



the Skyscraper

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

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Saturday, March 4, 7:00pm at North Scituate Community Center

Dye Hill Observatory – The Rubbermaid Wonder

Conrad Cardano will talk about his decision and methods to take a Rubbermaid toolshed and turn it into a one-person observatory. We are all very familiar with the wooden observatories at Seagrave and the expensive ones advertised in Sky & Telescope. Much though had to go into this because it was never made to be an observatory. He will show how his modifications to the toolshed made it into a usable observatory, all for around \$1200. There is nothing more convenient than having your telescope in a permanent place.

Conrad has been an amateur astronomer for almost 50 years and a Skyscrapers member for 30 years. As a boy growing up in Maryland, he had a roll-off roof observatory for his 6" reflector. He studied astronomy and physics at the University of Maryland in the 1970's, but became a computer programmer for the State of Rhode Island. Over the last ten years, he has gone way past the casual observing with his telescope and concentrated on areas like stellar spectroscopy with cameras and telescopes, solar observing with a Lunt Hydrogen-Alpha scope and CCD imaging.



**Skyscrapers
Board Meetings**
Third Monday of the Month
All Members Welcome

Phases of the Moon

First Quarter Moon
March 5 11:32

Full Worm Moon
March 12 14:54

Last Quarter Moon
March 20 15:58

New Moon
March 28 02:57

Seagrave Memorial Observatory Open Nights

Saturdays at 7:00 pm, 8:00pm beginning March 18
weather permitting

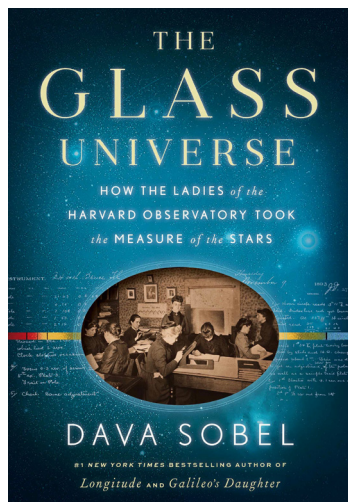
The Glass Universe: How the Ladies of the Harvard Observatory took the Measure of the Stars, by Dava Sobel.

Viking, New York, 2016, ISBN #978-0-067001-695-2, hardbound, \$30.00 U.S.

Review by Francine Jackson

Many of you are familiar with Dava Sobel's previous books, especially **Longitude** and **Galileo's Daughter**, both of which required extensive historical research. This one introduces a part of history that many astronomers use every day, but perhaps aren't aware from where it came: Spectral classification.

It is amazing that this book came out just about the same time as **Hidden Figures**, the story of the women of color who were very important to the space program; however, in this case, the "computers" were women who opened the universe to the size, brightness, and composition of the stars. Funded mainly by Anna Palmer Draper, and led by Edward Charles Pickering, this incredible team of women, including Williamina Fleming, Annie Jump Cannon, Antonia Maury, Henrietta Leavitt, and many others, were able to dissect an unbelievable amount of information from such tiny glass plates. Open **The Glass Universe** and you will immediately go back in time with these



women, learning their incredible patience, and noting how much they learned from these plates. Their dogged work resulted in much of the structure of the stars, and, in the case of Miss Leavitt, the distances to objects previously believed to be nebulous bodies in our galaxy, changing the concept of the universe itself.

But, this book, in addition to noting the incredible work these women performed, also goes into their lives, showing that their lives weren't just in the "stacks"; Mrs. Fleming began her life in Harvard as a maid, who, fortunately, E. C. Pickering recognized she had more to offer. In the course of her work, she discovered many variable stars and nova; Annie Jump Cannon spent much of her time caring for her older relative, and enjoyed entertaining; Henrietta Leavitt was not in the best of health, but worked as much as she could.

While painstakingly studying these slides, the women of Harvard changed the way astronomers look at, and study, the

stars. In **The Glass Universe**, Sobel gives us a glimpse into the amazing work of just a few dedicated women who, although they believed they were just doing their job, opened the sky to the tremendous discoveries we are still making today.

As an aside, I was recently speaking to an educator who reminded me that students today are not learning script writing in classes, as it is believed to be too ancient a way of communication. As this was the main way of writing for so long, and especially in the time of **The Glass Universe**, it is possible that, had someone years from now thought of putting together a book on this period, a potential author would be unable to decipher the beautiful, delicate writing of these women. Thank you, Dava Sobel, for the work you've done in preserving this very important part of astronomical history. Everyone reading this will be glad you did.



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



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 **March 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.

