



# the Skyscraper

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May 2020

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

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## Phases of the Moon

**Full Flower Moon**  
May 7 10:45

**Last Quarter Moon**  
May 14 14:03

**New Moon**  
May 22 17:39

**First Quarter Moon**  
May 30 03:30

## Betelgeuse Betelgeuse Betelgeuse... (Or, What is going on with Betelgeuse?)

by Dr. Stella Kafka, Director of the American Association of Variable Star Observers (AAVSO)

Saturday, May 2nd @ 3:00 PM via Zoom

Email [kathys5@cox.net](mailto:kathys5@cox.net) for Zoom Meeting link and information.

Members will be emailed a link and password for this presentation at 2:00PM on May 2nd.

In October 2019 astronomers noticed that Betelgeuse entered one of its dimming episodes. Nothing unusual, until Betelgeuse kept dimming past its known recorded minimum brightness. From the 7th brightest star in the sky, Betelgeuse eventually became the 21st, puzzling astronomers worldwide. This notable change in the star's behavior gave rise to a multitude of theories for its dimming, including a speculation on whether Betelgeuse has reached its fateful end as a supernova. Thanks to the AAVSO observers who continued to provide critical data on this bright star, we now have a good idea on the physical properties of the star, and an interpretation for its dimming. In this presentation, I will discuss focus on the 2019-2020 Betelgeuse event, presenting key theories and research outcomes explaining the event.

Dr. Stella Kafka, is the Executive Director and CEO of the AAVSO\* (American Association of Variable Star Observers), an international organization focusing on

engaging professional and amateur astronomers in science. Within the auspices of the AAVSO, Dr Kafka is working towards enabling individuals from all backgrounds to actively participate in research projects, building a community of science-savvy citizens who work collectively to understand some of the most dynamic phenomena in the universe.

Dr Kafka acquired her BSc in Physics from the University of Athens (Greece) and her MA/PhD in Astronomy from Indiana University (USA). Dr Kafka's research interests is semi-detached binary star systems (cataclysmic variables) which can become supernovae Ia. More information on Dr Kafka can be found at: <https://www.linke-din.com/in/stellakafka/>

\*The AAVSO is an international non-profit organization of variable star observers whose mission is to enable anyone, anywhere, to participate in scientific discovery through variable star astronomy.

**Membership Renewals for 2020-2021 are due.**

See renewal form on page 13, or renew online via PayPal  
[www.theskyscrapers.org/join-renew](http://www.theskyscrapers.org/join-renew)

**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.

# President's Message

by Steve Siok

Hello fellow Skyscrapers, as this is my first President's message, I want to thank our outgoing President, Steve Hubbard, and his executive committee for their efforts in the last two years. There have been many new initiatives in outreach, programs and improvements to the observatory during this time.

I thank you all for supporting the slate of officers in this year's election. Our team will continue to support Skyscrapers' programs during this coming year while working to expand our observing opportunities and outreach to our members and the public.

The near term will prove to be a chal-

lenge. I know that at some point in the future we will be able to return to both group observing and holding meetings. In the meantime I hope you can observe on your own and can take advantage of programs streamed on your computers. As some of you are aware, there are several bright comets in the sky right now. Although they are not naked eye brightness, they are visible in binoculars and scopes. I recommend you go to the Sky and Telescope web site for information. Also I would like to hear from you when you become aware of a worthwhile streamed program. Send me an e-mail and I will make sure it is sent to all our members.

In the meantime we will attempt to convene virtual monthly gatherings. We will be researching platforms to determine the best way to bring these meetings to you and

we will seek out speakers who can talk to us from wherever they live. If you have any ideas for a speaker please send us the contact information.

In closing, I thank you for being a member of Skyscrapers. We are a group of interested and interesting people who love astronomy. I remind you that the organization has started its 2020-2021 fiscal year. Dues for the new year are now payable. You may renew online or send a check to our address (47 Peeptoad Road, North Scituate). If you are not sure about your status, we will be sending out dues notices shortly or you can contact our treasurer.

Your financial support is vital so thank you for all your past and future generosity.

So, everyone stay healthy and safe. And please stay in touch and keep observing.

## 2020-21 Elections

by Linda Bergemann

The Election Committee is pleased to announce the results of the 2020 election. Thank you for returning your ballots during this unprecedented time. Fifty-one of the 99 ballots mailed to members were returned and counted.

We had an unusual (perhaps unprecedented) situation arise for the two Member-at-Large positions. With three candidates on the ballot, we had a tie for the second slot. Our Standing Rules for Elections indicate a "paper ballot run off" to resolve the tie. This seemed like an unnecessary bur-

den and expense, particularly at this time. Following some discussion, it was agreed that we should embrace the fact that three members were willing to run and seat all three. I proposed the following motion to the Board for consideration:

"For 2020-2021 only, due to a tie vote for the second Member-at-Large position in our recent balloting and complications resulting from the 2020 pandemic, the Board of Directors will include three Members-at-Large (instead of two)."

President Steve Hubbard presented the motion to the Board via e-mail and the response was astronomically positive. Consequently, I am pleased to announce the results of the 2020 election.

**President:** Steve Siok

**1st Vice President:** Steve Hubbard

**2nd Vice President:** Ian Dell'Antonio

**Secretary:** Sue Hubbard

**Treasurer:** Kathy Siok

**Members-at-Large:** Francine Jackson  
Laura Landen  
Matt Ouellette

**Trustee (3-year term):** Bob Janus

The newly-elected Officers, Members-at-Large (MAL) and Junior Trustee will assume their duties immediately. Please join me in thanking the outgoing Officers, MALs and Trustees for their service to Skyscrapers.



