



Observations

A Monthly Publication Of The
CHESTER COUNTY ASTRONOMICAL SOCIETY

Vol. 32, No. 7 **Three-Time Winner of the Astronomical League's Mabel Sterns Award** ☼ 2006, 2009 & 2016

July 2024

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M20, the Trifid Nebula



Image Credit & Copyright: [Jesús Carmona Guillén](#). See Don Knabb's article on page 6 featuring M20.

Membership Renewals Due

07/2024	Hunsinger McGuigan Morgan Piehl
08/2024	Borowski Johnston & Stein Knabb Lurcott Manigly Schultz Tiedemann Trunk Zullitti
09/2024	Atmore Das Holloway Hopper Matas Okpaku Reilly Squire

July 2024 Dates

- 5th** • New Moon, 6:59 p.m. EDT
- 7th** • Mercury is 3° below the Moon this evening.
- 13th** • First Quarter Moon, 6:57 p.m. EDT. Moon will occult Spica this evening blocking its view.
- 14th** • Lunar Straight Wall this evening.
- 17th** • Antares appears 0.2° south of the Moon.
- 21st** • Full Moon, Buck Moon, 6:19 a.m. EDT.
- 24th** • Regulus appears directly above Mercury and quite low in the western sky shortly after sunset.
- 27th** • Last Quarter Moon, 10:54 p.m. EDT.
- 28th-31st** • Delta Aquariid Meteor Showers (ZHR = 25) peaks on the 31st.



CCAS Upcoming Nights Out

In addition to our monthly observing sessions at the Myrick Conservancy Center, BRC (for directions, see pg. 13), 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 5, 2024 - CCAS Monthly Observing Session, Myrick Conservancy Center, Brandywine Red Clay Alliance. The observing session is from 7:00 p.m. to 9:00 p.m. EDT.
- ☼ Friday, July 12, 2024 - CCAS Special Observing Session, Friday Night Lights, ChesLen Preserve, Coatesville, PA.
- ☼ Saturday, July 13, 2024 - West Goshen Park Star Party, West Chester, PA, 8:00 p.m. to 10:00 p.m. EDT.

For more information about future observing opportunities, contact our [Observing Chair](#), Michael Manigly.

Summer Society Events

July 2024

3rd-6th • [Green Bank Star Quest XVII](#). National Radio Observatory, Green Bank, West Virginia.

5th • CCAS Monthly Observing Session, Myrick Conservancy Center, Brandywine Red Clay Alliance. The observing session is from 7:00 p.m. to 9:00 p.m. EDT.

12th • [Friday Night Lights Star Party](#), 7:00-10:00 p.m. EDT, ChesLen Preserve, Coatesville, PA. This is a fundraiser with music for the Natural Lands Trust. Several local astronomy clubs set up telescopes for the concert goers to view the night sky during the event. If you are not a member of CCAS you must purchase tickets from the Natural Lands Trust. CCAS members who want to assist with the astronomy portion of this event must bring a telescope or mounted astronomical binoculars to qualify for free admission.

13th • [West Goshen Park Star Party](#), West Chester, PA, 8:00 p.m. to 10:00 p.m. EDT.

20th • Open call for articles and photographs for the August 2024 edition of [Observations](#).

26th • Deadline for newsletter submissions for the August 2024 edition of [Observations](#).

August 2024

2nd • CCAS Monthly Observing Session, Myrick Conservancy Center, Brandywine Red Clay Alliance. The observing session is from 7:00 p.m. to 9:00 p.m. EDT.

20th • Open call for articles and photographs for the September 2024 edition of [Observations](#).

23rd • CCAS Special Observing Session, Starr Farm Park, Downingtown, PA. Center, Brandywine Red Clay Alliance. The observing session is from 7:00 p.m. to 10:00 p.m. EDT.

26th • Deadline for newsletter submissions for the September 2024 edition of [Observations](#).

27th-30th • CCAS Camping Trip, Cherry Springs State Park, Coudersport, PA.

Great Globular Cluster of Hercules

courtesy NASA's Night Sky Network



The Great Globular Cluster, also known as Messier 13, was discovered by astronomer Edmund Halley in 1714. Located 25,000 light-years from Earth with an apparent magnitude of 5.8, this glittering metropolis of stars in the constellation Hercules can be spotted with a pair of binoculars most easily in July. See this month's Night Sky Network article featuring Messier 13 on pg. 12.

September 2024 CCAS Meeting Agenda

by Bruce Ruggeri, CCAS Program Chair

Our next meeting will be held on September 10, 2024, in person at West Chester University's Merion Science Center, Room 113. The Science Center is located at 720 S. Church St., West Chester, PA. Member Speaker: John Conrad, NASA Solar System Ambassador and CCAS Member, "Spaceships for the 21st Century (aka SpaceX and the 7 Little Dwarfs)".

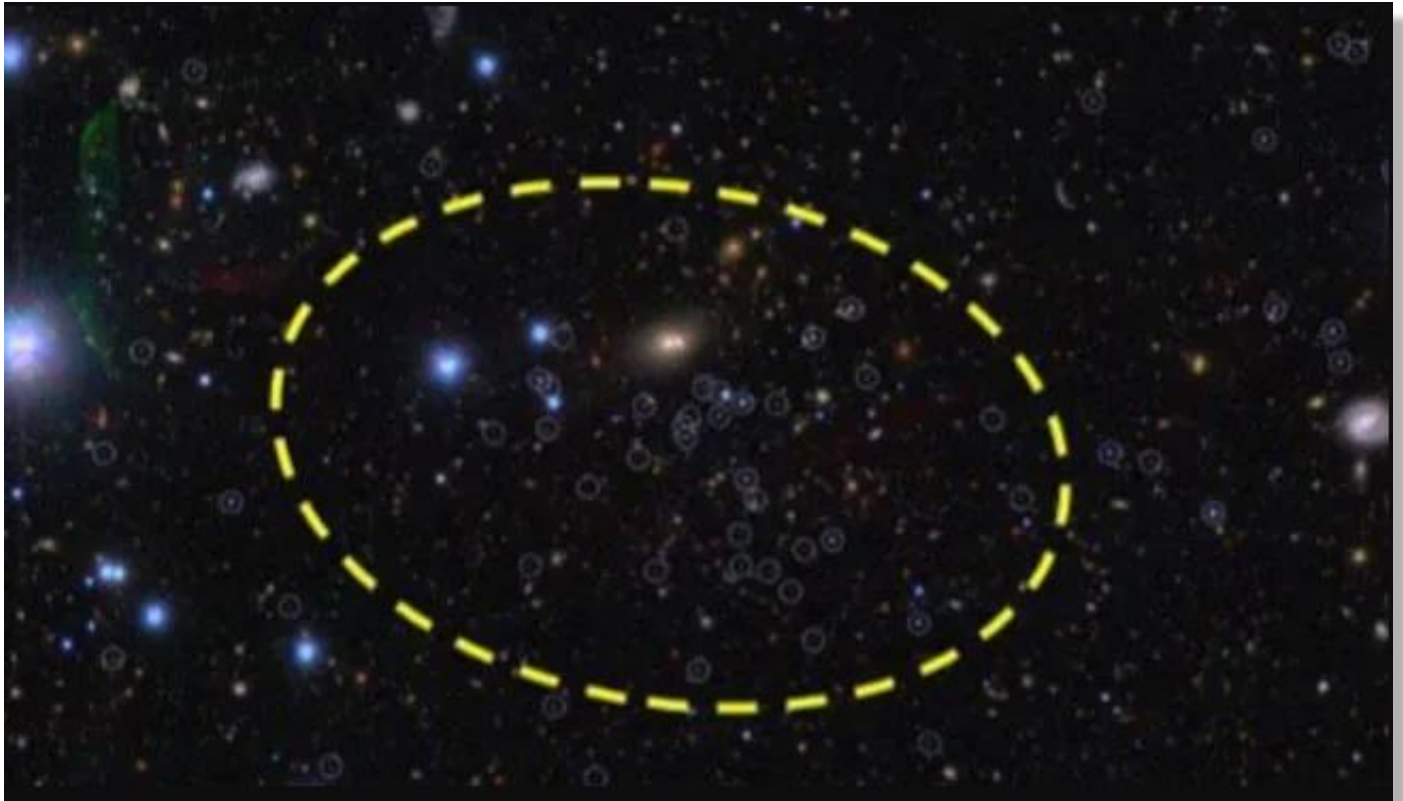
Please note that inclement weather or changes in speakers'

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 beyond our 2024-2025 season. If you are interested in presenting, or know someone who would like to participate, please contact me at programs@ccas.us.

Scientists Discover Two of the Milky Way's Missing Satellite Galaxies

by Robert Lea, courtesy of Space.com



The newly discovered dwarf galaxy Virgo III with its constituent stars circled in white (Image credit: NAOJ/Tohoku University)

Astronomers have discovered two new satellite galaxies of the Milky Way, and these findings could help us better understand dark matter — the mysterious stuff that accounts for around 85% of the matter in the universe yet remains effectively invisible to us.

The discoveries also move scientists a step closer to solving a lingering problem with the [standard model of cosmology](#), or the "[lambda cold matter model](#)," also known as " Λ CDM," in which the word "cold" assumes [dark matter](#) is composed of particles moving slower than the [speed of light](#).

