



the Skyscraper

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Seagrave Observatory is closed until further notice.

Due to the outbreak of coronavirus, Seagrave Memorial Observatory will remain closed to the public until further notice.

Phases of the Moon

Last Quarter Moon
December 8 00:37

New Moon
December 14 16:17

First Quarter Moon
December 21 23:41

Full Cold Moon
December 30 03:28

A Guide to Collecting Meteorites

A Presentation by Gregory Shanos
Saturday, December 5, 7:00pm EST via Zoom

Contact Steve Hubbard (cstahhs@gmail.com) for Zoom Meeting link and information.

Greg Shanos is a pharmacist by profession and amateur astronomer by passion. It all began with the apparition of Halley's Comet in 1985-1986 when Greg became a member of Skyscrapers and subscribed to Sky & Telescope/Astronomy magazines. There he found an ad for Robert Haag Meteorites. After receiving the catalog, Greg purchased three iron meteorites, and from that point on his passion for these extraterrestrial gems was ignited. Over thirty years later, Greg continues to collect, lecture, and educate about the wonders of these rocks from space. Greg has also published over 35 review articles in Meteorite & Meteorite-Times magazines regarding organic compounds in meteorites. Tonight's presentation is entitled: A Guide to Collecting Meteorites.

Upcoming Presentations

Saturday, January 2

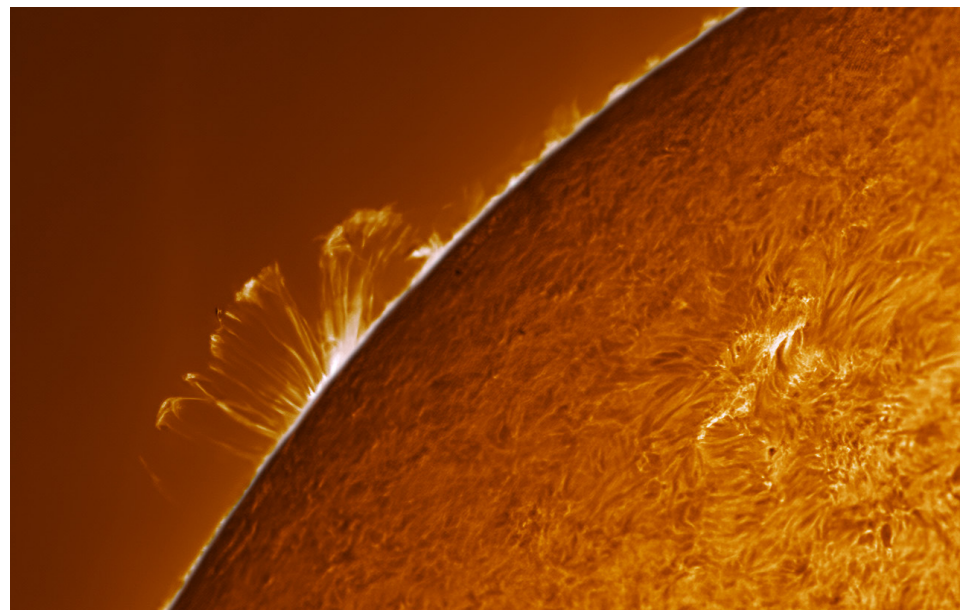
Mike Wenz: A Behind The Scenes Look At The Hubble Telescope

Saturday, February 6

John Briggs: A Walking Tour of Optical History - Artifacts and Anecdotes from the Astronomical Lyceum

Saturday, March 6

Mike Wenz: A Behind the Scenes Look at Sky & Telescope



New Problems for Radio Astronomy: The Rise of Starlink and the Loss of Arecibo

by Francine Jackson

It appears as if technology is hitting astronomy in two directions: Many who enjoy imaging the sky are finding more streaks brought on by what is becoming an untold number of “Starlink” satellites that streak through what should be a pristine view of the celestial sphere. Originally, when the Motorola series of satellite flares would occur, we used to alert the public on the brightness in a specific area, which would last just a few seconds, then disappear; now, however, with the launch of these Starlink satellites, the “streaks” won’t disappear. SpaceX has already sent up hundreds of these satellites, and will continue to do so.

Most of these satellites, normally just a few inches on a side, have an ultimate goal to provide internet service to remote areas. It does appear that SpaceX has decided to help the brightness issue, as it continues to launch more of these; at present, there are about 700 of the 1440 already set, and it apparently has been approved for 12,000 more (Daniel Cleary, Satellite Swarm Threatens Radio Array, Science, 16 October 2020, <https://science.sciencemag.org/content/370/6514/274>). SpaceX has changed the orientation of them in their orbits,

painted them darker, and added “visors” to lower reflection. Of course, besides our own observing and photographic efforts, professional observatories are worried, including Chile’s Vera C. Rubin Observatory.

In addition to optical problems brought on by these tiny orbiters, they are also creating havoc with the radio spectrum. Most notably, by sending radio signals downward, they would interfere with the work being done by the Square Kilometre Array (SKA) in South Africa, which is planned to be completed later this decade. The United Nations Office for Outer Space Affairs is looking into this double problem of astronomers within the Electromagnetic Spectrum, not only for science but also for the general public and wildlife concerns. If nothing is done, the SKA could lose 70% of its sensitivity; more of these satellites could potentially render this, and other radio observatories, basically silent in certain frequencies.

In another, related note: It appears we have to say good-bye to a workhorse of a radio telescope that many of us know, not only for its decades of service, but its presence in movies such as Contact and the

James Bond forgettable Goldeneye. Puerto Rico’s 1,000 foot (305 meter) Arecibo Observatory, which up until just recently was the largest radio dish in the world, had a 100-foot hole torn in its dish by an auxiliary cable in August; and, then, just a few weeks ago, one of its main steel cables snapped. This led the National Science Foundation to believe that, even if the damage were repaired, the structure in the long term could still be unstable, and possibly compromise the safety of the workers.

It is unfortunate that a facility such as this, which has been important, not only as a research tool, but a teaching platform for many astronomy graduate students, should be rendered unsafe, after withstanding hurricanes, earthquakes and intense humidity for 57 years; however, the research done there, such as pulsars, gravitational waves, and neutral hydrogen searches, will never be forgotten.



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

Observatory See more at <http://theskyscrapers.org/francine-jackson>



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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The Geminid Meteor Shower and the Great Conjunction of Jupiter & Saturn

by Dave Huestis

2020 has been disastrous for the local observatories. Seagrave and Ladd have been closed since mid-March due to Covid-19, thereby preventing stargazers from enjoying splendid views of the heavens from these great facilities. In addition, for me the pandemic forced my retirement from teaching astronomy labs at Bryant University after a great ten-year run of enlightening students about basic astronomical concepts. Although I hate to hasten the passage of time any quicker than it appears to be running at present, I for one will be glad to see 2020 in the rearview mirror.