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 **May 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](mailto:ssiok@cox.net)

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# Frank Dubeau

by Francine Jackson

Francis I. “Frank” Dubeau 76, of Blackstone, MA, passed away unexpectedly Thursday, April 16, 2020 at home. He was the husband of the late Estelle (Falardeau) Dubeau. Born in Woonsocket, Frank was a US Army veteran of the Vietnam war. For many years he worked as a machinist for the former Carol Cable/Miller Machine Co. before retiring in 2006. Frank loved to work with his hands. He was an especially gifted woodworker, and he also crafted his

own telescopes. Frank was a member of the VFW Post 11519, the American Veterans Association, and the Vietnam Veterans of America.

Frank is survived by three daughters and four grandchildren, and his dear friend Lucille Laliberte of Blackstone. Services and burial with military honors are private.



# Memories of Frank Dubeau

by Steve Siok

I was shocked to learn about Frank Dubeau’s passing last week. Frank was a long time Skyscraper. I think he joined about the same time Kathy and I did in the early 1970s. Frank was a very quiet person but he was quite active during the 70s and 80s. His being reserved may have gone hand and hand with his chosen profession, as he was a machinist. Many machinists I knew during my career were also quiet and kept more to themselves and their lathe. Frank was a great one, too. He built a Newtonian 10 inch with a German equatorial mount in 1974 and displayed it during the Skyscrap-

er Mall Planetarium Project in 1975. Back then a 10 inch telescope was a BIG deal.

Most of you may have seen the picture hanging in the meeting hall on the wall behind the propane stove. It is the Skyscraper crew that went to observe the Manitoba total solar eclipse. Frank is there along with Steve Hubbard, Dave Huestis, Brian Magaw and a ProJo reporter named Murry. They had clear skies but I think it was quite cold!

My best memory of Frank is shown in the accompanying picture. This was during the 1976 repairs to the Clark and the dome. The observatory dome refused to rotate and

a large group of members worked all summer, Saturdays and Sundays, to get us back running in time for Astroassembly that year. This picture shows Frank working on reattaching the bull gear to the dome, not an easy task because of the weight of the castings and the required alignment accuracy. Frank’s machinist skills were a great asset with this important project.

We will all miss him and also, by the way, his wry sense of humor.

Steve Siok



# May's Mooned-Out Meteor Shower & Solar Activity Update

by Dave Huestis

I always look forward to observing a good display of shooting stars. I've watched countless "burning rocks" plummet through the Earth's atmosphere in the 45 years I've been an amateur astronomer. The experience doesn't get old, except perhaps when the expected peak of activity falls far short of forecasts.

I hope the weather gods cooperated with April's Lyrid meteor shower back on the night of April 22-23. Unfortunately, the May Eta Aquarids on the night of May 5 to the early morning of the 6th will be severely hampered by an almost Full Supermoon, the last of 2020's supermoons. The meteors, remnants of Halley's Comet, enter the Earth's upper atmosphere head-on at 41 miles per second. We can expect to see no more than 10-15 swift and yellow shooting stars per hour under a bright moonlit sky.

(Note: In researching the shower characteristics for this May's Eta Aquarids among several sources, I did find discrepancies regarding the peak morning of activity. Some sources had the peak occurring on the morning of the 5th, while others stated the 7th. The Eta Aquarids do present a spread out peak, so depending upon the weather I would recommend observing on either of the three mornings if you have the time. Regardless, the bright Moon will affect your meteor counts. At least Aquarius will be above the southeastern horizon with the Moon in the southwest. I'm trying to be optimistic here!)

The meteors appear to radiate from the constellation of Aquarius, not a very prominent star pattern. Around 4:00 a.m. Aquarius will be located about 12 degrees above the east-southeast horizon. The shower's radiant point is in the Water Urn asterism (looks like a Y-shaped group of stars). While the meteors emanate from this region of the sky, scan around the entire sky to maximize your chances of observing one.

It's even possible you may see a few bright "earthgrazers," shooting stars that blaze long and slow along the horizon. And because the Eta Aquarids are very fast meteors, forty percent of them leave long persisting dust trains when they disintegrate. So, despite the bright moonlight, all is not lost for the Eta Aquarids this year.

The Full Moon on the 7th at 6:45a.m.

goes by several names, many of which are derived from Native American cultures. May's full moon is known as the Full Flower Moon because spring flowers were heralding a new season. Other names less frequently used are Full Corn Planting Moon and the Milk Moon.

## Solar Minimum Endures

Since my last update on the Sun's Deep Minimum persistence, sunspot activity on the solar disk continues to be low. Here is the data for the last five years:

Year	Spotless Days	Percentage (Spotless days /365 days)
2019	281	77%
2018	221	61%
2017	104	28%
2016	32	9%
2015	0	0%

Beginning on January 1, 2020, one group of sunspots was of the new Cycle 25 and was present on the solar disk for nine days. It was a new cycle region because it formed at a high latitude on the solar surface and its magnetic polarity was reversed from Cycle 24. The most individual spots that appeared on any given day during the nine-day run was three.

Spot activity then ceased for 14 days with the Sun being spotless once again.

Then for another nine-day period beginning on January 24, an old Cycle 24 spot group formed. This activity was followed by 34 spotless days, after which a new Cycle 25 group formed and lived for just three short

days.

This back and forth of the appearance of new and old solar cycle spots is typical of cycle transition. It is important to note that near the end of one cycle and the beginning of the next, spot groups of both polarities may and do coincide.

Beginning on March 10 there were eight spotless days. Then a single spot group formed and only survived for one day. It was a new Cycle 25 spot. Eleven spotless days followed. The last two days of March ended with another new Cycle 25 spot group.

While the appearance of reversed magnetic polarity spots seems to be increasing, who knows what our life-giving star has in store for us in the near future.

