle of Orion's Sword. M42 is about 20 light years across, which helps with its visibility since it's roughly 1,344 light years away! Baby stars, including the famous "Trapezium" cluster, are found inside the nebula's whirling gas clouds. These gas clouds also hide "protostars" from view: objects in the process of becoming stars,

but that have not yet achieved fusion at their core.

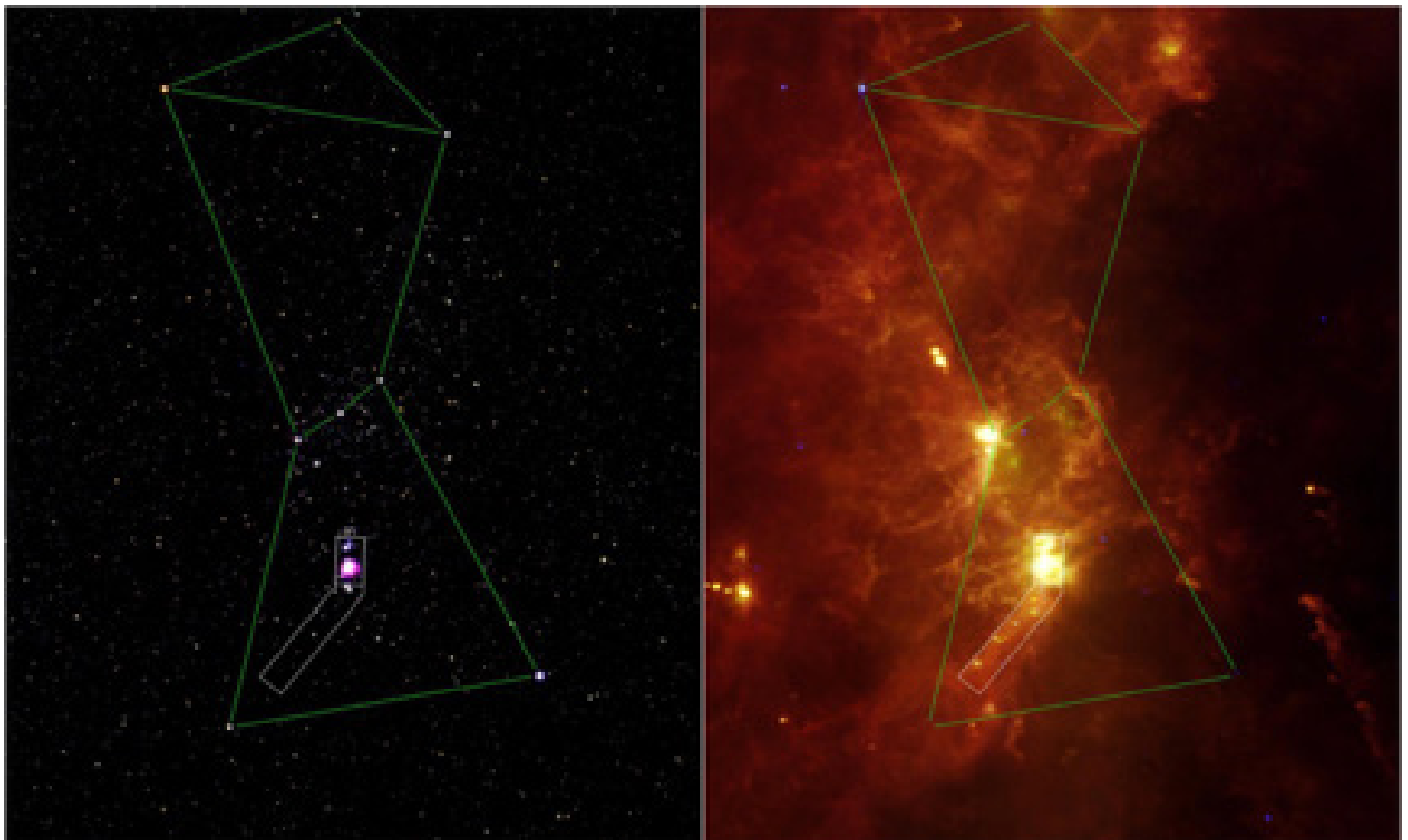
The Orion Nebula is a small window into a vastly larger area of star formation centered around the constellation of Orion itself. NASA's Great Observatories, space telescopes like Hubble, Spitzer, Compton, and Chandra, studied this area in wavelengths we can't see with our earthbound eyes, revealing the entire constellation alight with star birth, not just the comparatively tiny area of the nebula. Why then can we only see the nebula? M42 contains hot young stars whose stellar winds blew away their cocoons of gas after their "birth," the moment when they begin to fuse hydrogen into helium. Those gas clouds, which block visible light, were cleared away just enough to give us a peek inside at these young stars. The rest of the complex remains hidden to human eyes, but not to advanced space-based telescopes.

