Observations

A Monthly Publication Of The
CHESTER COUNTY ASTRONOMICAL SOCIETY

Vol. 32, No. 5 ***Three-Time*** *Winner of the Astronomical League's Mabel Sterns Award ☼ 2006, 2009 & 2016* *May 2024*

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April 2024 Solar Eclipse

The total solar eclipse on April 8, 2024, taken by Deepak Malkan in Indianapolis, Indiana.

May 2024 Dates

1st • Last Quarter Moon, 7:27 a.m. EDT.

5th • Eta Aquariid meteor shower peaks around 5:00 p.m. EDT can be viewed with the waning crescent Moon around 9:00 p.m. EDT.

7th • New Moon, 11:22 p.m. EDT.

8th • Saturn, Mars and Mercury line up in the morning sky this week.

12th • The Moon lines up with Pollux and Castor this evening.

15th • First Quarter Moon, 7:48 a.m. EDT.

23rd • Full Moon, Flower Moon, 9:53 a.m. EDT.

30th • Last Quarter Moon 1:13 p.m. EDT.

CCAS Upcoming Nights Out

In addition to our monthly observing sessions at the Myrick Conservancy Center, BRC (for directions, see pg. 15), 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.

- ☼ Wednesday, May 1, 2024 - Walk With the Third Quarter Moon at Paoli Battlefield Park, Malvern, PA. The event is scheduled 7:30 to 9:30 p.m. EDT.
- ☼ Friday, May 10, 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, June 7, 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.
- ☼ Saturday, June 22, 2024 - CCAS Special Observing Session "FamilyFest" at the American Helicopter Museum, West Chester, PA. from 10 a.m. - 3 p.m. EDT.

For more information about future observing opportunities, contact our Observing Chair, Michael Manigly.

Spring/Summer Society Events

May 2024

1st • Walk With the Third Quarter Moon at Paoli Battlefield Park, Monument & Wayne Avenues, Malvern, PA 19355. The event is scheduled 7:30 to 9:30 p.m. EDT.

10th • 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.

14th • CCAS Monthly Meeting, in person (as well as via Zoom) at West Chester University's Merion Science Center, Room 113. Member meet & greet, 7:00-7:30 pm. Meeting starts at 7:30 pm. Guest Speaker: astrophysics engineer Erika Nesvold, Ph.D., "Off-Earth Ethics: Learning from History to Build a Better Future in Space."

20th • Open call for articles and photographs for the June 2024 edition of Observations.

26th • Deadline for newsletter submissions for the June 2024 edition of Observations.

June 2024

5th-9th • York County Spring Star Party. Presented by Sky Shed Pod PA, York, PA.

7th • 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 • Solstice (northern summer/southern winter begins), 5 p.m. EDT. The North Pole of the earth will be tilted toward the Sun, which will have reached its northernmost position in the sky and will be directly over the Tropic of Cancer at 23.44° north latitude. This is the first day of summer (summer solstice) in the northern hemisphere and the first day of winter (winter solstice) in the southern hemisphere.

20th • Open call for articles and photographs for the July 2024 edition of Observations.

22nd • CCAS Special Observing Session "FamilyFest" at the American Helicopter Museum, West Chester, PA. from 10 a.m. - 3 p.m. EDT.

26th • Deadline for newsletter submissions for the July 2024 edition of Observations.

Monthly Meeting Minutes: March 12, 2024

by Bea Mazziotta, CCAS Secretary

- The March 2024 meeting was held in person and via Zoom and YouTube.
- Dave Hockenberry Club President kicked off the meeting with annual presentation of The Astronomical League Outreach Awards.
  - This year Don Knabb, club Treasurer and Education co-chair achieved the distinction of reaching the Master Level for his extraordinary outreach efforts.
  - Congratulations to Don and all the club members for working to foster an interest in astronomy in our community.
- Bruce Ruggeri's introduced the evening's speaker Don Miller. Dr. Miller has a doctorate in chemical engineering and pursued a career in the pharmaceutical industry. All the while he maintained and nurtured his love of stars and astronomy.
  - Don became a NASA Solar System Ambassador in 2022 in an effort to encourage all of us, especially children, to 'look up'.
  - His presentation was entitled *Could Extraterrestrial Life Exist? Or What is the Probability That Life Exists Beyond the Earth?* He originally attempted to present part one in January but was unable due to bad weather disruptions.
  - Tonight, Don picked up where he left off with a recap of part one and presentation of part two.
- Dr. Miller presented a history of how some in the astronomy community have approached this mission, including what to look and listen for, the formation of SETI, the Drake Equation, METI (our active signaling in hopes of a reply) and the results to date of these and other efforts including the most recent Nancy Grace Roman telescope.
  - Scheduled to launch in 2027, the Wide-Field Infrared Survey Telescope has several mission objectives. One objective is to search for extra-solar planets which scientists hope can further our understanding of the potential for life of some kind beyond our earthly borders.

May 2024 CCAS Meeting Agenda

by Bruce Ruggeri, CCAS Program Chair

Our next meeting will be held on May 14, 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. Guest Speaker: Dr. Erika Nesvold, "Off-Earth Ethics: Learning from History to Build a Better Future in Space."

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

May 2024 Monthly Meeting Presenter Bio

by Bruce Ruggeri, CCAS Program Chair

I am pleased to announce our guest speaker for our May 2024 monthly meeting, Dr. Erika Nesvold, astrophysics engineer and co-founder of the JustSpace Alliance, a nonprofit advocating for a more inclusive and ethical future in space. The CCAS meeting presentation will commence at approximately 7:50-8:00PM ET. Our meetings are held at West Chester University's (WCU) Merion Science Center, Room 113. The Science Center is located at 720 S. Church St.

The presentation title, synopsis and bio sketch for Dr Nesvold are provided below:

Title: *Off-Earth Ethics: Learning from History to Build a Better Future in Space*

Synopsis: The idea of human space settlement is experiencing a comeback thanks to the commercial spaceflight industry's recent rapid growth. Most of the conversation has focused on the technical and financial challenges of living in space. But to build thriving, healthy communities in space, we'll also need to tackle the social, ethical, and human rights challenges we'll encounter beyond Earth: How should we protect the space environment or handle interpersonal conflicts? How will we address criminal justice, avoid labor exploitation, and protect reproductive rights? Can we manage to do all this while keeping everyone alive in an environment we didn't evolve to survive in? This talk will provide an overview of the kinds of big questions we'll have to answer as we expand our civilization into space, and demonstrate how we can look to our past and present here on Earth for cautionary tales and success stories to help us avoid repeating the mistakes of history and build a better future for everyone, in space and on Earth.

Bio sketch: Erika Nesvold has a Ph.D. in physics from the University of Maryland and has performed computational astro-

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Report on the Northeast Astronomy Forum 2024

by Don Knabb, CCAS Treasurer & ALCOR

CCAS Treasurer & ALCOR Don Knabb with Astronomical League Secretary Terry Mann, AL Vice President Charles E. Allen II, and AL President Carroll Iorg.

Barb and I journeyed to Rockland Community College in Suffern, New York, to attend the Northeast Astronomy Forum on Saturday April 20th. Known as NEAF, this is one of the largest gatherings of astronomy vendors and exhibitors in the United States, if not the world. There are nearly 200 exhibitors in a 90,000 square foot exhibit hall. An auditorium has presentations by some of the top names in astronomy. Past presenters include several astronauts and NASA officials and numerous astronomy scientists and professionals such as Neil deGrasse Tyson.