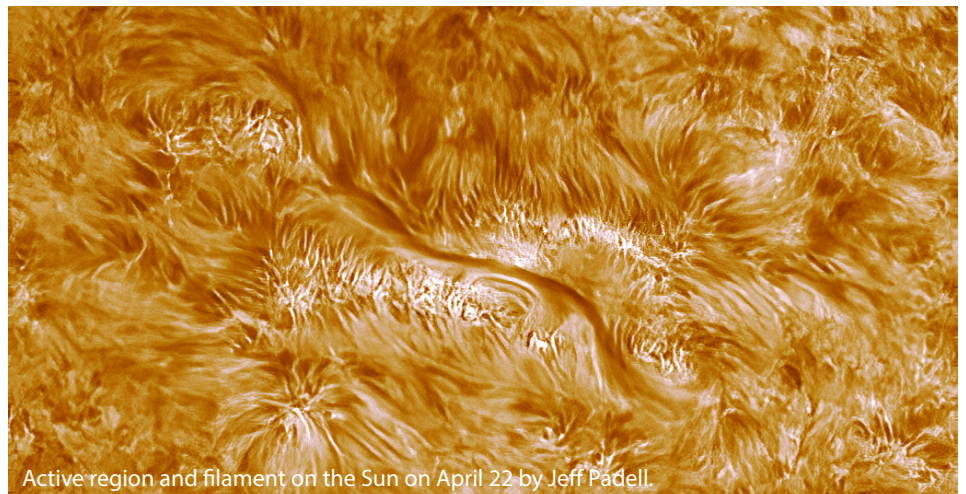
As I mentioned a few months ago, it is important to monitor our Sun's activity. Whether solar activity is high or low, extreme ranges in either direction can pose serious risks to life on our precious Earth. A recent report on [SpaceWeather.com](http://SpaceWeather.com) reported that cosmic rays are intensifying because during high solar activity coronal mass ejections (CMEs) protect the Earth from this hard radiation, and during solar activity decline the cosmic rays reach Earth and penetrate deep into our atmosphere. In addition, Earth's weakening magnetic field lines are also contributing to increased cosmic ray incursion. The article stated, "Commercial flight crews traveling over Earth's poles experience as much as 12% more radiation than they did just a few years ago."

Corona virus or cosmic rays. We humans can't seem to catch a break.

Keep your eyes to the skies and be well.



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>



Active region and filament on the Sun on April 22 by Jeff Padell.

# E. Margaret Burbidge: 1919-2020

by Francine Jackson

The astronomy community was saddened to hear of the death of E. Margaret Burbidge April 5th, 2020, after suffering a fall. A true trailblazer, Burbidge, among her many accomplishments, was the first female Director of the Royal Greenwich Observatory.



Born August 12th, 1919, she met her husband and collaborator, Geoffrey Burbidge, at University College London, a theoretical physics major who, on hearing of her passion for astronomy, became convinced to switch to theoretical astrophysics.

During World War II, she worked at the University College of London, but twice had to stop because of bombs flying. She turned down a postdoc from Carnegie Observatories because the work came with observing times at Mount Wilson, which at that time only allowed men to use.

Her first position in the U.S. was at Yerkes Observatory, but she returned to England to work, with her husband, William Alfred Fowler, and Fred Hoyle on an idea that became known as stellar nucleosynthesis, whereby stars produced chemical elements by means of nuclear reactions.

Returning to the United States, she again applied to observe at Mount Wilson, but was still refused; however, her husband ap-

plied, and upon his acceptance became his “assistant” in his work, although the majority of the observing was performed by her.

Throughout her life, Burbidge campaigned for both discrimination and what she called “positive discrimination,” whereby awards given to only women were also one of her focus points, only accepting awards that could be given to persons of either gender.

Through her life she authored over 370 research papers, a feat few people can compare with. Her legacy as an astronomer will never be forgotten.



*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>*

## In Search of the Ashen Light

by Francine Jackson

Optical astronomy is considered a very exact science, as something that is discovered and reported is then observed by everyone pointing a telescope in that direction. But, sometimes, that just might not always be true.

In 1643, Italian astronomer Giovanni Battista Riccioli noted that he had seen a faint glow on the unlit side of Venus, which was in its thin crescent phase. He called it the Ashen Light. Apparently, it glowed much like Earthshine, the Earth's reflected sunlight striking the surface of the Moon, lighting up the unlit portion a ghostly gray. The main problem with Riccioli's sighting, though, is that it is not a phenomenon seen by everyone looking at Venus, and no one seems to know where it comes from; also, no one has been able to image it.

It is surprising that many astronomers through history have documented seeing it, including such names as William Herschel and, fairly recently, Sir Patrick Moore; however, many more observers have not seen it. Through the centuries, this has been attributed to equipment failure, observer error, an optical illusion, or atmospheric

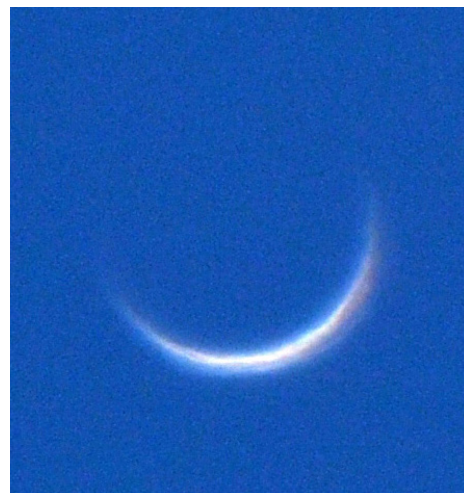
effects.