Regrettably, I believe it will be at least mid-year 2021 before we will be able to gather safely as a group to explore the heavens as we did BC (Before Covid). Until that time I will continue to provide you with news of astronomical events that can be observed either with your naked-eye or with small personal telescopes. The skies above are available for your exploration any clear night from the relative safety of your own backyard. There is something for everyone if you know what to look for and when. While my monthly columns can only highlight a couple of interesting astronomical events, there are many websites out there that can provide something of interest for practically every night. Here are a handful to get you started (some may require you to input the current year):

<http://www.seasky.org/astronomy/astronomy-calendar-2020.html>

<https://in-the-sky.org/newscal.php>

<https://www.timeanddate.com/astronomy/sights-to-see.html>

December has three major events on which I would like to focus. First up is the annual Geminid meteor shower on the night of December 13-14. The Geminids are the most reliable and productive display of shooting stars observed from the northern hemisphere. The Earth sweeps through a stream of debris deposited in the orbital path of a two-mile-in-diameter hybrid “rock comet” named 3200 Phaethon. And this year the Moon will be in its New phase and will not interfere whatsoever with ob-

serving as many meteors as possible.

If the weather cooperates, the dark moonless night will permit stargazers well away from interfering light pollution to observe 60+ meteors per hour at peak sometime between 10 p.m. and dawn’s early light. While the Geminids appear to radiate from Gemini near its brightest stars, Castor and Pollux, scan around the sky as much as possible. As the night progresses and Gemini moves across the sky towards the west, your scan should move as well. At around 2:30 a.m. Gemini will be on your north/south meridian, just south of zenith. The number of meteors per hour should increase throughout your observing session. You’ll know you’ve seen a Geminid if you can trace the origin of the meteor’s trail back to the radiant point.

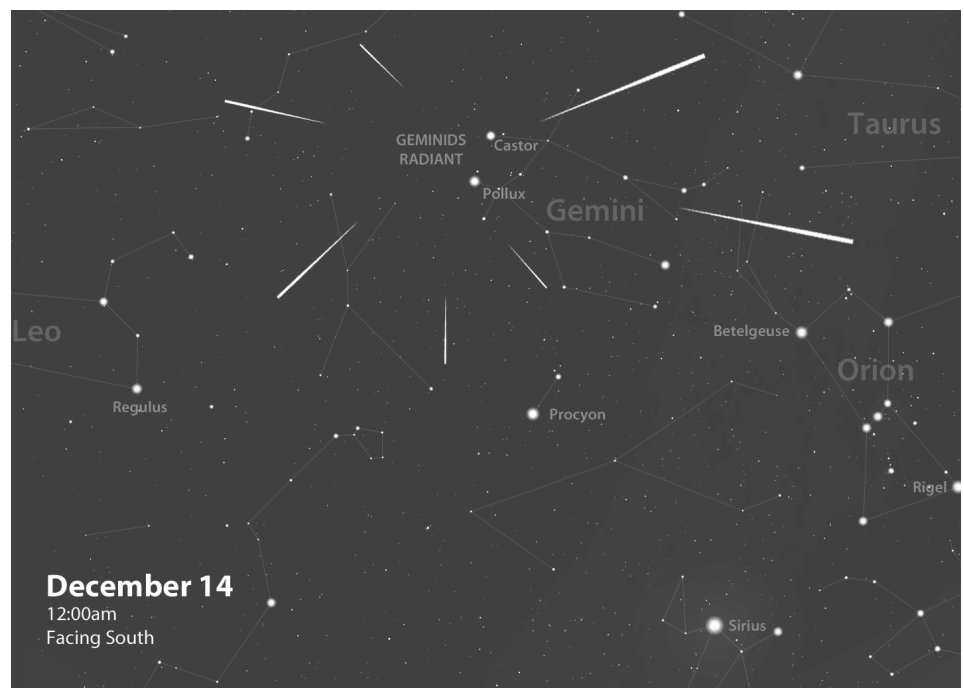
The Geminids are fairly bright and moderate in speed, hitting our atmosphere at 21.75 miles per second. They are characterized by their multicolored display (65% being white, 26% yellow, and the remaining 9% blue, red and green). Geminids also have a reputation for producing exploding meteors called fireballs.

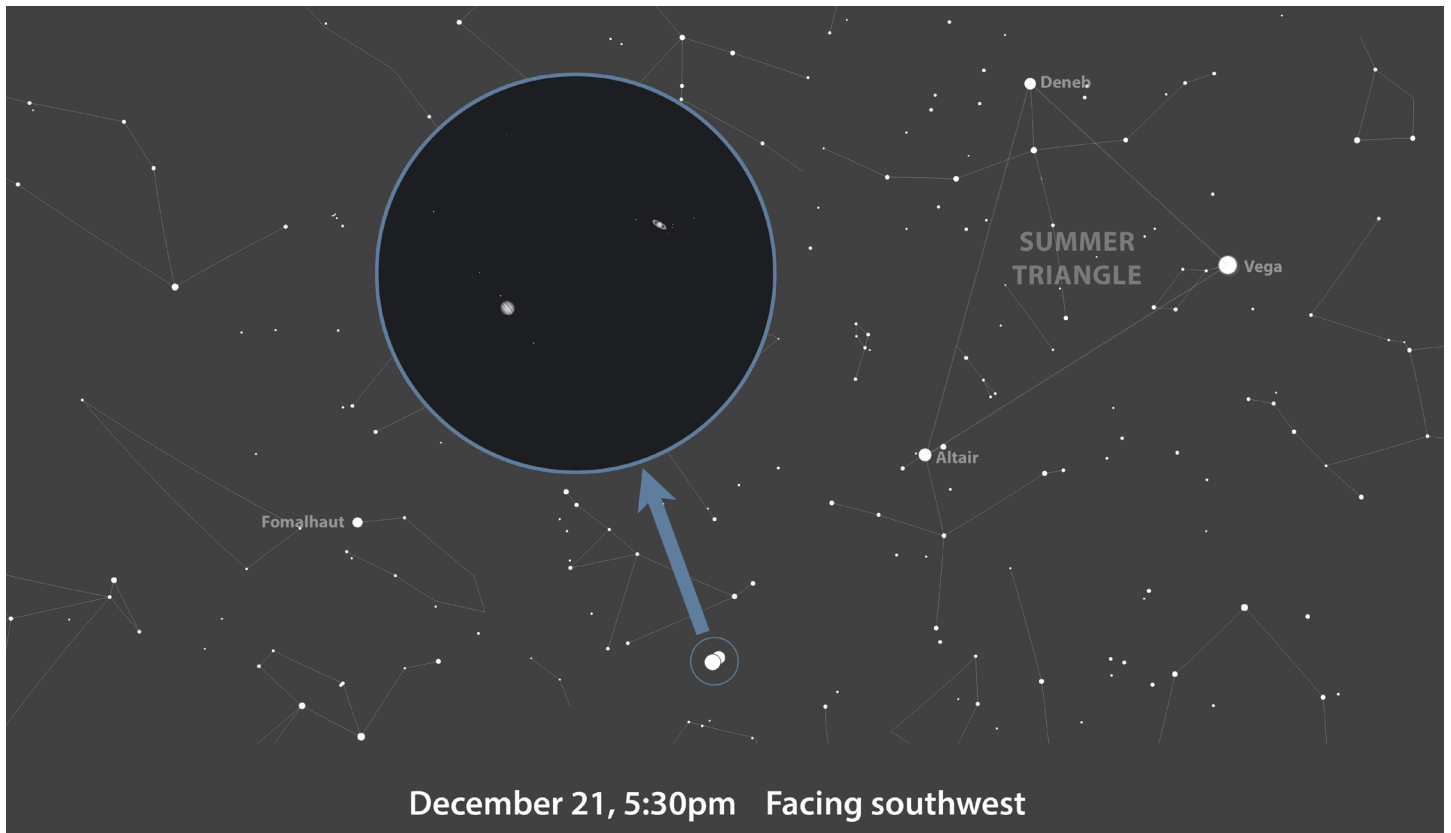
Keep in mind that the Geminid meteor

shower is one shooting star display that can be observed before the midnight hour. In fact, earlier in the evening of the 13th, you might spot a few Geminid earth grazers as they skim tangentially across the top of Earth’s atmosphere and parallel to the horizon. This scenario provides for much longer streaks, often looking like a stone skipping across a pond.

