



Observations

A Monthly Publication Of The
CHESTER COUNTY ASTRONOMICAL SOCIETY

Vol. 32, No. 1 **Three-Time** Winner of the Astronomical League's Mabel Sterns Award ☼ 2006, 2009 & 2016 January 2024

In This Issue

CCAS Winter Events.....	2
November 2023 Meeting Minutes.....	2
January 2024 Meeting Agenda.....	2
January 2024 Meeting Presenter Bio	3
Color-Corrected Images of Uranus & Neptune .3	
The Sky Over Chester County:	
January 2024	4
January 2024 Observing Highlights	5
Through the Eyepiece: M35	6
Astroleague Double Star Activity	8
Observing Mercury, Venus & the Moon	8
Classic La Para.....	9
CCAS Directions: Brandywine	
Red Clay Alliance	9
Night Sky Network: Connecting the 'Dots' with Asterisms	10
Navigating the January Night Sky	13
On the Cover.....	14
JWST Could Look for 'Carbon-lite' Exoplanet Atmospheres	15
Astronomical League Double Star Activity	17
CCAS Funds Library Telescope.....	17
Membership Renewals	18
New Member Welcome.....	18
CCAS Directions: WCU Map	18
Treasurer's Report	18
CCAS Information Directory	19-20

CCAS Member Original Art



See pg. 14 for details about this month's cover image.

Membership Renewals Due

12/2023	Aylam / Martin-Aylam Damerau DeAngelo DellaPenna Etherington Gandhi O'Leary Ross Toth Watson / Metts
01/2023	Johnson Jose Kellerman Kennedy Kovaacs McElwee Schier
02/2023	Buki Ruggeri Sutton Tronel

January 2024 Dates

- 3rd • Last Quarter Moon, 10:30 p.m. EST.
- 4th • Quadrantid meteor shower peaks (ZHR = 100).
- 11h • New Moon 6:57 a.m. EST.
- 11h • Mercury appears low in the southeast sky around dawn.
- 13th • Saturn is above the Moon at nightfall.
- 17th • First Quarter Moon 10:53 p.m. EST.
- 20th • the Moon south of Pleiades (M45).
- 25th • Full Moon, the Chief Moon, 12:54 p.m. EST..
- 26th • Regulus is below the Moon in early evening.



CCAS Upcoming Nights Out

In addition to our monthly observing sessions at the Myrick Conservancy Center, BRC (see pg. 9), 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, January 12, 2024 - Winter Fireside Event at Tyler Arboretum, Media, PA; 5-8 pm. This will be a large, casual event. There will be a viewing area with a telescope set up. Attendees will stop by to ask questions and view the night sky.

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

Winter Society Events

January 2024

9th • 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. CCAS Member Speaker: Dr. Don Miller, NASA Ambassador & CCAS Member, "Could Extraterrestrial Life Exist in the Universe?—Scientific & Philosophical Considerations (Part 1)."

12th • Winter Fireside Event at Tyler Arboretum, Media, PA; 5-8 pm. This will be a large, casual event. There will be a viewing area with a telescope set up. Attendees will stop by to ask questions and view the night sky.

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

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

26th • West Chester University Planetarium Show: "Fire In The Sky," in the Mather Planetarium. The show starts at 7 p.m. and runs approximately one hour in length. For more information and reservations, visit [WCU Public Planetarium Shows](#).

February 2024

13th • 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: Dr. Ashley Spindler, University of Hertfordshire, United Kingdom, "Role of AI and Machine Learning (ML) Approaches in Astronomy—Studies of Galactic Evolution."

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

23rd • West Chester University Planetarium Show: "Raining Stars," in the Mather Planetarium. The show starts at 7 p.m. and runs approximately one hour in length. For more information and reservations, visit [WCU Public Planetarium Shows](#).