Does this ashen light actually exist? With its having been seen by such distinguished astronomers, it should be a real effect. But, if so, what is it? Theories abound, some partially rational, other just plain off the wall: The Keck telescopes once noted they did see a subtle greenish glow, believed to be caused by ultraviolet light from the Sun splitting some of Venus's CO<sub>2</sub> into CO and oxygen, but the green that would result from this oxygen production would be too faint to be distinguished even with those telescopes. Others believe it could result from lightning bolts ravaging the planet, although they would be very difficult to be seen through the incredible atmosphere. Aurorae? Again, not likely with the atmosphere as thick as it is.

Probably the “best” explanation, as incredible theories go, comes from Franz von Gruithuisen, a 19th century physician and astronomer, who was known for, not only his observing prowess, but his incredible imagination. His idea was that the ashen light was from fires lit to either clear land for farming on Venus, or in celebration of a

new planetary emperor.

With Venus in its waning crescent phase, this is apparently the best time to observe this ashen light – if it indeed exists. If you plan on trying, the best way is to use an occulting bar to block the light of Venus itself. Let us know if you can resolve this phenomenon. Is it real? Apparently, only your own eyes can tell.



Crescent Venus imaged by Bob Horton using a 16-inch SCT on January 17, 2014

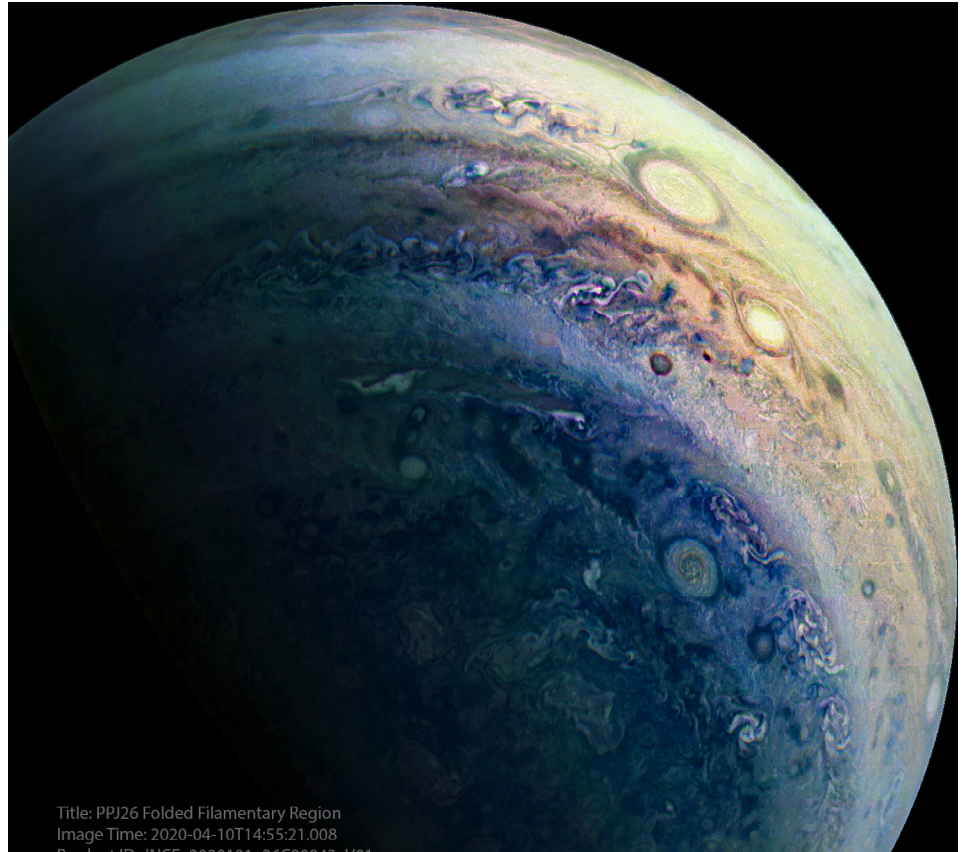
# NASA Night Sky Notes: Become a Citizen Scientist with NASA!

By David Prosper

Ever want to mix in some science with your stargazing, but not sure where to start? NASA hosts a galaxy of citizen science programs that you can join! You'll find programs perfect for dedicated astronomers and novices alike, from reporting aurora, creating amazing images from real NASA data, searching for asteroids, and scouring data from NASA missions from the comfort of your home. If you can't get to your favorite stargazing spot, then NASA's suite of citizen science programs may be just the thing for you.

Jupiter shines brightly in the morning sky this spring. If you'd rather catch up on sleep, or if your local weather isn't cooperating, all you need is a space telescope - preferably one in orbit around Jupiter! Download raw images straight from the Juno mission, and even process and submit your favorites, on the **JunoCam** website! You may have seen some incredible images from Juno in the news, but did you know that these images were created by enthusiasts like yourself? Go to their website and download some sample images to start your image processing journey. Who knows where it will take you? Get started at [bit.ly/nasajunocam](http://bit.ly/nasajunocam)

Interested in hunting for asteroids? Want to collaborate with a team to find them??



Title: PPJ26 Folded Filamentary Region  
Image Time: 2020-04-10T14:55:21.008  
File ID: J165-2020101-2660012-161

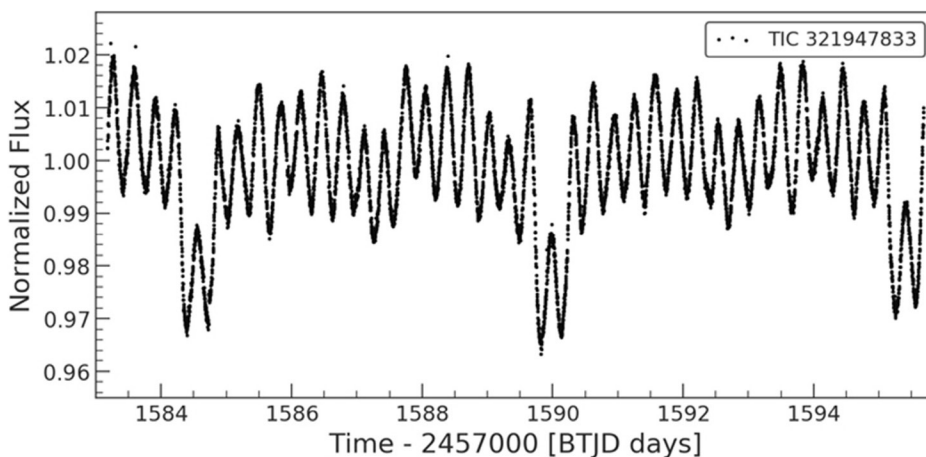
Tracy Prell created this image of Jupiter using NASA's Juno Cam by combing RGB images in Photoshop.