Good luck and remember to stay warm.

It doesn’t seem possible that winter is nearly upon us in the northern hemisphere. On the 21st the Winter Solstice occurs at 5:02 a.m. EST (Eastern Standard Time). Notice how far south along the eastern horizon the Sun rises. Then observe how far south along the western horizon the Sun sets. The apparent shift of the Sun’s position in the sky throughout the year is the result of the Earth’s fixed axial tilt of 23.5 degrees as our planet orbits the Sun. Read my article on ‘The Reason for the Season(s)’ on the Skyscrapers’ website: <http://www.theskyscrapers.org/reason-for-the-seasons>. Then watch the following video for a review of this movement: <https://youtu.be/d6rgyJkrMXg>. After the solstice, daylight hours grow longer as the angle the Sun rises





December 21, 5:30pm Facing southwest

and sets along our horizon increases as the Sun migrates northward in our sky.

While the close approach of Mars to the Earth two months ago was exciting, two other planets wanted to share the spotlight in 2020. I'm talking about the Great Conjunction of Jupiter and Saturn on night of the 21st. Throughout the year these two

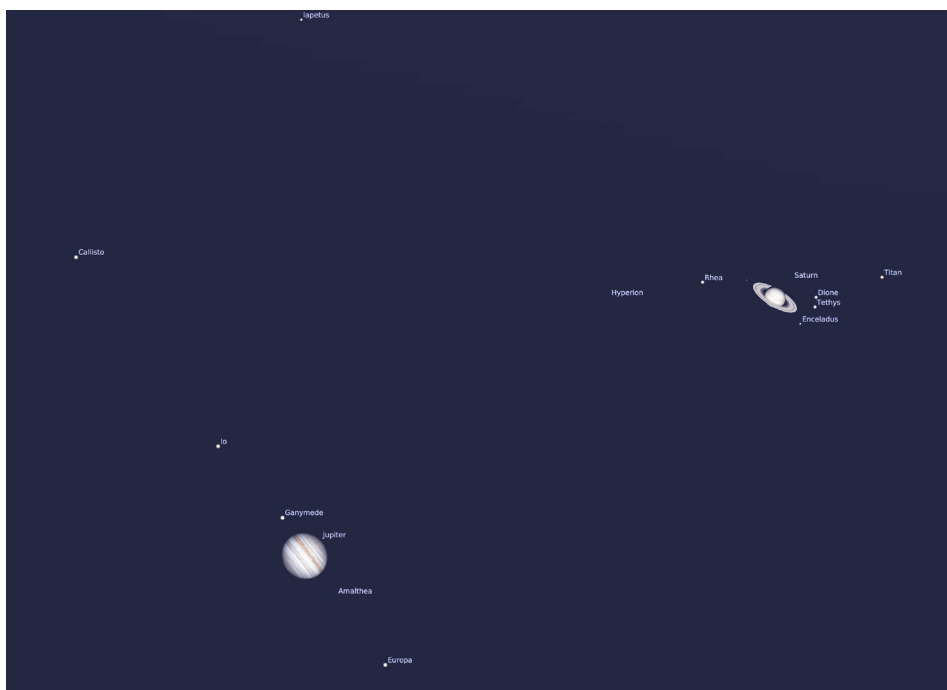
planets have been moving closer to each other in the sky from our Earthly perspective. On the night of the 21st they will be so close that they will appear as one object to the naked-eye just after sunset 15 degrees above the southwestern horizon. In reality, Jupiter will be approximately 551 million miles from the Earth, whereas Saturn will

be approximately just over one billion miles away. This "Great Conjunction" will be the closest these two worlds have been since 1623, and will be a spectacular phenomenon to behold.

To observe this event, you'll need to find an observing location that commands an unobstructed view towards the southwest. If you have a telescope by all means use it to focus in on this beautiful sight. Use medium-to- high power and you'll observe both worlds in their glory in the same field of view. Jupiter's four Galilean moons will be visible, with Callisto, Io and Ganymede on one side of the planet's disk, while Europa all by itself on the opposite side. Saturn's ring system will be very stunning, and his largest moon Titan will also be visible.

Hopefully the weather will cooperate, as the next Jupiter/Saturn conjunction on November 5, 2040 won't be as "Great." This event is really something special to note on your calendar.

Keep your eyes to the skies.
Happy Holidays!



Jupiter and Saturn will appear within a 1° field of view from December 12th through the 30th, and will appear as close as 6 arcminutes (1/5 lunar diameter) on the evening of the 21st. This diagram, produced from Stellarium, shows the positions of Jupiter, Saturn and each planet's bright satellites at 17:00 EST on the 21st.



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>

Planetary Nebula in Perseus: Messier 76

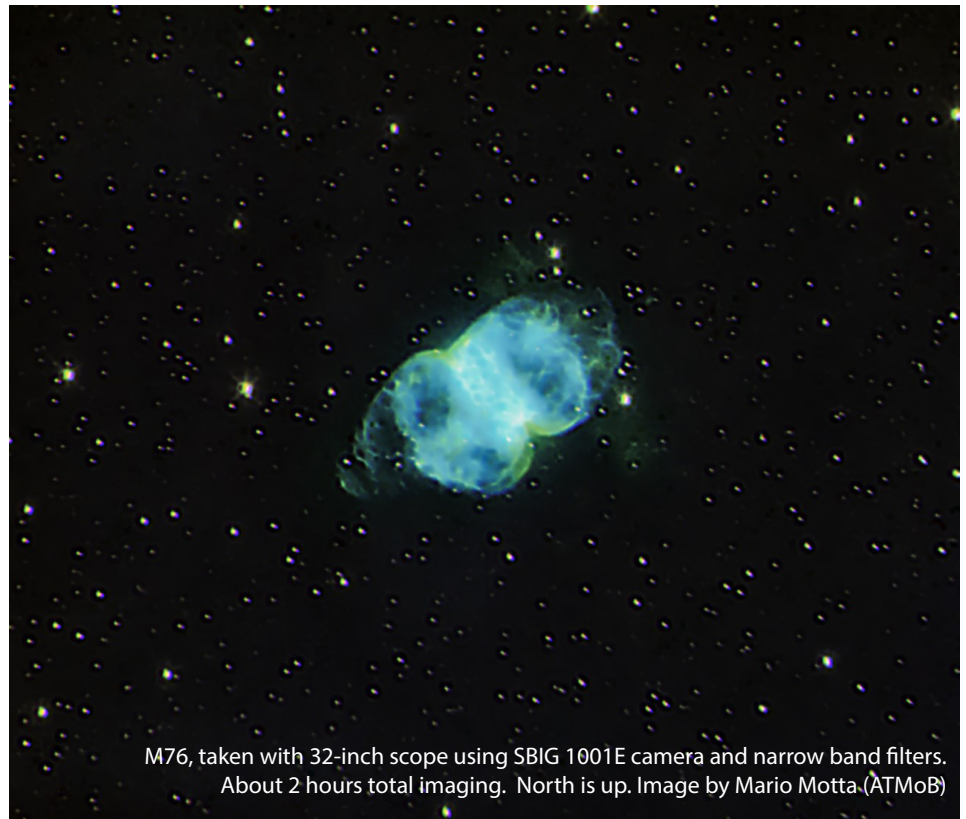
by Glenn Chaple for LVAS

Mag: 10.1, Size: 2.7' X 1.8'

