Observations

A Monthly Publication Of The CHESTER COUNTY ASTRONOMICAL SOCIETY

Vol. 30, No. 7 ***Three-Time*** *Winner of the Astronomical League's Mabel Sterns Award ☼ 2006, 2009 & 2016* *July 2022*

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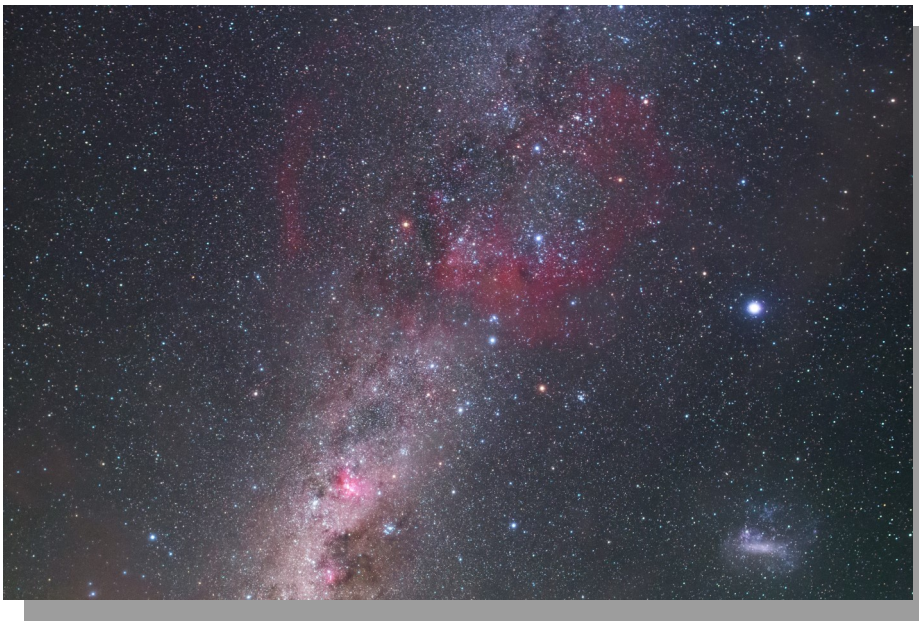
The Gum Nebula



This image of the Gum Nebula and the Milky Way, taken in the Atacama Desert, includes one of the Magellanic Clouds. Named for Australian astronomer Colin Stanley Gum (1924-1960), the origin of this complex nebula is still being debated. Image courtesy: P. Horálek/ESO

July 2022 Dates

6th • First Quarter Moon and the Lunar X is visible at 3 a.m.

7th • The Lunar Straight Wall is visible this evening

13th • Full Moon, the Full Buck Moon, the Full Thunder Moon or the Full Birds Shed Feathers Moon, 2:37 p.m. EDT

20th • Last Quarter Moon, 10:18 a.m. EDT

29th-30th • The Southern Delta Aquariid meteor shower peaks

28th • New Moon, 1:54 p.m. EDT

CCAS Upcoming Nights Out

In addition to our monthly observing sessions at the Myrick Conservancy Center, BRC (see pg. 7), CCAS has several special "nights out" scheduled over the next few months. Members are encouraged to help out during these events any way they can. See below for more information.

☼ Friday, July 8th • CCAS Special Observing Session, Friday Night Lights, ChesLen Preserve, Coatesville, PA.

☼ Friday, July 22nd • CCAS Monthly Observing Session, Myrick Conservancy Center, BRC. The observing session starts at sunset.

☼ Friday, August 19th • CCAS Monthly Observing Session, Myrick Conservancy Center, BRC. The observing session starts at sunset.

For more information about future observing opportunities, contact our Observing Chair, Don Knabb.

Summer Society Events

July 2022

8th • CCAS Special Observing Session, Friday Night Lights, ChesLen Preserve, Coatesville, PA. For non-members registration is required with The Natural Lands Trust. For more information, contact our Observing Chair, Don Knabb.

20th • The Department of Earth & Space Sciences at West Chester University will host two Webb Space Telescope Special Events. The first, at 6 p.m. EDT in Merion 113 will be a special live simulcast discussion of Webb's First Images by a panel of NASA experts. At 7 p.m. EDT, the Mather Planetarium will present a special full-dome show highlighting Webb, providing amazingly detailed views of the new Webb images, and exploring the science behind the new observations.

20th • Open call for articles and photographs for the August 2022 edition of Observations.

22nd • CCAS Monthly Observing Session, Myrick Conservancy Center, BRC. The observing session starts at sunset.

26th • Deadline for newsletter submissions for the August 2022 edition of Observations.

26th-29th • CCAS Special Camping Trip & Observing Session at Cherry Springs State Park, Coudersport, PA. For more information, contact our Observing Chair, Don Knabb.

28th-31st • 2022 Stellafane Convention, Springfield, VT.

August 2022

19th • CCAS Monthly Observing Session, Myrick Conservancy Center, BRC. The observing session starts at sunset.

20th • Open call for articles and photographs for the August 2022 edition of Observations.

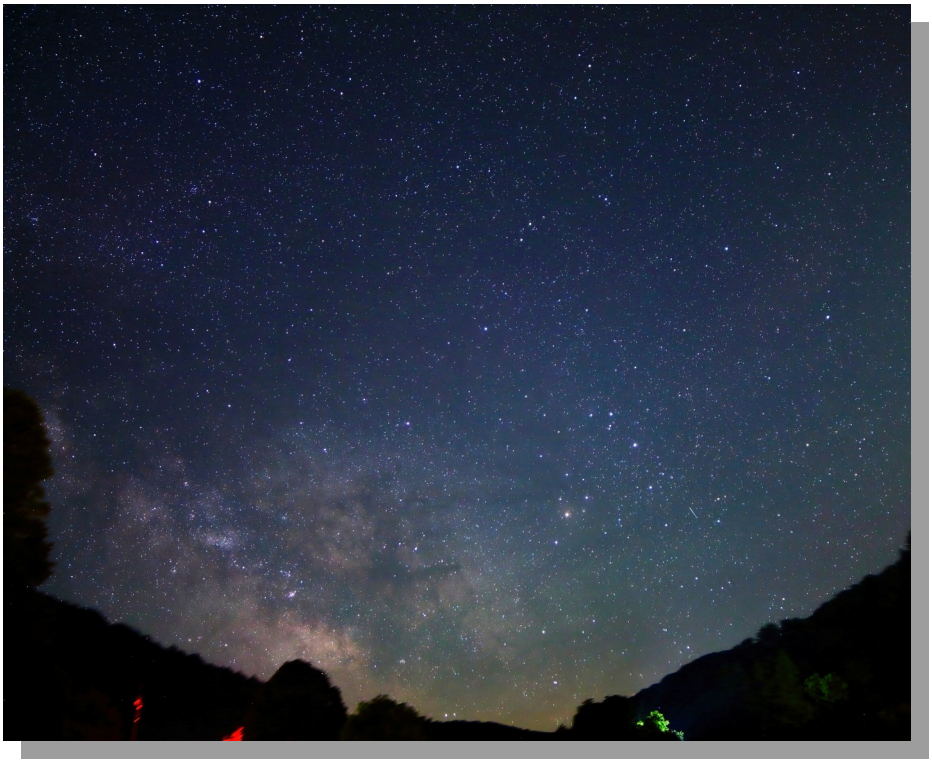
23rd-26th • CCAS Special Camping Trip & Observing Session at Cherry Springs State Park, Coudersport, PA. For more information, contact our Observing Chair, Don Knabb.

26th • Deadline for newsletter submissions for the August 2022 edition of Observations.

26th-30th • Almost Heaven Star Party, Spruce Knob, WV.