President

Steve Siok ssiok@cox.net

1st Vice President

Ian Dell'Antonio ian@het.brown.edu

2nd Vice President

Kathy Siok kathys5@cox.net

Secretary

Steve Hubbard cstahhs@gmail.com

Treasurer

Lloyd Merrill lloydmerrill@gmail.com

Members at Large

Tracy Prell registration@computerwebguru.com

Linda Bergemann lbergemann@aol.com

Trustees

Jim Crawford jcrawford@cox.net

Matt Ouellette matt80844@yahoo.com

Kent Cameron kentcameron48@gmail.com

Public Outreach Coordinator

Francine Jackson Francine_Jackson@brown.edu

Public Relations Spokesperson

Francine Jackson Francine_Jackson@brown.edu

Observatory Committee Chairperson

Jim Crawford jcrawford@cox.net

Membership Activities Coordinator

Pat Landers pblanders5@gmail.com

Librarian

Alex Bergemann astroalex@verizon.net

Historian

Dave Huestis dhuestis@aol.com

Archivist

Jim Crawford jcrawford@cox.net

Editor

Jim Hendrickson jim@distantgalaxy.com

Friday, March 10: Two Small Pieces of Glass Presented at the University of Rhode Island Planetarium

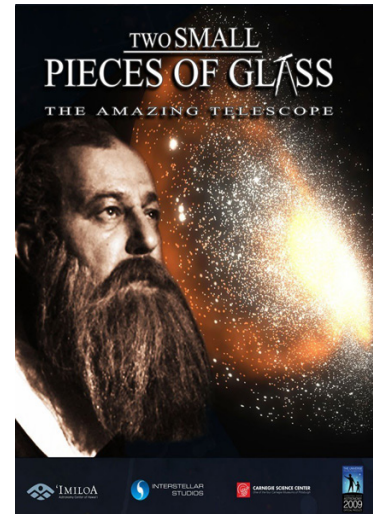
University of Rhode Island Planetarium
Kingston Campus
Upper College Road
Friday, March 10th, 2017, 6:00 P.M.
Contact: Francine Jackson 401-527-5558

The telescope introduced the sky as had never been seen. It showed that some objects were not point sources, but actual bodies: planets, star clusters, and, eventually, independent galaxies. Join the URI Planetarium as we learn the history of this very important tool that opened our eyes to new

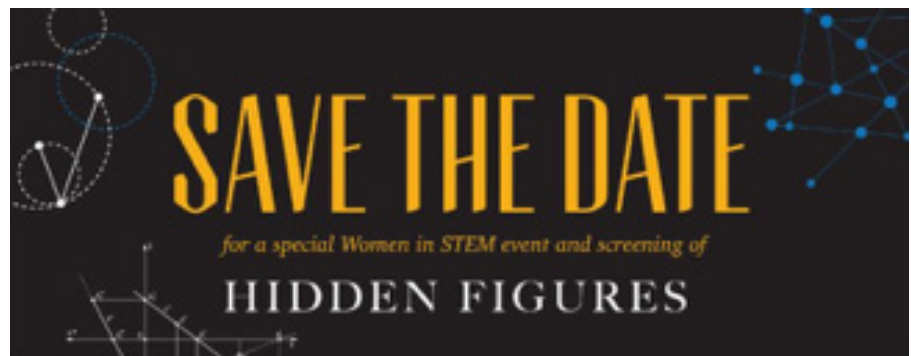
worlds of our celestial sphere.

This program, for the general audience, will be preceded by a short program, Losing the Dark on light trespass, and then will be followed by a live presentation on the Sky above the URI Campus. Admission is just \$5.00, to benefit the URI Planetarium Fund.

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



FRIDAY MARCH 24, 2017
MOVIE TIME: 9:30 am
Showcase Cinemas Warwick
1200 Quaker Lane
Warwick, RI 02886



The Women in Technology group, through Tech Collective, and NASA's Chandra X-Ray Observatory are offering a special screening of Hidden Figures, the incredible story of the brilliant African American women of NASA. The event is an opportunity for women in STEM, and students interested in STEM, to share the experience of this amazing film.

The event will include a Q&A panel discussion with local distinguished women in STEM. The film showing will begin at 9:30 am with a panel discussion to follow.

If you would like to attend the movie and sponsor a student from a participating school, register for this event!
FOR MORE INFORMATION AND QUESTIONS, CONTACT:

Amanda Roman
aroman@tech-collective.org
401-521-7805 x.106

Our friends, NASA's Kim Arcand and the Chandra X-ray Observatory, are planning a Special Screening of "Hidden Figures" for students on March 24th at the Showcase Cinema in Warwick, Rhode Island.

After the screening the students will have a panel discussion with Kim and other distinguished #WomenInStem. This would be a great #Stem opportunity for your child.

If you would like to purchase a ticket for this event click on this link <https://tinyurl.com/jmpbrkr> You have the option of purchasing a ticket for yourself and your child and providing a student a FREE ticket!

If you are not in the area or can't attend, please consider making a donation to provide a student with a FREE ticket.