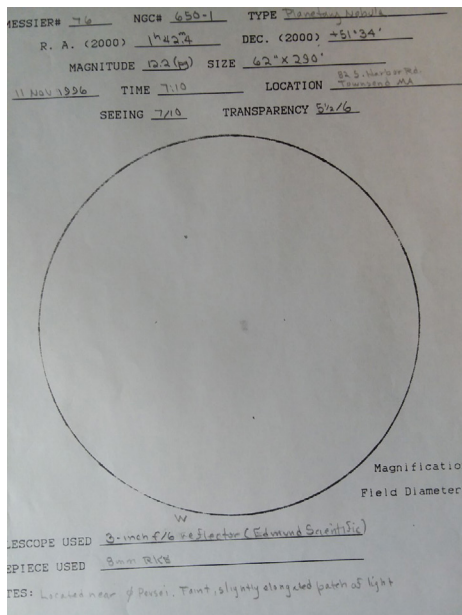
Messier 76, is one of four planetary nebulae listed in the Messier Catalog, the others being the Dumbbell Nebula (M27), the Ring Nebula (M57), and the Owl Nebula (M97). Similar in shape to M27 but 2½ magnitudes fainter and 3 times smaller, M76 is nicknamed the “Little Dumbbell Nebula.”

The Little Dumbbell is located at RA 01h 42.4m and Dec +51o 34.5'. For star-hoppers, that's about a degree north and slightly west of the 4th magnitude star phi (φ) Persei. At 10th magnitude and covering an area 2.7 by 1.8 arc-minutes, it's considered to be one of the more difficult to observe members of the Messier Catalog. However, it can be viewed with small-aperture instruments under reasonably dark sky conditions and with dark-adapted eyes.

M76 was discovered by French comet hunter Pierre Méchain on September 5, 1780. He reported his find to Messier, who added it to his catalog on October 21. Once believed to be two separate emission nebulae, the Little Dumbbell bears the New General Catalogue designation NGC 650/651. It lies about 2500 light years away and has a true diameter of 1.2 light years.

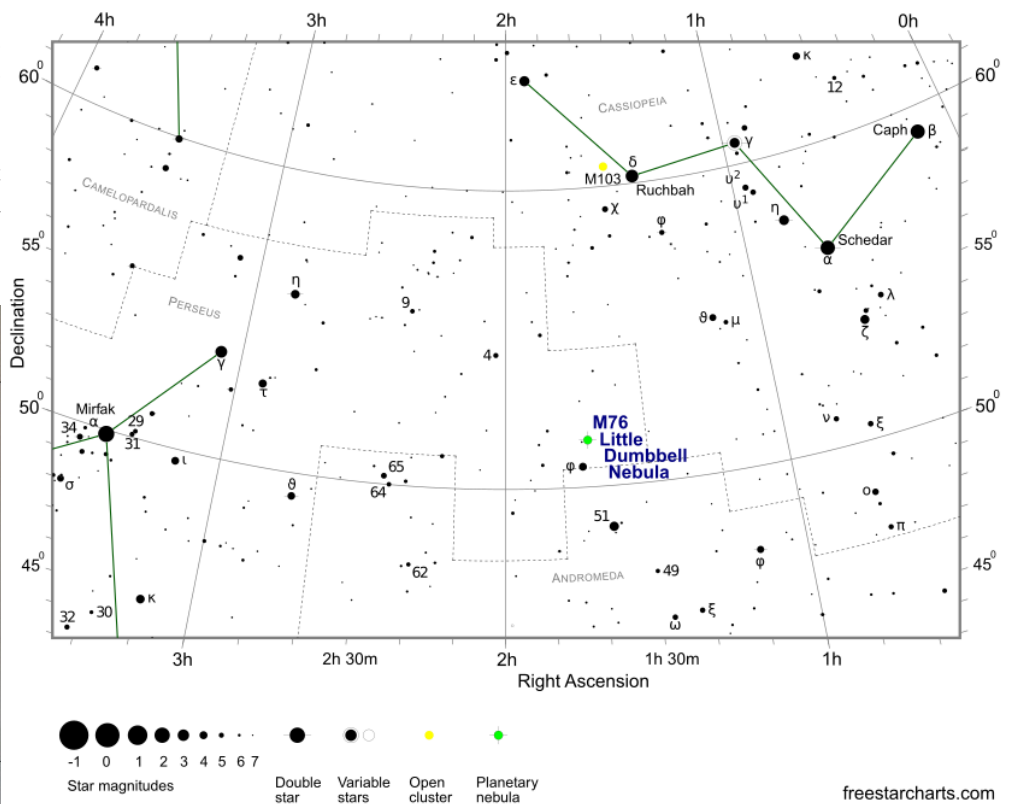


M76, taken with 32-inch scope using SBIG 1001E camera and narrow band filters. About 2 hours total imaging. North is up. Image by Mario Motta (ATMoB)



M76, as seen with 3-inch f/6 reflector at 57X. Field is one-half degree on a side and rotated so that North is up. Sketch by Glenn Chaple (ATMoB)

Messier 76 - M76 - Little Dumbbell Nebula



The purpose of the Observer's Challenge is to encourage the pursuit of visual observing. It is open to everyone who is interested. If you'd like to contribute notes, drawings, or photographs, we'll be happy to include them in our monthly summary. Submit your observing notes, sketches, and/or images to

Roger Ivester (rogerivester@me.com). To find out more about the Observer's Challenge or access past reports, log on to rogerivester.com/category/observers-challenge-reports-complete.

Visitors to Both Jupiter and Saturn

By David Prosper

Have you observed Jupiter and Saturn moving closer to each other over the past few months? On December 21, the two worlds will be at their closest, around 1/5 of a full Moon apart! While the two gas giants may appear close, in reality they are hundreds of millions of miles apart. Despite this vast distance, a select few missions have visited both worlds by using a gravity assist from giant Jupiter to slingshot them towards Saturn, saving time and fuel.

Pioneer 11 was the first mission to visit both worlds! Launched in 1973, the probe flew past Jupiter in late 1974, passing just 26,4000 miles above its stormy clouds. In 1979, it became the first spacecraft to encounter Saturn. Pioneer 11 took the first up-close photos of Saturn and its satellites, and made many exciting discoveries, including the detections of its magnetic field and a faint “F” ring, before departing Saturn and eventually, the solar system.