The newly found small gatherings of stars have been designated Sextans II and Virgo III. They join the around 60 known [dwarf galaxies](#) that swarm around our

much larger home [spiral galaxy](#) at maximum distances of 1.4 million light-years. The most famous and largest of these dwarf galaxy [satellites of the Milky Way](#) are the [Large Magellanic Cloud \(LMC\)](#) and the [Small Magellanic Cloud \(SMC\)](#).

"How many satellite galaxies does the Milky Way have? This has been an important question for astronomers for decades," team leader Masahi Chiba, a professor at Tohoku University, [said in a statement](#).

Many tiny dwarf galaxy satellites of the Milky Way remain undiscovered due to their distant and faint nature, but Chiba and colleagues were determined to start finding these elusive objects. So, they turned to the [Subaru telescope](#). This pow-

erful ground telescope, located near the summit of Mauna Kea, Hawaii, is well-suited to hunting dwarf galaxies, and the same team had previously used it to detect three new satellites of the [Milky Way](#).

Dark matter is a lingering cosmological problem because it neither interacts with light nor the ordinary matter that composes stars, planets, moons and us. And, well, if it does interact with those things, those interactions are far too weak for us to notice.

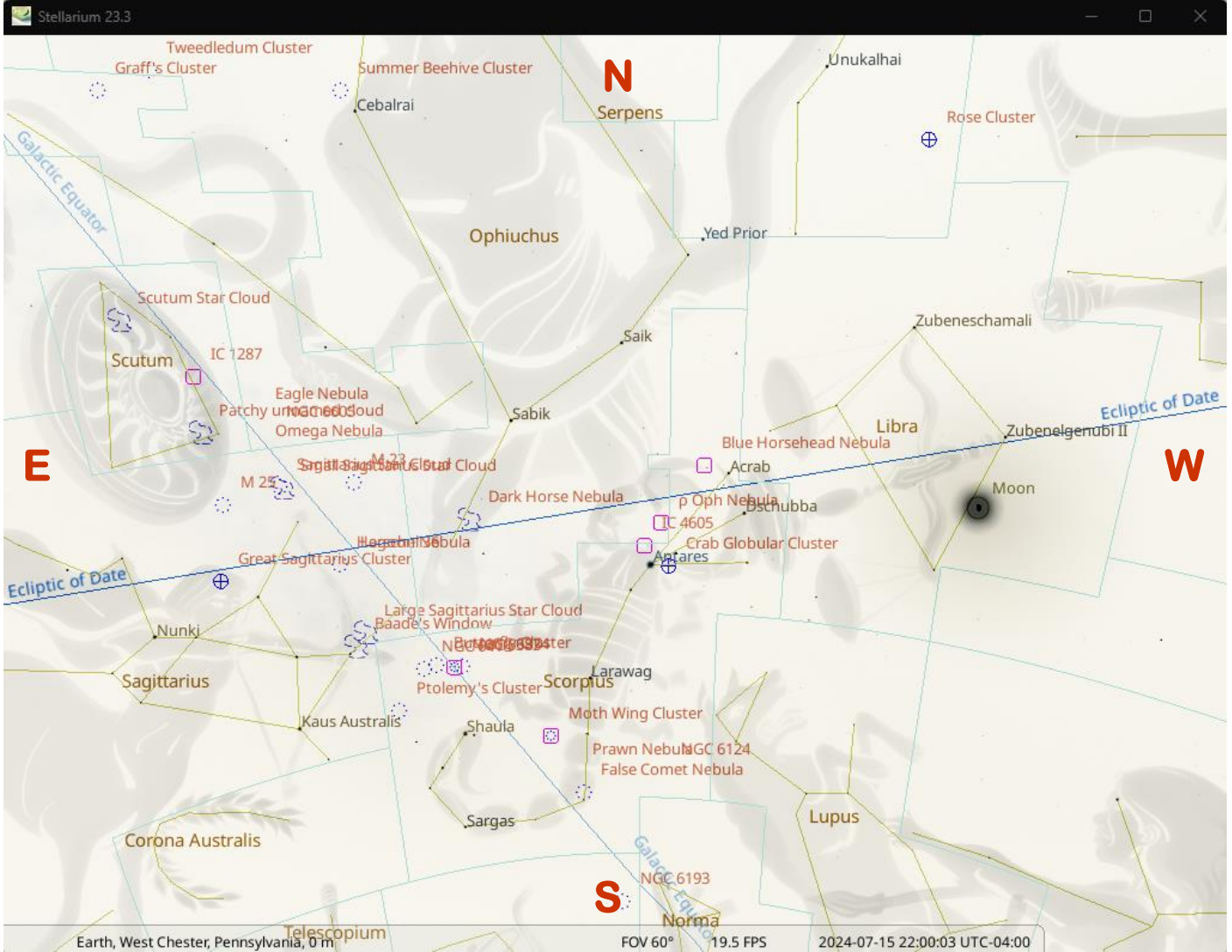
That means dark matter could be composed of particles that are currently undiscovered, though there are potential explanations that don't require extensions to particle physics. For instance, scientists have explored the idea that dark matter could be made

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The Sky Over Chester County

July 15, 2024 at 10:00 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
07/01/2024	5:05 a.m. EDT	5:37 a.m. EDT	8:34 p.m. EDT	9:07 p.m. EDT	14h 57m 09s
07/15/2024	5:15 a.m. EDT	5:46 a.m. EDT	8:29 p.m. EDT	9:01 p.m. EDT	14h 42m 55s
07/31/2024	5:30 a.m. EDT	6:00 a.m. EDT	8:16 p.m. EDT	8:46 p.m. EDT	14h 15m 54s

Moon Phases					
First Quarter	07/13/2024	6:57 p.m. EDT	New Moon	07/05/2024	6:59 p.m. EDT
Last Quarter	07/27/2024	10:54 p.m. EDT	Full Moon	07/21/2024	6:19 a.m. EDT

July 2024 Observing Highlights

by Michael Manigly, CCAS Observing Chair

5	New Moon 6:59 p.m. EDT
6	Asteroid 1 Ceres (m = 7.3) is at opposition. Look for it at the bottom of the Teapot.
7	Mercury is 3° below the Moon this evening.
13	First Quarter Moon 6:57 p.m. EDT. Moon will occult Spica this evening blocking its view.
14	Lunar Straight Wall this evening.
17	Antares appears 0.2° south of the Moon.
21	Full Moon 6:19 a.m. EDT. This Full Moon is called the Birds Shed Feathers Moon. It may also be called the Buck Moon, Hay Moon, Thunder Moon and Apollo Moon. Also, 40 Harmonia at opposition (m = 9.4).
24	Regulus appears directly above Mercury and quite low in the western sky shortly after sunset.
27	Last Quarter Moon 10:54 p.m. EDT.
28–31	Delta Aquariid Meteor Showers (ZHR = 25) peaks on the 31st. Best viewed in predawn hours with the waning crescent Moon.
29	Moon 0/1° south of the Pleiades (M45).

July observing highlights continue to be headlined by the lineup of planets, including Mars and Jupiter, with Aldebaran and other bright lights in the predawn hours of July 1st.

Summer constellations viewable include Corona Borealis, Draco, Hercules and Serpens. Multiple Messier deep sky object including the Pleiades (M45), Hercules Globular Cluster (M13), Beehive

Cluster (M44), Bode's Galaxy (M81) and the Cigar Galaxy (M82) are observable during the month of July.

Planets:

Mercury may be viewable around 30 minutes shortly after sunset. Look for Pollux and Castor northwest of the planet.

Venus is the first planet to set after the Sun on the 1st and disappears 30 minutes after sunset in the western sky. Similar conditions exist for most of the month.

Mars rises around 2 a.m. on the 1st and can be seen near the waning crescent Moon.

Jupiter remains a morning target during July.

Saturn rises at midnight on the 1st in the NE Aquarius. It is an easy target to find at magnitude 0.9. The waxing gibbous Moon stands about 7° west of the planet.

Uranus is viewable in the morning sky.

Neptune rises around midnight in the east and is a good height for viewing around 2 a.m. EDT. The waning gibbous Moon stands about 4.5° southwest of the planet on the 25th.

Constellations: July constellations include Corona Borealis, Draco, Hercules and Serpens. Each constellation provides excellent opportunities, under good dark sky conditions, to see multiple galaxies and deep sky objects (see below lists).

Messier/Deep Sky Objects: M13, M44, M45, M81 and M82 are available targets during the month.

Meteor Showers: The Delta Aquariid meteor showers (ZHR = 25) peak late in July. Look during the overnight hours from the 29th through the 31st for best views.

Comets: C/2023 A3 (Tsuchinshan – ATLAS) can be spotted south of Leo's tail. It is currently glowing at 8th magnitude and fades away by month's end. Also, 13P/Olbers can be located at the feet of Ursa Major. Look approximately 9° south of NGC2841 on the 8th to see its 8th magnitude glow.

Asteroids: Dwarf planet 1 Ceres can be located among the stars of Sagittarius Teapot.