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

November 2023 Monthly Meeting Minutes

by Bea Mazziotta, CCAS Secretary

- Dave Hockenberry, CCAS President, welcomed members and guests to the November 14, 2023, meeting, which was held in person at WCU and via Zoom and YouTube. There were 30 attending in person and 5 via zoom.
- Details of upcoming club events were announced including a workshop on November 19th from 6 - 8 PM at the American Helicopter Museum. Visit www.ccas.us for a calendar of events.
- Dave handed out some recently donated eyepieces to interested members. A full description of the donated eyepieces is in the November 2023 newsletter.
- Bruce Ruggeri, Program Chair, announced that he would be sending out emails regarding the CCAS Scholarship Program and how to donate to it.
- The annual CCAS holiday party is scheduled for December 12th at 7 PM at the Iron Hill Brewery in West Chester, PA.
- The planned presenter for the evening, Dr. Erika Nesvold, had to cancel. Don Knabb filled in and presented a slide show entitled "Galaxies Like Grains of Sand - an Attempt to Understand the Scale of the Universe Using Everyday Items."
 - Among the ways to try and grasp the age and vastness of the universe were a Cosmic Calendar, the size of atoms, the solar system, galaxies and stars.
 - A final thought from Stephen Hawking closed the presentation. "Look up at the stars and not down at your feet. Try to make sense of what you see and wonder about what makes the universe exist. Be curious."

January 2024 CCAS Meeting Agenda

by Bruce Ruggeri, CCAS Program Chair

Our next meeting will be held on January 9, 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. CCAS Member Speaker: Dr. Don Miller, NASA Ambassador & CCAS Member, "Could Extraterrestrial Life Exist in the Universe?—Scientific & Philosophical Considerations (Part 1)."

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.

January 2024 Monthly Meeting Presenter Bio

by Bruce Ruggeri, CCAS Program Chair

A very happy New Year to everyone! I am pleased to announce our first CCAS meeting of 2024 (in person and Zoom) on Tuesday, January 9th commencing at 7:30 pm ET. Our January speaker is Dr. Don Miller, a fellow CCAS member and NASA Solar System Ambassador. The CCAS meeting presentation will commence at approximately 7:50-8:00 pm 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 Miller are provided below:

Presentation Title: The Search for Intelligent Life in the Universe

Synopsis: Humans have wondered for millennia if we are alone in the universe, which remains one of mankind's greatest unanswered questions. The search for extraterrestrial intelligence (SETI) began more than 50 years ago by listening for signals from beyond the earth. With no clear evidence discovered to date for an intelligent signal from a non-human species, does this mean that we are alone?

This program will review what we know about the search for extraterrestrial, intelligent, civilizations and the parameters that would predict our chances of detecting such a signal. The improvement in our understanding of the stars, the galaxy, and exoplanets has allowed us to update the old estimations of the proba-

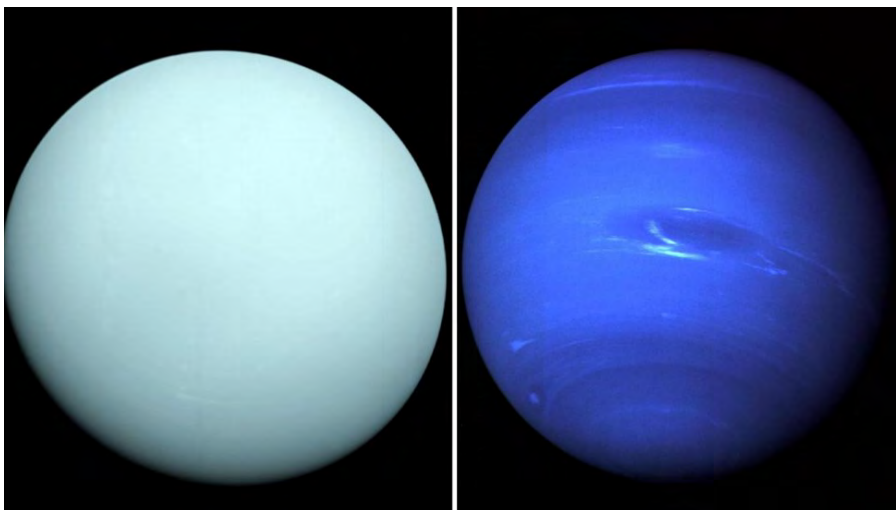
bility for success with SETI, including how close the nearest civilization might be to Earth.