CCAS Member Original Astrophotography

by Jeff Cunningham



Jeff Cunningham submitted this wonderful shot of the Milky Way galactic core rising with Scorpius and Libra, plus a meteor to the right of Antares. He took this image at the Frosty Hollow B&B, located just outside Cherry Springs Park on June 3, 2022. For those of you interested in the technical details, Jeff reports using a Canon Rebel T6 DSLR camera with an iOptron SkyTracker Pro mount and a Rokinon f2.8/14mm prime lens. The exposure was ISO 400 @ 103 seconds using daylight white balance. For processing the image, he used Canon Digital Photo Professional 4, to change the white balance and tweak the image brightness, contrast, shadow and saturation levels. He also used the software to remove sensor hot pixels caused by the long exposure. Lastly, Jeff used the plug-in Topaz DeNoise AI to handle any background image noise.

September 2022 CCAS Meeting Agenda

by Bruce Ruggeri, CCAS Program Chair

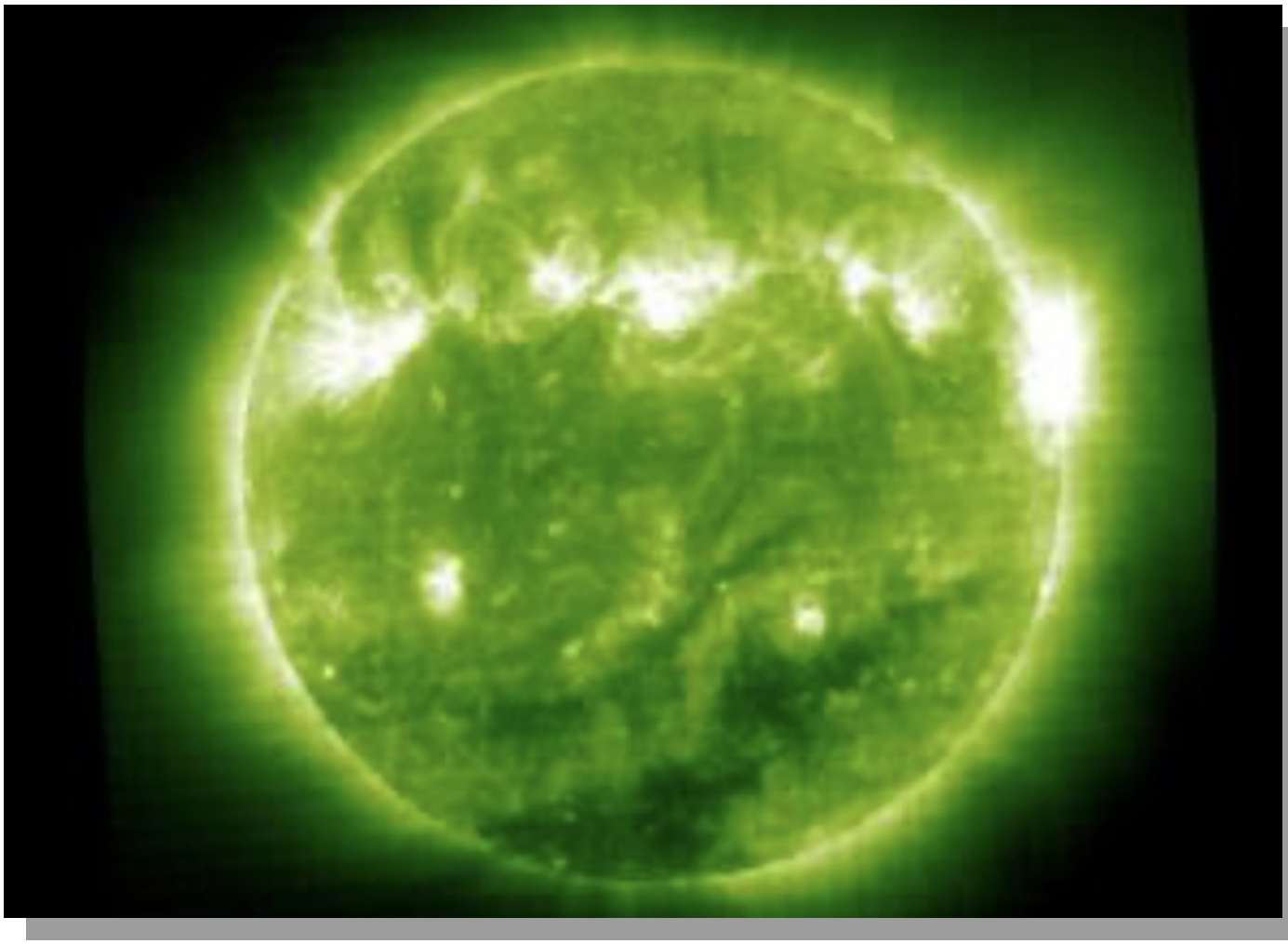
Our next meeting will be held on September 13, 2022, in person (as well as via Zoom) at West Chester University's Merion Science Center, Room 112 (please note the new room right next to our previous room). The Science Center is located at 720 S. Church St., West Chester, PA. CCAS Member Speaker: John Conrad, who will present "Do Look Up- DART: the worlds first asteroid deflection test."

Please note that inclement weather or changes in speakers' schedules may affect the program. In the event there is a change, CCAS members will be notified via e-mail with as much advance notice as possible.

As for future meetings, we are looking for presenters for our 2022 -2023 season and beyond. If you are interested in presenting, or know someone who would like to participate, please contact me at programs@ccas.us.

Is Zubeneschamali a Green Star?

by Bruce McClure, EarthSky.org



The sun in extreme ultraviolet, with a false color green. Do stars look green? Scientists say no, but observers swear Zubeneschamali, in the constellation Libra the Scales, does look green. Image via SOHO/ ESA/ NASA.

Zubeneschamali (Beta Librae) is the brightest star in the constellation Libra the Scales. It's only a touch brighter than the other bright star in Libra, called Zubenelgenubi. Modern observers – and we're talking about professional astronomers now – often say that the star Zubeneschamali in the constellation Libra is white or bluish. But earlier observers often described Beta Librae as a green star. For example, the incomparable Burnham's Celestial Handbook quotes the famous amateur astronomer Willian Tyler Olcott (1873–1936) on this subject. Olcott referred to Zubeneschamali as the only star visible to the unaided eye that is green in color. Many stargazers agree. Others don't. So is Zubeneschamali green or not?

According to scientists, we don't see green stars. Stars emit a spectrum ("rainbow") of colors, including green. But – within the range of wavelengths and intensities found in stars – greens get mixed with other colors. And so – according to astrophysicists – stars can't appear green. For stars, the general colors are, from lower to higher temperatures, red, orange, yellow, white and blue.