The Voyager missions quickly followed up, taking a “Grand Tour” of the four largest and most distant planets in our solar system. Both probes were launched within two weeks of each other in 1977. Voyager 1 flew past Jupiter in March 1979, discovering Jupiter’s faint ring and two new moons, along with active volcanoes on Io’s surface! The probe then flew past Saturn in November 1980, discovering five new moons, a new “G” ring, mysterious ring “spokes,” and “shepherd moons” shaping the rings. After a brief encounter with Titan revealed evidence of complex organic chemistry and liquid on the moon’s frigid surface, Voyager 1 was flung out of the plane of the solar system. Following close behind, Voyager 2 took detailed photos of Jupiter’s moons and cloud tops in July 1979. Flying past Saturn in August 1981, Voyager 2 measured the thickness of Saturn’s rings and took detailed

photos of many of its moons. This second explorer then captured images of Uranus and Neptune before leaving our solar system.

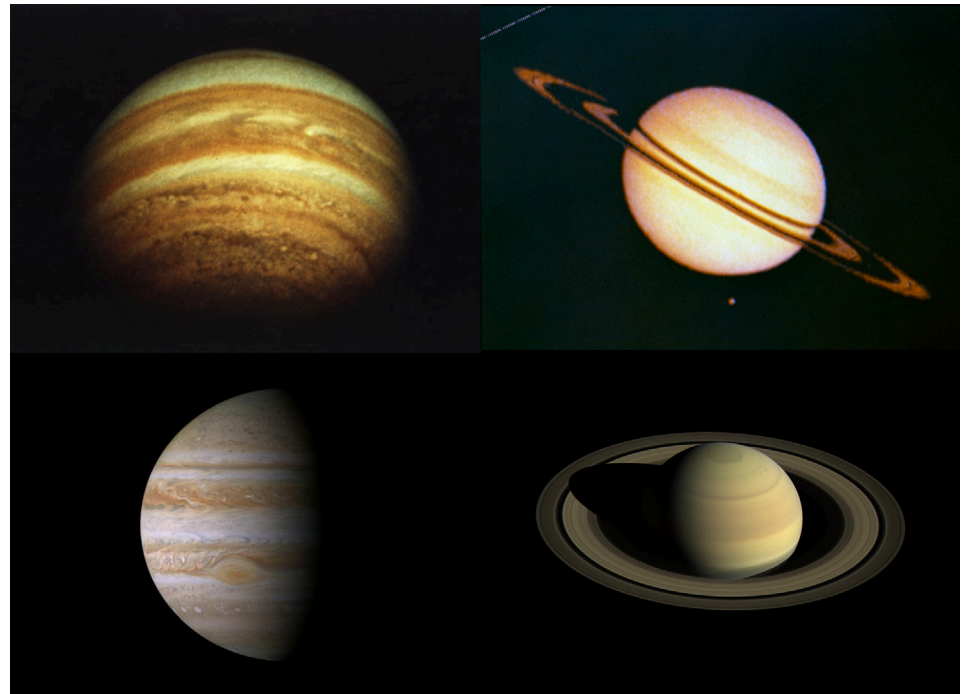
Cassini-Huygens was the last mission to visit both worlds. Launched in 1997, the mission flew past Jupiter in late 2000 and took incredibly detailed photos of its stormy atmosphere and faint rings. Cassini entered into Saturn’s orbit on July 1, 2004. The Huygens probe separated from Cassini, landing on Titan to become the first probe in the outer solar system. Cassini discovered geysers on Enceladus, fine details in Saturn’s rings, many more moons and “moonlets,” the changing oceans of Titan, and seasonal changes on Saturn itself. After

revolutionizing our understanding of the Saturnian system, Cassini’s mission ended with a fiery plunge into its atmosphere on September 15, 2017.

What’s next for the exploration of the outer worlds of our solar system? While Juno is currently in orbit around Jupiter, there are more missions in development to study the moons of Jupiter and Saturn. Discover more about future NASA missions to the outer worlds of our solar system at nasa.gov.



This article is distributed by NASA Night Sky Network. The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.gov to find local clubs, events, and more!



The difference in technology between generations of space probes can be stunning! The top two photos of Jupiter and Saturn were taken by Pioneer 11 in 1974 (Jupiter) and 1979 (Saturn); the bottom two were taken by Cassini in 2000 (Jupiter) and 2016 (Saturn). What kinds of photos await us from future generations of deep space explorers?



Monthly Presentation Videos on YouTube

With our monthly meetings going virtual this year, we have begun to record and publish, with permission, our monthly Zoom presentations on the Skyscrapers YouTube channel. Go to the URL below to view recent presentations.