To make a donation without purchasing a ticket click here <https://www.eventbrite.com/e/lady-project-reads-hidden-figures-tickets-31725874946> and then click on "Register" and make a donation to Tech Collective to help fund this event!

Observing the Last Quarter Moon

by Dave Huestis

There is a lunar phase that is not as regularly observed as other phases. It is the last (or third) quarter Moon. And the reason for its lack of scrutiny by casual stargazers is because it generally rises around midnight. Although space does not permit me to review the reason for the cycle of lunar phases, you can refresh your understanding by visiting <http://www.theskyscrapers.org/the-moon-its-just-a-phase-its-going-through>.

March's last quarter Moon will occur on the 20th, so this month's column will highlight a few of the features that can be observed during this often overlooked phase. A small inexpensive telescope will be required to observe these formations adequately, though binoculars or even a birder's spotting scope will provide glimpses of a few of them.

Even around the midnight hour you'll need to wait for the moon to ascend higher into the sky and above the tree line. But if you don't wish to forgo your beauty sleep, the next best time to observe this phase is a couple of hours before morning twilight. At sunrise the last quarter Moon will be due south of your location and at its highest point off the horizon. You can easily observe the moon in broad daylight, but the contrast is low, causing fewer details to be seen.

The accompanying Moon map will help you locate the lunar features I will explore. The Moon's north pole is at the top of the map, while its western limb is to the left. Keep in mind that binoculars will provide you the same view that the map shows. Various telescope designs reverse the image right to left and up and down. You'll need to orient your telescopic view to the map using a prominent surface feature as a guide.

There are many formations that can be observed during this lunar phase. And even if you have observed some of them during a different phase of illumination, the ever changing sunlight angle can reveal subtle details not seen in those other phases.

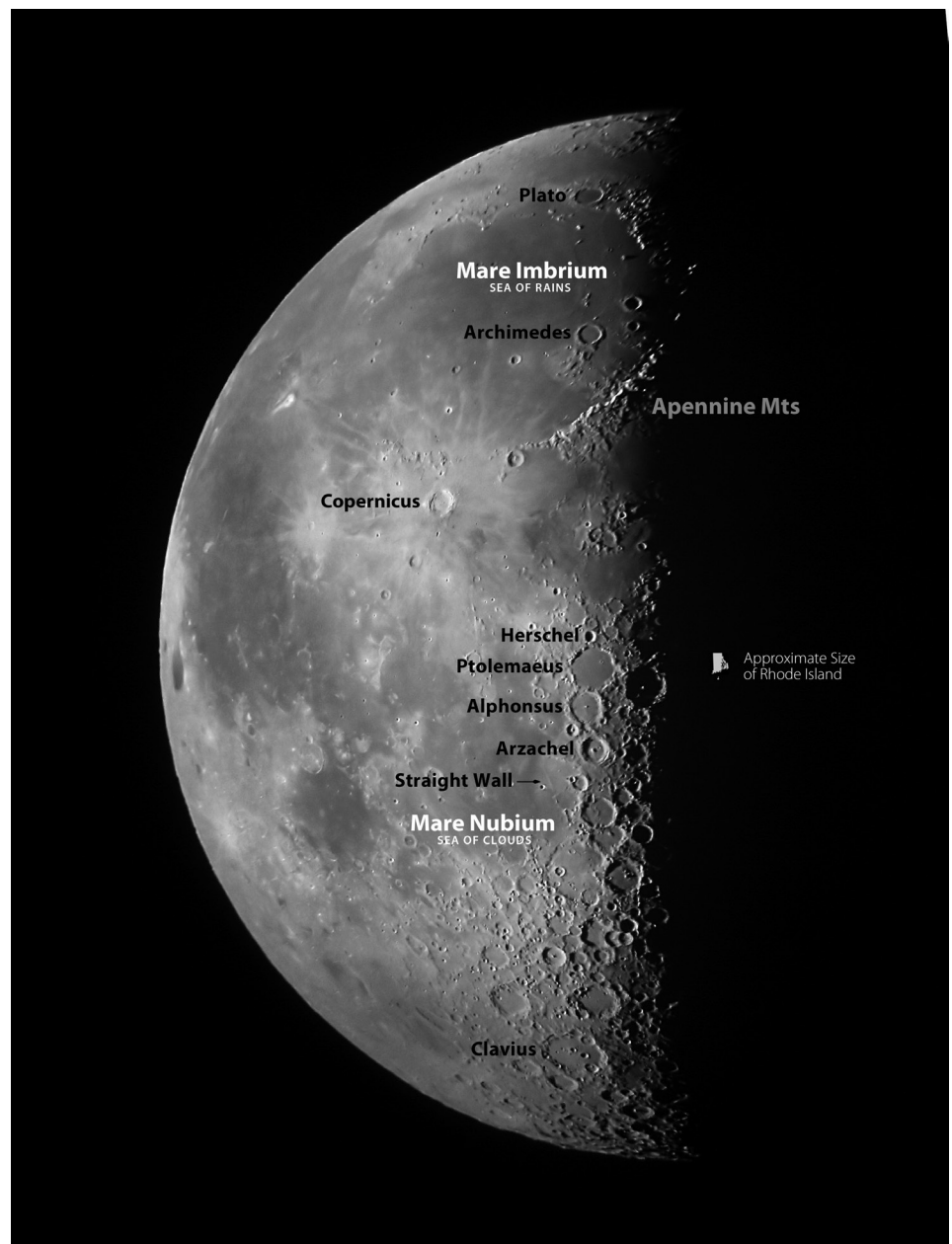
Also, most native Rhode Islanders know that our state is often used as a unit of measure. Refer to the inset of the Rhode Island state map to scale in the un-illuminated half of the moon map. East to west "Little Rhody" is approximately 37 miles across, and the north to south dimension measures