Through the Eyepiece: The Lagoon and Trifid Nebulas in Sagittarius

by Don Knabb, CCAS Treasurer & ALCOR

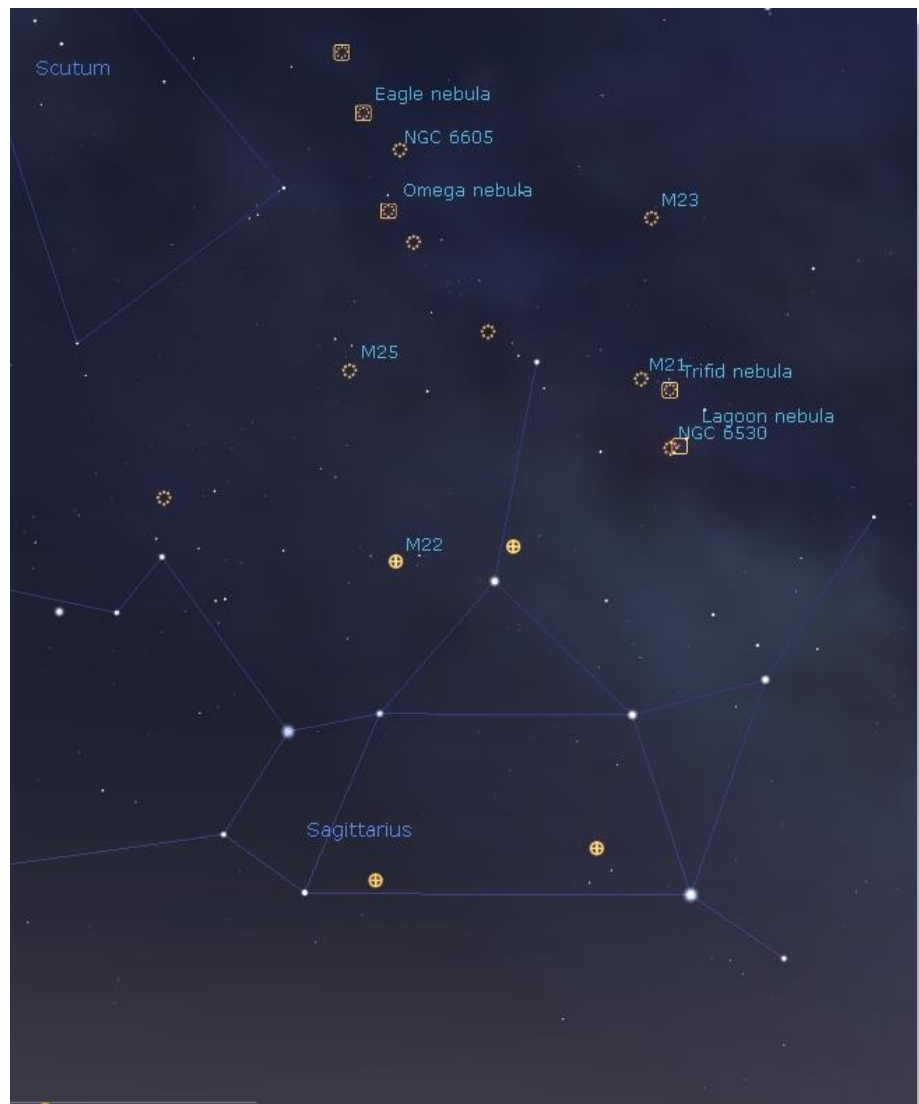
We only have a few months to enjoy the deep southern sky with Sagittarius and Scorpius spending their brief time near the horizon. Without fail, the first two objects I look for when I pick up my binoculars or set up my telescope are the Lagoon Nebula (Messier 8) and the Trifid Nebula (Messier 20). These giant clouds of glowing gas are within one field of view in binoculars.

To find them look to the northwest of the “teapot” of Sagittarius. I usually find the two stars that define the top of the spout of the teapot and scan upward until I find the two bright fuzzy spots that are M8 and M20.

My favorite object in this area is Messier 8, the Lagoon Nebula. For me, this is the summer equivalent of the Orion Nebula. This object is vastly larger than our solar system but is more than 5,000 light years away. It is an emission nebula, which is a vast cloud of gas that is glowing like a neon tube due to ultraviolet radiation from hot, young stars within.

The name Lagoon Nebula is derived from the dark channel, the “lagoon”, that seems to divide the object in two. In binoculars, the Lagoon is a distinct oval cloud-like patch with a definite core, like a pale celestial flower. The nebula has a fragile star cluster superimposed on it, making this one of the leading celestial sights of summer night skies.

From a very dark site such as Cherry Springs State Park, the Lagoon Nebula is visible to the unaided eye. The Lagoon nebula is a beautiful sight in any size telescope.



Sky map from Stellarium, the free planetarium software

The Lagoon Nebula is also a magnificent object for the amateur astrophotographer. On page 7 is a picture from Brent Crabb of Southern California.

Just above the Lagoon Nebula is a smaller fuzzy grey area. This is the Trifid Nebula, M20. The nebula's name means "divided into three lobes". The object is a remarkable collection of open cluster, emission nebula (the lower, red portion), reflection nebula (the upper, blue portion) and dark nebula (the separation

within the emission nebula).

Below the image of the Lagoon Nebula is a striking photo of M20, again from Brent Crabb of Southern California.

The energetic processes of star formation create not only the colors but the chaos in this beautiful deep sky object. The red-glowing gas results from high-energy starlight striking interstellar hydrogen gas. The dark dust filaments that lace M20 were

(Continued on page 7)

Eyepiece (Cont'd)



Lagoon Nebula, M8. Photo credit: Brent Crabb, Astrophotographer, Orange County, California



Trifid Nebula, M20. Photo credit: Brent Crabb, Astrophotographer, Orange County, California

(Continued from page 6)

created in the atmospheres of cool giant stars and in the debris from supernovae explosions. Which bright young stars light up the blue reflection nebula is still being investigated. The light from M20 we see today left perhaps 3,000 years ago, although the exact distance to the nebula remains unknown.

The sources I researched for this article vary in their opinion of who discovered the Trifid Nebula. One source says it was discovered by the French astronomer Legentil de La Galaisière before 1750 and named by the English astronomer Sir John Herschel for the three dark rifts that seem to divide the nebula and join at its center. Other articles state that Charles Messier discovered this object on June 5, 1764, and described it as a cluster of stars of 8th to 9th magnitude, enveloped in nebulosity.

So grab your binoculars or set up your telescope and enjoy these and the numerous other deep sky objects in Sagittarius!

Information credits:

- Pasachoff, Jay M. 2000. *A Field Guide to the Stars and Planets*. New York, NY. Houghton Mifflin.
- Dickinson, Terence 2006. *Nightwatch: a practical guide to viewing the universe*. Buffalo, NY. Firefly Books
- 2008 Skywatch. *Sky and Telescope magazine*
- <http://www.seds.org/messier/m/m008.html>
- http://www.astropix.com/HTML/D_SUM_S/M8.HTM
- <http://www.britannica.com/EBchecked/topic/605155/Trifid-Nebula>
- <http://www.seds.org/messier/m/m020.html>

False Comet Region in SW Scorpius

courtesy of the Astronomical League

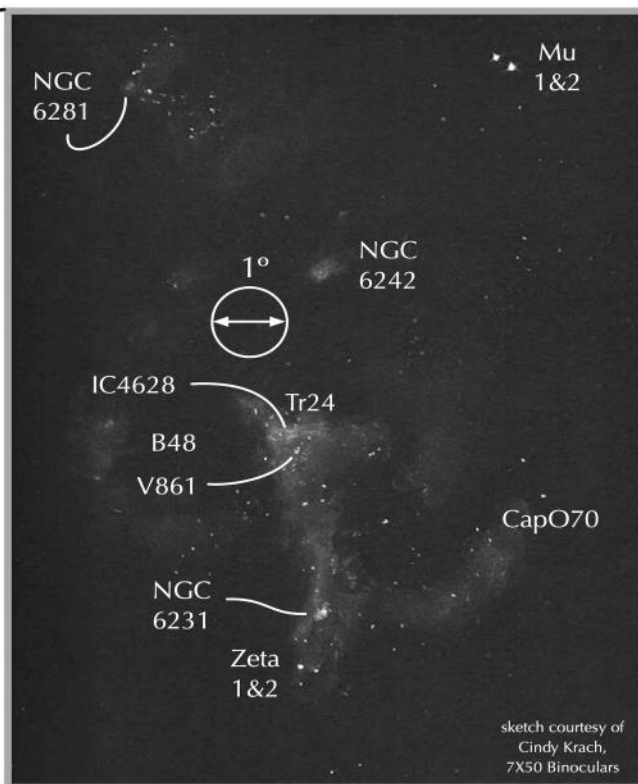
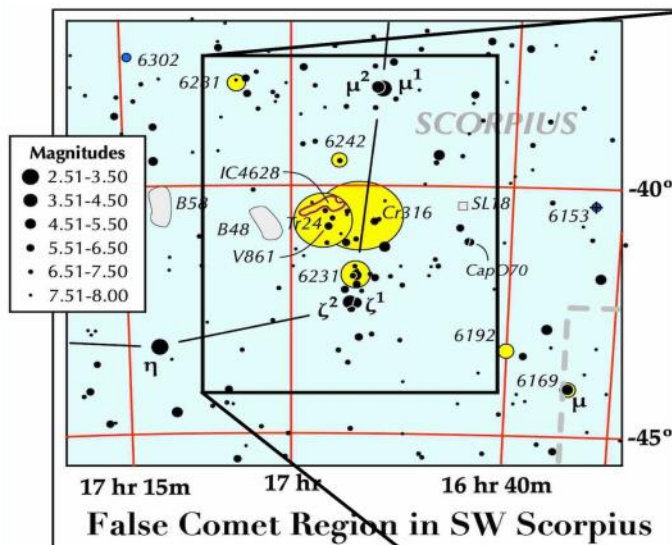


Often ignored because of its southerly declination,
this is a great region for binocular observers and telescope users!