Therefore, there are no green stars, according to scientists. Physics Ph.D. candidate Ben Bartlett at Stanford explains:

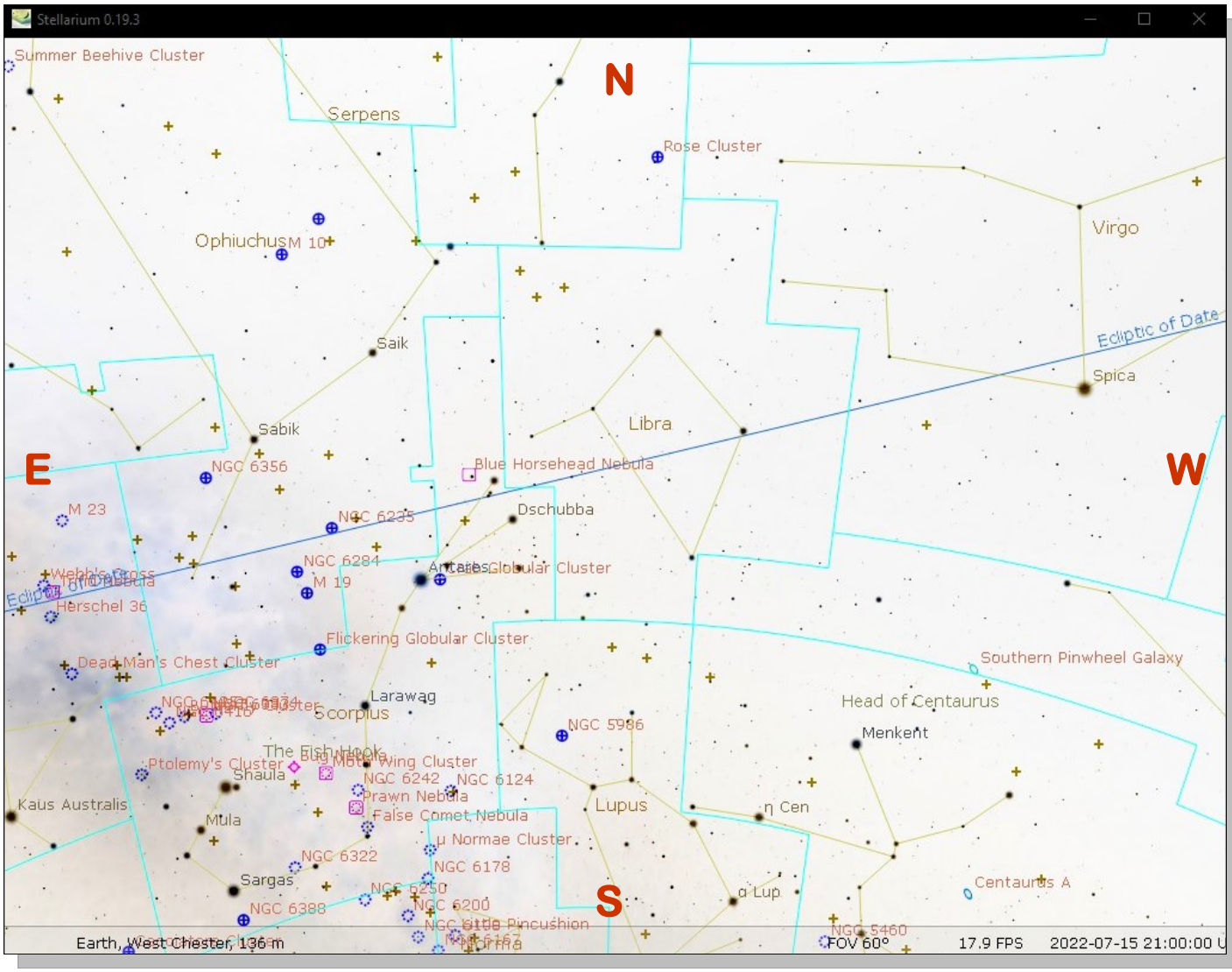
"Starlight looks basically like an ideal blackbody spectrum: a broad curve with the peak wavelength depending on the temperature. However, our eyes see in a 3-dimensional color space by sampling the intensities of red, green, and blue light. Cool stars emit mostly in infrared, which we can't see, but within the visible spectrum, they emit much more red light than blue or

(Continued on page 6)

The Sky Over Chester County

July 15, 2022 at 9:00 p.m. ET

Note: This screen capture is taken from Stellarium, the free planetarium software available for download at www.stellarium.org.



Date	Civil Twilight Begins	Sunrise	Sunset	Civil Twilight Ends	Length of Day
07/01/2022	5:04 a.m. EDT	5:37 a.m. EDT	8:35 p.m. EDT	9:07 p.m. EDT	14h 57m 24s
07/15/2022	5:14 a.m. EDT	5:46 a.m. EDT	8:30 p.m. EDT	9:01 p.m. EDT	14h 43m 37s
07/31/2022	5:29 a.m. EDT	6:00 a.m. EDT	8:17 p.m. EDT	8:47 p.m. EDT	14h 16m 54s

Moon Phases					
First Quarter	07/06/2022	10:14 p.m. EDT	Full Moon	07/13/2022	2:37 p.m. EDT
Last Quarter	07/20/2022	10:18 a.m. EDT	New Moon	07/28/2022	1:54 p.m. EDT

July 2022 Observing Highlights

by Don Knabb, CCAS Treasurer & Observing Chair

6	**First Quarter Moon and the Lunar X is visible at 3 a.m.**
7	**The Lunar Straight Wall is visible this evening**
13	**Full Moon, the Full Buck Moon, the Full Thunder Moon or the Full Birds Shed Feathers Moon, 2:37 p.m. EDT**
19	**The Moon is 3° below Jupiter**
20	**Last Quarter Moon, 10:18 a.m. EDT**
21	**The Moon is 3° above right of Mars**
28	**New Moon, 1:54 p.m. EDT**
29/30	**The Southern Delta Aquariid meteor shower peaks**

The best sights this month: The morning planet parade continues through July if you can get up early enough to enjoy it. On July 1st you can see Mercury, Venus, Uranus, Mars, Jupiter, Neptune and Saturn in the pre-dawn sky.

Mercury: Catch Mercury early in the month in the morning sky before it passes behind the Sun and reappears late in the month in the evening sky very low in the fading glow of the sunset.

Venus: Venus continues to shine brightly in the morning planet parade, rising around 4 a.m.

Mars: Mars rises around 2 a.m. and is growing brighter as the year progresses.

Jupiter: The king of the planets rises around midnight during July.

Saturn: Saturn rises in the east around 11 p.m., so you will need to stay up until the wee hours for the ringed wonder to be high enough for good telescopic viewing.

Uranus and Neptune: Uranus rises after Venus but before Mars in the early morning hours. Neptune rises just after midnight and is 12º west of Jupiter.

The Moon: The Moon is full on July 13th. Native Americans called this the Full Buck Moon because July is normally the month when the new antlers of buck deer push out of their foreheads with coatings of velvety fur. It was also often called the Full Thunder Moon since thunderstorms are most frequent during this time of year. This Full Moon has also been called the Full Hay Moon. Native Canadians called this the Birds Shed Feathers Moon.

Constellations: Fireflies, warm nights, and the hazy stars of summer; this is July! This is one of the few months of the year when you can lay a blanket down on the lawn and not be cold, so enjoy it even if it is hot and humid during the day. Arcturus will be setting in the west and the Summer Triangle will be nearly at the zenith. If you sit up for a bit and look to the south you will see the big bug of summer, Scorpius. Then grab your binoculars and scan from Scorpius up the Milky Way through Sagittarius, on to Aquila and Cygnus and beyond!

Messier/deep sky: Globular clusters and nebula rule the summer sky for anyone with a telescope or binoculars. Sagittarius is full of Messier objects such as the Trifid and the Lagoon nebula. In Scorpius is M4, a globular cluster that is easy to find using Antares as a guide. If you have a low western horizon look for NGC 6231 where the tail of Scorpius turns to the east. This open cluster is called the Northern Jewel Box. Then look high overhead with binoculars and find the coat hanger cluster between Vega and Altair. This is a great object to share with friends.

Comets: There are no bright comets visible during July but if you want to chase 7th magnitude Comet C/2017 K2 (PanSTARRS) you can find a sky map in the July issue of Astronomy magazine. The comet will be in the constellation Ophiuchus during July and on July 30 and 31 the comet will be near globular cluster M 107.

Meteor showers: Meteor showers: The Southern Delta Aquariid meteor shower is active from July 12th to August 23rd with the peak of activity on July 30th.