48 miles. Keep these figures in mind when comparing to crater sizes.

On the edge of Mare Imbrium (translation means Sea of Rains – yes, early astronomers once thought the Moon possessed seas and oceans) is the crater Archimedes, an almost perfect circle about 52 miles across. Under low magnification its floor is almost featureless. A short distance to the southeast and seeming to extend from the terminator (during Last Quarter the terminator defines the sunset point) is the Apennine Mountains. This range contains some of the tallest mountains on the lunar surface. Carefully scan up and down this

region. Some of the mountains' bases may already be in shadow while their peaks can still be catching glimpses of sunlight.

As we continue our journey south and to the west we encounter the absolutely beautiful crater Copernicus. While this crater is not the largest (only 53 miles across), the detail one can observe is remarkable. Its walls show very fine detail and the crater floor has an incredible central peak. In fact, during one perfect evening many moons ago while using the 8 ¼-inch Clark refractor at Seagrave Observatory, I was able to look deep into this crater and see where a huge boulder had tumbled down one of its



steep walls. Outstanding!

Next please locate and examine the crater chain that comprises Ptolemaeus, Alphonsus and Arzachel. The detail that can be seen here is exquisite. Ptolemaeus is an old crater about 95 miles in diameter. Another impact, Herschel, blasted a 25-mile-in-diameter hole into its northern rim, and Ptolemaeus also shows smaller impacts on its floor. Alphonsus, 74 miles across, has a well-preserved central peak, where Ptolemaeus does not. Arzachel is roughly 60 miles in diameter and is very well preserved, showing great detail in its walls and central peak.

One of the most fascinating features on the lunar surface is the Straight Wall. This feature lies to the southwest of Arzachel and sits in Mare Nubium (Sea of Clouds). This formation is very impressive. It is a fault or escarpment approximately 68 miles long, 1.5 miles wide, and no more than 1,000 feet above the floor of the Mare. While it may look very steep, its slope is no more than 7 degrees. The Straight Wall's appearance changes dramatically with the sun angle, so try to observe it during other lunar phases as well.

And finally I can't end this lunar tour

without noting crater Clavius. Sci-fi fans will recall that the monolith in the movie 2001: A Space Odyssey was uncovered in this crater. Clavius is huge, measuring 140 miles across. Though several smaller impacts have marred its floor, the inner crater walls are high and well defined. Several impacts have also occurred along the rim.

I hope this brief tour of our closest neighbor in space will encourage you to spend a few hours examining the lunar surface with whatever optical instrument you can use. The more magnification one is able to apply, the more detail one will be able to discern. Binoculars and telescopes should be outside collecting moonlight, not inside collecting dust in a closet or basement.

In conclusion, don't forget we set our clocks ahead one hour (spring ahead) to EDT (Eastern Daylight Time) on Sunday morning, March 12, at 2:00 a.m. On this date most of the United States shifts to Daylight Saving Time. And finally, on the same day as the last quarter moon (March 20), the Vernal Equinox (spring) begins at 6:29 a.m. EDT. The Sun appears to be moving northward in our sky as a result of the Earth's axial tilt as we revolve around the Sun on our axis.

The only observatory you may often find open after midnight to observe the last quarter Moon is Frosty Drew Observatory (<http://frostydrew.org/observatory/>) in Charlestown, open every clear Friday night year-round. However, don't forget that the other observatories are open at more convenient times to observe the heavens. Seagrave Memorial Observatory (<http://www.theskyscrapers.org>) in North Scituate is open to the public every clear Saturday night. Ladd Observatory (<http://www.brown.edu/Departments/Physics/Ladd/>) in Providence is open every clear Tuesday night. The Margaret M. Jacoby Observatory at the CCRI Knight Campus in Warwick (<http://www.ccri.edu/physics/observatory.html>) is open every clear Wednesday night.

Great American Total Solar Eclipse on August 21, 2017. Countdown: 172 days as of March 1, 2017.

Keep your eyes to the skies.