False Comet, a closer look

Take your time and explore what this area offers: Open clusters, double stars, variable stars, dark nebulae, emission nebula, & planetary nebulae.



Features to Identify

- Zeta 1 & 2, and Mu 1 & 2, binocular double stars.
- NGC 6231 (Caldwell 76), open cluster.
- Trumpler 24: open cluster, 8.6 mag., 60'
- Collinder 316: Large open cluster.
- B 48 & B 58: dark nebulae
- NGC 6242: open cluster, 6.5 mag., 40'
- NGC 6281: open cluster, 5.4 mag., 8'
- NGC 6302: planetary nebula, "Bug," 9.2 mag., 50".
- V861: eclipsing binary with period of 7.85 days, 6.1 to 6.4 mag.
- IC 4628: emission nebula, the "Prawn."
- CapO70: binocular double star, 6.1 & 6.2 mag., 97" sep.

A great region for binoculars!

- 7x50 and 10x50 work nicely.
- Best when mounted on a tripod for steady viewing.
- Best to have high contrast, dark skies.

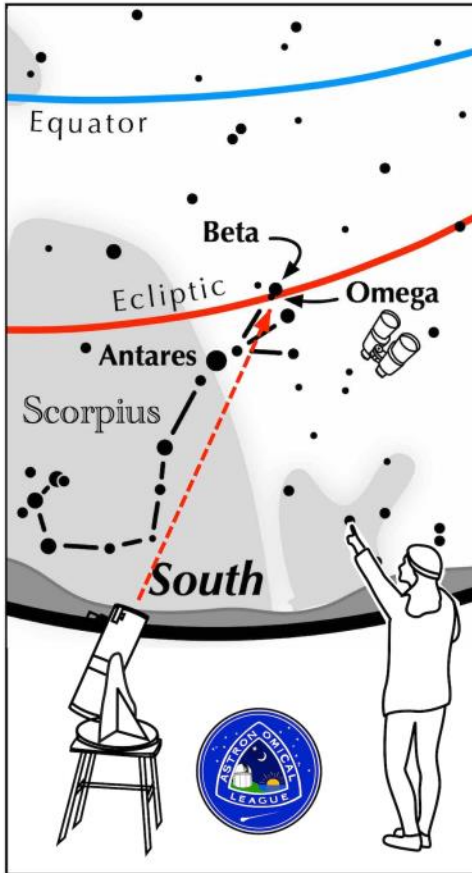


See more detail:

- Use a high contrast or deep sky nebula filter.
- Don't forget to try high magnification, >200.

Try your hand at sketching: Lay down the bright stars first to set relative distances, lightly outline bright nebula next, then fill in cluster stars and dimmer field stars. Add shading. Note dark areas. The more you look, the more you see!

Double Star Challenge for July 2024
courtesy of the Astronomical League



Other Suns: Beta Scorpii

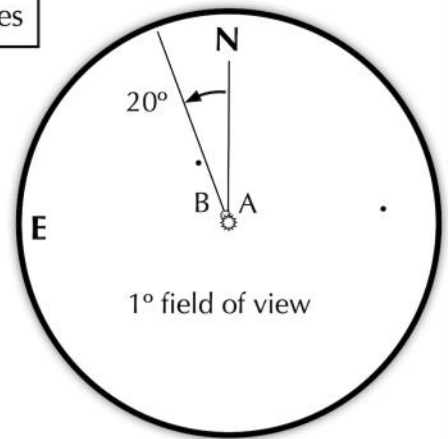
How to find Beta Scorpii on a July evening

Find the bright red star Antares low in the south. To its west shine three stars representing the claws of Scorpius. The northern star is Beta Scorpii. Immediately below Beta lies Omega, a very wide optical double star, easily separated in binoculars.

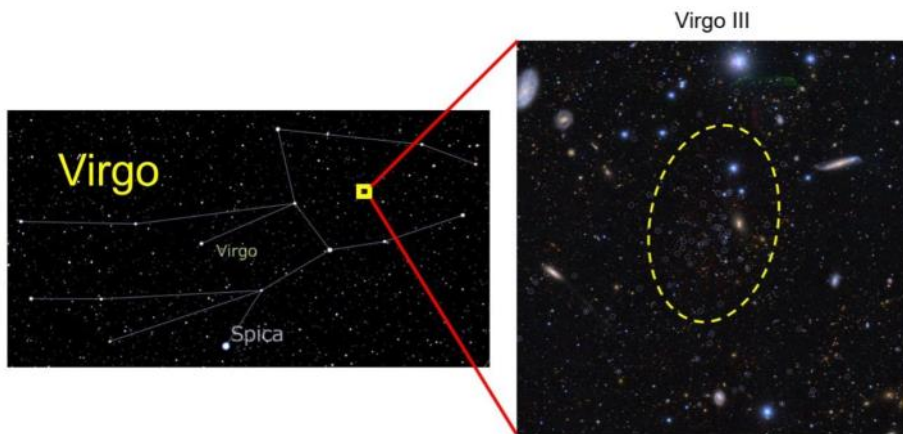
Suggested magnification: >40x
Suggested aperture: >3 inches

Beta Scorpii

A-B separation: 14 sec
A magnitude: 2.6
B magnitude: 4.5
Position Angle: 20°
A & B colors: white & blue



Satellite Galaxies (Cont'd)



The position of the newly found dwarf galaxy Virgo III and its member stars. (Image credit: NAOJ/ Tohoku University)

(Continued from page 3)

of tiny primordial black holes left over from just after the Big Bang.

However, dark matter indeed interacts with gravity, which can

influence the motion and dynamics of light and everyday matter. This has allowed scientists to infer the presence of dark matter, and eventually determine that large galaxies are surrounded by vast haloes of this mysterious

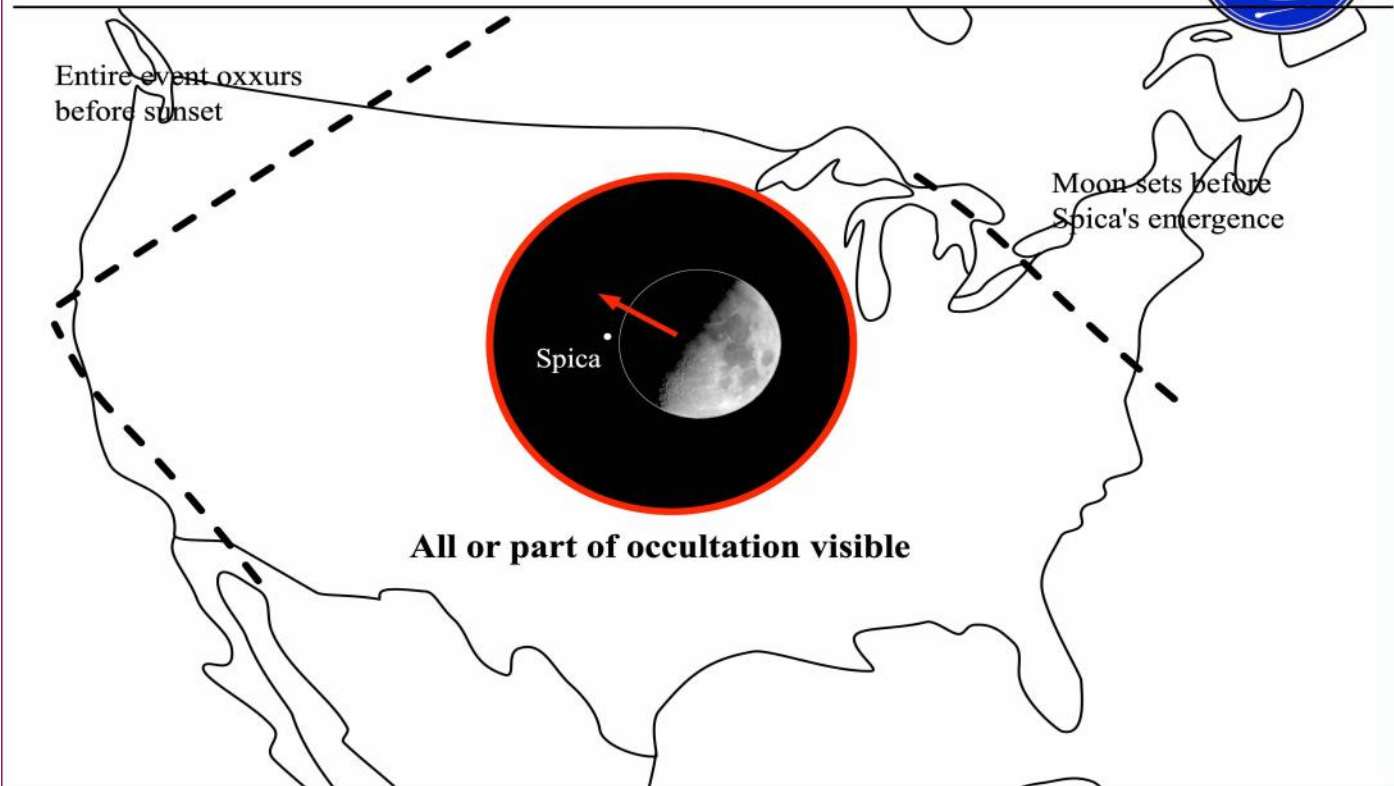
substance. Those halos, it's believed, extend far beyond galactic disks and halos of visible matter.