<https://www.youtube.com/channel/UCEZ5UnO-Sly0DXsSrUAXONg>

The Sun, Moon & Planets in December

This table contains the ephemeris of the objects in the Solar System for each Saturday night in December 2020. 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	5	16 47.6	-22 23.7	Oph	-26.8	1947.6	-	-	-	0.99	06:58	11:37	16:15
	12	17 18.3	-23 05.5	Oph	-26.8	1949.3	-	-	-	0.98	07:04	11:40	16:15
	19	17 49.3	-23 24.9	Sgr	-26.8	1950.6	-	-	-	0.98	07:09	11:43	16:18
	26	18 20.3	-23 21.4	Sgr	-26.8	1951.5	-	-	-	0.98	07:12	11:47	16:22
Moon	5	8 39.9	21 44.1	Cnc	-12.4	1846.6	127° W	80	-	-	20:02	03:45	11:19
	12	14 46.5	-13 23.8	Lib	-10.3	1954.7	37° W	10	-	-	04:26	09:42	14:49
	19	21 46.3	-18 59.3	Cap	-11.0	1866.3	56° E	22	-	-	11:12	16:24	21:44
	26	3 07.6	14 10.4	Ari	-12.3	1800.0	134° E	85	-	-	14:01	21:20	04:50
Mercury	5	16 12.1	-21 02.2	Sco	-0.6	4.8	8° W	97	0.45	1.40	06:20	11:03	15:45
	12	16 58.4	-23 22.7	Oph	-0.7	4.7	5° W	99	0.46	1.44	06:49	11:22	15:54
	19	17 46.3	-24 45.5	Sgr	-0.8	4.7	2° W	100	0.47	1.45	07:16	11:42	16:08
	26	18 35.4	-25 03.0	Sgr	-0.8	4.7	4° E	99	0.45	1.43	07:38	12:04	16:29
Venus	5	14 58.7	-15 19.2	Lib	-3.8	11.7	27° W	89	0.72	1.45	04:42	09:48	14:54
	12	15 33.6	-17 46.1	Lib	-3.8	11.4	25° W	91	0.72	1.48	04:59	09:56	14:51
	19	16 09.5	-19 50.2	Sco	-3.8	11.2	23° W	92	0.72	1.51	05:16	10:04	14:51
	26	16 46.3	-21 27.1	Oph	-3.8	11.0	22° W	93	0.72	1.54	05:32	10:13	14:54
Mars	5	1 06.0	7 08.6	Psc	-1.0	13.9	125° E	92	1.47	0.67	13:23	19:52	02:20
	12	1 12.9	8 06.2	Psc	-0.8	12.9	119° E	91	1.48	0.73	12:59	19:31	02:04
	19	1 21.2	9 10.1	Psc	-0.6	11.9	115° E	90	1.49	0.78	12:36	19:12	01:49
	26	1 31.0	10 18.9	Psc	-0.4	11.1	110° E	89	1.50	0.84	12:14	18:55	01:35
1 Ceres	5	22 42.8	-19 39.5	Aqr	9.1	0.4	82° E	97	2.96	2.94	12:40	17:29	22:17
	12	22 48.8	-18 41.0	Aqr	9.1	0.4	76° E	97	2.96	3.03	12:15	17:07	22:00
	19	22 55.4	-17 39.8	Aqr	9.2	0.4	71° E	97	2.96	3.13	11:50	16:46	21:43
	26	23 02.5	-16 36.4	Aqr	9.2	0.4	66° E	98	2.95	3.21	11:25	16:26	21:27
Jupiter	5	19 56.3	-21 13.5	Sgr	-1.9	34.1	44° E	100	5.10	5.77	10:01	14:43	19:24
	12	20 02.4	-20 56.7	Sgr	-1.8	33.7	38° E	100	5.10	5.84	09:38	14:21	19:04
	19	20 08.7	-20 38.5	Cap	-1.8	33.3	32° E	100	5.10	5.90	09:16	14:00	18:44
	26	20 15.1	-20 18.7	Cap	-1.8	33.0	27° E	100	5.10	5.96	08:53	13:39	18:24
Saturn	5	20 03.9	-20 45.6	Sgr	0.7	15.5	45° E	100	9.99	10.66	10:06	14:50	19:33
	12	20 06.8	-20 37.4	Sgr	0.7	15.4	39° E	100	9.99	10.74	09:41	14:25	19:09
	19	20 09.9	-20 28.5	Cap	0.7	15.3	33° E	100	9.99	10.80	09:16	14:01	18:45
	26	20 13.0	-20 19.1	Cap	0.6	15.2	26° E	100	9.99	10.86	08:51	13:36	18:22
Uranus	5	2 20.8	13 32.3	Ari	5.7	3.7	144° E	100	19.78	18.97	14:13	21:05	03:57
	12	2 20.0	13 28.5	Ari	5.7	3.7	137° E	100	19.77	19.05	13:45	20:37	03:28
	19	2 19.3	13 25.4	Ari	5.7	3.7	129° E	100	19.77	19.13	13:17	20:09	03:00
	26	2 18.8	13 22.9	Ari	5.7	3.7	122° E	100	19.77	19.23	12:50	19:41	02:32
Neptune	5	23 18.2	-5 41.0	Aqr	7.9	2.3	95° E	100	29.93	29.83	12:22	18:03	23:45
	12	23 18.4	-5 39.9	Aqr	7.9	2.3	88° E	100	29.93	29.95	11:54	17:36	23:18
	19	23 18.6	-5 38.1	Aqr	7.9	2.3	81° E	100	29.93	30.07	11:27	17:09	22:50
	26	23 18.9	-5 35.7	Aqr	7.9	2.3	74° E	100	29.93	30.19	10:59	16:41	22:23
Pluto	5	19 41.7	-22 33.5	Sgr	14.4	0.2	40° E	100	34.17	34.92	09:52	14:27	19:03
	19	19 43.5	-22 30.3	Sgr	14.4	0.2	26° E	100	34.18	35.06	08:59	13:34	18:10
	26	19 44.4	-22 28.6	Sgr	14.4	0.2	19° E	100	34.19	35.11	08:32	13:08	17:43

Star Party Update

Starry, Starry Nite: An Evening of Stargazing at Chase Farm Park Friday, 9/4/2020

First Star Party since March 2020! From Jim Hendrickson: Star party went well. They had 30. Francine gave her presentation while it got dark, and then we had 3 telescopes (mine, Francine's and Ron Zincone (he came with Heidi, don't know her last name, she came to Seagrave a couple times)). Sky conditions were good, almost ideal (clouds came in after we left). Jupiter, Saturn, Mizar & Alcor, Coathanger Cluster. Ron may have looked at a couple other things but I'm not sure. The Moon was coming up after we packed up. It would have been visible early enough if we had it Thursday.



Silhouette at "Starry Starry Nite" taken by Jim Hendrickson



Kathy Hartley of Hearthside House Museum welcoming visitors before Francine Jackson's presentation. Photo by Jim Hendrickson

Starry, Starry Nite: An Evening of Stargazing at Chase Farm Park Thursday, 9/24/2020

Early weather forecasts were looking like a 50/50 clear condition in the early evening, which we thought would be enough for us to view the Moon and planets. Throughout the day, forecast conditions worsened, with clearing not expected until 11pm. Because of the forecast, Ron and Heidi decided not to come (they're less local than Francine and I are). We arrived at the park around 6pm under near full overcast with occasional slivers of thin enough cloud to see the Moon through, but it never cleared enough for telescope viewing. We were treated to spectacular sunset colors as Francine gave her "The Sky Tonight" presentation and planisphere demonstration before about 12 guests. Because of the weather conditions, and that some registered guests didn't show, we offered to give a repeat program on the rain date, Thursday, October 1 at 6:30pm, which will be under the full Harvest Moon.



Speaker Francine Jackson presenting "The Sky Tonight", followed by a planisphere demonstration, before about 12 guests. Photo credit: Jim Hendrickson.



Spectacular sunset at Chase Farm Park as Francine Jackson gives her presentation. Photo credit: Jim Hendrickson

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Thursday, 10/1/2020

Report by Jim Hendrickson: Francine gave her presentation and handed out star charts from SkyMaps.com to about 12 visitors and then they arrived at the telescopes just in time to see the Full Harvest Moon rise as a deep pumpkin-orange orb. Sky conditions were clear and calm, and relatively warm temperature. Francine had her 4" Celestron XLT refractor set on the Moon and I brought my C-90 in order to get close up views of Jupiter, Saturn and Mars. There was a Space Station pass below the Big Dipper but we lost track of time and missed it. Everyone was pleased with the outcome and we talked with Kathy Hartley about the success of having this program for the past 3 years and discussed continuing it next summer.



This photo of the Full Harvest Moon rising taken through Francine's 4" Celestron 102mm refractor was featured the following morning on the Channel 10 WJAR weather segment and social media.