Dave Huestis is Skyscrapers Historian and has been contributing monthly columns to local newspapers for nearly 40 years. See more at <http://theskyscrapers.org/dave-huestis>

Fellow Skyscrapers,

Long time member Ed Turco has a number of pieces of #14 welder's glass that could serve as eclipse viewers.

Here are the details. If you are interested, please feel free to get in touch with Ed at his email address: ed_turco@yahoo.com

I have a number of interesting pieces for the upcoming eclipse - #14 welder's glass, just perfect for any eclipse event excepting totality. These are 4.5x5.25" and I'll sell these for \$10/apiece, shipping included, or 3/\$25.

I am wary of those aluminized thingies; they develop pinholes while welders glass keeps on ticking. These are solely for naked eye protection, NOT for any sort of telescopic use.

Located 380,000 light years away and visible just north of Regulus, the dwarf galaxy Leo 1 is part of the Local Group. Photo by Jim Hendrickson using 80mm f/4.8 & Atik Infinity camera, 10x120s exposures stacked.



Open Cluster in Cancer

M67 (NGC 2682)

by Glenn Chaple for LVAS

Mag. 6.9; Size 25'

Cancer is home to a pair of Messier open clusters. The first, M44, is the large naked eye group that became one of Galileo's first telescopic targets. The second, M67, is our LVAS Observer's Challenge for March.

Discovered by the German astronomer Johann Gottfried KoeHLer in 1779 (some sources say he encountered it a few years earlier), M67 is located a little less than 2 degrees west of Acubens (alpha [α] Cancri). Its faintness when compared to M44 is illusory, as its calculated distance of 2600 light years is five times greater than that of the Beehive.

My first encounter with M67 was on the night of January 11, 1978, when I viewed it with a 3-inch $f/10$ reflector at 30X. I wrote in my log book, "Faint, ghostly, beautiful; Reminds me of M11. Contains three visible stars attended by a soft glow. Glow bursts into speckles of light with averted vision. General funnel shape." More recently, I re-observed M67 with the same scope and a higher magnification of 60X. The cluster was better resolved; with a half dozen faint stars surrounded by another dozen or so averted vision stars.

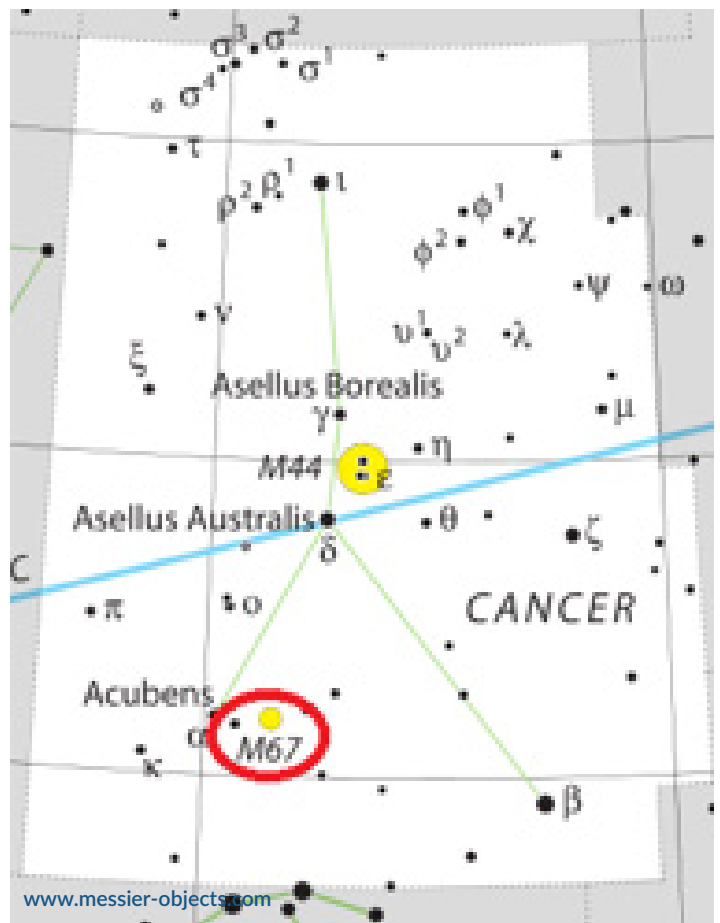
M67 is visible in binoculars as a hazy patch of light, not unlike the naked eye appearance of M44. As already noted, a small-aperture telescope will reveal a handful of cluster members. Scopes in the 8 to 12-inch range will capture up to 100 of the cluster's 500-plus stars.

Being one of the oldest known open star clusters with a calculated age of 4 billion years, M67 is of particular interest to professional astronomers. Along with the Hyades, it's the most-studied of any open star cluster.