We put telescopes in orbit to get above the interference of our atmosphere, which absorbs many wavelengths of light. Infrared space telescopes, such as Spitzer and the upcoming James Webb Space Telescope, detect longer wavelengths of light that allow them to see through the dust clouds in Orion, revealing hidden stars and cloud structures. It's similar to the infrared goggles firefighters wear to see through smoke from burning buildings and wildfires.

Learn more about how astronomers combine observations made at different wavelengths with the Night Sky Network activity, "The Universe in a Different Light," downloadable from bit.ly/different-light-nsn. You can find more stunning science and images from NASA's Great Observatories 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.



This image from NASA's Spitzer missions shows Orion in a different light – quite literally! Note the small outline of the Orion Nebula region in the visible light image on the left, versus the massive amount of activity shown in the infrared image of the same region on the right. Image Credit: NASA/JPL-Caltech/IRAS /H. McCollon. From bit.ly/SpitzerOrion

Emission Nebula in Cassiopeia: IC 1805

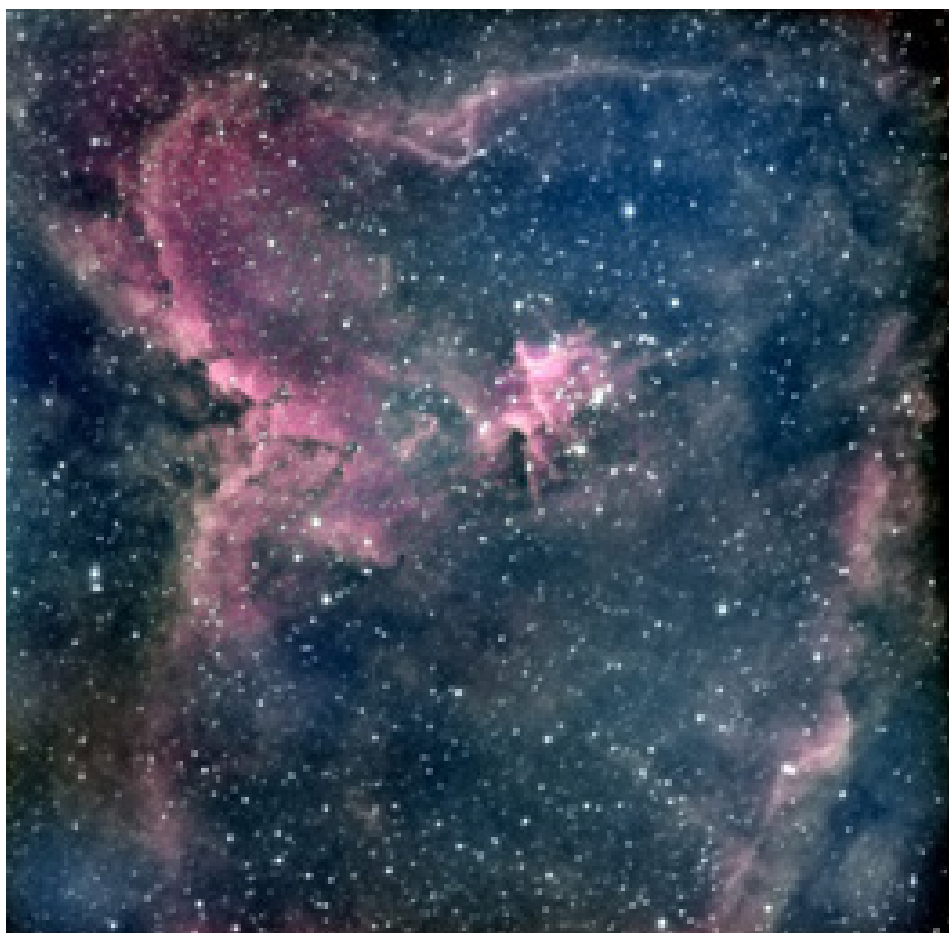
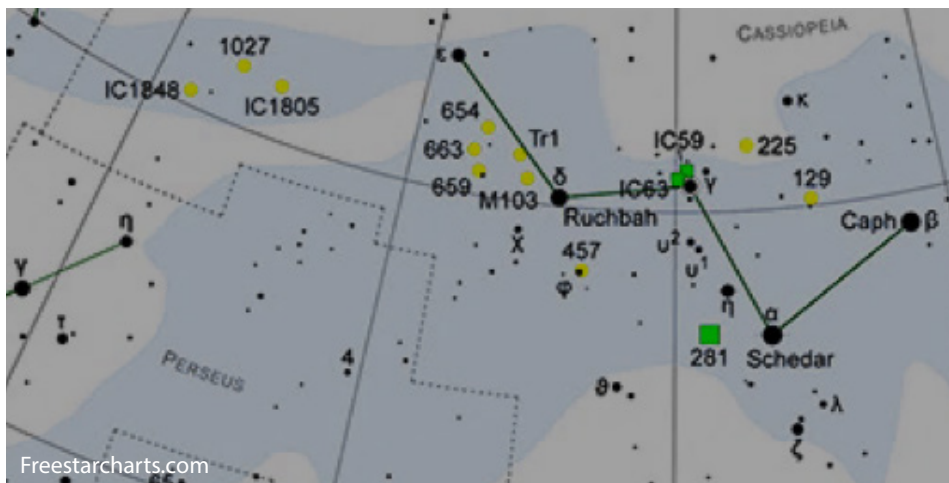
by Glenn Chaple for LVAS