One of our first stops was at the Astronomical League table. There we met Carroll Iorg, AL president, Chuck Allen, AL vice president and Terry Mann, AL Secretary. We had met Terry previously at Green Bank Star Quest and had met Carroll and Chuck over Zoom, but never in

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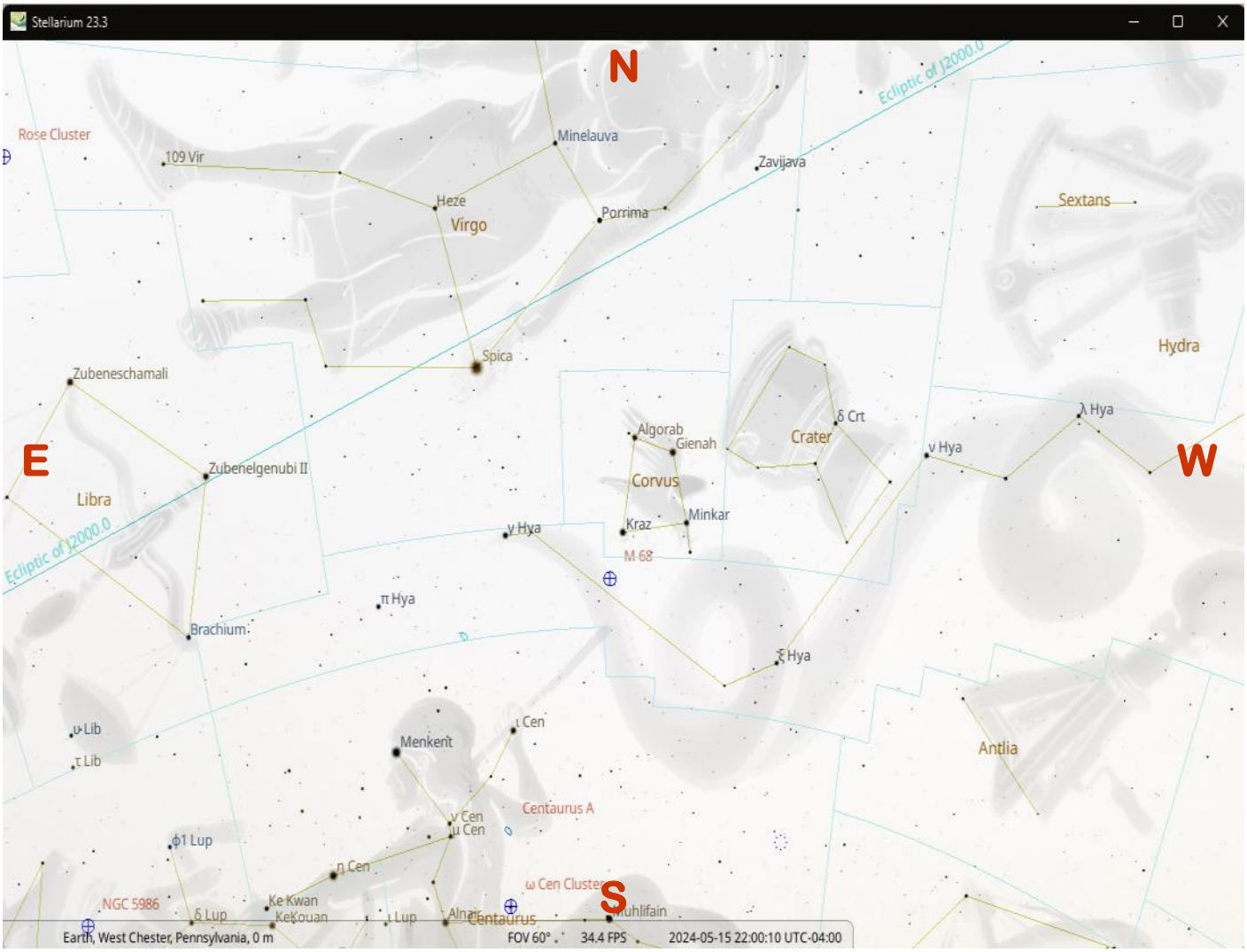
The Sky Over Chester County

May 15, 2024 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
05/01/2024	5:32 a.m. EDT	6:01 a.m. EDT	7:57 p.m. EDT	8:27 p.m. EDT	13h 55m 44s
05/15/2024	5:16 a.m. EDT	5:46 a.m. EDT	8:11 p.m. EDT	8:42 p.m. EDT	14h 24m 31s
05/31/2024	5:03 a.m. EDT	5:36 a.m. EDT	8:24 p.m. EDT	8:56 p.m. EDT	14h 48m 46s

Moon Phases					
Last Quarter	05/01/2024	7:27 a.m. EDT	New Moon	05/07/2024	11:21 p.m. EDT
First Quarter	05/15/2024	7:48 a.m. EDT	Full Moon	05/23/2024	9:53 a.m. EDT
Last Quarter	05/30/2024	1:13 p.m. EDT			

May 2024 Observing Highlights
by Michael Manigly, CCAS Observing Chair

1	**Last Quarter Moon 7:27 a.m. EDT.**
5	**Eta Aquariid meteor shower peaks tonight around 5:00 p.m. EDT and can be viewed with the waning crescent Moon around 9:00 p.m. The peak number of meteors may be around 50/hour. The meteor showers best observed will be on the 7th with the New Moon during overnight hours.**
7	**New Moon 11:22 p.m. EDT. Best night to observe the Eta Aquariid meteor shower.**
8	**Saturn, Mars and Mercury line up in the morning sky this week.**
12	**The Moon lines up with Pollux and Castor this evening. Pollux will be to the right of the Moon and Castor sits further along the same line.**
15	**First Quarter Moon 7:48 a.m. EDT. Also, Regulus sits to the lower right of the Moon as darkness falls.**
16	**Lunar Straight Wall this evening.**
18	**Spica can be located to the lower left of the Moon at nightfall.**
23	**Full Moon – Called the Flower Moon because there are multiple flower blooms at this time. Also referred to as the Frog Croaking Moon, the Milk Moon, and the Corn Moon.**
24	**Antares can be found just south of the Moon.**
30	**Last Quarter Moon 1:13 p.m. EDT.**

May observing highlights include: the Eta Aquariid meteor showers, the lineup of Saturn, Mars, Mercury and Neptune during morning twilight during the week of the 8th and the spring constellations of Leo, Virgo and Ursa Major. Multiple Messier and deep sky object are observable as the weather warms and longer dark nights begin.

Mercury: Very low in the ENE at morning twilight early in May but difficult to see later in the month.

Venus: Earth's evil twin is not observable this month.

Mars: The god of war rises after 2:00 a.m. EDT in ENE.

Jupiter: The king of the planets is visible extremely low in the western sky but lost in the evening twilight by mid-month.

Saturn: The ringed beauty rises in the ESE after 2:00 a.m. EDT.

Uranus: Too close to the Sun to be observed this month.

Neptune: May be viewable at morning twilight.

Constellations: May Spring constellations include Leo, Virgo and Ursa Major. 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: Leo highlights include the Leo triplet of M65, M66 and NGC3628 (Hamburger Galaxy), M95, M96 and NGC3370 (Silverado Galaxy); Virgo highlights include M87 (Radio Galaxy Virgo A) and M104 (Sombrero Galaxy); and the Ursa Major highlights include M81 (Bode's Galaxy), M82 (Cigar Galaxy), M97 (Owl Nebula) and M101 (Pinwheel Galaxy).

Meteor Showers: ETA Aquariids peak on May 5th. Best observed during overnight hours on May 7th with the New Moon.

Comets: 13P/Olbers may be viewable in the evening sky during May. The comet brightens during the month but its altitude declines. Look low in the NW sky in Auriga at nightfall.

Asteroids: 4 Vesta, the second largest object in the asteroid belt, may be observable with favorably dark skies in Gemini during May.

Through the Eyepiece: The Total Solar Eclipse of April 2024

by Don Knabb, CCAS Treasurer & ALCOR

Usually, my monthly articles are about telescopic or naked eye night sky objects or events. This article is about a daylight event, and it was an amazing spectacle! The April 8th total solar eclipse was witnessed by millions of people and their stories filled the newspapers, websites, and blogs. Here is a brief story of our eclipse experience.