Biosketch: Dr. Don Miller is retired from a career in pharmaceutical research covering a range of disease areas from oncology to neurology. During his career, he led the team that developed the first anti-TNF agent which became Enbrel and also the team that developed the world's first antibody targeted chemotherapeutic (Mylotarg); for the latter, he received recognition from the American Chemical Society as a "Hero in Chemistry" and the American Institute of Chemical Engineering as Industrial Researcher of the Year. Don holds B.S. and Ph.D. degrees in Chemical Engineering.

(Continued on page 8)

Color-Corrected Images Reveal Accurate Portraits of Uranus and Neptune

by Ashley Strickland, CNN.com



Voyager 2 captured the first detailed images of Uranus in 1986 (left) and Neptune in 1989. These are the images of the planets that most of us are accustomed to viewing. Image Credit: NASA/JPL-Caltech

Often appearing in images to have starkly different hues, the true colors of Neptune and

Uranus may be more similar than previously thought, new research has found.

The first detailed glimpses of the two ice giants on the outer edge of our solar system were made possible by NASA's Voyager 2 mission, which conducted flybys of Uranus in 1986 and [Neptune in 1989](#). Voyager 2 remains the only spacecraft to fly by both worlds.

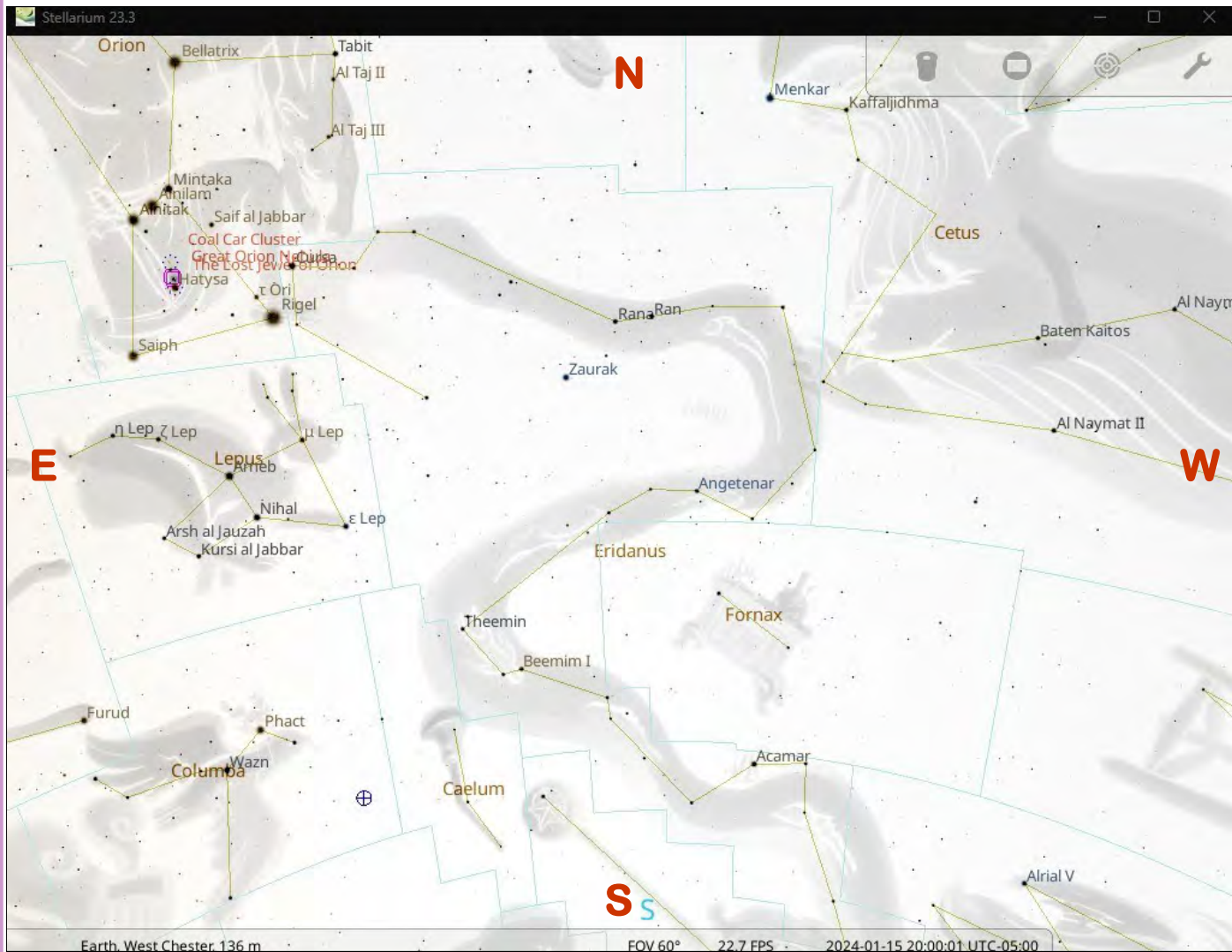
Uranus appeared to be a pale cyan color, while Neptune was depicted as a striking deep blue. Voyager 2 captured images of each planet in separate colors, and the single-color images were combined to create composites. The images of Neptune were enhanced to