Mag: 6.5; Size: 1.5° X 1.5°

Last month's Observer's Challenge, the planetary nebula NGC 246 in Cetus, tested our observing skills because its light is spread over a relatively large area. We continue that scenario with IC 1805, the "Heart Nebula" in Cassiopeia. Notes in Sanner and Kepple's *Night Sky Observer's Guide* describe this 1.5 by 1.5 degree nebula as "not visible" in 8-10 inch scopes and "very faint through a UHC filter" with 12-14 inch instruments. Despite this discouraging assessment, it might be an interesting challenge for large binoculars in a dark sky area or a rich-field telescope like an Edmund Astroscan fitted with a low power eyepiece and a UHC filter.

At the heart of the "Heart" is the source of its illumination – the open cluster Melotte 15. A young stellar group (its age is estimated to be 1.5 million years), Melotte 15 is dominated by O-type stars, some as much as 50 times the mass of the sun. According to Sanner and Kepple, the cluster is visible in scopes as small as 2-3 inches. Nebula and cluster lie some 7500 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.



Color Image of IC 1805: This was combined with 1 hour each of Oxygen 2 filter and Sulfur filter, for the color image. By Mario Motta (AAVSO) North is up.

The Sun, Moon & Planets in December

This table contains the ephemeris of the objects in the Solar System for each Saturday night in November 2019. Times in Eastern Standard Time (UTC-5). Ephemeris times are for Seagrave Observatory (41.845N, 71.590W).