The **International Astronomical Search Collaboration** program matches potential asteroid hunters together into teams throughout the year to help each other dig into astronomical data in order to spot dim objects moving in between photos. If your team discovers a potential asteroid that is later confirmed, you may even get a chance to name it! Join or build a team and search for asteroids at [iasc.cosmosearch.org](http://iasc.cosmosearch.org)

Want to help discover planets around

other star systems? NASA's TESS mission is orbiting the Earth right now and scanning the sky for planets around other stars. It's accumulating a giant horde of data, and NASA scientists need your help to sift through it all to find other worlds! You can join **Planet Hunters TESS** at: [planethunters.org](http://planethunters.org)

Intrigued by these opportunities? These are just a few of the many ways to participate in NASA citizen science, including observing your local environment with the GLOBE program, reporting aurora with Aurorasaurus, measuring snowpack levels, training software for Mars missions - even counting penguins! Discover more opportunities at [science.nasa.gov/citizenscience](http://science.nasa.gov/citizenscience) and join the NASA citizen science Facebook group at [facebook.com/groups/Science/](https://facebook.com/groups/Science/) And of course, visit [nasa.gov](http://nasa.gov) to find the latest discoveries from all the research teams at NASA!



Light curve of a binary star system containing a pulsating (variable) star, as spotted on Planet Hunters TESS by user mhuten and featured by project scientist Nora Eisner as a "Light Curve of the Week." Credit: Planet Hunters TESS/NASA/mhuten/Nora Eisner



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](http://nightsky.jpl.nasa.gov) to find local clubs, events, and more!

# Lenticular Galaxy in Coma Berenices & Barred Spiral Galaxy in Coma Berenices: M85 (NGC 4382) & NGC 4394

by Glenn Chaple for LVAS

**Mag: 9.1 Size: 7.1' X 5.5' & Mag. 10.9 Size: 3.6' X 3.2'**

The last two Observer's Challenges, the 11th magnitude galaxies NGC 2859 (March) and NGC 3877 (April), were, well – challenges! If you'd like an easier target this month, we have something for you. If you'd like another challenge, we have something for you as well. The “easy challenge” is the 9th magnitude lenticular galaxy M85; the “challenging challenge” is its 11th magnitude neighbor, the barred spiral galaxy NGC 4394.

M85 is the northernmost Messier galaxy in the Virgo Galaxy Cluster and can be found about a degree ENE of the Magnitude 4.7 star 11 Comae Berenices. I described M85 as “easy,” because it's relatively bright. I've seen it with a 3-inch reflector and a magnifying power of 30X. Here's a challenge. Can you capture it with binoculars?

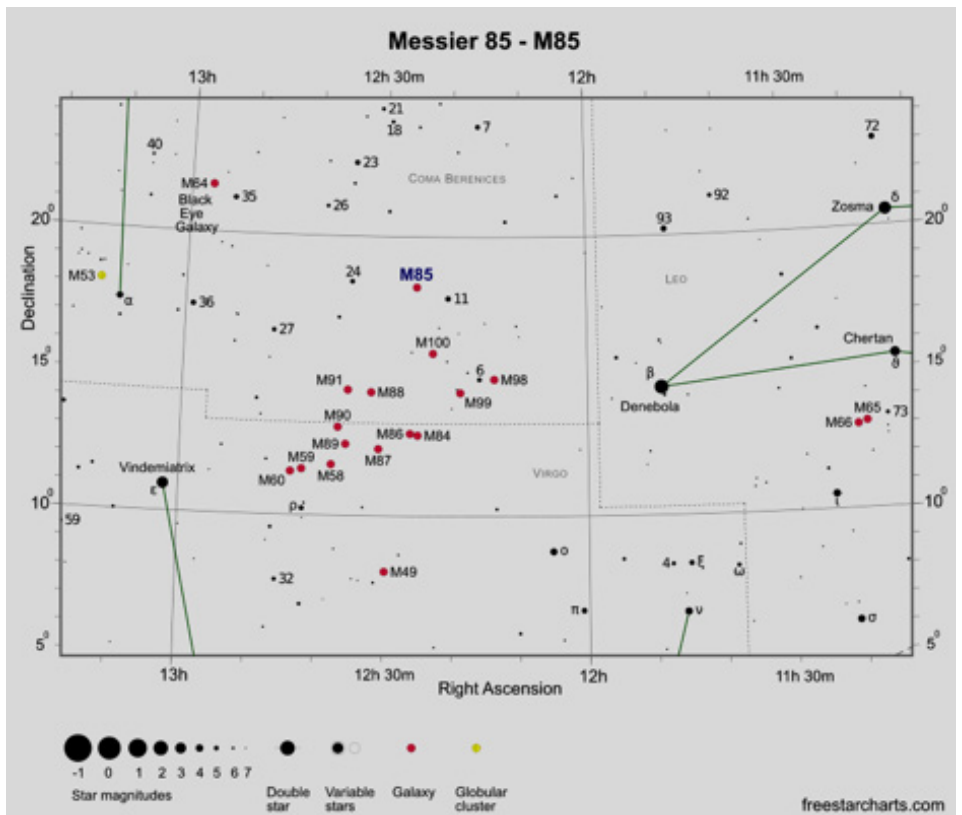
If you look 8.5 arcminutes east of M85, you'll see the faint glimmer of the barred spiral NGC 4394. Under dark sky conditions, a 10-inch scope will reveal the bar, which has a NW-SE orientation. If you're viewing NGC 4394 with a large-aperture scope, look for the outer halo, visible in the accompanying image by Mario Motta

M85 was discovered by Pierre Méchain in early 1781. William Herschel picked up NGC 4394 three years later. Both galaxies are about 60 million light years away.