(Continued on page 11)

The Sky Over Chester County

January 15, 2024 at 8:00 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
01/01/2024	6:53 a.m. EST	7:24 a.m. EST	4:47 p.m. EST	5:18 p.m. EST	9h 24m 17s
01/15/2024	6:52 a.m. EST	7:22 a.m. EST	5:01 p.m. EST	5:31 p.m. EST	9h 38m 52s
01/31/2024	6:43 a.m. EST	7:12 a.m. EST	5:19 p.m. EST	5:48 p.m. EST	10h 07m 49s

Moon Phases					
Last Quarter	01/03/2024	10:30 p.m. EST	New Moon	01/11/2024	6:57 a.m. EST
First Quarter	01/17/2024	10:52 p.m. EST	Full Moon	01/25/2024	12:54 p.m. EST

January 2024 Observing Highlights

by Michael Manigly, CCAS Observing Chair

1	Moon at apogee (251,599 miles from Earth) 10:28 a.m. EST. Mercury is stationary 11:00 p.m. EST.
2	Earth at perihelion (91.4 million miles from the Sun) 8:00 p.m. EST.
3	Last or Third Quarter Moon 10:30 p.m. EST.
4	Quadrantid meteor shower peaks (ZHR = 100). Spica stands to the lower left of the Moon at dawn.
6	Two shadows on Jupiter are visible in all North America at 9:00 p.m. EST.
10	Moon passes 4° south of Mars 4:00 a.m. EST. Also, the Moon is at its greatest southern declination (-28.1°).
11	New Moon 6:57 a.m. EST. Mercury appears low in the southeast sky around dawn.
13	Moon at perigee (225,102 miles from Earth) 5:36 a.m. EST. Saturn is above the Moon at nightfall.
14	Moon passes south of Saturn 5:00 a.m. EST.
17	First Quarter Moon 10:53 p.m. EST. Moon at ascending node. Jupiter stands to the left of the Moon at nightfall.
20	354 Eleonora at opposition (m = 9.7) and the Moon south of Pleiades (M45).
21	El Nath (the tip of one of the horns of Taurus the Bull) stands to the lower left of the Moon at nightfall.
23	Mercury at descending node. Also, the Moon is at greatest northern declination (+28.2°).
24	Pollux is close and above the Moon as night falls and Castor is above them.
25	Full Moon 12:54 p.m. EST.
26	Regulus is below the Moon in early evening.
27	Uranus stationary 6:00 a.m. EST. Also, Regulus is to the upper right of the Moon in early evening.
29	Moon at apogee (252,138 miles from Earth) 3:14 a.m. EST.

The best sights this month: January finds Venus in the predawn morning and Jupiter at night with Saturn and Mercury making short appearances. Also, look for peak of the Quadrantids meteor showers on the 4th and multiple constellations and deep sky objects available for crazy, cold-weather observers.

Mercury can be found very low in the southwest sky before sunrise shining at mag 0.5. The waning Moon stands south of the planet on the 9th. It stands 11° apart from Venus on the 17th.

Venus shines at mag -4 and stands around 1° north of Beta Scorpii on the 1st with Antares 9° below the planet. It rises around 3 hours before the Sun in the southeast sky. Venus passes north of Antares 3:00 a.m. EST.