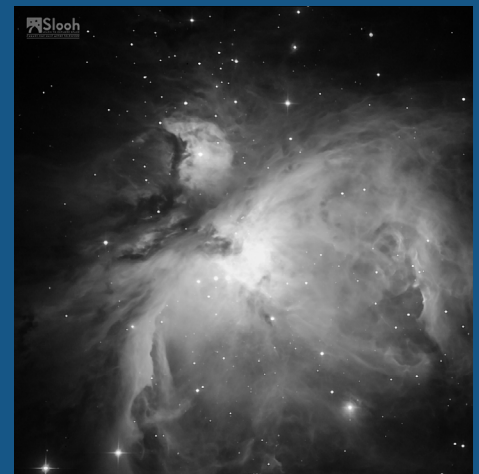
Object	Date	RA	Dec	Const	Mag	Size	Elong	Phase(%)	Dist(S)	Dist(E)	Rise	Transit	Set
Sun	7	16 53.0	-22 32.7	Oph	-26.8	1948.0	-	-	-	0.99	06:59	11:37	16:15
	14	17 23.7	-23 10.6	Oph	-26.8	1949.7	-	-	-	0.98	07:05	11:40	16:16
	21	17 54.8	-23 25.9	Sgr	-26.8	1950.9	-	-	-	0.98	07:10	11:44	16:18
	28	18 25.8	-23 18.3	Sgr	-26.8	1951.6	-	-	-	0.98	07:12	11:47	16:22
Moon	7	1 00.4	0 08.6	Cet	-12.2	1805.1	119° E	75	-	-	14:00	20:27	03:03
	14	7 03.9	22 35.8	Gem	-12.6	1911.8	158° W	96	-	-	18:47	02:31	10:08
	21	13 30.2	-4 32.9	Vir	-11.4	1907.2	67° W	30	-	-	01:53	07:45	13:27
	28	19 55.4	-22 59.2	Sgr	-8.9	1827.6	21° E	3	-	-	09:12	13:59	18:50
Mercury	7	15 38.7	-17 51.6	Lib	-0.5	5.7	18° W	82	0.40	1.19	05:28	10:24	15:19
	14	16 20.1	-20 43.6	Sco	-0.4	5.2	15° W	90	0.43	1.30	05:54	10:38	15:21
	21	17 04.9	-22 58.0	Oph	-0.5	4.9	11° W	95	0.45	1.37	06:21	10:55	15:29
	28	17 51.8	-24 19.2	Sgr	-0.6	4.7	8° W	98	0.47	1.42	06:47	11:15	15:43
Venus	7	18 59.8	-24 21.5	Sgr	-3.8	12.0	29° E	88	0.73	1.41	09:16	13:45	18:14
	14	19 37.4	-23 20.4	Sgr	-3.8	12.3	31° E	86	0.73	1.37	09:21	13:55	18:29
	21	20 14.1	-21 45.5	Cap	-3.8	12.6	32° E	85	0.73	1.34	09:23	14:04	18:45
	28	20 49.9	-19 40.0	Cap	-3.9	13.0	34° E	83	0.73	1.30	09:22	14:12	19:02
Mars	7	14 37.7	-14 46.9	Lib	1.7	4.0	33° W	97	1.62	2.35	04:13	09:21	14:28
	14	14 56.1	-16 13.0	Lib	1.7	4.1	35° W	97	1.61	2.31	04:09	09:12	14:14
	21	15 14.8	-17 33.5	Lib	1.6	4.1	38° W	96	1.60	2.26	04:06	09:03	13:59
	28	15 33.9	-18 47.5	Lib	1.6	4.2	40° W	96	1.59	2.21	04:02	08:54	13:46
1 Ceres	7	18 35.8	-26 41.2	Sgr	9.1	0.3	24° E	100	2.90	3.78	09:02	13:18	17:34
	14	18 48.1	-26 37.6	Sgr	9.1	0.3	19° E	100	2.91	3.82	08:46	13:03	17:20
	21	19 00.5	-26 30.6	Sgr	9.0	0.3	15° E	100	2.91	3.85	08:30	12:48	17:05
	28	19 12.9	-26 20.1	Sgr	9.0	0.3	11° E	100	2.91	3.87	08:14	12:32	16:51
Jupiter	7	18 04.1	-23 18.3	Sgr	-1.7	31.9	16° E	100	5.24	6.17	08:14	12:46	17:18
	14	18 11.0	-23 17.7	Sgr	-1.7	31.7	11° E	100	5.23	6.20	07:53	12:25	16:58
	21	18 18.0	-23 16.0	Sgr	-1.7	31.7	5° E	100	5.23	6.21	07:32	12:05	16:37
	28	18 25.0	-23 13.0	Sgr	-1.7	31.7	0° W	100	5.23	6.21	07:11	11:44	16:17
Saturn	7	19 20.5	-22 03.8	Sgr	0.6	15.3	34° E	100	10.04	10.84	09:24	14:02	18:39
	14	19 23.7	-21 58.0	Sgr	0.6	15.2	28° E	100	10.04	10.90	08:59	13:37	18:16
	21	19 27.1	-21 51.8	Sgr	0.6	15.1	21° E	100	10.04	10.95	08:35	13:13	17:52
	28	19 30.5	-21 45.1	Sgr	0.6	15.1	15° E	100	10.03	10.98	08:10	12:49	17:28
Uranus	7	2 04.5	12 05.4	Ari	5.7	3.7	139° E	100	19.82	19.07	13:58	20:44	03:30
	14	2 03.8	12 01.9	Ari	5.7	3.7	131° E	100	19.82	19.16	13:30	20:16	03:02
	21	2 03.2	11 59.2	Ari	5.7	3.7	124° E	100	19.82	19.25	13:02	19:48	02:34
	28	2 02.8	11 57.2	Ari	5.7	3.6	117° E	100	19.82	19.36	12:34	19:20	02:06
Neptune	7	23 09.9	-6 29.8	Aqr	7.9	2.3	91° E	100	29.93	29.89	12:11	17:50	23:29
	14	23 10.1	-6 28.4	Aqr	7.9	2.3	84° E	100	29.93	30.01	11:44	17:23	23:02
	21	23 10.4	-6 26.3	Aqr	7.9	2.3	77° E	100	29.93	30.13	11:17	16:56	22:35
	28	23 10.8	-6 23.7	Aqr	7.9	2.3	70° E	100	29.93	30.25	10:49	16:28	22:08
Pluto	7	19 33.8	-22 18.7	Sgr	14.4	0.2	37° E	100	33.93	34.72	09:38	14:15	18:51
	14	19 34.7	-22 17.3	Sgr	14.4	0.2	30° E	100	33.94	34.79	09:11	13:48	18:25
	21	19 35.6	-22 15.8	Sgr	14.4	0.2	23° E	100	33.94	34.85	08:45	13:21	17:58
	28	19 36.6	-22 14.2	Sgr	14.4	0.2	16° E	100	33.95	34.89	08:18	12:55	17:32



Kim Arcand presented at our November 3 meeting on the 20th anniversary of Chandra X-Ray Observatory and signed copies of her new book *Light from the Void*.



Jocelyn Bell Burnell, discoverer of the first pulsar in 1967, presented the Katzenstein Distinguished Lecture at UConn in Storrs on November 8, which was attended by Francine Jackson and Jim Hendrickson.



Some images taken with the SLOOH telescope in Canary Islands processed by Jeff Padell: planetary nebula NGC1360 in Cassiopeia; Caldwell 56 Skull Nebula, M41 Orion Nebula.