Barb and I, along with CCAS members Sue Johnston and Bob Stein traveled to a small cabin in Geneva-on-the-Lake, Ohio. This location was just off the center line of totality and nearly 4 minutes of totality was expected. There was a large, mowed grass field behind the cabin that was perfect for setting up our three telescopes.

We awoke the morning of the eclipse to showers and a cloudy sky, which is not unusual for the location during April. But a look at the satellite images from several weather websites showed that clear skies were headed in our direction, and we expected reasonably clear skies by the time the eclipse started.

CCAS Don Miller and his wife and several family members and friends were in Erie, about an hour to our east. It appeared that while we would have clear skies, Erie would still be under clouds for the eclipse. So, we invited the Miller gang to join us behind our cabin and we were thrilled when they accepted our invitation. The more the merrier!

As the morning progressed the clouds gradually broke up and by noon the sky was mostly clear with a few cumulus clouds and a separate layer of high, thin clouds. We walked to a nearby park on the shore of Lake Erie and a significant crowd of people were setting up chairs in preparation for the show in the sky and a festival atmosphere was apparent.

We returned to our cabin and set up three telescopes: a 3.5-inch Questar with a solar filter, a Coronado "Personal Solar Telescope" which is a dedicated solar observing telescope with a hydrogen alpha filter, and a ZWO SeeStar S50 automated telescope equipped with a solar filter that could be quickly removed during totality.

We watched excitedly as the first bit of the Moon began to cover the Sun. There were thin high clouds, but they did not interfere with the view of the eclipse. The Questar was provid-

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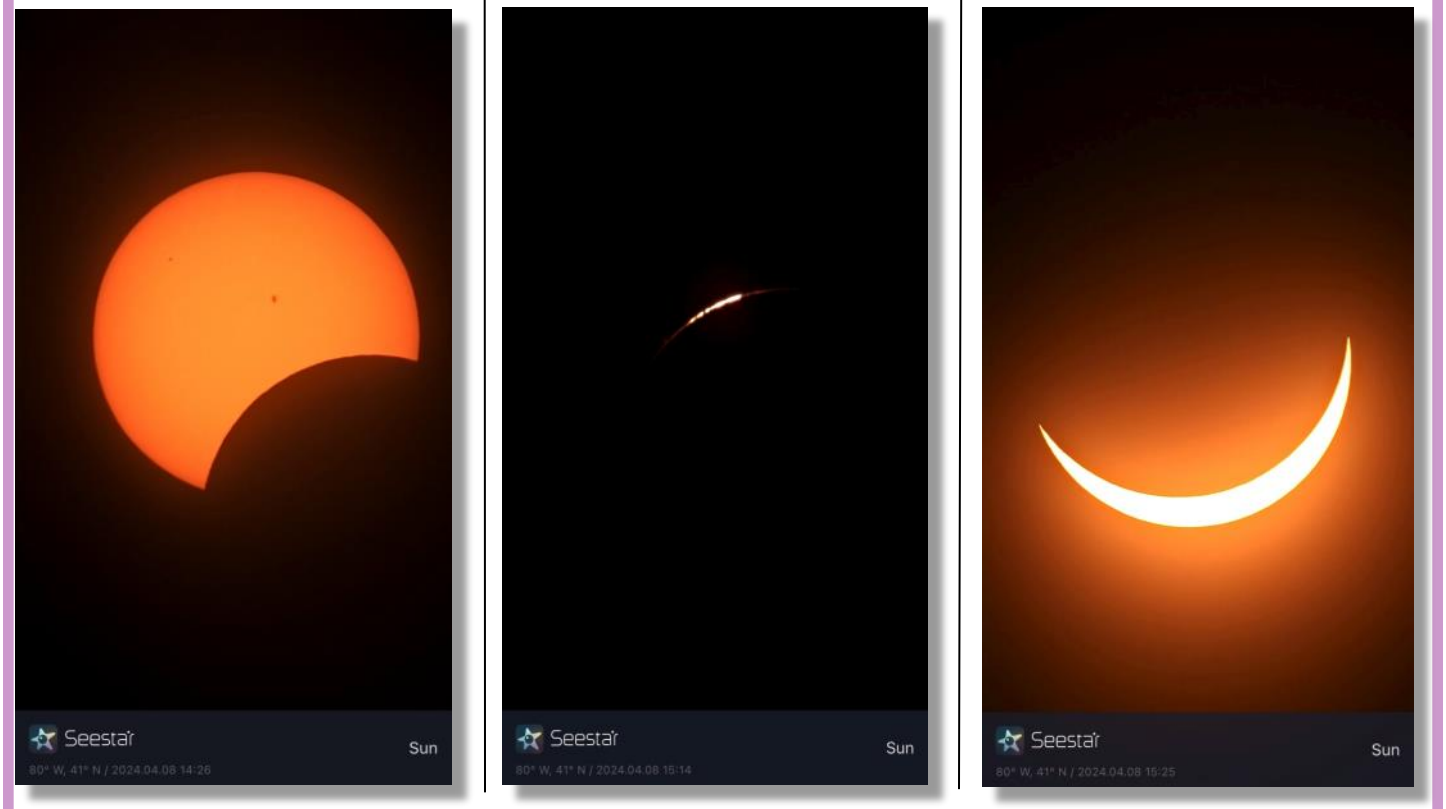

Several images of the eclipse (including Bailey's Beads) captured by Don Knabb in Geneva-on-the-Lake, Ohio.

Eyepiece (Cont'd)

Barb Knabb with the Questar & SeeStar Telescopes

Sun & Venus during Totality.

Don Miller & Family

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ing excellent views of two sunspots and the SeeStar image was on my iPad through the entire eclipse. The solar scope was probably the least used of the three telescopes.

As the Moon continued to cover the Sun the light began to approach the intensity of dusk and the spring peeper frogs in the wetlands across the street began to sing as if nightfall was approaching.

A beautiful ring was visible around the Sun as totality approached. Then the light began to fade quickly as the last bit of the Sun was visible and the light took on a surreal quality, it was like no other light I have seen. Finally, with our eclipse glasses still in place, we saw the diamond ring effect and we removed our glasses to enjoy totality.

With the thin high clouds, we did not see the Sun's corona extending far from the surface, but easily visible were several solar prominences with one especially large one at the bottom of the Sun. The prominence was an unusual color, sort of red and purple. Jupiter was easily visible far to the left of the Sun and Venus was visible to the lower right of the Sun. We could not see any stars because of the high, thin, clouds.

I took pictures on the SeeStar as totality approached and discovered later that I obtained an image of Bailey's Beads, the thin line of the Sun shining through the mountains of the Moon. When totality started, I removed the solar filter from the