Mars may become visible on the 19th when it stands 5° east of Mercury. Look high in the southeast sky shortly before sunrise. Mars and Mercury appear close to each other on the 27th. The planet is a morning sky object for all of 2024.

Jupiter shows up high in the southern sky shining at mag -2.6 on the 1st but dims to -2.4 by the 31st. The planet remains visible until after midnight. Two dark bands are visible and occasionally the Great Red Spot appears near the southern band. The four bright Galilean moons—Io, Europa, Ganymede, and Callisto—undergo transits and occultation in January. Also, the First Quarter Moon passes to the north of Jupiter on the 18th.

Saturn can be found 30° high in the southwest sky an hour after sunset. It lies in Aquarius shining at mag 0.9. The planet sets earlier each night as January progresses. A crescent Moon stands 8° west of Saturn on the 13th and 7° to the east on the 14th.

Uranus shines at mag 5.7 in eastern Aries. It is located halfway between Jupiter and the Pleiades star cluster (M45) and is an easy binoculars target in the evening sky.

Neptune rests 20° east of Saturn along the ecliptic and sets around 8 p.m. EST. The planet is located in Pisces and binoculars will be needed to view this distant planet at mag 7.8. Moon passes south of Neptune in early evening on the 15th.

The Moon: The Full Moon is on the 25th. This month's Full Moon is called the Old Moon. Other

(Continued on page 9)

Through the Eyepiece: M35, a Sparkling Sugar Donut in the Sky

by Don Knabb, CCAS Treasurer & ALCOR



Image credit: sky map made with Stellarium planetarium software

Around 9 or 10 p.m. on January nights you will find the constellation Gemini the Twins high in the south to the upper left of Orion the Hunter, which puts it between Taurus the Bull and Cancer the Crab on the ecliptic. A nice binocular or telescopic object in Gemini is the open cluster M 35, also known as NGC 2168.

M35 is easy to find using the star chart above. This cluster is near the foot of Castor, one of the twins of Gemini.

M35 covers an area approximately equal to the size of the full Moon, so it is a large object. It is easily visible in 50mm binoculars and is just visible to the

naked eye at a dark sky observing site.

Because Messier 35 is so large, you'll need low magnification to appreciate the size of this cluster in a telescope. It stands up well to a bit of moonlight and somewhat light polluted skies, but you will need around a 10" or larger telescope to really notice its companion cluster, NGC 2158. In smaller telescopes with good conditions, it will appear as a faint nebulous patch.

In the photo below M35 is the large open cluster to the left of center and smaller NGC 2158 is in the lower right of the picture.

Open clusters are formed when a

giant molecular cloud collapses under its own weight and quickly fragments into the hundreds, even thousands of stars that make up a star cluster. Unlike many star clusters, M 35 has no central condensation. In fact, many observers see an absence of stars or a "hole" near the center of the cluster, which, with a little imagination, gives it the appearance of a sparkling sugar donut. Even a modest scope reveals curved strands of stars twisting about a sparse central region, like bursting fireworks on a dark summer night.

This wonderful star cluster was discovered by Philippe Loys de

(Continued on page 7)

Eyepiece (Cont'd)