Transit of Mercury



My brother Glen and I set up our scopes on the Bryant University Campus. We were there for the entire five hour and 30 minute event. Clouds to start, so no 1st or 2nd contact. But once the clouds moved northward we had clear skies for most of the morning, only having partly cloudy skies at 3rd and 4th contact.

Perhaps 100 students stopped by to take a look. Many faculty and staff also visited.

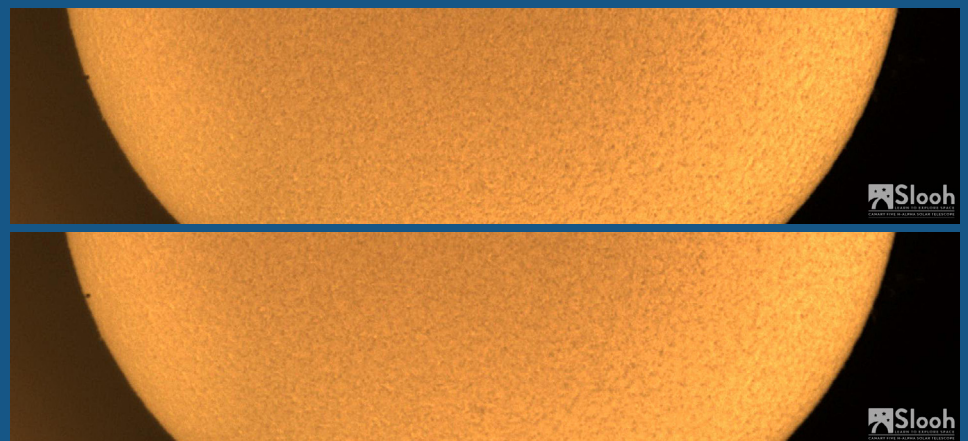
Even though my two astronomy labs of students (26 in all) knew about the event, when it came time to submit their weekly sunspot counts 1-2 days later, about one-third reported Mercury as a spot!