Green Star (Cont'd)

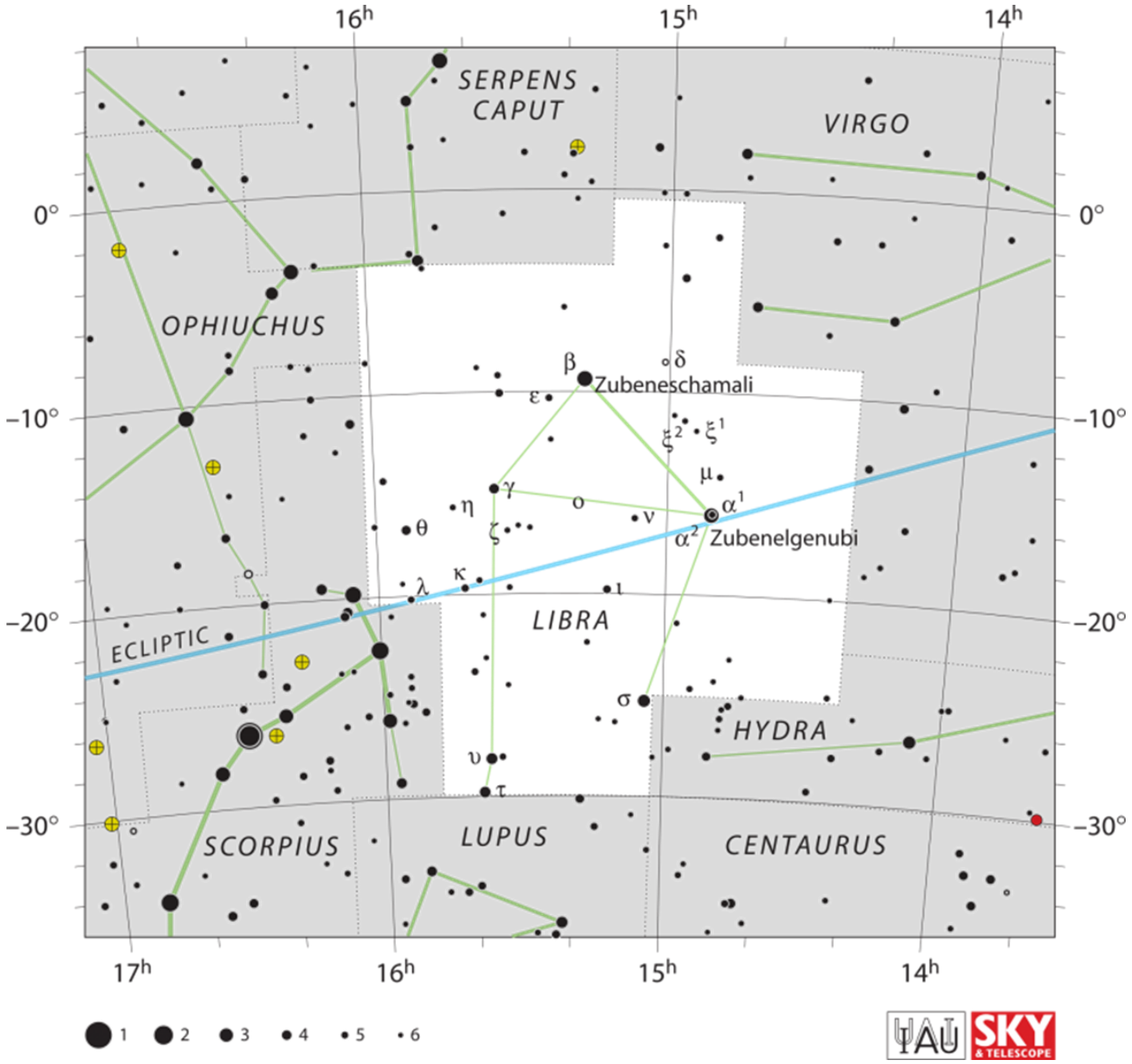


Image via International Astronomical Union/ Sky & Telescope (Roger Sinnott & Rick Fienberg)/ Wikimedia Commons.

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green. Hot stars shine mostly in UV, but emit more blue than red or green. But if the peak emission wavelength is green, then the broad blackbody curve is centered in the visible spectrum. So star emits roughly the same amount of red, green, and blue light, appearing white!"

So scientists can explain to you why stars can't look green. Yet many stargazers swear that Zubeneschamali proves otherwise. Look for yourself. If Zubeneschamali doesn't appear green to your unaided eye, try binoculars. Have your friends look at this star too. You might at least discover that people see colors differently.

Check this star out for yourself on a Northern Hemisphere summer evening. Assuming you're in the Northern Hemisphere, it shines high in your southern sky each summer and

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Green Star (Cont'd)

(Continued from page 6)

is easy to find. Look for Zubeneschamali a good two fist-widths to the northwest (upper right) of the brilliant ruddy star Antares in the constellation Scorpius – one of the few constellations that look like the creature for which it was named. Hold your fist an arm's length away.

Zubeneschamali is slightly brighter than its brother star Zubenelgenubi. But Zubenelgenubi is designated as the alpha star of the constellation Libra. Why? It might be because the other star, Zubenelgenubi, sits squarely on the ecliptic, the annual pathway of the sun in front of the background stars.

Zubenelgenubi is a bit fainter than Libra's other bright star

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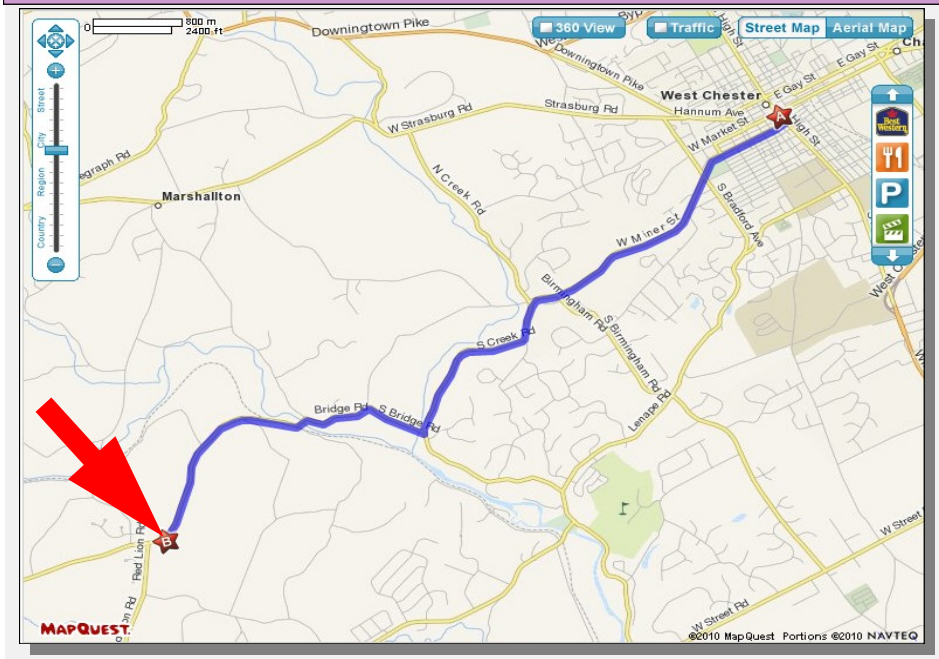
Classic La Para

by Nicholas La Para

CCAS Directions



Brandywine Red Clay Alliance
1760 Unionville Wawaset Rd
West Chester, PA 19382
(610) 793-1090
http://brandywinewatershed.org/

BRC was founded in 1945 and is committed to promoting and protecting the natural resources of the Brandywine Valley through educational programs and demonstrations for all ages.