The Λ CDM predicts that these dark matter halos have played a significant role in the evolution of galaxies. In the early universe, they formed gravitational wells into which the gas and dust that formed stars within galaxies were drawn. Eventually, these halos also drew together, forming large galaxies like the Milky Way.

This model also suggests there should really be hundreds of satellite galaxies around the Milky Way and other major galaxies.

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If you can see only one celestial event this month, see this one. The first quarter moon occults Spica on July 13.



Occultation of Spica occurs in the evening hours for most of the US. The moon sets before Spica's emergence for viewers in the northeast. Viewers in the northwest see the event before sunset.

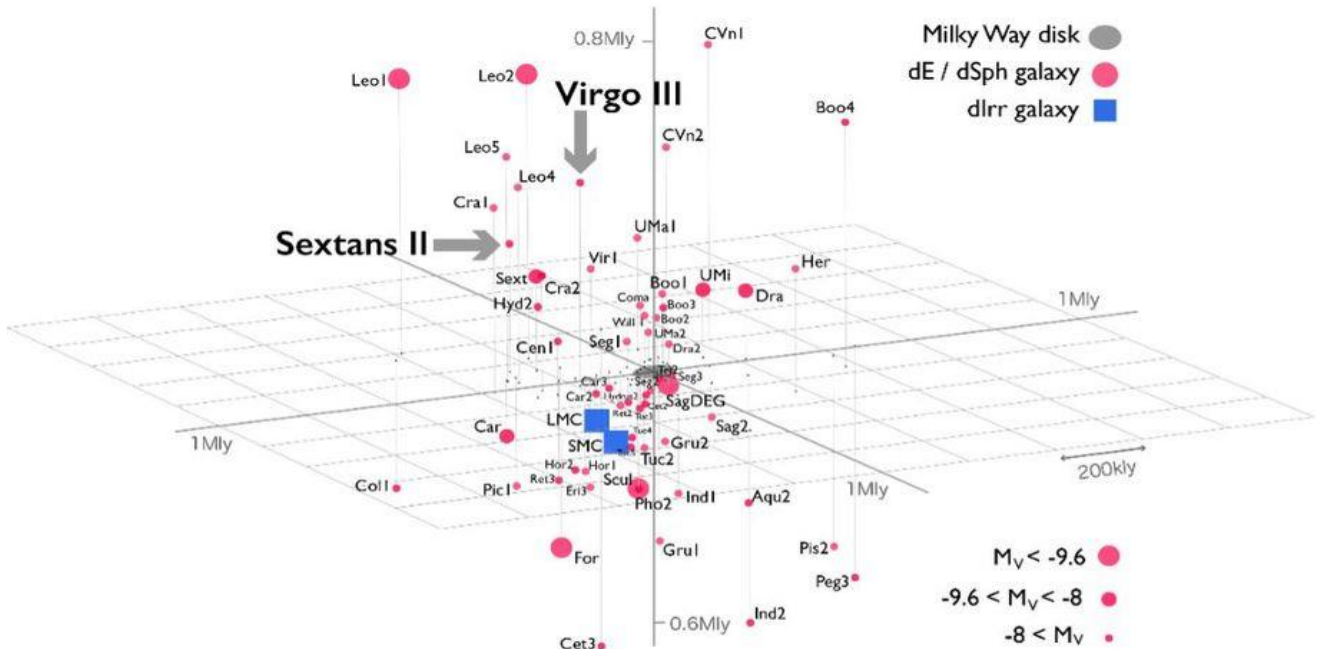


A great binocular event



City	Start	Altitude	End	Altitude	Notes
Boston	11:24	6°	-----	----	12:03 moonset
Washington	11:26	11°	12:34	----	12:32 moonset
Atlanta	11:28	19°	12:41	5°	1:08 moonset
Miami	11:48	15°	12:54	1°	12:59 moonset
Chicago	10:10	19 ^a	11:23	8°	8:24 sunset
St Louis	10:12	23°	11:28	10°	12:25 moonset
New Orleans	10:29	24°	11:44	10°	
Minneapolis	9:57	22°	11:13	12°	
Kansas City	10:05	26°	11:23	14°	8:44 sunset
San Antonio	10:18	33°	11:37	18°	
Denver	8:48	33°	10:11	22°	8:27 sunset
Albuquerque	8:54	37°	10:17	25°	8:21 sunset
Tucson	7:54	41°	9:15	30°	7:31 sunset
Seattle	7:13	31°	8:33	28°	9:03 sunset
San Francisco	7:28	41°	8:44	36°	8:32 sunset
San Diego	7:44	44°	9:02	35°	7:57 sunset

Satellite Galaxies (Cont'd)



A diagram showing the known satellite galaxies of the Milky Way, including the newly discovered Sextans II and Virgo III. The central grey dot is the disk of the Milky Way (Image credit: NAOJ/Tohoku University)

(Continued from page 9)

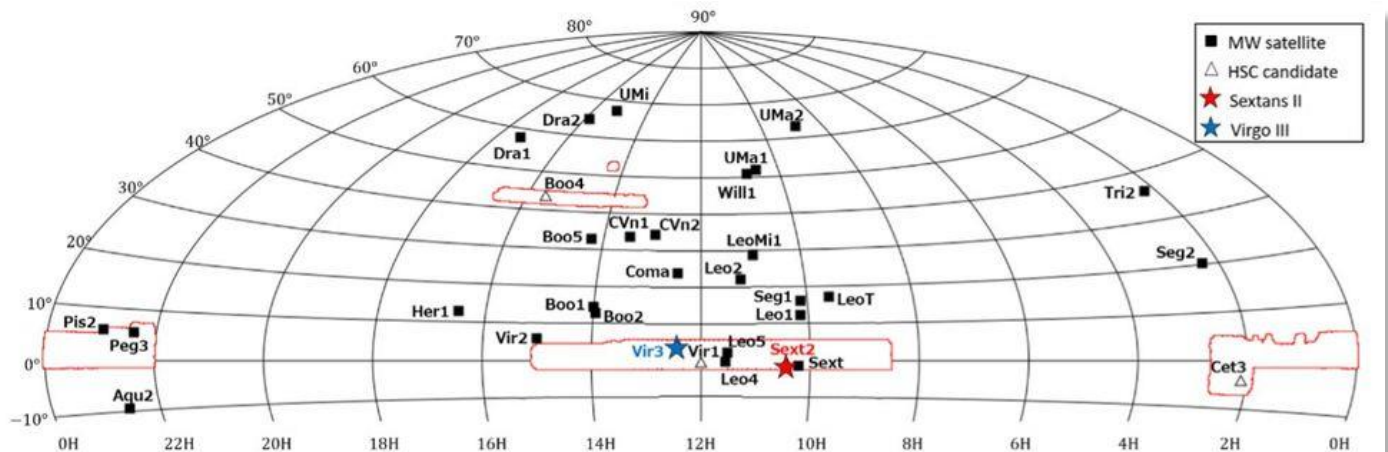
For instance, simulations using Λ CDM predict that our neighboring galaxy, [Andromeda](#), should be surrounded by around 500 satellite galaxies. Yet, astronomers have seen just 39 dwarf galaxies swirling around Andromeda.

For the Milky Way, some simulations based upon the standard model of cosmology indicate that our galaxy should be orbited by about 220 dwarf galaxies, yet scientists can't figure out where they all are. The discovery of Sextans II and Virgo III helps to redress that balance. Still, results spinning out of these findings could present cosmologists with

the opposite problem they were facing before this.

Though the number of Milky Way galaxies identified is still well below the predicted 220 dwarf galaxies, the team behind this research took into account the fact that the Subaru can't see the entirety of the night sky over

(Continued on page 13)



The area of the sky over Earth observed by the HSC-SSP (area surrounded by red lines). Previously known satellite galaxies are indicated by black squares, and newly discovered satellite galaxies are indicated by white triangles and stars (Image credit: NAOJ/Tohoku University)

Night Sky Notes: A Hero, a Crown, and Possibly a Nova!

by Vivian White

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.