*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](mailto: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](http://rogerivester.com/category/observers-challenge-reports).*



Messier 85 (right) and NGC 4394 (left). Image by Mario Motta (ATMoB) Taken through 32 inch scope with ZWO ASI6200 camera, 2 hrs integration time, processed in PixInsight.



# The Sun, Moon & Planets in May

This table contains the ephemeris of the objects in the Solar System for each Saturday night in May 2020. Times in Eastern Daylight Time (UTC-4) after March 8. 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
<b>Sun</b>	<b>2</b>	2 38.5	15 27.0	Ari	-26.8	1904.3	-	-	-	1.01	05:40	12:43	19:46
	<b>9</b>	3 05.5	17 25.3	Ari	-26.8	1901.1	-	-	-	1.01	05:31	12:42	19:54
	<b>16</b>	3 33.0	19 09.3	Tau	-26.8	1898.1	-	-	-	1.01	05:24	12:42	20:01
	<b>23</b>	4 01.0	20 37.4	Tau	-26.8	1895.5	-	-	-	1.01	05:18	12:43	20:08
	<b>30</b>	4 29.4	21 48.2	Tau	-26.8	1893.2	-	-	-	1.01	05:14	12:44	20:14
<b>Moon</b>	<b>2</b>	10 01.9	16 12.6	Leo	-12.2	1962.5	105° E	63	-	-	13:57	21:00	03:51
	<b>9</b>	16 38.4	-20 51.9	Oph	-12.7	1948.4	159° W	97	-	-	21:35	02:27	07:15
	<b>16</b>	22 58.7	-12 18.4	Aqr	-11.4	1759.0	74° W	37	-	-	02:59	08:29	14:08
	<b>23</b>	4 12.5	18 28.2	Tau	-5.1	1808.8	4° E	0	-	-	05:59	13:32	21:12
	<b>30</b>	10 42.1	12 55.4	Leo	-11.9	1954.3	88° E	48	-	-	12:57	19:46	02:23
<b>Mercury</b>	<b>2</b>	2 25.9	13 48.6	Ari	-2.2	5.1	3° W	99	0.33	1.33	05:37	12:33	19:32
	<b>9</b>	3 24.8	19 17.9	Tau	-2.0	5.2	5° E	98	0.31	1.30	05:46	13:05	20:26
	<b>16</b>	4 25.5	23 21.2	Tau	-1.1	5.6	13° E	85	0.32	1.21	06:01	13:38	21:16
	<b>23</b>	5 21.3	25 21.9	Tau	-0.5	6.3	19° E	67	0.35	1.07	06:20	14:05	21:51
	<b>30</b>	6 07.3	25 32.7	Gem	0.1	7.2	23° E	49	0.39	0.93	06:37	14:23	22:08
<b>Venus</b>	<b>2</b>	5 12.7	27 47.8	Tau	-4.5	40.1	38° E	24	0.72	0.42	07:19	15:15	23:11
	<b>9</b>	5 21.6	27 42.0	Tau	-4.4	44.8	33° E	17	0.72	0.38	07:01	14:56	22:51
	<b>16</b>	5 22.7	27 07.9	Tau	-4.4	50.0	26° E	11	0.72	0.34	06:37	14:28	22:19
	<b>23</b>	5 15.3	26 01.1	Tau	-4.3	54.7	18° E	5	0.72	0.31	06:08	13:53	21:37
	<b>30</b>	5 00.6	24 19.2	Tau	-4.2	57.9	8° E	1	0.73	0.29	05:33	13:10	20:46
<b>Mars</b>	<b>2</b>	21 40.9	-15 37.5	Cap	0.4	7.7	80° W	86	1.44	1.22	02:40	07:45	12:50
	<b>9</b>	21 59.9	-14 09.8	Aqr	0.3	8.0	82° W	86	1.43	1.17	02:25	07:36	12:47
	<b>16</b>	22 18.6	-12 38.2	Aqr	0.2	8.4	84° W	85	1.42	1.12	02:10	07:27	12:44
	<b>23</b>	22 36.9	-11 03.6	Aqr	0.1	8.7	86° W	85	1.42	1.07	01:55	07:18	12:41