Dave Huestis

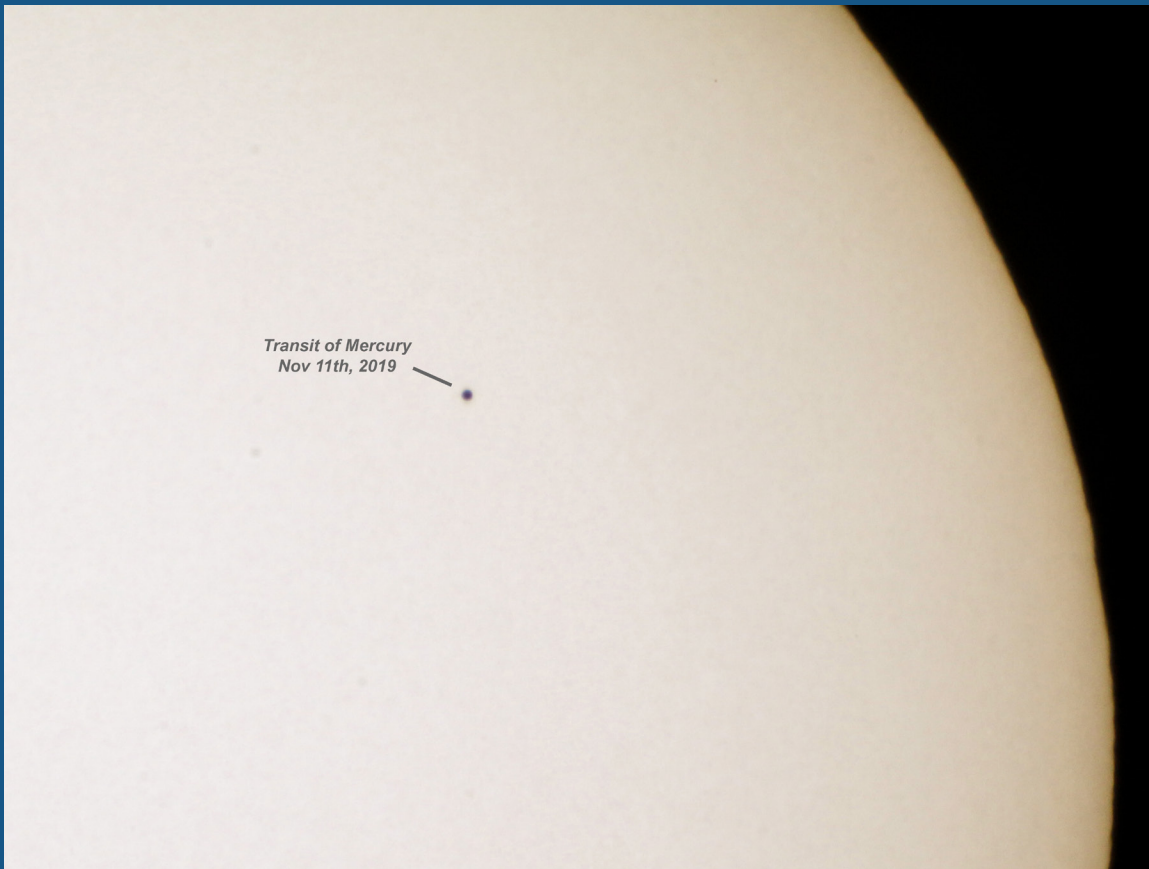


Ian Dell'Antonio, Jim Hendrickson, Bob Horton, and Francine Jackson gathered at Barus & Holley at Brown University to observe the transit of Mercury under mainly clear skies. Clouds began to interfere only during the final stages, but third and fourth contacts were visible.

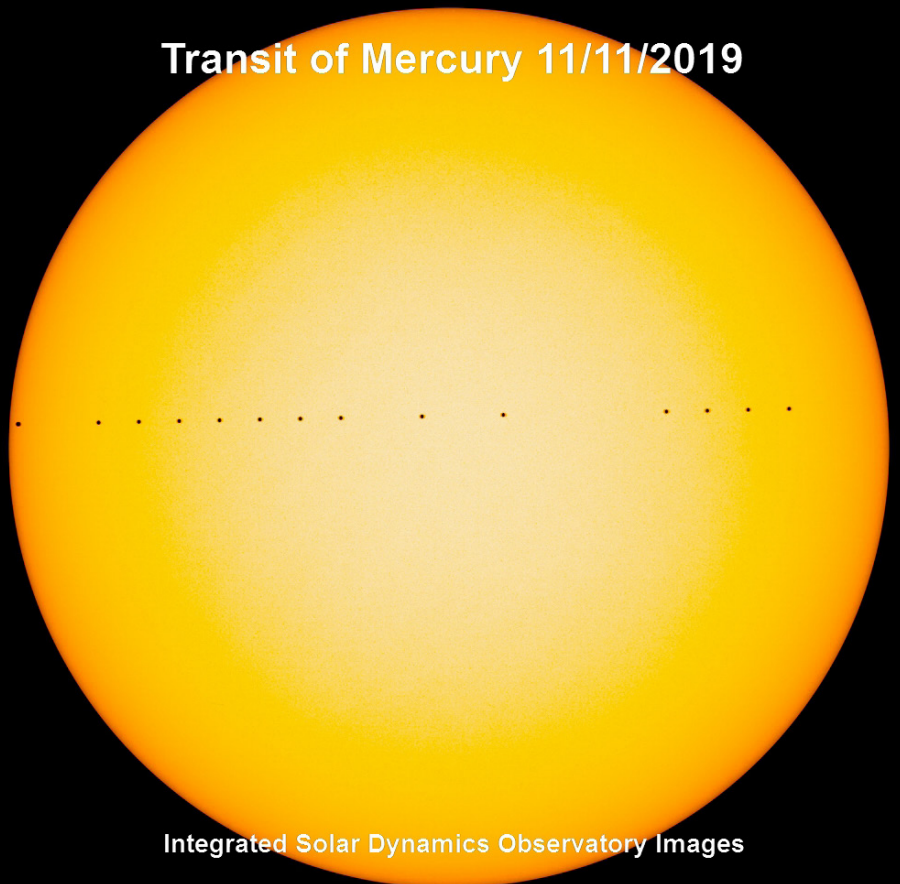
Jeff Padell caught Mercury's first and second contact using SLOOH at Canary Islands.



Mercury Transit captures by Tracy Prell using a 107mm refractor and Canon SLR.



Transit of Mercury 11/11/2019



Integrated Solar Dynamics Observatory Images

SDO/HMI Quick-Look Continuum: 20191111_1 500

William Weber 11/11/2019

I followed the transit through the Slooh and Solar Dynamics Observatory (SDO) websites.

I integrated the images from SDO in PixInsight and after a small stretch, a curve transform tweak and annotations, I got the attached image.

By William Weber

November Reports

Cash Flow by Tag YTD - All Dates
4/7/2006 through 11/1/2019

Fiscal Year 2019-2020 Budget & YTD Totals 11-01-19

Category	2019	OVERALL TOTAL
INFLOWS		
Astro Assembly Income		
Banquet	1,355.00	1,355.00
Doantions	25.00	25.00
Grill	480.00	480.00
Misc	8.00	8.00
Raffle	511.00	511.00
Registration	1,555.00	1,555.00
TOTAL Astro Assembly Income	3,934.00	3,934.00
Astronomical League Membership Co... Donation	90.00	90.00
Donation for Capital Improvements	3,015.00	3,015.00
Misc Donation	1,675.06	1,675.06
Tracy Prell Birthday Fundraiser	1,569.78	1,569.78
TOTAL Donation	6,259.84	6,259.84
Dues		
Family	960.00	960.00
Junior	30.00	30.00
Regular	1,500.00	1,500.00
Senior	775.00	775.00
TOTAL Dues	3,265.00	3,265.00
Misc Income		
Sale of Items	140.00	140.00
TOTAL Misc Income	140.00	140.00
Star Party Donations	150.00	150.00
TOTAL INFLOWS	13,838.84	13,838.84
OUTFLOWS		
Astro Assem Exp		
Banquet		
Caterer	747.50	747.50
Reception	19.00	19.00
TOTAL Banquet	766.50	766.50
Grill	159.53	159.53
Hall Rental	200.00	200.00
Misc	53.20	53.20