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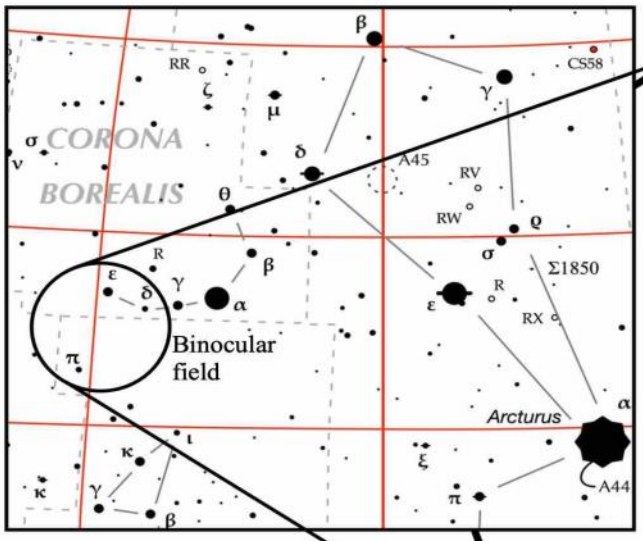
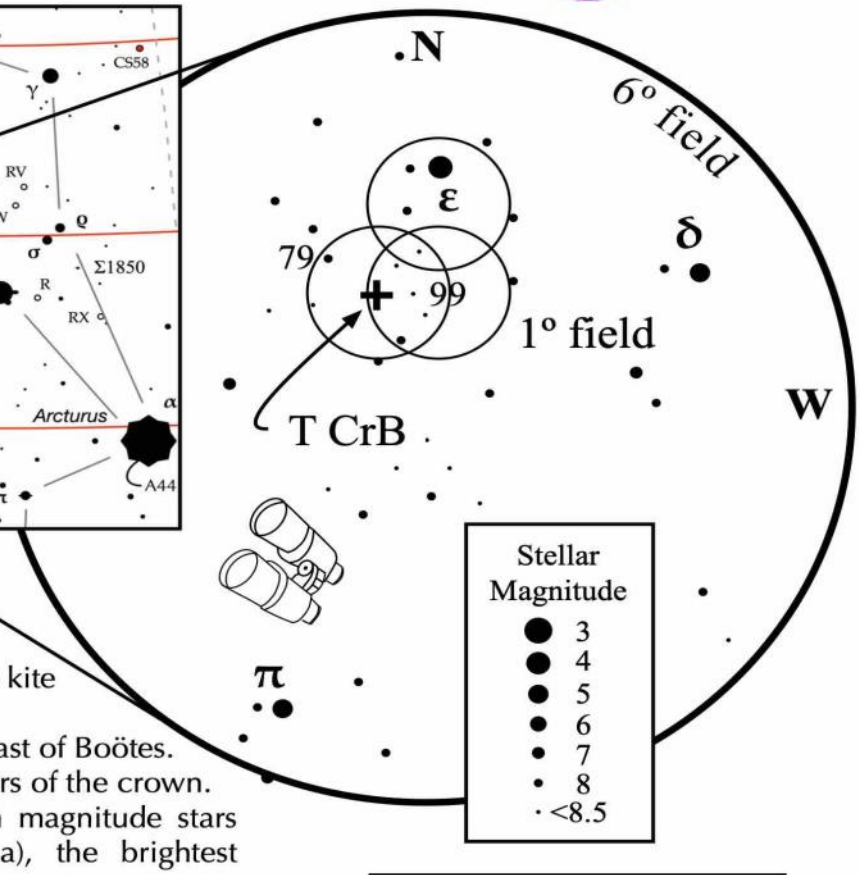
T Coronae Borealis
by Astronomical League

T Coronae Borealis

A nova waiting to happen – soon!

also known as HIP 78322 and the "Blaze Star"





How to find
T Coronae Borealis

A. Locate bright Arcturus and the kite shaped constellation Boötes.
B. Corona Borealis lies directly east of Boötes.
C. Trace the semi-circle of the stars of the crown.
D. Epsilon and Delta are fourth magnitude stars shining east of Alpha (Gemma), the brightest member of the crown.
E. Place Epsilon in the northern half of the binocular (or finder) field. Fifth magnitude Pi Serpentis lies near the bottom of the field.
F. T Coronae Borealis is about 1/4 the distance between Epsilon and Pi.
G. Move two low power eyepiece fields south of Epsilon.
H. Then move 1/2 low power eyepiece field east.
I. This is the vicinity of 10th magnitude T CBr.

- The star normally is magnitude 10.3.
- Ten years before its outburst, it rises to magnitude 9.8. It did this 10 years ago.
- It then dims to about magnitude 12 one year before outburst. It did this in April 2023.

Between now and September, T CrB is predicted to nova, quickly reaching 2nd magnitude and rivaling the brightness of Alpha CrB (Gemma).

- Its brightness rise will take one day or less.
- It will likely remain near maximum brightness (2nd mag.) for only a few days.

T CrB: Blaze Star

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Voyager 1 Is Sending Data Back to Earth for the First Time in Five Months

by Ashley Strickland, CNN

Members of the Voyager flight team celebrate after receiving the first coherent data from Voyager 1 in five months at NASA's Jet Propulsion Laboratory on April 20. - NASA/JPL-Caltech© Provided by CNN

For the first time in five months, NASA engineers have received decipherable data from Voyager 1 after crafting a creative solution to fix a communication problem aboard humanity's most distant spacecraft in the cosmos. Voyager 1 is currently about 15 billion miles (24 billion kilometers) away, and at 46 years old, the probe has shown multiple quirks and signs of aging in recent years.

The latest issue experienced by Voyager 1 first cropped up in November 2023, when the flight data system's telemetry modulation unit began sending an indecipherable repeating pattern of code. Voyager 1's flight data system collects information from the spacecraft's science instruments and bundles it with engineering data that reflects its current health status. Mission control on Earth receives that data in binary code, or a series of ones and zeroes.

But since November, Voyager 1's flight data system had been stuck in a loop. While the probe has continued to relay a steady radio signal to its mission control team on Earth over the past few months, the signal did not carry any usable data.

The mission team received the first coherent data about the health and status of Voyager 1's engineering systems on April 20. While the team is still reviewing the information, everything they've seen so far suggests Voyager 1 is healthy and operating properly.

"Today was a great day for Voyager 1," said Linda Spilker, Voyager project scientist at JPL, in a statement Saturday. "We're back in communication with the spacecraft. And we look forward to getting science data back."

The breakthrough came as the result of a clever bit of trial and error and the unraveling of a mystery that led the team to a single chip.

After discovering the issue, the mission team attempted sending commands to restart the spacecraft's computer system and learn more about the underlying cause of the problem. The team sent a command called a "poke" to Voyager 1 on March 1 to get the flight data system to run different software sequences in the hopes of finding out what was causing the glitch.

On March 3, the team noticed that activity from one part of the

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Eyepiece (Cont'd)

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SeeStar and took several pictures. The exposure was such that the prominences are not visible, but the corona was accurately captured.

It is impossible to describe the experience of totality, it is unlike anything else we experience at other times. The quality of the light was otherworldly with a golden glow all around us. Looking around the horizon one could see the colors of a sunset all around us. It never became as dark as night but more like dusk a half hour before true darkness.

I did not time totality, but it must have been near the prediction of nearly 4 minutes. But it went by all too quickly! I took a few pictures with my iPhone and was able to capture the Sun and Venus; Jupiter was too far away from the Sun to be in the same field of view. Totality was over all too soon.

Having the company of Barb, Sue Johnston, Bob Stein and Don and Eva Miller and their family made the experience even more special. Don Miller, NASA Solar System Ambassador, provided all of us with occasional commentary on what was happening as the eclipse progressed.

Would I like to see more total solar eclipses? Absolutely! But the choice is either wait 20 years for the next total solar eclipse in the United States or travel a significant distance to see one in another part of the world. I think the experience of another total solar eclipse would be worth the travel time!

Image of Totality Taken by Don Knabb in Geneva-on-the-Lake, Ohio.

Eyepiece (Cont'd)

Bob Stein, Sue Johnston, & Barb Knabb

Ring Around the Sun

Voyager (Cont'd)

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flight data system stood out from the rest of the garbled data. While the signal wasn't in the format the Voyager team is used to seeing when the flight data system is functioning as expected, an engineer with NASA's Deep Space Network was able to decode it.

The Deep Space Network is a system of radio antennae on Earth that help the agency communicate with the Voyager probes and other spacecraft exploring our solar system. The decoded signal included a readout of the entire flight data system's memory. By investigating the readout, the team determined the cause of the issue: 3% of the flight data system's memory is corrupted. A single chip responsible for storing part of the system's memory, including some of the computer's software code, isn't working properly. While the cause of the chip's failure is unknown, it could be worn out or may have been hit by an energetic particle from space, the team said.