The purpose of the LVAS Observer's Challenge is to encourage the pursuit of visual observing. It is open to everyone that is interested, and if you are able to contribute notes, drawings, or photographs, the LVAS will be happy to include them in our monthly summary. If you would like to contribute material, submit your observing notes, sketches, and/or images to either Roger Ivester (rogerivester@me.com) or Fred Rayworth (queex@embarqmail.com). To find out more about the LVAS Observer's Challenge or access past reports, log on to lvastronomy.com/observing-challenge.



Mario Motta M.D.





Solar Eclipse Provides Coronal Glimpse

By Marcus Woo

On August 21, 2017, North Americans will enjoy a rare treat: The first total solar eclipse visible from the continent since 1979. The sky will darken and the temperature will drop, in one of the most dramatic cosmic events on Earth. It could be a once-in-a-lifetime show indeed. But it will also be an opportunity to do some science.

Only during an eclipse, when the moon blocks the light from the sun's surface, does the sun's corona fully reveal itself. The corona is the hot and wispy atmosphere of the sun, extending far beyond the solar disk. But it's relatively dim, merely as bright as the full moon at night. The glaring sun, about a million times brighter, renders the corona invisible.

"The beauty of eclipse observations is that they are, at present, the only opportunity where one can observe the corona [in visible light] starting from the solar surface out to several solar radii," says Shadia Habbal, an astronomer at the University of Hawaii. To study the corona, she's traveled the world having experienced 14 total eclipses (she missed only five due to weather). This summer, she and her team will set up identical imaging systems and spectrometers at five locations along the path of totality, collect-

ing data that's normally impossible to get.

Ground-based coronagraphs, instruments designed to study the corona by blocking the sun, can't view the full extent of the corona. Solar space-based telescopes don't have the spectrographs needed to measure how the temperatures vary throughout the corona. These temperature variations show how the sun's chemical composition is distributed—crucial information for solving one of long-standing mysteries about the corona: how it gets so hot.

While the sun's surface is ~9980 Fahrenheit (~5800 Kelvin), the corona can reach several millions of degrees Fahrenheit. Researchers have proposed many explanations involving magneto-acoustic waves and the dissipation of magnetic fields, but none can account for the wide-ranging temperature distribution in the corona, Habbal says.

You too can contribute to science through one of several citizen science projects. For example, you can also help study the corona through the Citizen CATE experiment; help produce a high definition, time-expanded video of the eclipse; use your ham radio to probe how an eclipse affects the propagation of radio waves in the ionosphere; or even observe how wildlife

responds to such a unique event.

Otherwise, Habbal still encourages everyone to experience the eclipse. Never look directly at the sun, of course (find more safety guidelines here: <https://eclipse2017.nasa.gov/safety>). But during the approximately 2.5 minutes of totality, you may remove your safety glasses and watch the eclipse directly—only then can you see the glorious corona. So enjoy the show. The next one visible from North America won't be until 2024.

For more information about the upcoming eclipse, please see:

NASA Eclipse citizen science page

<https://eclipse2017.nasa.gov/citizen-science>

NASA Eclipse safety guidelines

<https://eclipse2017.nasa.gov/safety>

Want to teach kids about eclipses? Go to the NASA Space Place and see our article on solar and lunar eclipses! <http://spaceplace.nasa.gov/eclipses/>

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



Illustration showing the United States during the total solar eclipse of August 21, 2017, with the umbra (black oval), penumbra (concentric shaded ovals), and path of totality (red) through or very near several major cities. Credit: Goddard Science Visualization Studio, NASA

Star Party Update

On Wednesday, February 22, Francine Jackson, Connie and Kent Cameron and Jim Hendrickson set up at the Marian J. Mohr Memorial Library in Johnston for an early evening star party attended by about 12 kids and adults. Featured were the crescent phase of Venus, Pleiades Cluster, Orion Nebula, and double star Mizar & Alcor.

Contact Francine Jackson at francine_jackson@brown.edu to participate in upcoming events.