Category	Budget	YTD Totals	Delta
INCOME			
AstroAssembly	4,000	3,934	(66)
Dues	3,100	3,265	165
AL Membership	90	90	0
Donations	1,300	6,260	4,960
Sale of Equipment	100	140	40
Star Party Donations	300	150	(150)
Transfer from Savings/CD	2,035	0	(2,035)
TOTAL INCOME	10,925	13,839	2,914
EXPENSES			
Astro Assem Exp	1,450	1,234	216
AL Membership Exp	100	100	0
Contingency	258	35	223
Corporation, State Fee	22	22	0
Domain Name	20	156	(136)
Donation	50	0	50
PayPal Fees	50	64	(14)
Outreach	300	0	300
Postage and Delivery	75	11	64
Property Insurance	2,500	0	2,500
Refreshment Expense	200	0	200
Trustee Expense	3,500	4,342	(842)
Utilities	2,400	1,571	829
TOTAL EXPENSES	10,925	7,535	3,390
OVERALL TOTAL	0	6,304	



Quest for the Northern Lights

6 Nights • October 11 - 17, 2020

Presented by Skyscrapers Inc.

Package Inclusions:

- Roundtrip air from Boston
- Arrival & departure transfers in Iceland
- 5-night hotel accommodations
- 12 Meals: 6 breakfasts, 2 lunches & 4 dinners
- Local guide and sightseeing as scheduled
- Multiple Northern Lights excursions
- Services of a AAA Host[^]

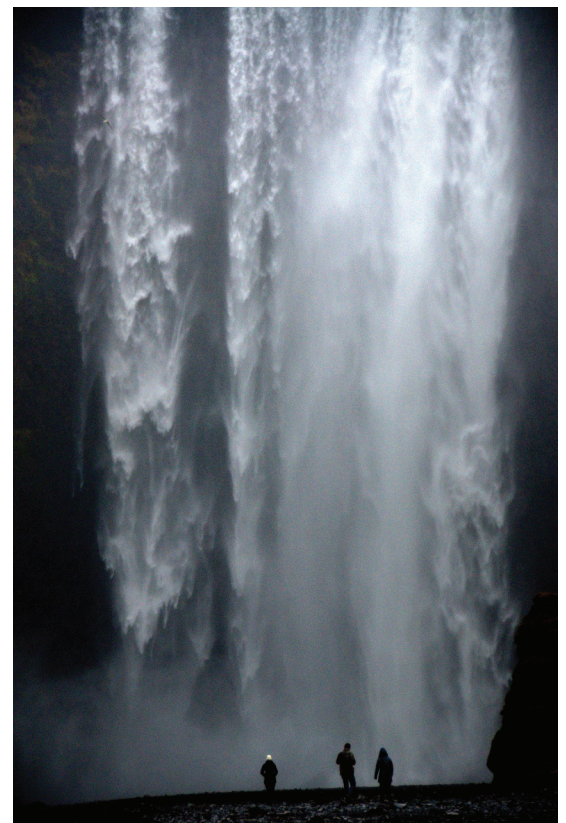
From: \$3,329 pp

RESERVE YOUR SPOT TODAY!

Melissa Mennella

401-868-2000 ext. 2662

MMennella@AAANortheast.com



Itinerary:

B = Breakfast, L = Lunch, D = Dinner

Day 1: October 11, 2020 - Overnight Flight to Reykjavik

Day 2: October 12, 2020 - Get ready for a full day of exploring as you are introduced to the amazing country of Iceland. You'll be greeted by our tour guide who will lead us to our private motor coach. The first stop is breakfast and then we're off to the capital to begin touring. Take in all the city's major attractions, including: Parliament, National Museum, Höfði house and much more. Then we will visit the Aurora Museum where we learn about this phenomenon and how other countries around the world connect with it. This evening we dine together, followed by a Northern lights cruise, if weather permits. **B, D**



Day 3: October 13, 2020 - Enjoy breakfast before an independent visit to the Reykjavik Museum of Photography. The museum features a collection of approximately six million photographs with some dating back as early as 1860. In the afternoon, we will rejoin our guide and visit the National Museum. This evening brings us to Perlan - Wonders of Iceland, where visitors can experience Iceland's many natural wonders all in one place. Later, venture to the top floor of Perlan and dine under a glass dome while enjoying an incredible 360° view. **B, D**