Brandywine Red Clay Alliance

The monthly observing sessions (held February through November) are held at the Myrick Conservation Center of the Brandywine Red Clay Alliance.

To get to the Myrick Conservation Center from West Chester, go south on High Street in West Chester past the Courthouse. At the next traffic light, turn right on Miner Street, which is also PA Rt. 842. Follow Rt. 842 for about 6 miles. To get to the observing site at the BRC property, turn left off Route 842 into the parking lot by the office: look for the signs to the office along Route 842. From that parking lot, go left through the gate and drive up the farm lane about 800 feet to the top of the hill. The observing area is on the right.

If you arrive after dark, *please turn off your headlights and just use parking lights* as you come up the hill (so you don't ruin other observers' night vision).

Through the Eyepiece: Messier 21, an Open Cluster in Sagittarius
by Don Knabb, CCAS Observing Chair & Treasurer

Star map created with Stellarium planetarium software

Back in the 18th century, famed French astronomer Charles Messier noted the presence of several "nebulous objects" in the night sky. Having originally mistaken them for comets, he began compiling a list of these objects so that other astronomers wouldn't make the same mistake. This list is now called The Messier Catalog and it contains many of the deep space objects that amateur astronomers seek with their binoculars and telescopes.

The summer southern sky around Sagittarius and Scorpius is full of amazing objects from Messier's catalog. One of the less flashy and often overlooked objects is Messier 21.

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Eyepiece (Cont'd)

Image credit: Rick Saunders https://commons.wikimedia.org/wiki/File:Messier_21.jpg

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Messier 21 or M21, also designated NGC 6531 or Webb's Cross, is an open cluster of stars in the north-east of the constellation Sagittarius, close to the Messier objects M20 and M8. M20 and M21 lie at opposite ends of Webb' Cross, an asterism of stars from magnitude 6 to magnitude 8 arranged like a cross.

This cluster is relatively young and tightly packed. A few blue giant stars have been identified in the cluster, but Messier 21 is composed mainly of small dim stars. As of January 2022, Messier 21 is one of the few remaining objects in the Messier Catalog to not have been photographed by the Hubble Space Telescope

Messier 21 is only 4.6 million years old, which makes it relatively young for an open star cluster. It is only 10 percent of the age of Messier 45, the famous Pleiades cluster in Taurus, and 1 percent the age of the Sun.

Messier 21 lies just beyond naked eye visibility but can easily be found even in the smallest binoculars. It is located 2.5 degrees northwest of Messier 8 (the Lagoon Nebula) and only 0.75 degrees to the northeast of Messier 20 (the Trifid Nebula).

The cluster contains about 35 stars with a visual magnitude between 8 and 12. Many of these stars can easily be seen in a small telescope. A telescope 6 -inch or larger will show more stars tightly packed within an area 13 arc minutes in apparent size.

The best time of year to observe M21 is in the months of June, July and August.

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NASA Night Sky Notes: Find Hercules and His Mighty Globular Clusters

by David Prosper

This article is distributed by the NASA Night Sky Network, a coalition of hundreds of astronomy clubs across the US dedicated to astronomy outreach.

Visit nightsky.jpl.NASA.gov to find local clubs, events, stargazing info and more.

Hercules is one of the standout heroes of Greek mythology, but his namesake constellation can be surprisingly hard to find - despite being one of the largest star patterns in our night skies! Once you find the stars of Hercules, look deeper; barely hidden in the space around his massive limbs and "Keystone" asterism are two beautiful globular star clusters: M13 and M92!

Since the constellation itself is relatively dim but bordered by brighter constellations, you can

find the stars of Hercules by looking between the bright stars Vega and Arcturus. They are fairly easy to identify, and we have tips on how to do so in previous articles. Vega is the brightest star in the constellation Lyra and one of the three stars that make up the Summer Triangle (*June 2020: Summer Triangle Corner: Vega*). Arcturus is the brightest star in the constellation Boötes, and can be found by "arcing to Arcturus" from the handle of the Big Dipper (*May 2021: Virgo's Galactic Harvest*). You may be able to Hercules's "Keystone" asterism first; this distinct pattern of four stars is traditionally shown as the torso of the great hero, though some illustrators prefer marking the Keystone as the head of Hercules. What pattern do *you* see in the stars of Hercules?

Globular star clusters appear

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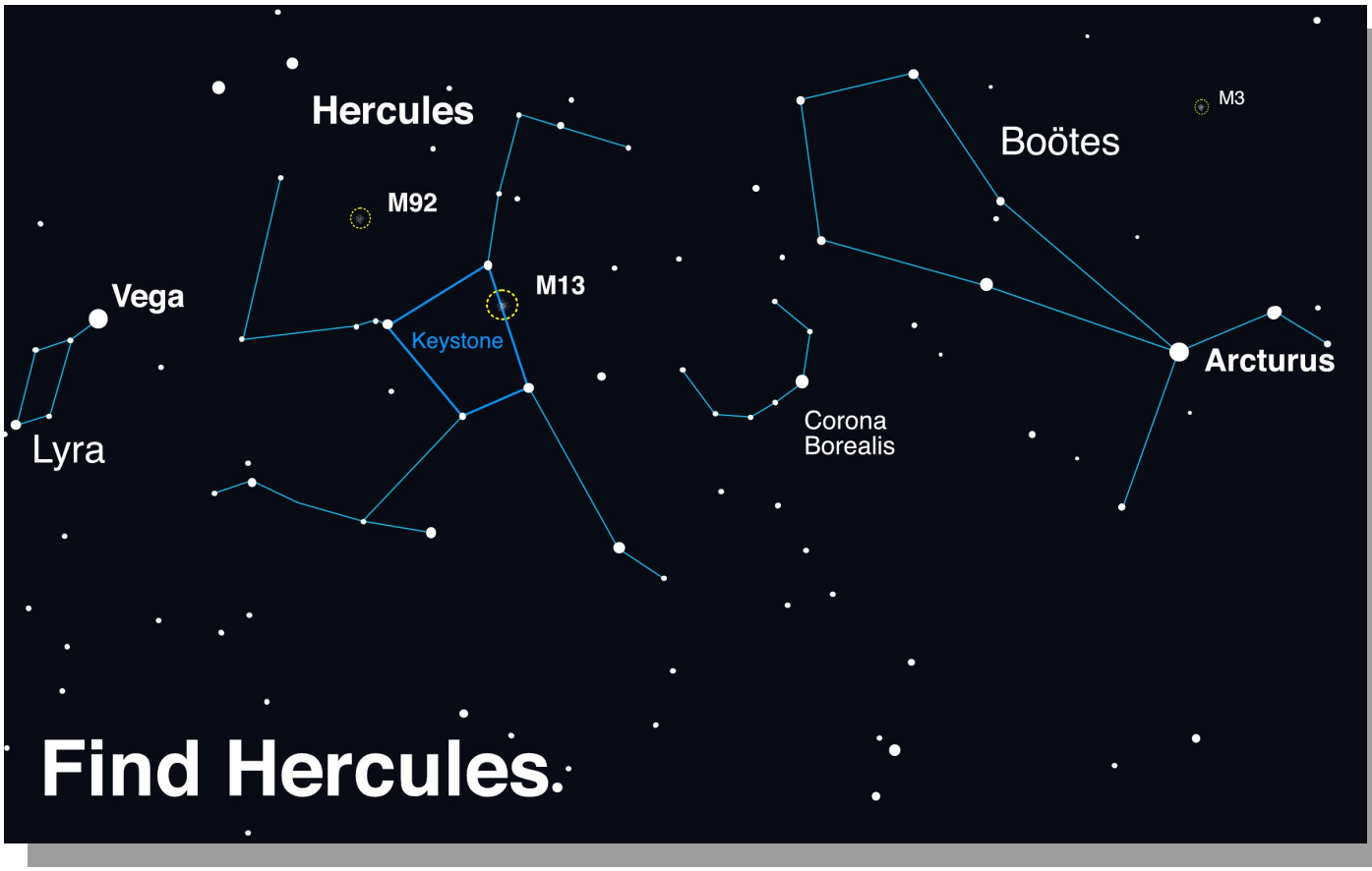