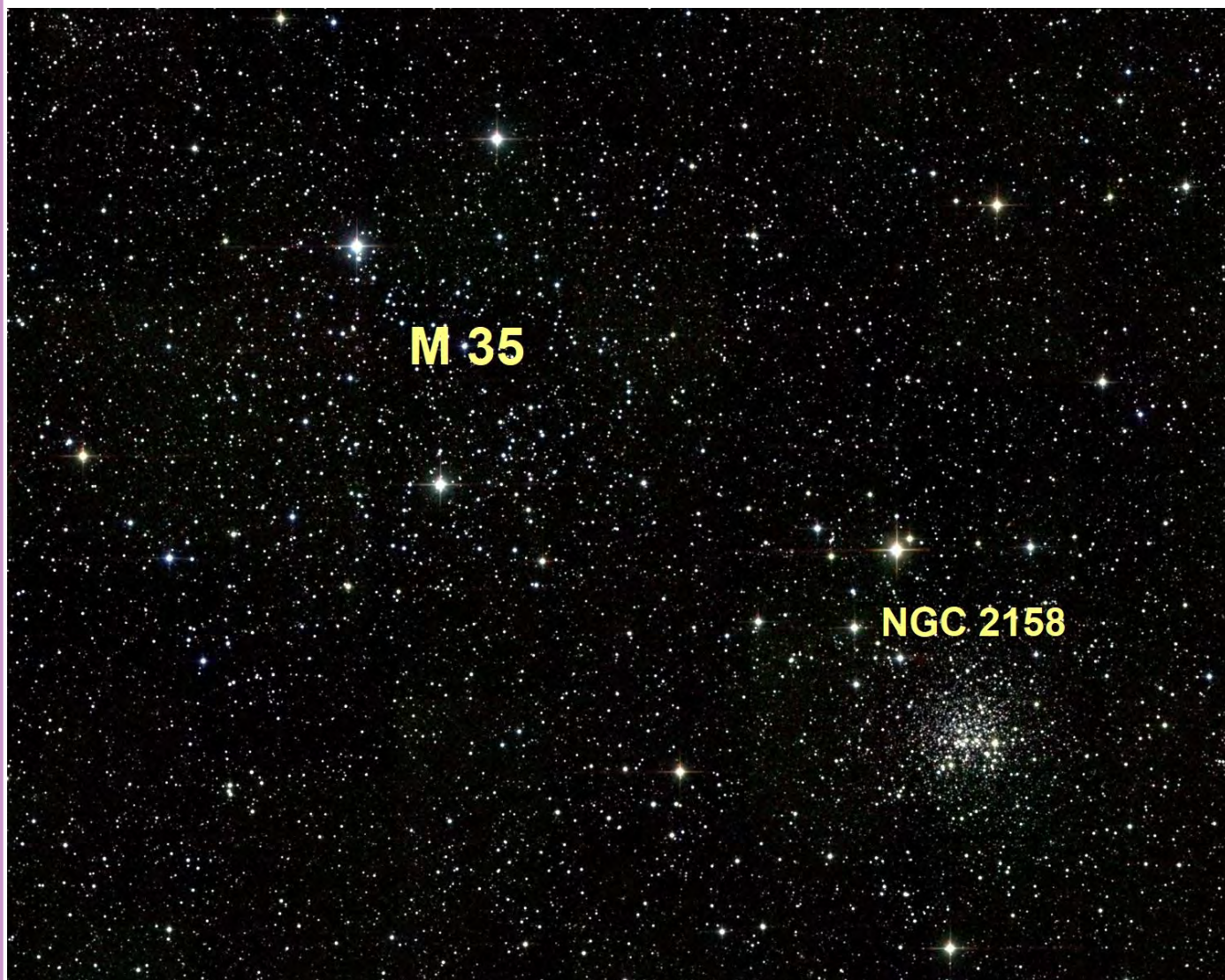


Image credit: Atlas Image, Two Micron All Sky Survey, a joint project of the University of Massachusetts and the Infrared Processing and Analysis Center/ California Institute of Technology, funded by NASA the National Science Foundation.

(Continued from page 6)

Chéseaux in 1745 and rediscovered again by John Bevis in 1750. However, we know it best as Messier Object 35 when it was penned into being by Charles Messier. Messier writes:

“In the night of August 30 to 31, 1764, I have observed a cluster of very small stars, near the left foot of Castor, little distant from the stars Mu and Eta of that constellation. When examining this star cluster with an

ordinary refractor of 3 feet, it seemed to contain nebulosity; but having examined it with a good Gregorian telescope which magnified 104 times, I have noticed that it is nothing but a cluster of small stars, among which there are some which are of more light.”