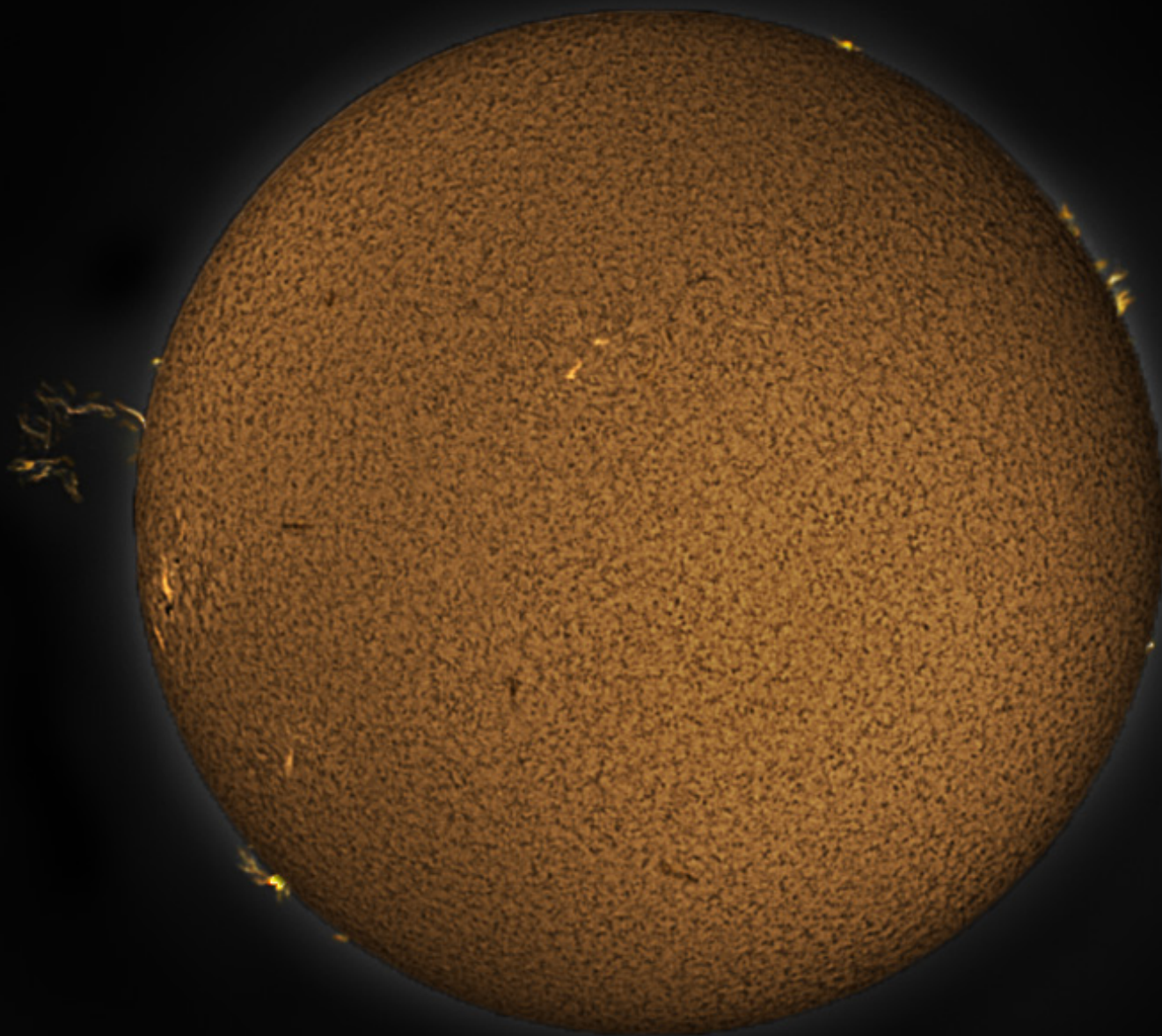
Bob Horton begins work on a 16-inch f/6 mirror.