Look up after sunset during summer months to find Hercules! Scan between Vega and Arcturus, near the distinct pattern of Corona Borealis. Once you find its stars, use binoculars or a telescope to hunt down the globular clusters M13 and M92. If you enjoy your views of these globular clusters, you're in luck - look for another great globular, M3, in the nearby constellation of Boötes. Image created with assistance from Stellarium: stellarium.org

Composite image of the dense starry core of M92 imaged in multiple wavelengths. While your own views of these globular clusters won't be nearly as crisp and detailed, you might be able to count some of its member stars. How far into their dense cores can you count individual stars? Credits: ESA/Hubble & NASA; Acknowledgment: Gilles Chapdelaine. Source: https://www.nasa.gov/feature/goddard/2017/messier-92

(Continued from page 10)

"fluffy," round, and dense with stars, similar to a dandelion gone to seed, in contrast to the more scattered and decentralized patterns of open clusters. Open clusters are generally made up of young stars that are gradually spreading apart and found inside our Milky Way galaxy, while globular clusters are ancient clusters of stars that are compact, billions of years old, bound to each other and orbit around our galaxy. Due to their considerable distance, globular clusters are usually only visible in telescopes, but one notable exception is M13, also known as the Great Cluster or Hercules Cluster.

During very clear dark nights, skilled observers *may* be able to spot M13 without optical aid along the border of the Keystone, in between the stars Zeta and Eta Herculis - and a bit closer to Eta. Readily visible as a fuzzy "star" in binoculars, in telescopes M13 explodes with stars and can fill up an eyepiece view with its sparkling stars, measuring a little over half the diameter of a full Moon in appearance!

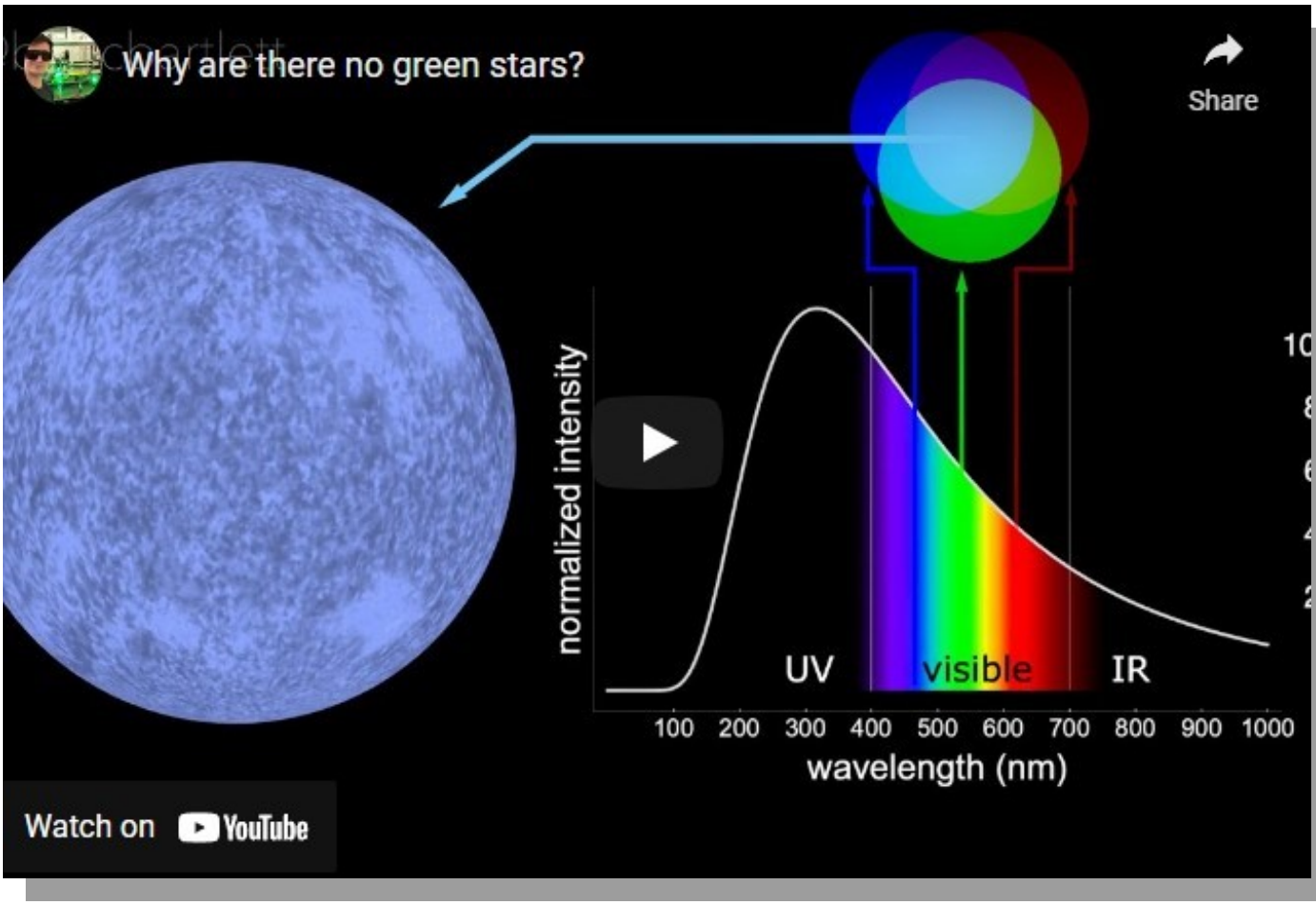
When viewed through small telescopes, globular clusters can appear orb-like and without discernable member stars, similar in appearance to the fuzzy comae of distant comets. That's why comet hunters Edmund Halley and Charles Messier discovered and then catalogued M13, in 1714 and 1764 respectively, marking this faint fuzzy as a "not-comet" so as to avoid future confusion.

While enjoying your view of M13, don't forget to also look for M92! This is another bright and bold globular cluster, and if M13 wasn't so spectacular, M92 would be known as the top celestial sight in Hercules. M92 also lies on the edge of naked-eye visibility, but again, binoculars and especially a telescope are needed to really make it "pop." Even though M92 and M13 appear fairly close together in the sky, in actuality they are rather far apart: M13's distance is estimated at about 25,000 light years from Earth, and M92's at approximately 27,000 light years distant. Since M13 and M92 appear so close together in our skies and relatively easy to spot, switching between these two clusters in your scope makes for excellent star-hopping practice. Can you observe any differences between these two ancient clusters of stars?

Globular clusters are closely studied by astronomers for hints about the formation of stars and galaxies. The clusters of Hercules have even been studied by NASA's space telescopes to reveal the secrets of their dense cores of hundreds of thousands of stars.

Find their latest observations of globular clusters - and the universe - at nasa.gov.

Green Star (Cont'd)



Bartlett has a neat animation to help you visualize why stars don't look green. Watch it on YouTube at: https://youtu.be/4K3uK-b6nm0

(Continued from page 7)

Zubeneschamali. But it lies nearly on the ecliptic, or pathway of the sun, moon and planets. That might be why the ancient stargazers gave Zubenelgenubi the alpha designation within this constellation.