High in the summer sky, the constellation Hercules acts as a centerpiece for late-night stargazers. At the center of Hercules is the “Keystone,” a near-perfect square shape between the bright stars Vega and Arcturus that is easy to recognize and can serve as a guidepost for some amazing sights. While not the brightest stars, the shape of the hero’s torso, like a smaller Orion, is nearly directly overhead after sunset. Along the edge of this square, you can find a most magnificent jewel - the Great Globular Cluster of Hercules, also known as [Messier 13](#).

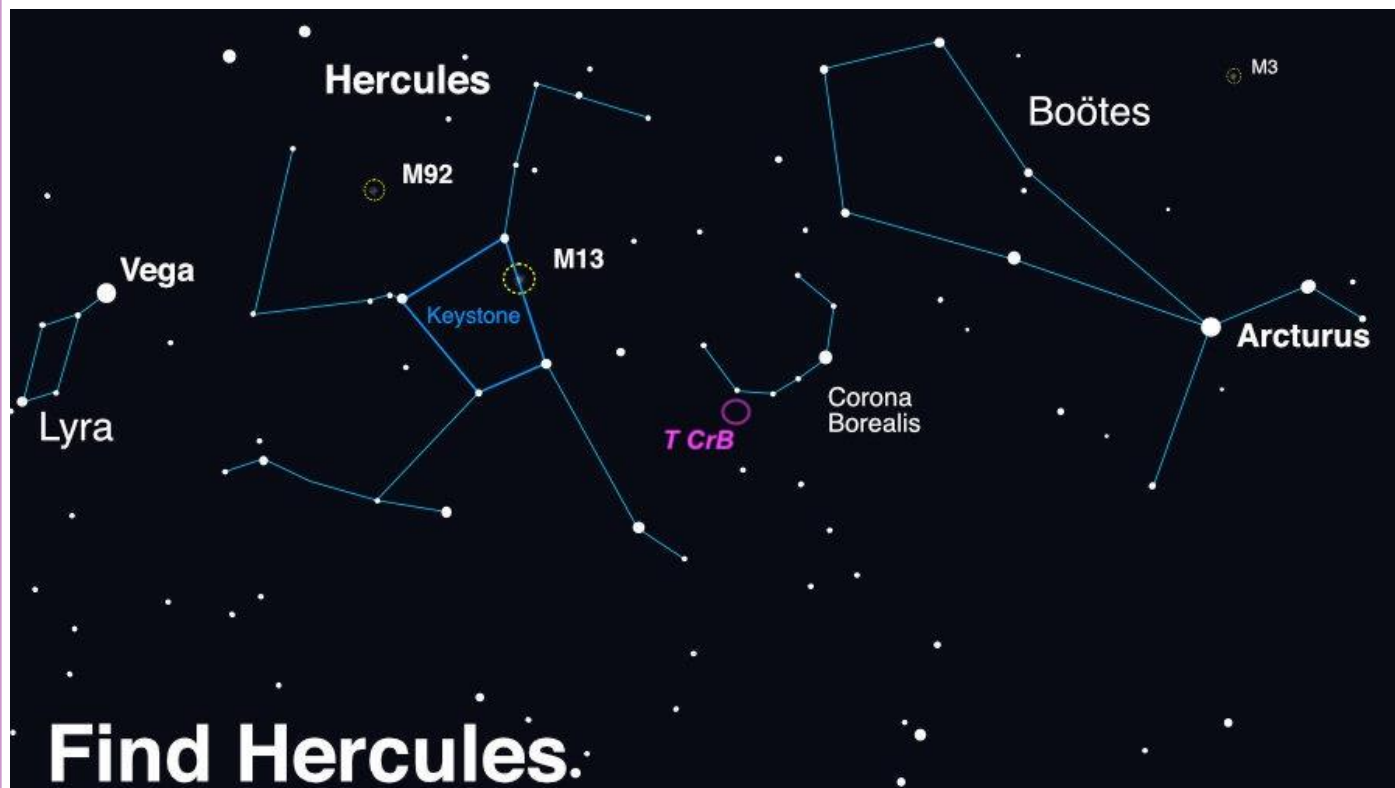


Globular clusters are a tight ball of very old stars, closer together than stars near us. These clusters orbit the center of our Milky Way like tight swarms of bees. One of the most famous short stories, [Nightfall](#) by Isaac Asimov, imagines a civilization living on a planet within one of these star clusters. They are sur-

rounded by so many stars so near that it is always daytime except for once every millennium, when a special alignment (including a solar eclipse) occurs, plunging their planet into darkness momentarily. The sudden night reveals so many stars that it drives the inhabitants mad.

Back here on our home planet Earth, we are lucky enough to experience [skies full of stars](#), a beautiful [Moon](#), and regular [eclipses](#). On a clear night this summer, take time to look up into the Keystone of Hercules and follow this sky chart to the Great Globular Cluster of Hercules. A pair of binoculars will show a faint, fuzzy patch, while

(Continued on page 13)



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 a smaller globular cluster 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

Night Sky Notes (Cont'd)



A red giant star and white dwarf orbit each other in this animation of a nova similar to T Coronae Borealis. The red giant is a large sphere in shades of red, orange, and white, with the side facing the white dwarf the lightest shades. The white dwarf is hidden in a bright glow of white and yellows, which represent an accretion disk around the star. A stream of material, shown as a diffuse cloud of red, flows from the red giant to the white dwarf. When the red giant moves behind the white dwarf, a nova explosion on the white dwarf ignites, creating a ball of ejected nova material shown in pale orange. After the fog of material clears, a small white spot remains, indicating that the white dwarf has survived the explosion. Image Credit: NASA/Goddard Space Flight Center

(Continued from page 12)

a small telescope will resolve some of the stars in this globular cluster.

Bonus! Between Hercules and the ice-cream-cone-shaped Boötes constellation, you'll find the small constellation Corona Borealis, shaped like the letter "C." Astronomers around the world

are watching T Coronae Borealis, also known as the "Blaze Star" in this constellation closely because it is predicted to go nova sometime this summer. There are only five known nova stars in the whole galaxy. It is a rare observable event and you can take part in the fun! The Astronomical League has issued a Special Observing Challenge

that anyone can participate in. Just make a sketch of the constellation now (you won't be able to see the nova) and then make another sketch once it goes nova.

Tune into our mid-month article on the Night Sky Network page, as we prepare for the Perseids! Keep looking up!

Satellite Galaxies (Cont'd)

(Continued from page 11)

Earth.

They combined the distribution of dwarf galaxies Subaru has been able to see with its night-sky "footprint" to calculate an estimate for how many satellites *should*, in reality, surround

our galaxy. This led to the calculation that 500 galaxies surround the Milky Way — over double the amount predicted by simulations based on the Λ CDM.

So, have scientists gone from a "not enough dwarf galaxies problem" to a "too many dwarf

galaxies" problem? Maybe not. Recently, amateur astronomer Giuseppe Donatiello discovered five new satellite galaxies around the Sculptor galaxy, officially known as NGC 253.

When he and a team of astron-

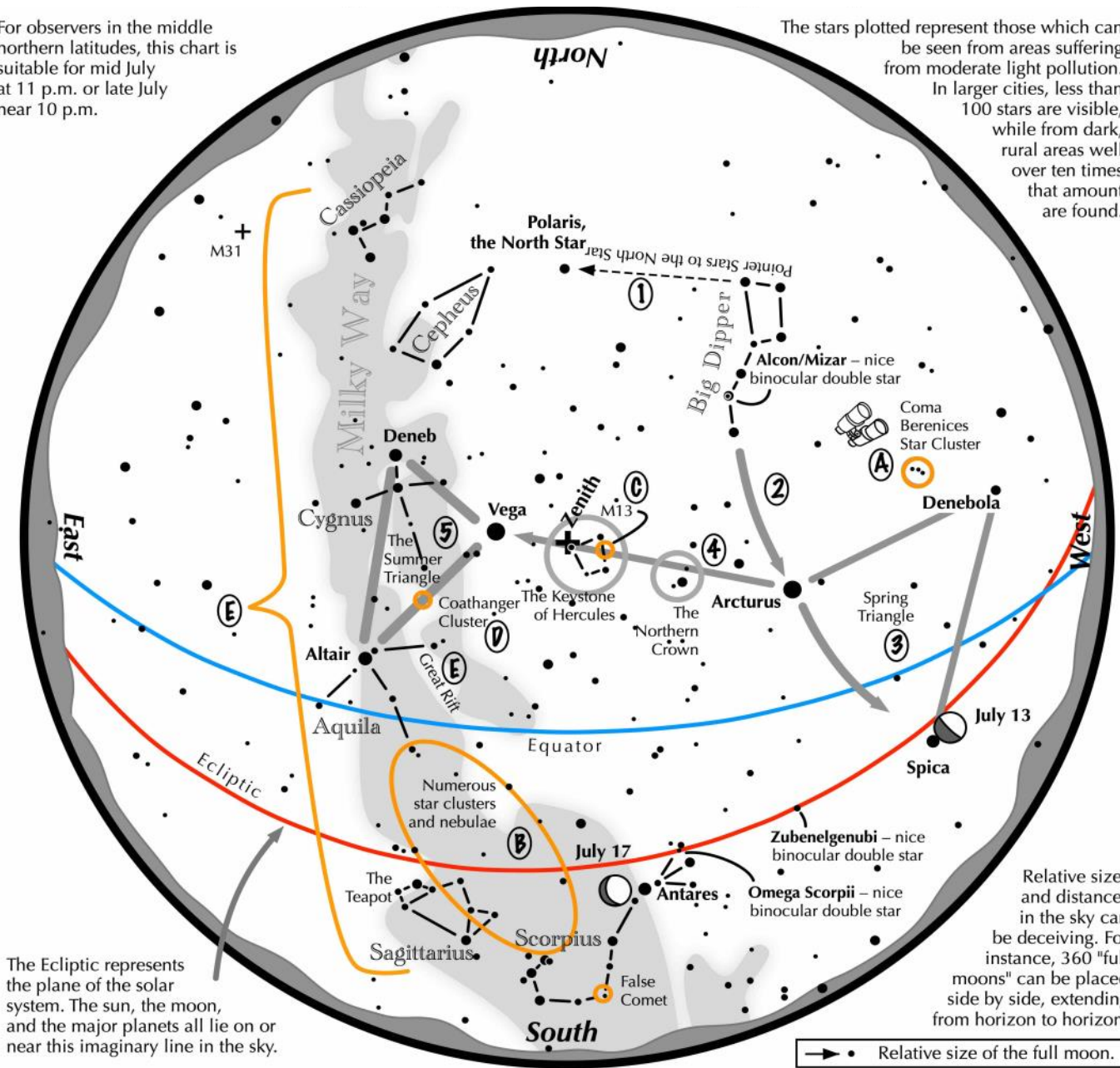
(Continued on page 15)