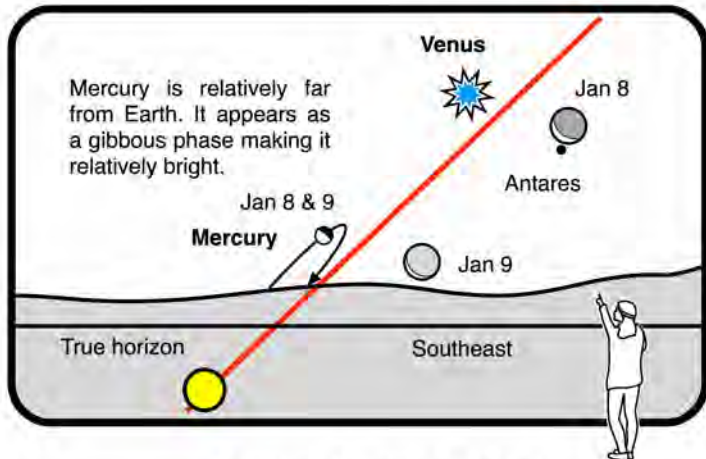
So, add M 35 to your cold weather observing list. It should be easy to find as you hold your binoculars with your gloved hands!

Information credits:

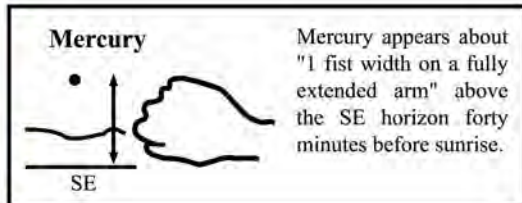
- http://en.wikipedia.org/wiki/Messier_35
- <http://seds.org/messier/m/m035.html>
- Harington, P. (2011, January). 10 Top Winter Binocular Treats, *Astronomy magazine*.
- <http://www.universetoday.com/34034/messier-35/>
- <http://www.oneminuteastronomer.com/2009/03/09/messier-35/>
- http://en.wikipedia.org/wiki/File:Gemini_constellation_map.svg

Observing Mercury, Venus & the Moon
by *Astronomical League*

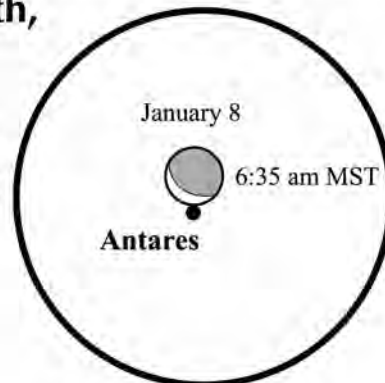
**If you can observe only one celestial event this month,
see this one:**



**January 8 and 9, 2024:
Mercury, Venus, and the moon
forty minutes before sunrise
in the southeast**



**View through
10x50 binoculars
on January 8**



The Scene:

**The crescent moon, Antares, Venus, and
Mercury in the morning twilight**

On January 8, the crescent moon approaches Antares low in the southeast 90 minutes before sunrise.

- The moon occults Antares for viewers living in the southwestern portion of the US. (NM, UT, AZ, and So CA.)

- The event begins at 6:39AM MST, location dependent.

- Use common household binoculars to watch the occultation and begin viewing at 6:35 MST.

- * The very bright object to the moon's left is Venus.

- 40 minutes before sunrise, look for Mercury low in the southeast to the far lower left of Venus.

On January 9, an even thinner crescent moon lies right of Mercury and below brilliant Venus.

January 2024 Speaker Bio (Cont'd)

(Continued from page 3)

Don has been interested in science and the stars ever since he had a night out with his father at age 6 looking at the sky and discussing the possibilities of the universe. He followed every aspect of the Apollo and subsequent programs. He saved up his money as a young kid to purchase an 8-inch reflector telescope and later as an adult moved on to an even larger telescope. He can frequently be found in his backyard or at star parties looking at the stars and

sharing his love for space with the community. He has been a member of the San Francisco Sidewalk Astronomers, moved to Pennsylvania and joined the Chester County Astronomical Society, traveled to Wyoming to see the total solar eclipse, traveled to northern Sweden to see the northern lights, and many national parks for their dark skies, plus great hiking.

One of his current activities is participating in the Astronomical Society of the Pacific's Project Astro which brings hands-on

space science to grade school children. Don is also a NASA Solar System Ambassador giving talks to all age groups about astronomy, NASA programs and space in general.

When Don is not doing astronomy related things, he loves hiking, exercise, cycling, trekking and traveling around the world, plus reading and cooking.