Both of these star names – Zubeneschamali and Zubenelgenubi – rhyme with Obi-Wan Kenobi of Star Wars fame. They are Arabic phrases meaning the Northern Claw (of the Scorpion) and the Southern Claw (of the Scorpion), respectively. Many thousands of years ago in ancient Babylon, these two stars once belonged to the constellation Scorpius the Scorpion, and once depicted the Scorpion's outstretched claws.

Apparently, the ancient Greeks and Romans redrew the boundaries, creating the constellation Libra the Scales. Well over 2,000 years ago, the sun on the autumn equinox shone in front of Libra, the balance symbolizing the equal duration of day and night on the equinox. At present, the sun is in front of the constellation Virgo the Maiden on the autumn equinox, which falls annually on or near September 22.

In the star lore of the ancient Greeks, the constellation Virgo represents Astrea, the goddess of justice, holding Libra the Scales and weighing judgment upon human souls. It's thought that Roman citizens associated Libra with Augustus, the dispenser of divine judgment.

Science has helped Zubeneschamali to one-up its biggest rival in Libra, the alpha star Zubenelgenubi. Astronomers have determined that Libra's beta star is considerably brighter intrinsically than its rival Zubenelgenubi.

Yet these two Libra stars appear nearly the same brightness as seen from Earth. Why? It's because Zubenelgenubi lies at

(Continued on page 14)

Green Star (Cont'd)

Zubeneschamali looks blue in this photo, but stargazers routinely report that, through their telescopes, they see it as green. Photo via nikomi.net.

Eyepiece (Cont'd)

(Continued from page 9)

Charles Messier discovered this object on June 5th, 1764. As he wrote in his notes on the occasion: "In the same night I have determined the position of two clusters of stars which are close to each other, a bit above the Ecliptic, between the bow of Sagittarius and the right foot of Ophiuchus: the known star closest to these two clusters is the 11th of the constellation Sagittarius, of seventh magnitude, after the catalog of Flamsteed: the stars of these clusters are, from the eighth to the ninth magnitude, environed with nebulosities."

While Messier did separate the two star clusters, he assumed the nebulosity of M20 was also involved with M21. In this circumstance, we cannot fault him. After all, his job was to locate comets, and the purpose of his catalog was to identify those objects that were not.

An open cluster is a group of up to a few thousand stars that were formed from the same giant molecular cloud and have roughly the same age. More than 1,100 open clusters have been discovered within the Milky Way galaxy, and many more are thought to exist. They are loosely bound to each other by mutual gravitational attraction and become disrupted by close encounters with other clusters and clouds of gas as they orbit the galactic center. Open clusters generally survive for a few hundred million years. In contrast, the more massive globular clusters of stars exert a stronger gravitational attraction on their members and can survive for many billions of years.

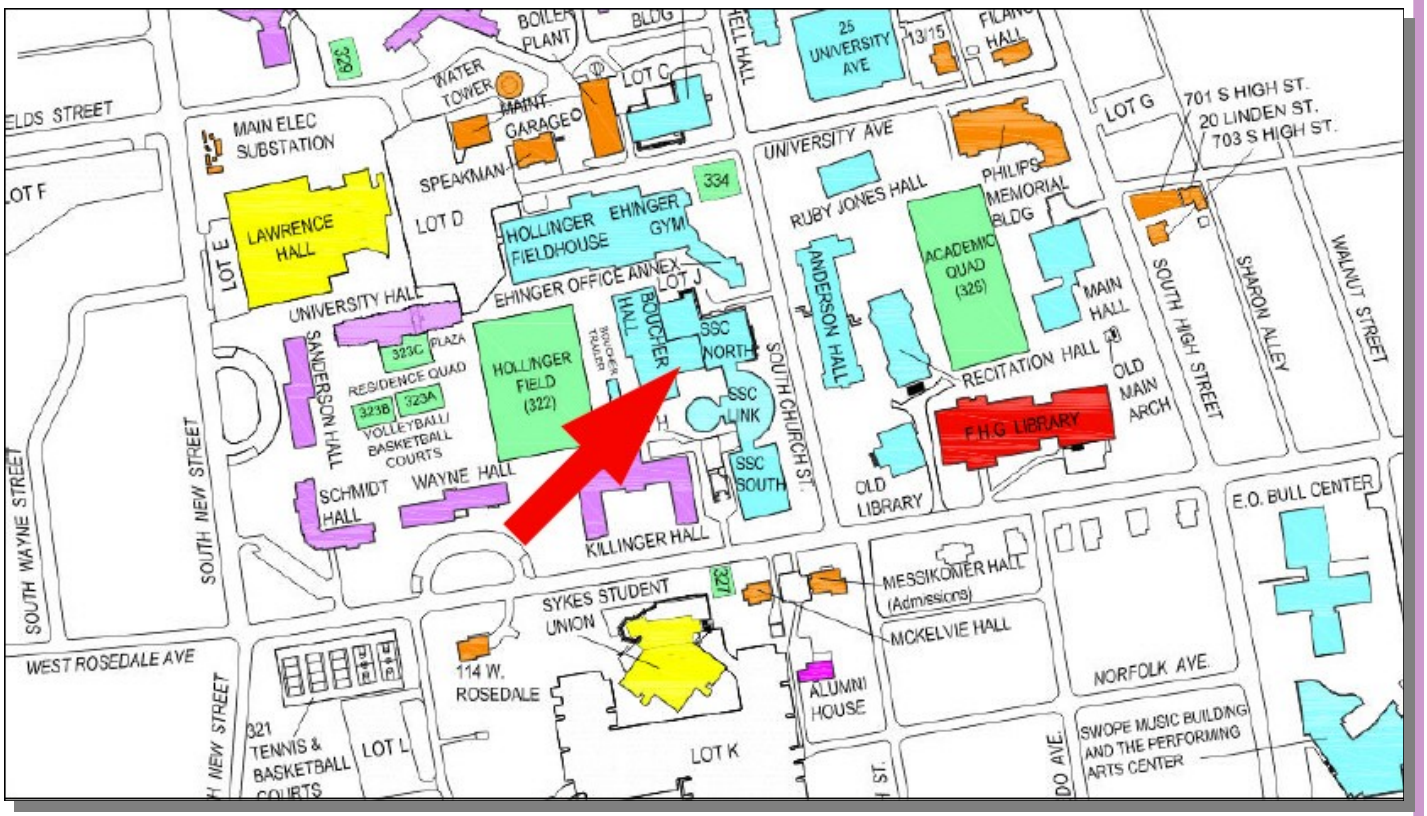
Information sources:

- https://en.wikipedia.org/wiki/Messier_21
- https://www.universetoday.com/31935/messier-21/
- https://www.messier-objects.com/messier-21/

CCAS Directions

West Chester University Campus

The monthly meetings (September through May) are held in Room 112 in Merion Science Center (formerly the Boucher Building), attached to the Schmucker Science Center. The Schmucker Science Center is located at the corner of S. Church St & W. Rosedale Ave. Parking is generally available across Rosedale in the Sykes Student Union parking lot (Lot K).



Green Star (Cont'd)

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less than half Zubeneschamali's distance. Zubenelgenubi is 75 light-years away. Zubeneschamali is 185 light-years away. Zubeneschamali's intrinsic luminosity is nearly five times that of Zubenelgenubi and 130 times that of the sun. Zubeneschamali's position: RA: 15h 17.5m, dec: -9° 25′.

Bottom line: Is Zubeneschamali green? Learn more about this brightest star in the constellation Libra.

Read the original article at EarthSky | Is Zubeneschamali a green star?

CCAS Membership Information and Society Financials

Treasurer's Report
by Don Knabb

June 2022 Financial Summary

Beginning Balance	$1,842
Deposits	$210
Disbursements	-$1178
Ending Balance	$874

New Member Welcome!