Navigating the Mid-July 2024 Night Sky

courtesy of the Astronomical League

For observers in the middle northern latitudes, this chart is suitable for mid July at 11 p.m. or late July near 10 p.m.

The stars plotted represent those which can be seen from areas suffering from moderate light pollution. In larger cities, less than 100 stars are visible, while from dark, rural areas well over ten times that amount are found.



The Ecliptic represents the plane of the solar system. The sun, the moon, and the major planets all lie on or near this imaginary line in the sky.

Relative sizes and distances in the sky can be deceiving. For instance, 360 "full moons" can be placed side by side, extending from horizon to horizon.

→ • Relative size of the full moon.

Navigating the mid July night sky: Simply start with what you know or with what you can easily find.

- 1 Extend a line north from the two stars at the tip of the Big Dipper's bowl. It passes by Polaris, the North Star.
- 2 Follow the arc of the Dipper's handle. It first intersects Arcturus, the brightest star in the July evening sky, then continues to Spica. Arcturus, Spica, and Denebola form the Spring Triangle, a large equilateral triangle.
- 3 To the northeast of Arcturus shines another star of similar brightness, Vega. Draw a line from Arcturus to Vega. It first meets "The Northern Crown," then the "Keystone of Hercules." A dark sky is needed to see these two dim stellar configurations.
- 4 High in the East lies the Summer Triangle stars of Vega, Altair, and Deneb.

Binocular Highlights

- A: Between Denebola and the tip of the Big Dipper's handle, lie the stars of the Coma Berenices Star Cluster.
- B: Between the bright stars Antares and Altair, hides an area containing many star clusters and nebulae.
- C: On the western side of the Keystone glows the Great Hercules Cluster, containing nearly 1 million stars.
- D: 40% of the way between Altair and Vega, twinkles the "Coathanger," a group of stars outlining a coathanger.
- E: Sweep along the Milky Way for an astounding number of faint glows and dark bays, including the Great Rift.



Astronomical League www.astroleague.org/; duplication is allowed and encouraged for all free distribution.

Satellite Galaxies (Cont'd)

(Continued from page 13)

omers looked at the distribution of satellite galaxies around the sculptor galaxy, including three previously found by Donatiello himself, they found that the distribution of these galaxies, which sit around 11.5 million light-years away from Earth, was uneven. In other words, the tiny galaxies seemed to have a "favored direction," with more galaxies lying to one side of the Sculptor galaxy than the other.

If there is also a favored direction to dwarf galaxies around the Milky Way and the Subaru telescope happened to be looking this way, then the estimates based on Subaru's observations would be inflated.

The team behind these Milky Way dwarf galaxy findings now

(Continued on page 18)

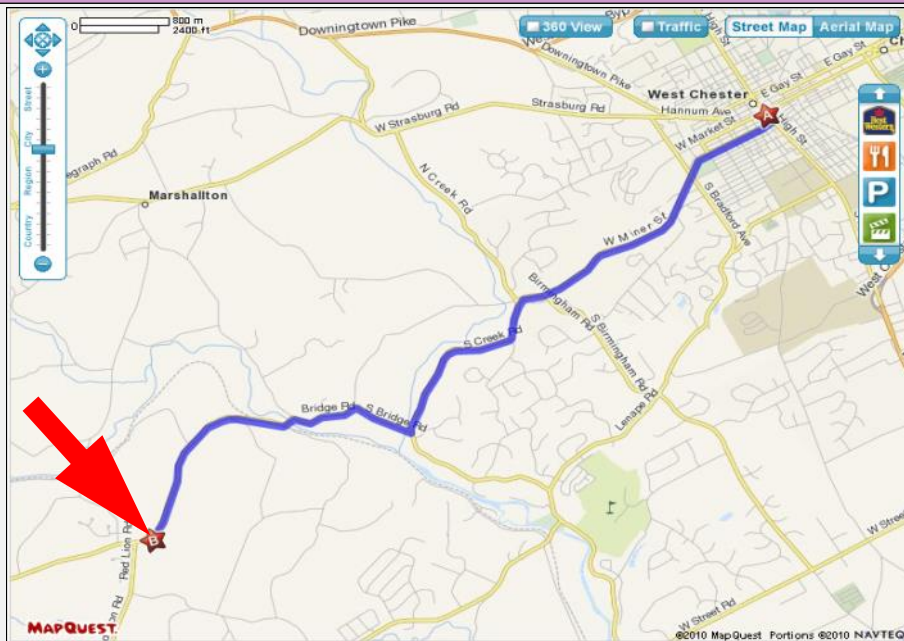
Classic La Para

by Nicholas La Para

THAT'S IT! NO MORE MESSIER MARATHONS.



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).

Ed Stone, Former Director of JPL and Voyager Project Scientist, Dies

courtesy Jet Propulsion Laboratory

[Edward Carroll Stone](#), Jr., former director of NASA's Jet Propulsion Laboratory and longtime project scientist of the agency's Voyager mission, died on June 9, 2024. He was age 88. Known for his steady leadership, consensus building, and enthusiasm for engaging the public in science, Stone left a deep impact on the space community.

Stone was preceded in death by his wife, Alice Stone, whom he met at the University of Chicago. They are survived by their two daughters, Susan and Janet Stone, and two grandsons.

Stone also served as the David Morrisroe professor of physics and vice provost for special projects at Caltech in Pasadena, California, which last year established a new faculty position, the [Edward C. Stone Professorship](#).

"Ed Stone was a trailblazer who dared mighty things in space. He was a dear friend to all who knew him, and a cherished mentor to me personally," said Nicola Fox, associate administrator for the Science Mission Directorate at NASA Headquarters in Washington. "Ed took humanity on a planetary tour of our solar system and beyond, sending NASA where no spacecraft had gone before. His legacy has left a tremendous and profound impact on NASA, the scientific community, and the world. My condolences to his family and everyone who loved him. Thank you, Ed, for everything."

Stone served on nine NASA missions as either principal investigator or a science instrument lead, and on five others as a co-investigator (a key science



Ed Stone discusses NASA's Voyager mission in April 2011 at the agency's headquarters in Washington, D.C. (Image credit: NASA/Carla Cioffi)

instrument team member). These roles primarily involved studying energetic ions from the Sun and cosmic rays from the galaxy. He had the distinction of being one of the few scientists involved with both the mission that has come closest to the Sun ([NASA's Parker Solar Probe](#)) and the one that has traveled farthest from it ([Voyager](#)).

"Ed will be remembered as an energetic leader and scientist who expanded our knowledge about the universe — from the Sun to the planets to distant stars — and sparked our collective imaginations about the mysteries and wonders of deep space," said Laurie Leshin, JPL director and Caltech vice president. "Ed's discoveries have fueled exploration of previously unseen corners of our solar system and will inspire future generations to reach new frontiers. He will be greatly missed and always remembered by the NASA, JPL, and Caltech communities and beyond."

Stone is best known for his work on NASA's longest-running mission, Voyager, whose

twin spacecraft [launched in 1977](#) and are still exploring deep space today. He served as Voyager's sole project scientist from 1972 until his [retirement in 2022](#). "Becoming Voyager project scientist was the best decision I made in my life," Stone said in 2018. "It opened a wonderful door of exploration."

Voyager's high profile lifted Stone's profile as well. In 1991, roughly two years after the mission completed its planetary flybys, Stone became director of JPL, serving until 2001. Under his leadership, JPL was responsible for more than two dozen missions and instruments. Highlights for Stone's tenure included landing NASA's Pathfinder mission with the first Mars rover, Sojourner, in 1996 and launching the NASA-ESA (European Space Agency) Cassini/Huygens mission in 1997. The first Saturn orbiter, Cassini was a direct outgrowth of the scientific questions that arose from Voyager's two flybys, and it carried the only probe that has ever landed in the outer solar system (at Titan).