Day 4: October 14, 2020 - The day is yours to create your own Icelandic story. This evening, join the local astronomy society for a visit at their observatory in Grotta. **B**

Day 5: October 15, 2020 - After breakfast, we drive through the fertile farmlands of Southern Iceland toward its majestic mountains and beautiful waterfalls. Visit the Lava Centre to experience a high-tech educational exhibit depicting volcanic activity, earthquakes and the creation of Iceland. The famous Iceland Lava show is also included during our visit. This evening we will enjoy dinner at the hotel before heading out for a Northern Lights hunt on foot with our guide. Included Meals: **B, L, D**



Day 6: October 16, 2020 - We'll enjoy a full-day tour of southwest Iceland today, which includes three of Iceland's best-known attractions: Gullfoss, one of the most impressive waterfalls in Europe, with its icy water thundering majestically into a deep canyon; the Geysir Hot Springs, featuring a numerous geysers, including the 30-meter spouting world-known Strokkur; and a visit with lunch at Friðheimar tomato greenhouse. We will also get to see a demonstration of the famed five gaits unique to the Icelandic horse. Dinner is included this evening before we head out for one last attempt to see the Northern Lights. Included Meals: **B, L, D**

Day 7: October 17, 2020 - This morning we travel back to the airport but not before a visit to the famous Blue lagoon. The lagoon is a unique formation with pleasantly warm, mineral-rich geothermal water in the middle of a black lava field. Enjoy a swim with an included silica mask during your visit before departing to Keflavík International Airport for your flight home. Included Meals: **B**

*Rate is per person, based on double occupancy for October 11, 2020 departure including roundtrip air from Boston and includes government-imposed fees and taxes which are subject to change without notice. Additional airline restrictions, including, but not limited to baggage fees (See iflybags.com for specific details). Please contact the airline directly for details and questions. Fuel surcharges and any other applicable vendor surcharges are additional. Rate shown is current at time of print, capacity controlled, subject to availability and valid on new bookings only. AAA reserves the right to change or cancel itineraries whenever it is deemed necessary. If any changes occur, every effort will be made to offer other comparable package components. Trip Cancellation Insurance is strongly recommended. A valid U.S. passport with a validity date at least 6 months after return date is required for U.S. Citizens traveling outside the United States. AAA does not assume responsibility for any errors or omissions in the content of the offers displayed. Other restrictions and conditions may apply.



AAA Northeast Reservation Form

Group Name: **Rhode Island Skyscrapers**

Tour Name: **Iceland's Northern Lights**

Travel Dates: **October 11- 17, 2020**

FOR RESERVATIONS PLEASE CONTACT

Melissa Mennella, Group Sales and Product Operations (401) 868 -2000 x 2662 mmennella@aaanortheast.com
AAA Northeast 110 Royal Little Drive Providence, RI 02904

TRIP COST

\$3329 per person double occupancy // \$3979 per person single occupancy

Reservations booked and deposited by December 15, 2019 will receive a \$50 per person early booking discount.

DEPOSIT AND FINAL PAYMENT

Deposit: \$250 per person // Final payment: Due by June 13, 2020

Please complete the form below and mail it, along with a copy of your passport to the address above. Names **MUST** be listed in full exactly as they appear on your passport. If the name on your reservation does not **EXACTLY** match the name on your passport, you will not be allowed to proceed through TSA. Name changes and/or modifications will result in a fee.

YOUR INFORMATION

First / Middle/ Last Name _____

DOB ____/____/____ Address _____

Phone _____ Email Address _____

Rooming with _____

Emergency contact name _____ Phone _____

TRAVEL PROTECTION

- Yes, I would like to purchase travel protection (**\$226** per person based on double occupancy, **\$254** per person based on single occupancy)
- No, I decline travel protection

**Please note that if you choose not to purchase travel protection, you will incur penalties for changes and/or cancellations. To ensure preexisting conditions are covered, the travel protection is due with your initial deposit. Price of insurance varies based upon age, state of residence and package price. Please call for an insurance quote.*

SPECIAL NOTES

Please use this area to note any special requests, dietary restrictions, food allergies, or medical restrictions:

NOTES

*All US citizens traveling outside of the United States are required to carry a valid passport. Passports must be valid for at least six months from the date of your return to the US. For up to date international travel documentation, visit www.travel.state.gov well in advance of your travel.

PAYMENT INFORMATION

Method of Payment Check *Please make all checks payable to: AAA Northeast* Deposit Total _____

Credit Card AMEX ___ VISA ___ DISCOVER ___ MASTERCARD ___

Credit Card # _____ Exp. Date ____/____/____ CVV _____

Signature _____ Date ____/____/____

**Cash deposits are not accepted*

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