The Sun, Moon & Planets in March

This table contains the ephemeris of the objects in the Solar System for each Saturday night in March 2017. All times are in Eastern Standard (UTC-5) through March 11, Daylight saving time (UTC-4) begins on March 12. 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	4	22 59.5	-6 27.0	Aqr	-26.8	1935.6	-	-	-	0.99	06:15	11:57	17:40
	11	23 25.5	-3 43.5	Aqr	-26.8	1932.1	-	-	-	0.99	06:04	11:56	17:48
	18	23 51.1	-0 57.9	Psc	-26.8	1928.4	-	-	-	1	06:52	12:54	18:56
	25	0 16.6	1 47.9	Psc	-26.8	1924.5	-	-	-	1	06:40	12:52	19:04
Moon	4	3 29.9	13 12.8	Tau	-11.5	1968.9	70° E	33	-	-	10:06	17:20	00:39
	11	10 14.4	10 20.9	Leo	-12.6	1890.4	160° E	97	-	-	16:59	23:39	07:10
	18	15 51.9	-15 11.6	Lib	-12.2	1756.8	119° W	74	-	-	23:56	05:10	10:19
	25	21 44.0	-13 07.4	Cap	-10.3	1852.5	40° W	12	-	-	05:22	10:51	16:27
Mercury	4	22 52.5	-9 14.0	Aqr	-1.3	4.9	3° W	99	0.39	1.38	06:21	11:53	17:26
	11	23 41.2	-3 24.9	Aqr	-1.5	5.1	4° E	99	0.35	1.33	06:21	12:14	18:08
	18	0 30.0	3 03.0	Psc	-1.3	5.4	11° E	91	0.32	1.24	07:19	13:35	19:53
	25	1 15.1	9 16.0	Psc	-0.8	6.2	16° E	71	0.31	1.08	07:13	13:52	20:32
Venus	4	0 37.4	11 31.4	Psc	-4.4	49.8	30° E	14	0.72	0.34	06:48	13:32	20:17
	11	0 32.4	12 05.0	Psc	-4.2	54.8	23° E	8	0.72	0.31	06:13	12:59	19:45
	18	0 20.9	11 28.0	Psc	-4.0	58.7	14° E	3	0.72	0.29	06:36	13:19	20:02
	25	0 05.8	9 42.3	Psc	-3.8	60.2	8° E	1	0.72	0.28	06:01	12:37	19:12
Mars	4	1 35.0	9 57.9	Psc	1.3	4.6	42° E	95	1.48	2.06	07:53	14:32	21:12
	11	1 54.1	11 51.3	Ari	1.4	4.5	40° E	95	1.49	2.10	07:37	14:24	21:11
	18	2 13.4	13 39.0	Ari	1.4	4.4	38° E	96	1.49	2.15	08:22	15:15	22:10
	25	2 32.9	15 20.2	Ari	1.4	4.3	36° E	96	1.50	2.19	08:07	15:07	22:08
1 Ceres	4	2 29.5	10 37.5	Ari	9.0	0.4	55° E	98	2.78	3.23	08:44	15:25	22:07
	11	2 38.5	11 40.3	Ari	9.1	0.4	50° E	98	2.78	3.30	08:21	15:07	21:52
	18	2 48.0	12 42.2	Ari	9.1	0.4	46° E	98	2.77	3.37	08:59	15:49	22:38
	25	2 57.9	13 42.9	Ari	9.1	0.4	42° E	99	2.76	3.43	08:38	15:31	22:25
Jupiter	4	13 24.1	-7 11.8	Vir	-2.2	42.3	141° W	100	5.46	4.65	20:45	02:21	07:57
	11	13 21.9	-6 57.2	Vir	-2.2	43.0	149° W	100	5.46	4.58	20:14	01:51	07:28
	18	13 19.2	-6 40.3	Vir	-2.3	43.5	157° W	100	5.46	4.53	20:43	02:21	07:59
	25	13 16.3	-6 21.6	Vir	-2.3	43.8	164° W	100	5.46	4.49	20:11	01:50	07:30
Saturn	4	17 46.6	-22 05.4	Sgr	0.5	16.2	77° W	100	10.05	10.23	02:05	06:43	11:20
	11	17 48.0	-22 05.4	Sgr	0.5	16.4	83° W	100	10.05	10.12	01:39	06:17	10:54
	18	17 49.2	-22 05.3	Sgr	0.5	16.6	90° W	100	10.05	10.00	02:13	06:50	11:28
	25	17 49.9	-22 05.0	Sgr	0.5	16.8	97° W	100	10.05	9.89	01:46	06:24	11:01
Uranus	4	1 23.1	8 07.6	Psc	5.9	3.4	39° E	100	19.93	20.70	07:47	14:18	20:50
	11	1 24.4	8 15.4	Psc	5.9	3.4	32° E	100	19.93	20.77	07:20	13:52	20:24
	18	1 25.7	8 23.5	Psc	5.9	3.4	25° E	100	19.93	20.83	07:53	14:26	20:58
	25	1 27.2	8 32.0	Psc	5.9	3.4	19° E	100	19.93	20.87	07:27	14:00	20:33
Neptune	4	22 54.1	-7 55.7	Aqr	8.0	2.2	2° W	100	29.95	30.94	06:16	11:49	17:23
	11	22 55.1	-7 49.8	Aqr	8.0	2.2	9° W	100	29.95	30.93	05:49	11:23	16:57
	18	22 56.1	-7 43.9	Aqr	8.0	2.2	15° W	100	29.95	30.91	06:22	11:56	17:31
	25	22 57.0	-7 38.1	Aqr	8.0	2.2	22° W	100	29.95	30.87	05:55	11:30	17:04
Pluto	4	19 21.1	-21 11.3	Sgr	14.3	0.2	55° W	100	33.28	33.85	03:36	08:17	12:58
	11	19 21.7	-21 10.6	Sgr	14.3	0.2	62° W	100	33.29	33.75	03:09	07:50	12:32
	18	19 22.2	-21 10.0	Sgr	14.3	0.2	68° W	100	33.29	33.64	03:42	08:23	13:05
	25	19 22.7	-21 09.6	Sgr	14.3	0.2	75° W	100	33.30	33.54	03:14	07:56	12:38



The Sun on February 20th 12:45 pm using Lunt LS50 single stacked, ZWO ASI174mm exposed for Proms and then second exposure for the surface, processed with ASI2 to stack, the wavelets with Registax 6 and then Photoshop CC to combine and colorize, finally Adobe Lightroom 6 for final tweaking. Photo by Jeff Padell.



Waxing crescent Moon, Venus & Mars from Foster on February 27 by Bob Horton.

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