The loss of the code on the chip caused Voyager 1's science and engineering data to be unusable. Since there was no way to repair the chip, the team opted to store the affected code from the chip elsewhere in the system's memory. While they couldn't pinpoint a location large enough to hold all of the code, they were able to divide the code into sections and store it in different spots within the flight data system.

"To make this plan work, they also needed to adjust those

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May's Night Sky Notes: Stargazing for Beginners

by Kat Troche

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.

Millions were able to experience the solar eclipse on April 8, 2024, inspiring folks to become amateur astronomers – hooray! Now that you've been 'bitten by the bug', and you've decided to **join your local astronomy club**, here are some stargazing tips!

The Bortle Scale

Before you can stargaze, you'll want to find a site with dark skies. It's helpful learn what your Bortle scale is. But *what is* the Bortle scale? The Bortle scale is a numeric scale from 1-9, with 1 being darkest and 9 being extremely light polluted; that rates your night sky's darkness. For example, New York City would be a Bortle 9, whereas Cherry Springs State Park in Pennsylvania is a Bortle 2.

Determining the Bortle scale of your night sky will help narrow down what you can expect to see after sunset. Of course, other factors such as weather (clouds namely) will impact seeing conditions, so plan ahead. Find Bortle ratings near you here: www.lightpollutionmap.info

No Equipment? No Problem!

There's plenty to see with your eyes alone. Get familiar with the night sky by studying star maps in books, or with a planisphere. These are great to begin identifying the overall shapes of constellations, and

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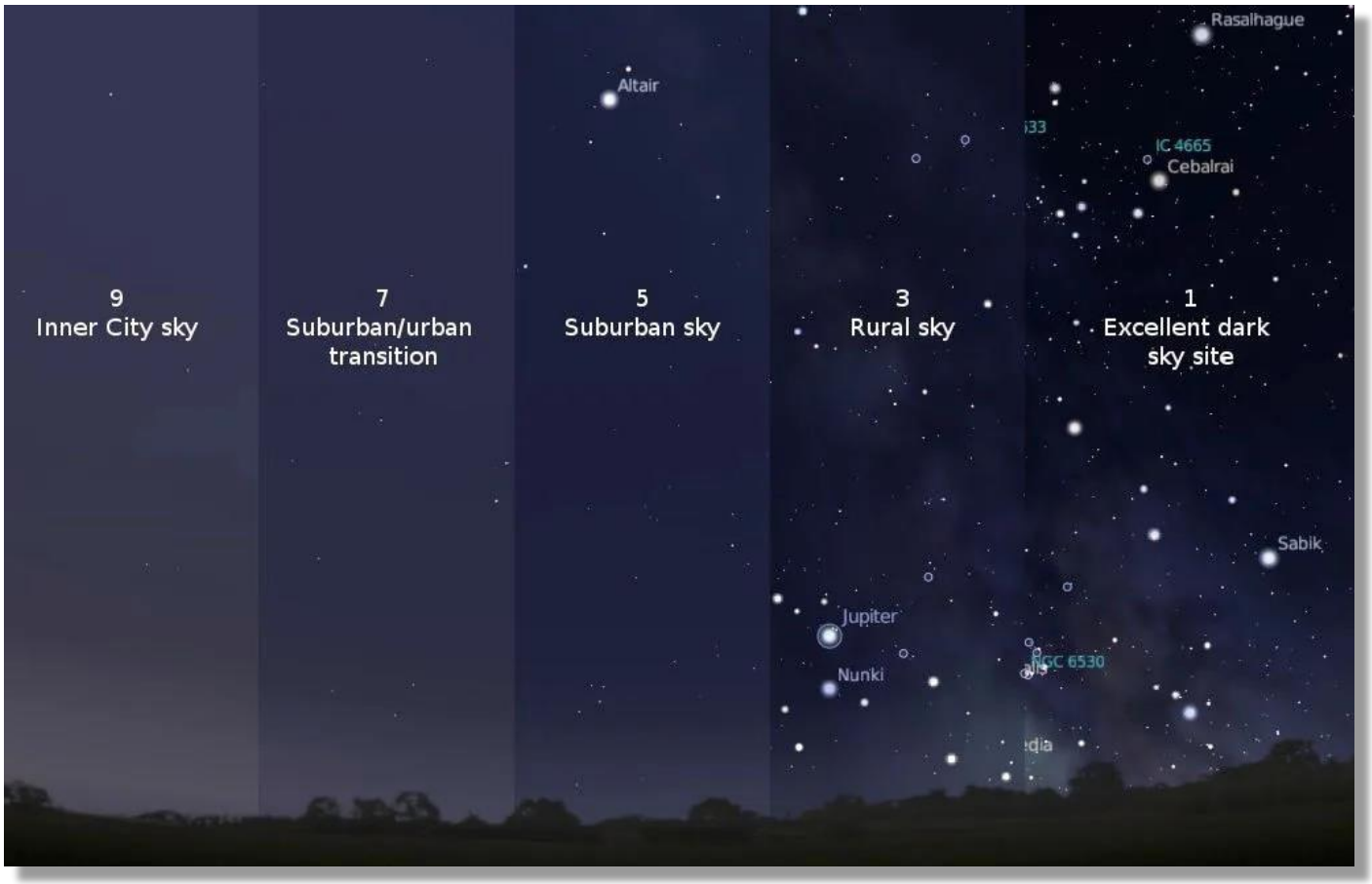
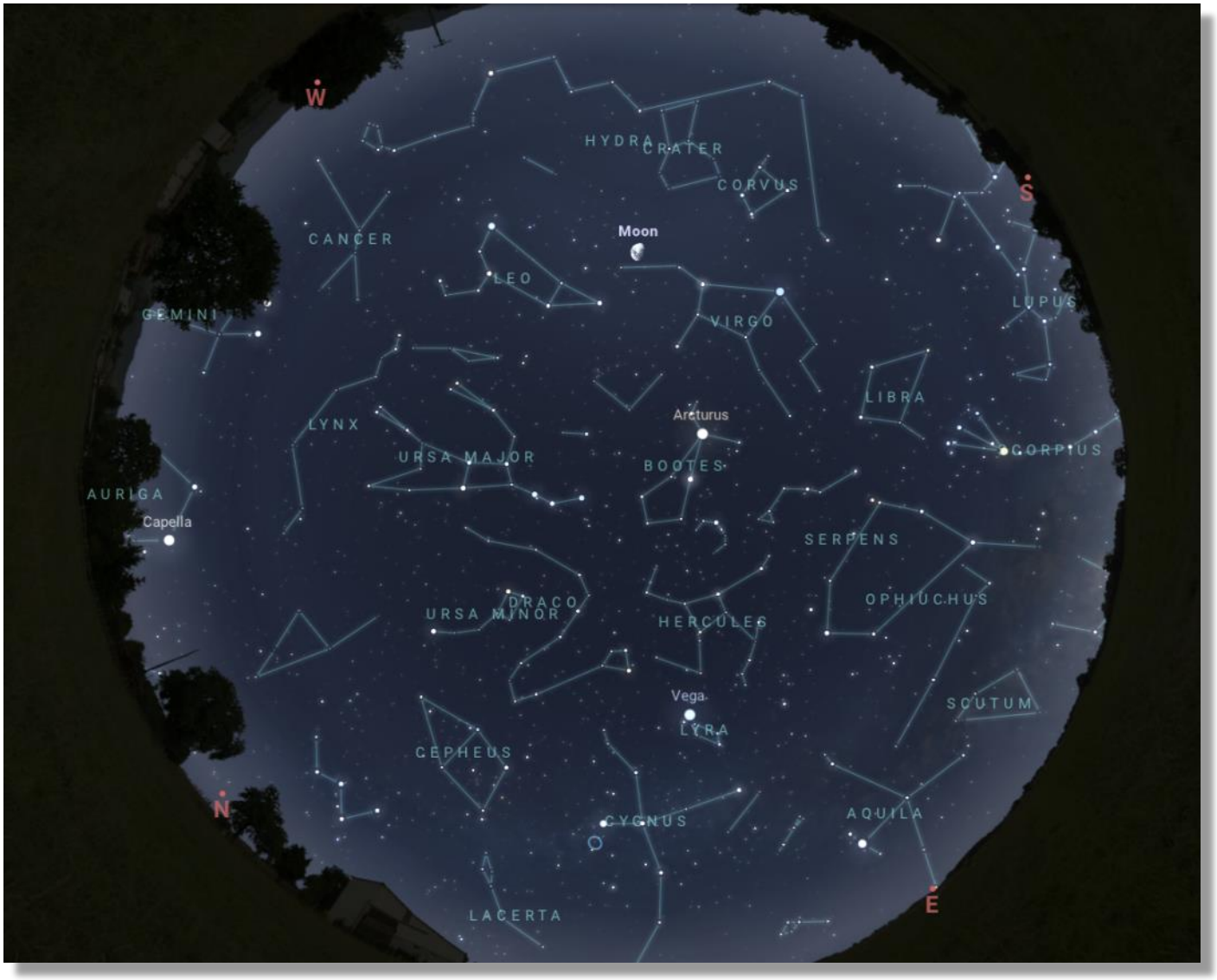