Welcome to our new CCAS member Jack O'Neill from Phoenixville, PA.

We're glad you decided to join us under the stars! Clear skies to you!

Membership Renewals

You can renew your CCAS membership by writing a check payable to "Chester County Astronomical Society" and sending it to our Treasurer:

Don Knabb
988 Meadowview Lane
West Chester PA 19382

The current dues amounts are listed in the *CCAS Information Directory*. Consult the table of contents for the directory's page number in this month's edition of the newsletter.

CCAS Information Directory

Join the Fight for Dark Skies!

You can help fight light pollution, conserve energy, and save the night sky for everyone to use and enjoy. Join the nonprofit International Dark-Sky Association (IDA) today. Individual memberships start at $30.00 for one year. Send to:

International Dark-Sky Association
3225 North First Avenue
Tucson, AZ 85719

Phone: **520-293-3198**
Fax: **520-293-3192**
E-mail: **ida@darksky.org**

For more information, including links to helpful information sheets, visit the IDA web site at:

http://www.darksky.org

Dark-Sky Website for PA

The Pennsylvania Outdoor Lighting Council has lots of good information on safe, efficient outdoor security lights at their web site:

http://www.POLCouncil.org

Find out about Lyme Disease!

Anyone who spends much time outdoors, whether you're stargazing, or gardening, or whatever, needs to know about Lyme Disease and how to prevent it. You can learn about it at:

http://www.LymePA.org

Take the time to learn about this health threat and how to protect yourself and your family. It is truly "time well spent"!

Good Outdoor Lighting Websites

One of the biggest problems we face in trying to reduce light pollution from poorly designed light fixtures is easy access to good ones. When you convince someone, a neighbor or even yourself, to replace bad fixtures, where do you go for good lighting fixtures? Check out these sites and pass this information on to others. Help reclaim the stars! And save energy at the same time!

Light pollution from poor quality outdoor lighting wastes billions of dollars and vast quantities of valuable natural resources annually. It also robs us of our heritage of star-filled skies. Starry Night Lights is committed to fighting light pollution. The company offers the widest selection of ordinance compliant, night sky friendly and neighbor friendly outdoor lighting for your home or business. Starry Night Lights is located in Park City, Utah.

Phone: **877-604-7377**
Fax: **877-313-2889**

http://www.starrynightlights.com

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Lighthouse Outdoor Lighting is a dedicated lifetime corporate member of the International Dark-Sky Association. Lighthouse's products are designed to reduce or eliminate the negative effects outdoor lighting can have while still providing the light you need at night.

Phone: **484-291-1084**

https://www.lighthouse-lights.com/landscape-lighting-design/pa-west-chester/

Local Astronomy-Related Stores

Listing retail sites in this newsletter does not imply endorsement of any kind by our organization. This information is provided only as a service to our members and the general public.

Skies Unlimited is a retailer of telescopes, binoculars, eyepieces and telescope accessories from Meade, Celestron, Televue, Orion, Stellarvue, Takahashi, Vixen, Losmandy and more.

Skies Unlimited
Suburbia Shopping Center
52 Glocker Way
Pottstown, PA 19465

Phone: **610-327-3500** or **888-947-2673**
Fax: **610-327-3553**

http://www.skiesunlimited.net

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Located in Manayunk, Spectrum Scientifics educates and entertains customers with an array of telescopes, microscopes, binoculars, science toys, magnets, labware, scales, science instruments, chemistry sets, and much more.

4403 Main Street
Philadelphia, PA 19127

Phone: **215-667-8309**
Fax: **215-965-1524**

Hours:
Tuesday thru Saturday: 10AM to 6PM
Sunday and Monday: 11AM to 5PM

http://www.spectrum-scientifics.com

CCAS Information Directory

CCAS Lending Telescopes

Contact Don Knabb to make arrangements to borrow one of the Society's lending telescopes. CCAS members can borrow a lending telescope for a month at a time; longer if no one else wants to borrow it after you. Don's phone number is 610-436-5702.

CCAS Lending Library

Contact our Librarian, Barb Knabb, to make arrangements to borrow one of the books in the CCAS lending library. Copies of the catalog are available at CCAS meetings, and on the CCAS website. Barb's phone number is 610-436-5702.

Contributing to *Observations*

Contributions of articles relating to astronomy and space exploration are always welcome. If you have a computer, and an Internet connection, you can attach the file to an e-mail message and send it to: **newsletter@ccas.us**

Or mail the contribution, typed or handwritten, to:

Dr. John C. Hepler
21 Medinah Drive
Reading, PA 19607

CCAS Newsletters via E-mail

You can receive the monthly newsletter (in full color!) via e-mail. All you need is a PC or Mac with an Internet e-mail connection. To get more information about how this works, send an e-mail request to Dr. John Hepler, the newsletter editor, at: **newsletter@ccas.us**.

CCAS Website

Dr. John Hepler is the Society's Webmaster. You can check out our Website at:

http://www.ccas.us

Dr. Hepler welcomes any additions to the site by Society members. The contributions can be of any astronomy subject or object, or can be related to space exploration. The only requirement is that it is your own work—no copyrighted material! Give your contributions to Dr. Hepler at (484) 883-5033 or e-mail to webmaster@ccas.us

CCAS Purpose

The Chester County Astronomical Society was formed in September 1993, with the cooperation of West Chester University, as a non-profit organization dedicated to the education and enjoyment of astronomy for the general public. The Society holds meetings (with speakers) and observing sessions once a month. Anyone who is interested in astronomy or would like to learn about astronomy is welcome to attend meetings and become a member of the Society. The Society also provides telescopes and expertise for "nights out" for school, scout, and other civic groups.

CCAS Executive Committee

For further information on membership or society activities you may call:

President:	Dave Hockenberry 610-558-4248
Vice President:	Pete Kellerman 610-873-0162
ALCor, Observing, & Treasurer:	Don Knabb 610-436-5702
Secretary:	Beatrice Mazziotta 610-933-2128
Librarian:	Barb Knabb 610-436-5702
Program:	Bruce Ruggeri 484-883-5092
Education:	Don Knabb 610-436-5702 Dennis O'Leary 610-701-8042
Webmaster & Newsletter:	John Hepler 484-883-0533
Public Relations:	Ann Miller 610-558-4248

CCAS Membership Information

The 2021 membership rates are as follows:

REGULAR MEMBER……$30/year
SENIOR MEMBER…….$15/year
STUDENT MEMBER……..$ 5/year
JUNIOR MEMBER……..$ 5/year
FAMILY MEMBER…….$40/year

Membership Renewals

Check the Membership Renewals on the front of each issue of *Observations* to see if it is time to renew. If you need to renew, you can mail your check, made out to "Chester County Astronomical Society," to:

Don Knabb
988 Meadowview Lane
West Chester PA 19382-2178

Phone: **610-436-5702**
e-mail: **treasurer@ccas.us**

*Sky & Tel*escope Magazine

The club membership subscription cost for *Sky and Telescope* magazine has increased to **$43.95**. This is still a good saving from the regular rate of **$56.05**.

There is no need to go through the CCAS treasurer for subscriptions or renewals. Just go to the Sky and Telescope website and select "Magazine", then under the FAQs you can subscribe at the club rate.

https://skyandtelescope.org/subscribe/

If you have **any** questions call Don Knabb at 610-436-5702.

Astronomy Magazine Group Rates

Subscriptions to this excellent periodical are available through the CCAS at a reduced price of **$34.00** which is much less than the individual subscription price of **$42.95** (or $60.00 for two years).

There is no need to go through the CCAS treasurer for subscriptions or renewals. Just call customer service at 877-246-4835 and request the club rate for your new subscription or renewal.