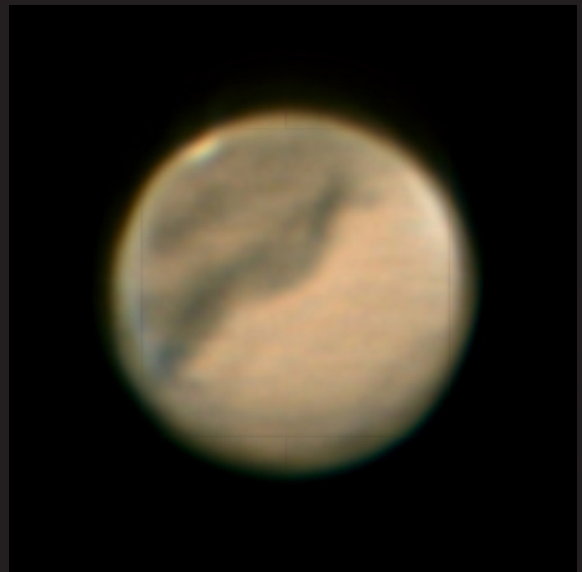


Chase Hill Farm Visitor Center with telescopes in foreground. Photo Credit: Jim Hendrickson

Astrophoto Gallery



Mars on October 4, 12:30, Seeing about 5 of 10. 14inch SCT stopped down to 10 inches with an apodizing mask added. Best 250 frames out of 4 minutes of data, using a ZWO ASI174 and processed with ASI2. By Steve Hubbard



Mars on 10/17/2020 @ 10:40PM, Workflow - Firecapture > PIPP > Autostakkert3 > Reigstax6 2500 frames by Lloyd Merrill



Last quarter Moon sets behind colorful trees at Lincoln Woods State Park on November 8 by Jim Hendrickson

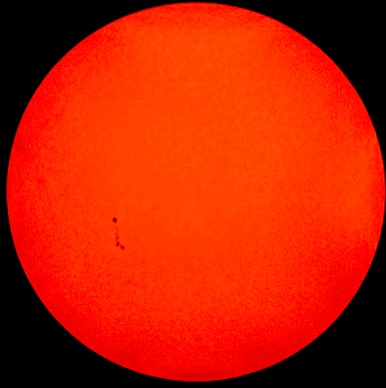


Globular Cluster M15
17:30 hrs, 20 Nov 2020
Wishing Star Observatory

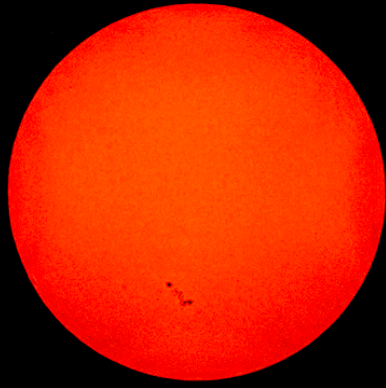
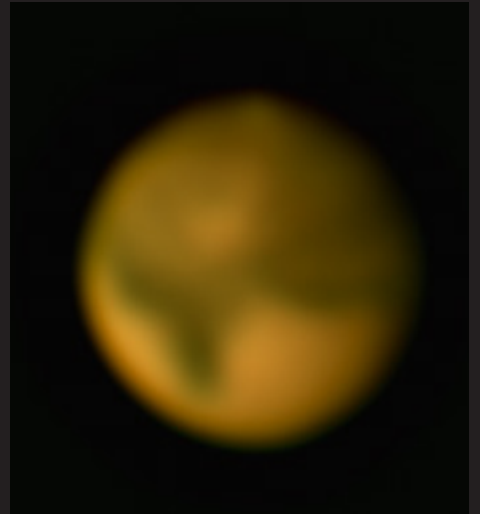
Globular cluster M15 in Pegasus on November 20 by Pete Peterson. Can you count the stars in the spherical ball? Let me know when you hit 100,000.



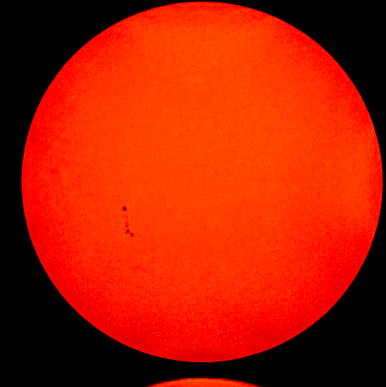
Ron Zincone had several days of clear weather to capture sunspot group AR2781. This sequence from November 5-9 was taken with Televue 60 APO with Televue 2.5X Powermate (900mm @ f/15), Canon 6D on Manfrotto tripod, Remote shutter release
Astrozap glass solar filter.



Mars captured on November 7 by Tom Thibault night at around 7:00. Image is a tack of 800 frames of 2,280 taken through a C11 SCT with a Celestron NexImage 5 camera.

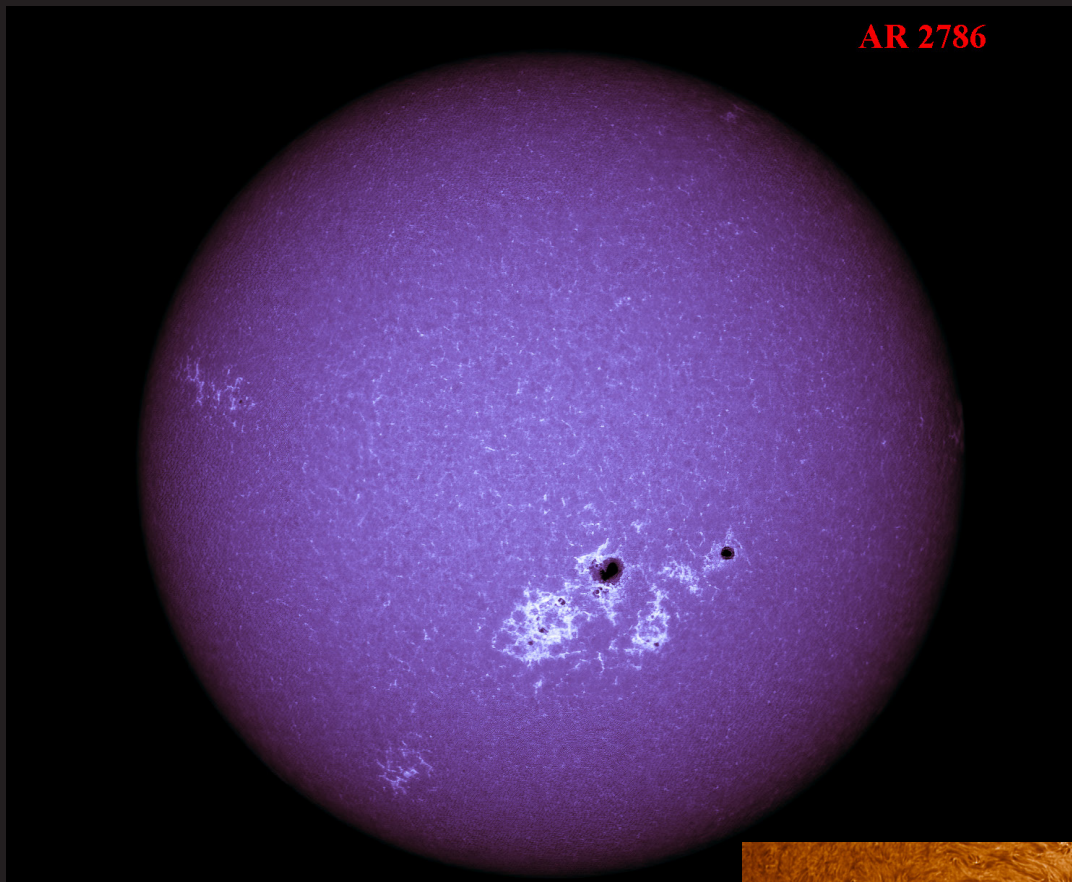


The Moon and Mars on October 3 by Jim Hendrickson using Canon 70D & Tamrom 150-600mm lens at 480mm. 1/1600s exposure at f/8.