The Bortle scale helps amateur astronomers and stargazers to know how much light pollution is in the sky where they observe.
Credit: International Dark Sky Association

Night Sky Notes (Cont'd)



A full view of the northern hemisphere night sky in mid-May. Credit: Stellarium Web.

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what is visible during various months.

Interactive sky maps, such as Stellarium Web, work well with mobile and desktop browsers, and are also great for learning the constellations in your hemisphere. There are also several astronomy apps on the market today that work with the GPS of your smartphone to give an accurate map of the night sky.

Keep track of Moon phases.

Both the interactive sky maps and apps will also let you know when planets and our Moon are out! This is especially important because if you are trying to look for bright deep sky objects, like the Andromeda Galaxy or the Perseus Double Cluster, you want to *avoid* the Moon as much as possible. Moonlight in a dark sky area will be as bright as a streetlight, so plan accordingly! And if the Moon is out, check out this Skywatcher's Guide to the Moon: bit.ly/MoonHandout

Put On That Red Light

If you're looking at your phone, you won't be able to see as much. Our eyes take approximately 30 minutes to get dark sky adapted, and a bright light can ruin our night vision temporarily. The easiest way to stay dark sky adapted is to avoid any bright lights from car headlights or your smartphone. To avoid this, simply use red lights, such as a red flashlight or headlamp. **The reason:** white light con-

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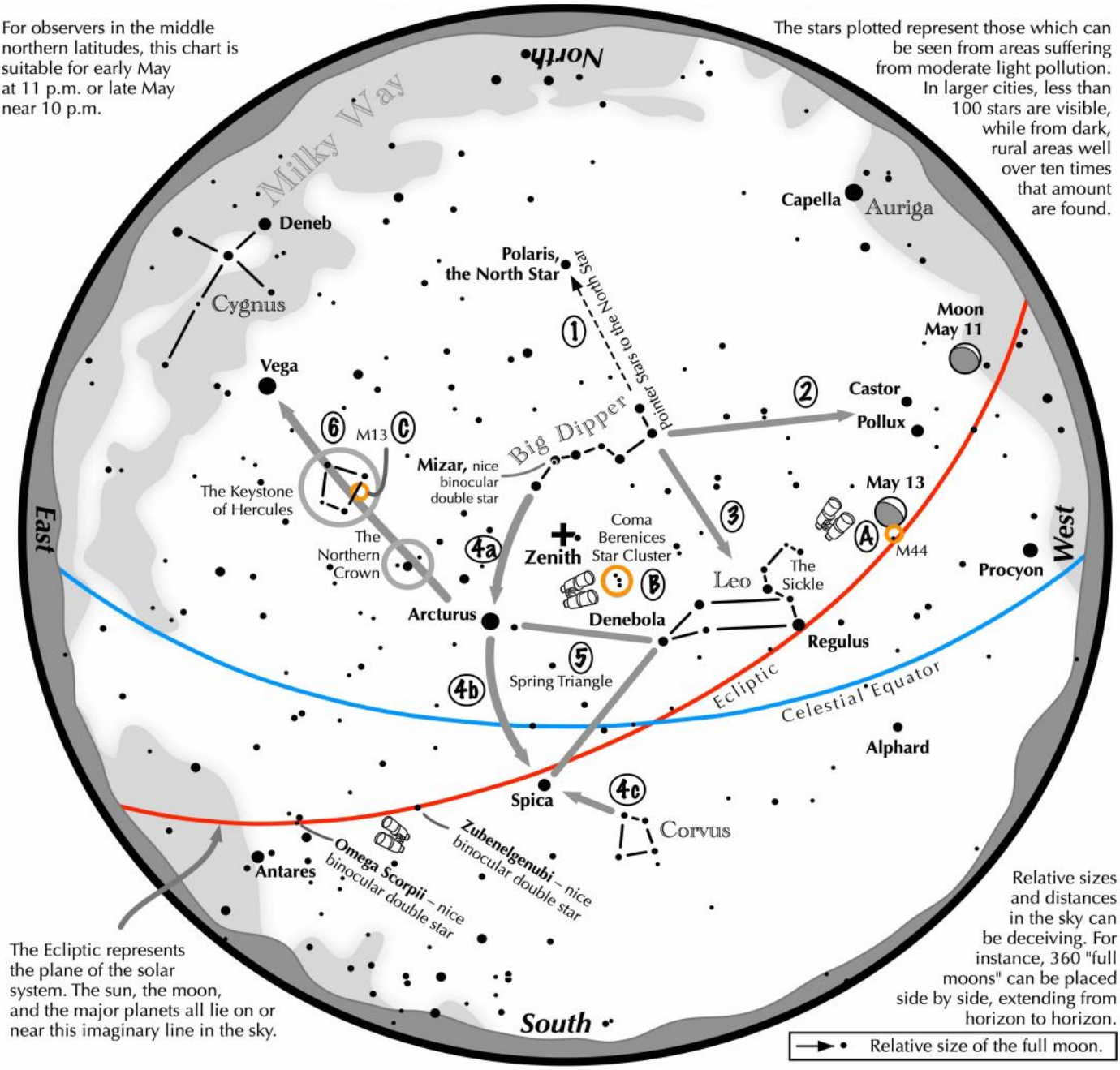
Navigating the May 2024 Night Sky

by Astronomical League



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

1. Extend a line northward from the two stars at the tip of the Big Dipper's bowl. It passes by Polaris, the North Star.
2. Through the two diagonal stars of the Dipper's bowl, draw a line pointing to the twin stars of Castor and Pollux in Gemini.
3. Directly below the Dipper's bowl reclines the constellation Leo with its primary star, Regulus.
4. Follow the arc of the Dipper's handle. It first intersects Arcturus, then continues to Spica. Confirm Spica by noting that two moderately bright stars just to its southwest form a straight line with it.
5. Arcturus, Spica, and Denebola form the Spring Triangle, a large equilateral triangle.
6. Draw a line from Arcturus to Vega. One-third of the way sits "The Northern Crown." Two-thirds of the way hides the "Keystone of Hercules." A dark sky is needed to see these two dim stellar configurations.

Binocular Highlights

A: M44, a star cluster barely visible to the naked eye, lies to the southeast of Pollux. **B:** Look near the zenith for the loose star cluster of Coma Berenices. **C:** M13, a round glow from a cluster of over 500,000 stars.