	<b>30</b>	22 54.8	-9 27.1	Aqr	0.0	9.2	88° W	85	1.41	1.02	01:40	07:08	12:37
<b>1 Ceres</b>	<b>2</b>	22 29.5	-18 02.9	Aqr	9.2	0.4	70° W	97	2.96	3.16	03:37	08:32	13:27
	<b>9</b>	22 37.3	-17 41.9	Aqr	9.2	0.4	75° W	97	2.97	3.07	03:16	08:13	13:09
	<b>16</b>	22 44.7	-17 24.7	Aqr	9.1	0.4	80° W	97	2.97	2.98	02:55	07:52	12:50
	<b>23</b>	22 51.4	-17 12.0	Aqr	9.0	0.4	85° W	97	2.97	2.88	02:33	07:32	12:30
	<b>30</b>	22 57.6	-17 04.3	Aqr	9.0	0.4	90° W	97	2.97	2.79	02:11	07:10	12:09
<b>Jupiter</b>	<b>2</b>	19 56.3	-20 53.3	Sgr	-2.2	40.7	105° W	99	5.18	4.83	01:16	05:59	10:42
	<b>9</b>	19 57.1	-20 52.0	Sgr	-2.3	41.7	112° W	99	5.18	4.72	00:50	05:32	10:15
	<b>16</b>	19 57.3	-20 52.6	Sgr	-2.3	42.6	118° W	99	5.18	4.62	00:22	05:05	09:48
	<b>23</b>	19 56.9	-20 54.9	Sgr	-2.4	43.5	125° W	99	5.18	4.52	23:54	04:37	09:20
	<b>30</b>	19 55.8	-20 59.1	Sgr	-2.4	44.3	132° W	99	5.17	4.44	23:26	04:08	08:51
<b>Saturn</b>	<b>2</b>	20 16.7	-19 50.4	Cap	0.6	16.9	100° W	100	10.02	9.79	01:32	06:19	11:07
	<b>9</b>	20 16.9	-19 50.2	Cap	0.5	17.1	107° W	100	10.02	9.68	01:05	05:52	10:39
	<b>16</b>	20 16.9	-19 51.0	Cap	0.5	17.3	114° W	100	10.02	9.57	00:37	05:25	10:12
	<b>23</b>	20 16.5	-19 53.0	Cap	0.5	17.5	120° W	100	10.02	9.47	00:10	04:57	09:44
	<b>30</b>	20 15.8	-19 55.9	Cap	0.4	17.7	127° W	100	10.02	9.37	23:42	04:28	09:15
<b>Uranus</b>	<b>2</b>	2 18.9	13 23.9	Ari	5.9	3.4	5° W	100	19.80	20.81	05:29	12:21	19:12
	<b>9</b>	2 20.5	13 31.8	Ari	5.9	3.4	12° W	100	19.80	20.79	05:03	11:55	18:47
	<b>16</b>	2 22.0	13 39.4	Ari	5.9	3.4	18° W	100	19.80	20.76	04:36	11:29	18:21
	<b>23</b>	2 23.5	13 46.8	Ari	5.9	3.4	24° W	100	19.80	20.72	04:10	11:03	17:56
	<b>30</b>	2 24.9	13 53.9	Ari	5.9	3.4	31° W	100	19.80	20.67	03:43	10:37	17:30
<b>Neptune</b>	<b>2</b>	23 25.8	-4 49.0	Aqr	7.9	2.2	52° W	100	29.93	30.54	03:43	09:28	15:13
	<b>9</b>	23 26.4	-4 45.2	Aqr	7.9	2.2	58° W	100	29.93	30.45	03:16	09:01	14:46
	<b>16</b>	23 27.0	-4 41.9	Aqr	7.9	2.3	65° W	100	29.93	30.34	02:49	08:34	14:19
	<b>23</b>	23 27.5	-4 39.1	Aqr	7.9	2.3	72° W	100	29.93	30.23	02:22	08:07	13:53
	<b>30</b>	23 27.9	-4 36.9	Aqr	7.9	2.3	78° W	100	29.93	30.12	01:54	07:40	13:25
<b>Pluto</b>	<b>2</b>	19 48.4	-21 59.0	Sgr	14.3	0.2	107° W	100	34.03	33.72	01:13	05:51	10:29
	<b>9</b>	19 48.2	-22 00.2	Sgr	14.3	0.2	114° W	100	34.04	33.61	00:46	05:23	10:01
	<b>16</b>	19 48.0	-22 01.6	Sgr	14.3	0.2	121° W	100	34.04	33.51	00:18	04:56	09:33
	<b>23</b>	19 47.7	-22 03.2	Sgr	14.3	0.2	128° W	100	34.05	33.42	23:50	04:28	09:05
	<b>30</b>	19 47.3	-22 05.0	Sgr	14.3	0.2	134° W	100	34.05	33.33	23:23	04:00	08:37