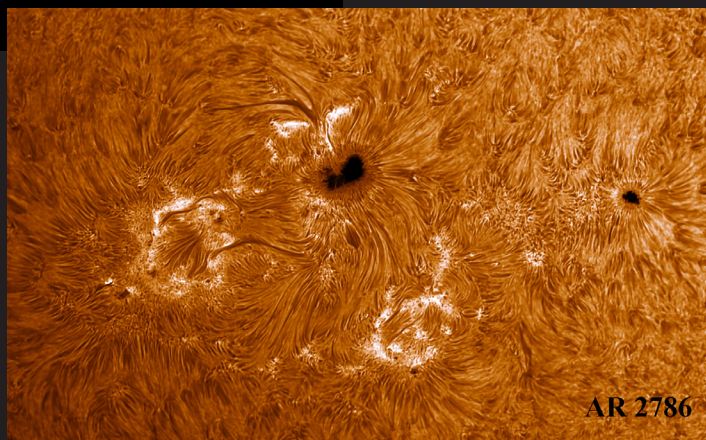


AR 2786

Solar activity on November 29
by Jeff Padell: AR2786 in CaK,
Lunt ED102, Lunt CaK module,
ZWO ASI174mm.



AR2786 (Active Region) and a
really large sunspot
Lunt ED102 refractor
Daystar Quark Chromosphere
ZWO ASI174mm camera
100 frames stacked out of
5,000 frames



Bob Horton was hoping to get some
nice constellation photos on November
7, but the clouds won out. This is only
photo he managed to get, a one minute
capture of Taurus and the Pleiades
using a 50mm lens on a Canon Ra.



Saturn, Jupiter and the Moon, just above
Sagittarius. November 18, 2020 by Bob
Horton

STARRY SCOOP

Editor: Kaitlynn Goulette



WHAT'S UP

December 2nd marks the 25th anniversary of the launch of the Solar and Heliospheric Observatory (SOHO). SOHO was a joint project between the European Space Agency and NASA. This space observatory's mission is to study the sun and its solar wind. SOHO is positioned between the earth and sun at Lagrange Point L1, which is a spot where the gravitational pull of the earth and sun exactly balance each other and the satellite remains stable. SOHO is very important because it helps us protect our continental power grids and global communications from solar storms. Originally planned as a two-year mission, SOHO is still in operation.

The Geminid meteor shower runs from the 7th to the 17th, peaking on the night of the 13th and into the morning of the 14th. Considered by many to be the best meteor shower of the year, it produces up to 120 multicolored meteors per hour. It's best observed from a dark place after midnight.

The December Solstice (Winter Solstice and first day of winter in the northern hemisphere) occurs on the 21st. This day has the shortest period of daylight for people living north of the equator and the longest for those in the southern hemisphere. Everyone on the earth experiences the Solstice at the very same moment. This astronomical event is caused by the tilt of the earth's axis and its orbital motion around the sun.

Jupiter and Saturn have their Great Conjunction on the 21st. On that night, they will be separated by only 6.1

arcminutes or about 1/5 the span of the full moon. Jupiter and Saturn haven't been this close, as seen from Earth's vantage point, since 1623. They won't appear this close again until the year 2080! To find them, look low in the southwestern sky after the sun has set. Jupiter will be a bright point of light with Saturn appearing dimmer.

DECEMBER'S SKY

8: Last Quarter Moon

13-14: Geminid Meteor Shower Peak

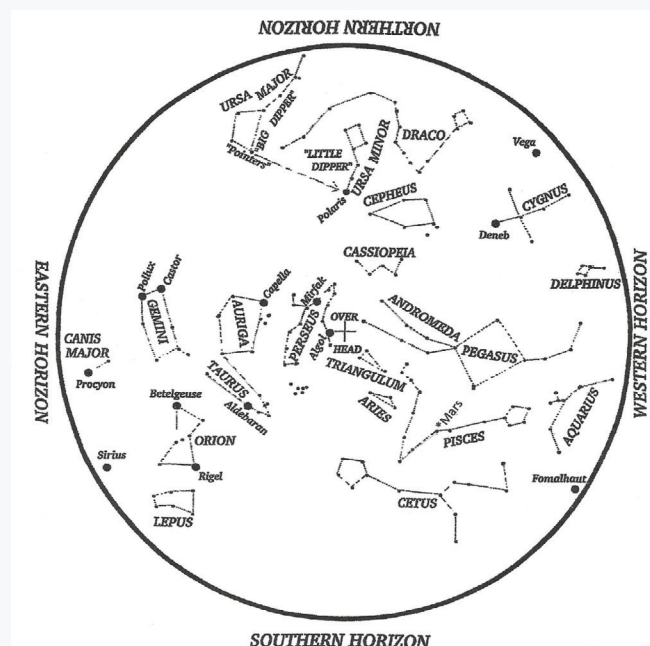
14: New Moon

21: Winter Solstice

21: The Great Conjunction

22: First Quarter Moon

30: Full Moon



Credit: Roger B. Culver

Hold star map above your head and align with compass points.

OBSERVATIONS

November started out with a trip to the Arunah Hill Natural Science Center with my sister and dad. This was the first time that we got the 12-inch Dobsonian telescope mobile! We took turns finding different deep-sky objects to view. My younger sister started by pointing the scope toward the Andromeda Galaxy. The detail was stunning in the wide-field eyepiece at 50x. We observed many more galaxies, nebulae, and star clusters. Two objects that are memorable for me are the Pinwheel Galaxy and the Helix Nebula. Under the dark skies of Cummington, MA, I was able to resolve the Pinwheel much better than in my light-polluted skies at home. The Helix Nebula was spectacular, and was special for me because this was my first time observing it.

A shout-out and thank you to Rich Nugent, president of the Amateur Telescope Makers of Boston, for putting together a monthly observing list and sharing it with me. Using this list, I spent several nights hunting for galaxies, planetary nebulae, galactic clusters, and binary stars. The list included one of my favorites, Gamma Andromeda. A few more stand-out observations were the Blue Snowball, Mirach's Ghost, the Blue Flash Nebula, and the E.T. Cluster.



The purpose of the Starry Scoop is to communicate current astronomy and space events. If you want to share your observations or get digital copies of the Starry Scoop, contact starryscoop@gmail.com. Clear skies!

OBJECT OF THE MONTH

The famous open star cluster called the Pleiades (M45) is December's featured object. This cluster is commonly called the Seven Sisters because you can glimpse seven stars with the unaided eye. The Pleiades are part of many myths and legends. They are mentioned in Homer's "Illiad" and "Odyssey" and even in the Bible. "Subaru" is the Japanese word for Pleiades and the star cluster appears in the automobile's emblem.

Containing more than 1000 stars, the Pleiades are among the closest star clusters to Earth. These stars have a common origin. They were born together in a giant cloud of dust and gas.

Alfred Lord Tennyson, a 19th century poet, described the Pleiades in his poem called Locksley Hall.

"Many a night I saw the Pleiads,
rising thro' the mellow shade,
Glitter like a swarm of fire-flies
tangled in a silver braid."

You can find the Pleiades in the Eastern sky shortly after twilight, where they'll resemble a tiny dipper to the unaided eye. Binoculars or a low power telescope will reveal the beauty of this cluster. Good luck and enjoy!



The Pleiades
Photo by Ashfield Astrophotography

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