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

Voyager (Cont'd)

(Continued from page 11)

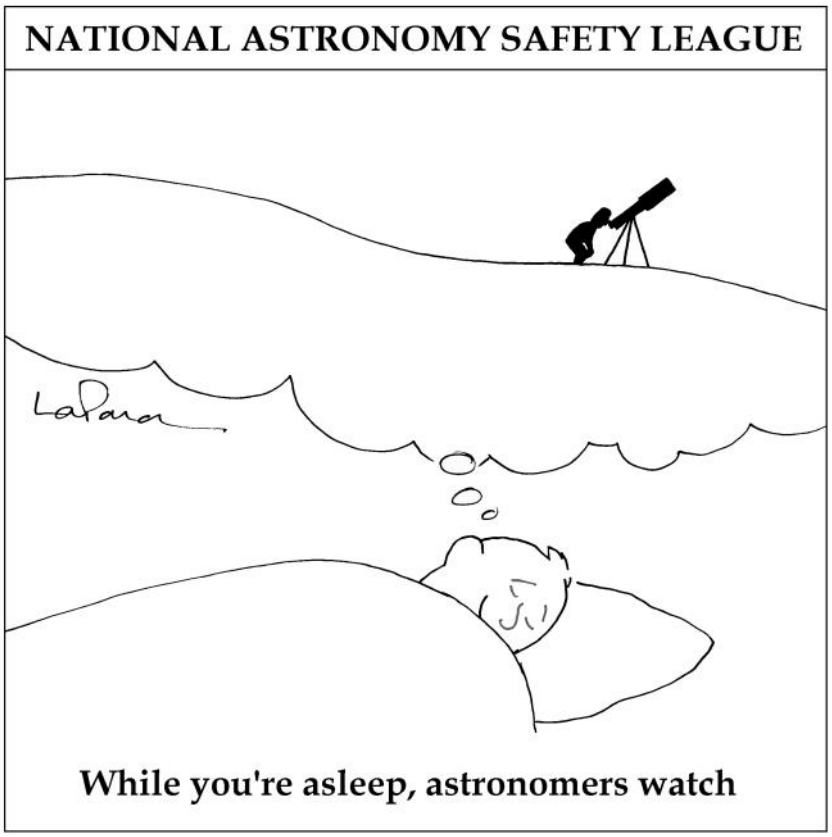
code sections to ensure, for example, that they all still function as a whole," according to an update from NASA. "Any references to the location of that code in other parts of the (flight data system) memory needed to be updated as well."

After determining the code necessary for packaging Voyager 1's engineering data, engineers sent a radio signal to the probe commanding the code to a new location in the system's memory on April 18. Given Voyager 1's immense distance from Earth, it takes a radio signal about 22.5 hours to reach the probe, and another 22.5 hours for a response signal from the spacecraft to reach Earth.

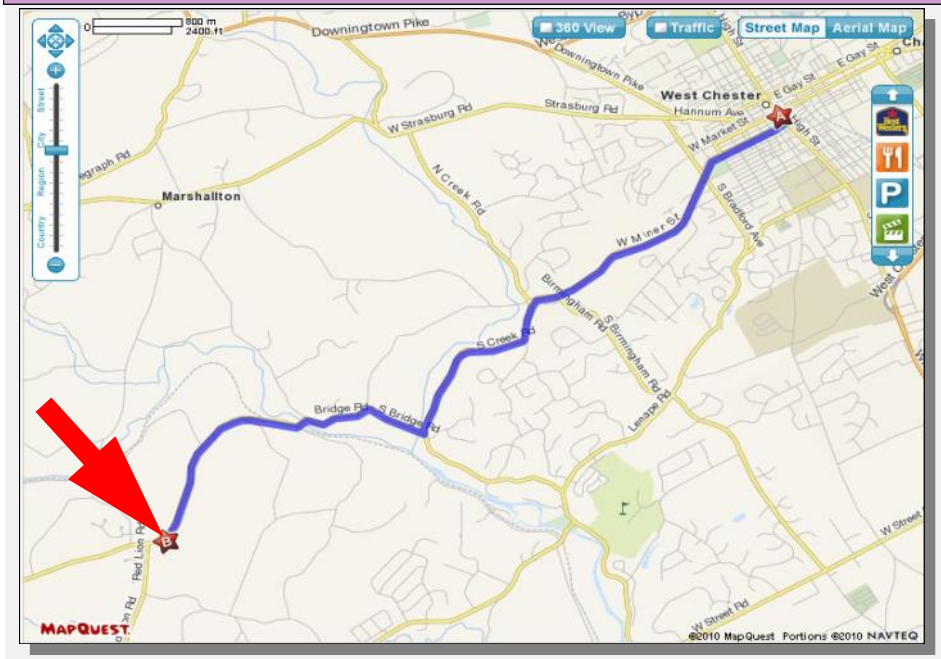
(Continued on page 17)

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).

NEAF (Cont'd)

Images from NEAF: (l.to r., top to bottom): Barb Knabb & new friend; the Astronomical League booth; the Classic Telescopes booth; Unitron Refractors; Explore Scientific booth; Expo floor in RCC Fieldhouse; Dr. David Levy presented "Shoemaker-Levy 9: 30 Years." Image credit: Don & Barb Knabb.

(Continued from page 3)

person. The AL table was across the aisle from the Tele Vue display, an ideal location because of the high traffic attracted to the Tele Vue display.

We explored the exhibition hall's many exhibitors. One fascinating display was the Classic Telescopes display. There were dozens of classic telescopes and an amazing collection of Unitron refractors, including a huge one that must have been a 5 or 6 inch primary lens.

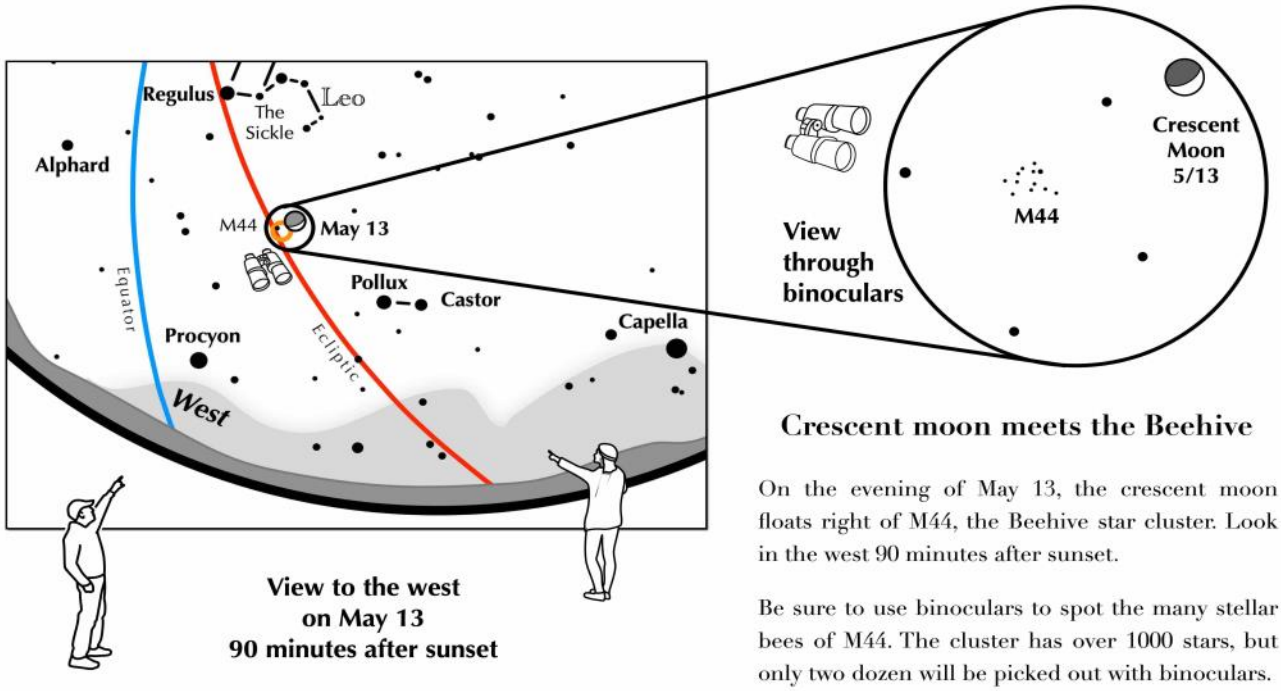
We attended one of the presentations in the main auditorium. Dr David Levy is the co-discoverer of Comet Shoemaker-Levy 9. That is the comet that collided with Jupiter in 1994, leaving Earth-sized impact marks on the surface of Jupiter. Levy's presentation was amazing, he connects with his audience in a personal manner. He displayed the original films from the 18-inch Schmidt telescope at Mt. Palomar that showed the first images of Comet Shoemaker-Levy 9.