Stone was born on Jan. 23, 1936, in Knoxville, Iowa. The eldest of two sons of Edward Carroll Stone Sr. and Ferne Elizabeth Stone, he grew up in the nearby commercial center of Burlington.

Stone's father, Edward Stone Sr., was a construction superintendent who delighted in showing his son how to take things apart and put them back together again — cars, radios, hi-fi stereos. When the younger Stone was

(Continued on page 17)

Ed Stone (Cont'd)



Stone became project scientist for the Voyager mission in 1972, five years before launch, and served in the role for a total of 50 years. During that time, he also served as director of NASA's Jet Propulsion Laboratory, which manages the Voyager mission for the agency. Credit: NASA/JPL-Caltech

(Continued from page 16)

in junior high, the principal asked him to learn how to operate the school's 16 mm movie projector and soon followed up with a request to run the school's reel-to-reel tape recorder.

"I was always interested in learning about why something is this way and not that way," Stone said in an interview about this career in 2018. "I wanted to understand and measure and observe."

His first job was at a J.C. Penney department store, where he worked his way up from stockroom to clerk on the store floor.

He also earned money playing French horn in the Burlington Municipal Band.

After high school, Stone enrolled in Burlington Junior College to study physics, and went on to the University of Chicago for graduate school. Shortly after he was accepted, the Soviet Union launched Sputnik and the Space Age began.

"Space was a brand-new field waiting for discovery," Stone recalled in 2018.

He joined a team at the university that was building science instruments to launch into space. The first he designed rode aboard

Discoverer 36, a since-declassified spy satellite that launched in 1961 and took photographs of Earth from space as part of the Corona program. Stone's instrument, which measured the Sun's energetic particles, helped scientists figure out why solar radiation was fogging the film and ultimately improved their understanding of the Van Allen belts, energetic particles trapped in Earth's magnetic field.

In 1964, Stone joined Caltech as a postdoctoral fellow, running the university's Space Radiation Lab together with Robbie Vogt, who had been a colleague at Chicago. They worked closely on a number of NASA satellite missions, studying galactic cosmic rays and solar energetic particles. In 1972, Vogt recommended Stone to JPL leadership for the position of Voyager project scientist, which he held for 50 years.

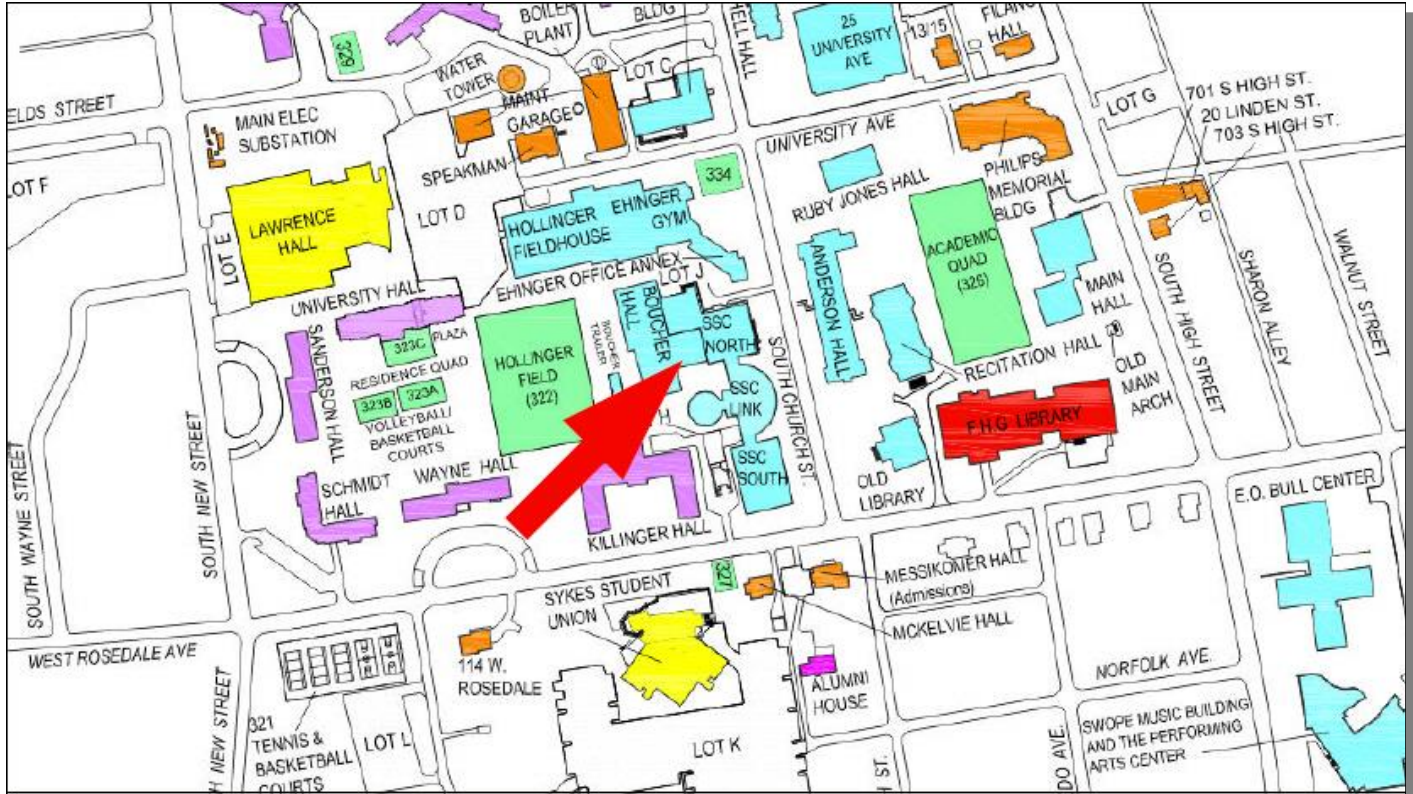
Among Stone's many awards, the National Medal of Science from President George H.W. Bush stands out as the most prominent. In 2019 he won the Shaw Prize in Astronomy, with an award of \$1.2 million, for his leadership in the Voyager project, which, as the citation noted, "has over the past four decades, transformed our understanding of the four giant planets and the outer solar system, and has now begun to explore interstellar space." He was also proud to have a middle school named after him in Burlington, Iowa, as an inspiration to young learners.

[Editor's Note: Read the [full obituary](#) online at jpl.nasa.gov]

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).



Satellite Galaxies (Cont'd)

(Continued from page 15)

intends to further investigate the actual number of satellite galaxies surrounding us with yet another ground telescope. "The next step is to use a more powerful telescope that captures a wider view of the sky," Chiba concluded. "Next year, the [Vera C. Rubin Observatory](#) in Chile will be used to fulfill that purpose. I hope that many new satellite galaxies will be discovered."

The team's results were published on June 8 in the [Publications of the Astronomical Society of Japan](#).

[Editor's Note: Read the [original article online](#) at Space.com]

CCAS Membership Information and Society Financials

Treasurer's Report by Don Knabb

June 2024 Financial Summary

Beginning Balance	\$2098
Deposits	\$210
Disbursements	-\$1530
Ending Balance	\$778

New Member Welcome!

Welcome to new CCAS members Brett Beidler, Douglassville, PA, Ryan Rauenzahn, Audubon, PA, and Ravi Ramadoss, Chester Springs, 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.

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
 5049 E Broadway Blvd, #105
 Tucson, AZ 85711
 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.lymebasics.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 Phoenix, Arizona.

Phone: 520-280-3846

<http://www.starrynightlights.com>



LIGHTHOUSE
 OUTDOOR LIGHTING

Lighthouse Outdoor Lighting is a dedicated lifetime corporate member of the [International Dark-Sky Association](http://www.darksky.org). 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.

211 North Walnut St.
1st Floor
West Chester, PA 19380

Phone: 484-291-1084 or 800-737-4068

<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.



High Point Scientific is a retailer of telescopes, binoculars, eyepieces and telescope accessories from Meade, Celestron, Televue, Orion, StellarMate, Takahashi, and many more. They also have an extensive blog of advice and education for amateur astronomers.

High Point Scientific
 442 Route 206
 Montague NJ, 07827

Phone: 800-266-9590

<https://www.highpointscientific.com/>



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: 267-297-0423
 Fax: 215-965-1524

Hours:
 Monday thru Friday: 9AM 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.

Contributing to Observations

Contributions of articles and images 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 to:

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

The deadline for submissions to the monthly newsletter is the 26th of each month. Articles and images should be original or the author/artist must be given credit. Articles should be in MS Word format with 12 point Times New Roman Font with single row spacing and one-inch margins on all four sides. Images should be in JPG or PNG file format. The submission window opens on the 20th of each month.

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 & Treasurer: Don Knabb
610-436-5702

Observing: Michael Manigly
484-631-6197

Secretary: Beatrice Mazziotta
610-933-2128

Program: Bruce Ruggeri
610-256-4929

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 2023 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 & Telescope 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.