# Astrophoto Gallery

Sharpless 2-274, the Medusa Nebula, is a large but faint planetary nebula in Gemini. Image by Steve Hubbard.



NGC 4565



NGC 4631 - Whale Galaxy



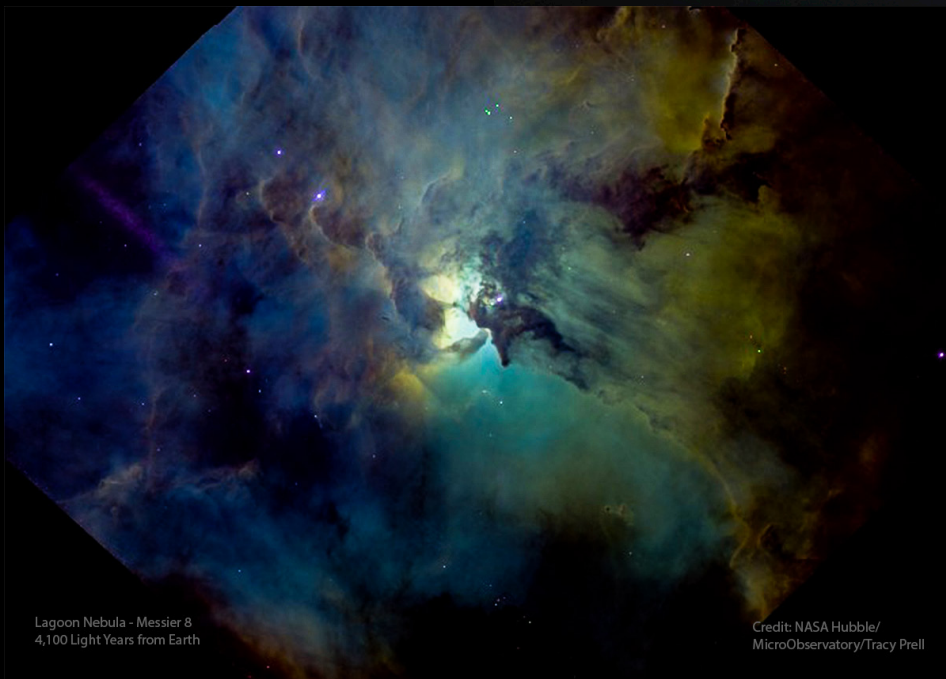
NGC 5395

Deep sky images by Steve Hubbard. All with 14" F8 SCT and ZWO ASI294 pro. Each was a 3 minute single exposure at 300 gain, screen grab and lightly processed in nebulosity. NGC 5395 is a weird galaxy interacting with another and a bit of a tail because of it.

Jeff Padell processed these images from the Sloan telescopes. Top: NGC 5053 a small globular, M53 is in upper right corner. Bottom: M83, the Southern Pinwheel Galaxy.



Venus in Taurus on the evening  
of April 11 by Bob Horton.≠



Lagoon Nebula - Messier 8  
4,100 Light Years from Earth

Credit: NASA Hubble/  
MicroObservatory/Tracy Prell

Tracy Prell processed this Hubble  
Space Telescope image of M8 Lagoon  
Nebula Lagoon Nebula using the  
JS9-4I image processing software  
from the Micro Observatory

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Regular	<input type="checkbox"/> \$50
*Family	<input type="checkbox"/> \$60
Senior	<input type="checkbox"/> \$25
Contributing	<input type="checkbox"/> \$

(any amount in excess of annual dues is gratefully accepted as a donation)

\*The Name of the primary family member is listed above. Please identify on separate paper the name, address, email and phone number of the second family member. The second member shall have voting rights during election cycles if 18 years of age.

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North Scituate, RI 02857

# Spectrum of Algol

by Conrad Cardano

Algol is a 2nd magnitude star of the constellation Perseus. This class B (B8) star appears rather normal, its faintly bluish white light. It is a main sequence star that is 3.5 times more massive than the sun.

Every 2.8 days, the brightness of the star drops from magnitude 2.1 to a magnitude 3.4 (~30 percent of normal). There are on a few times during the year when the eclipse occurs on a clear night. The entire event is not very long (only a few hours).

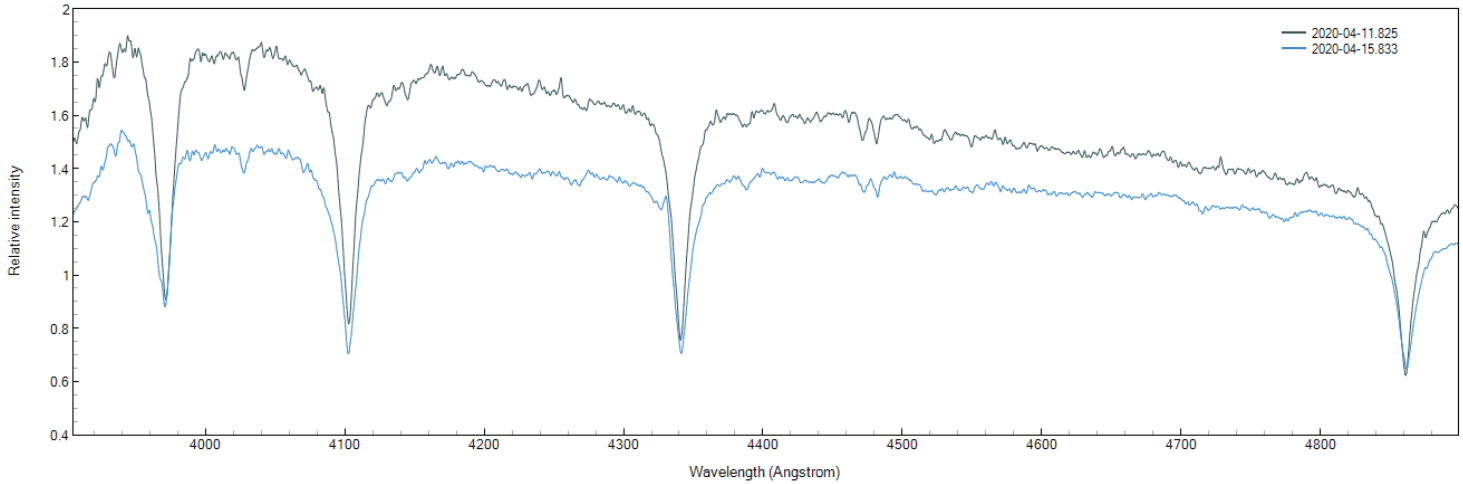
Algol is an eclipsing double star whose components orbit each other every 2.8 days. The companion to the observed star is a much dimmer yellow-orange class K giant star.

The B star, at 2.9 solar radii, is smaller than the K giant (3.5 solar). Each orbit, when the dimmer, larger K star passes in front of the brighter B star, we see a deep eclipse. The eclipse is only partial, some of the light of the principal component still shining brightly through. Between the deep "primary" eclipses is a smaller dip when the bright star passes partially in front of the dim one.

The graph shows the spectra of Algol at two times. The first one was taken on April 11, in the evening. On this day, Algol was at its maximum, 2.1 magnitude. The second was taken on April 15 at the eclipse maximum.

At first, I couldn't see much of a difference; however, when I cut and enlarged the graph, the difference became obvious.

The large dips in the graph are the hydrogen absorption lines that are typical in a B-class star. If you look closely, the width of the lines is not the same. Something happened. I cannot explain it yet.



# 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