NEAF is an annual event that is held in April. It is about a three-hour drive from West Chester, the vast majority of which is on interstate highways. Mark your calendar for next April to attend this amazing showcase of all things astronomical.

Astronomical League Challenge for May 2024

by Astronomical League

In the early evening on May 13, try this challenge:



Crescent moon meets the Beehive

On the evening of May 13, the crescent moon floats right of M44, the Beehive star cluster. Look in the west 90 minutes after sunset.

Be sure to use binoculars to spot the many stellar bees of M44. The cluster has over 1000 stars, but only two dozen will be picked out with binoculars.

Even though they lie near each other in binoculars, they are nowhere near each other in three-dimensional space. M44 is 150 million times farther than the moon!

It has taken the light from M44's stars over 600 years to reach your eyes!

Voyager (Cont'd)

(Continued from page 15)

On April 20, the team received Voyager 1's response indicating that the clever code modification had worked, and they could finally receive readable engineering data from the probe once more.

Within the coming weeks, the team will continue to relocate other affected parts of the system's software, including those responsible for returning the valuable science data Voyager 1 is collecting.

The team estimates it's a few weeks away from receiving science data from Voyager 1 and looks forward to seeing what that data contains. "We never know for sure what's going to happen with the Voyagers, but it constantly amazes me when they just keep going," said Voyager Project Manager Suzanne Dodd, in a statement. "We've had many anomalies, and they are getting harder. But we've been fortunate so far to recover from them. And the mission keeps going. And younger engineers are coming onto the Voyager team and contributing their knowledge to keep the mission going."

[Editor's Note: Read the entire article at cnn.com.]

Night Sky Notes (Cont'd)

(Continued from page 13)

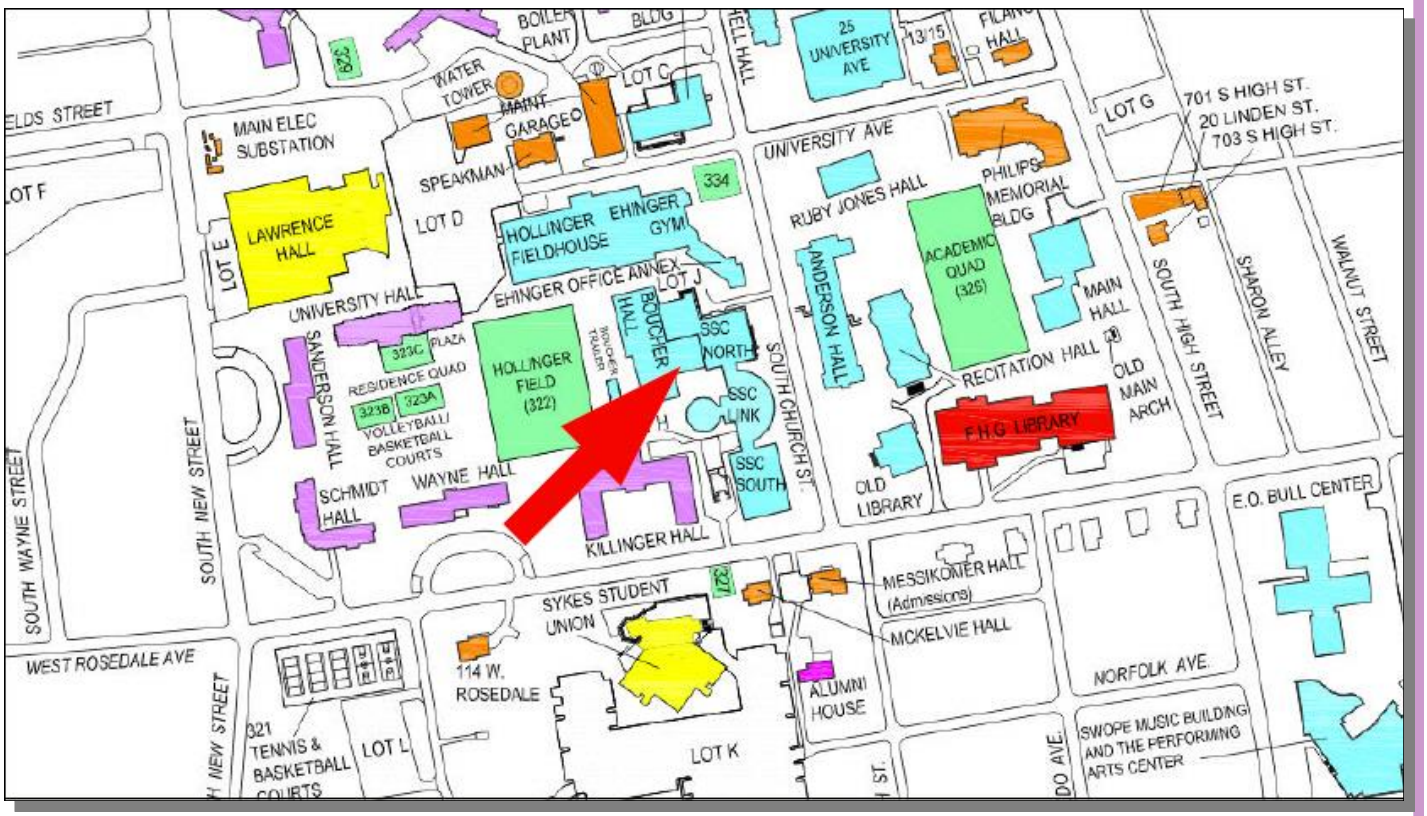
stricts the pupils of your eyes, making it hard to see in the dark, whereas red light allows your pupils to stay dilated for longer. Most smartphones come with adaptability shortcuts that allow you to make your screen red, but if you don't have that feature, use red cellophane on your screen and flashlight.

Up next: why binoculars can sometimes be the best starter telescope, with Night Sky Network's upcoming mid-month article through NASA's website!

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).



Speaker Bio (Cont'd)

(Continued from page 3)

physics research at NASA Goddard Space Flight Center, the Carnegie Institution for Science, NASA Ames, and SETI. She now works as an astrophysics engineer on the educational astrophysics' software Universe Sandbox. Erika is the co-founder of the JustSpace Alliance, a nonprofit advocating for a more inclusive and ethical future in space. She is the author of *Off-Earth: Ethical Questions and Quandaries for Living in Outer Space* and the co-editor of *Reclaiming Space: Progressive and Multicultural Visions of Space Exploration.*

CCAS Membership Information and Society Financials

Treasurer's Report
by Don Knabb

April 2024 Financial Summary

Beginning Balance	$1858
Deposits	$35
Disbursements	-$0
Ending Balance	$1893

New Member Welcome!

Welcome to new CCAS member Shana Nolan of Coatesville, PA, and returning member Michael Dennis, 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
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 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.

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.

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**
Email: **info@skiesunlimited.com**

http://www.skiesunlimited.net

★ ★ ★ ★ ★

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.

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. 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 & Treasurer:	Don Knabb 610-436-5702
Observing:	Michael Manigly 484-631-6197
Secretary:	Beatrice Mazziotta 610-933-2128
Librarian:	Barb Knabb 610-436-5702
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 & 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.