Observing (Cont'd)

(Continued from page 5)

names this month are the Moon After Yule and the Wolf Moon. Spica sits south of the Moon on the evening of the 5th. On the 9th, the Moon passes south of Mercury around morning twilight with Venus high above. The Lunar Straight Wall is visible on the evening of the 19th. Note that the Moon is at apogee twice during January: 1st and 29th.

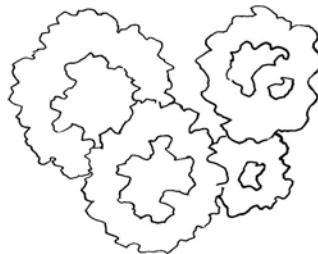
Constellations: Although cold, January is a great time for naked eye star gazing and constellation viewing. Look for Orion, Dorado, Taurus, Lepus, Mensa, Pictor, and Reticulum this month.

Messier/deep sky: January is a great month to observe Messier/deep sky objects including the

(Continued on page 14)

Classic La Para by Nicholas La Para

THE NEW MESSIER LIST



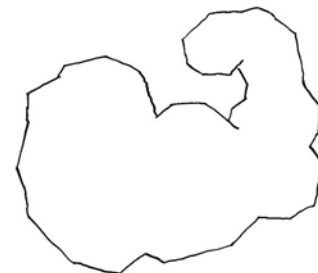
ONION RINGS NEBULA



BATHTUB DRAIN GALAXY



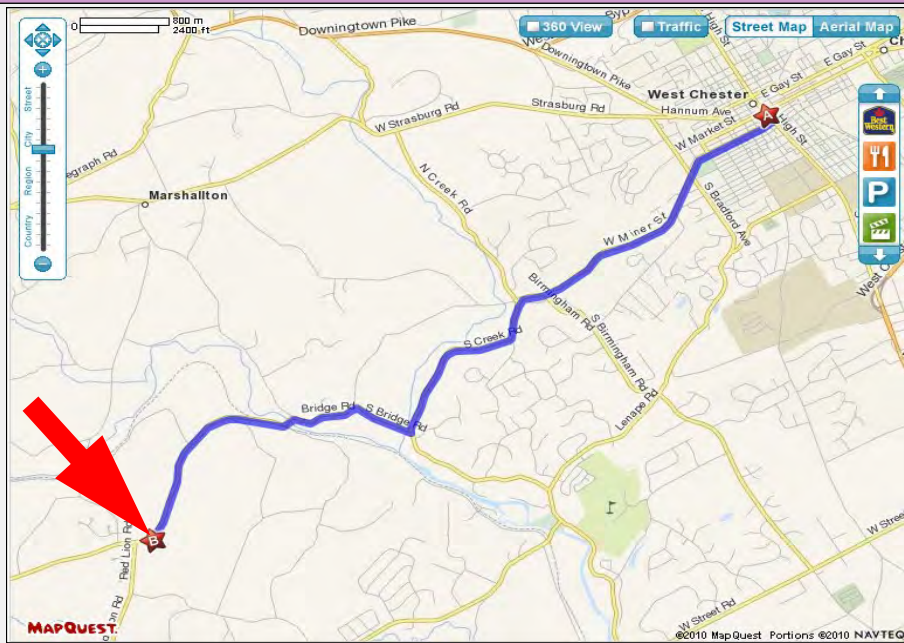
CASPER THE GHOST NEBULA



STEROID ASTEROID

LaPara

CCAS Directions



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).

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.

Night Sky Network: Connecting the 'Dots' with Asterisms

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.

In our [December Night Sky Notes](#), we mentioned that the Orion constellation has a distinct hourglass shape that makes it easy to spot in the night sky. But what if we told you that this is not the complete constellation, but rather, an *asterism*?

An asterism is a pattern of stars in the night sky, forming shapes that make picking out constellations easy. Cultures throughout history have created these patterns as part of storytelling, honoring ancestors, and timekeeping. Orion's hourglass is just one of many examples of this, but did you know Orion's brightest knee is part of another asterism that spans six constellations, weaving together the Winter night sky? Many asterisms feature bright stars that are easily visible to the naked eye. Identify these key stars, and then connect the dots to reveal the shape.

Asterisms Through the Seasons

Try looking for these asterisms this season and beyond:

- **Winter Circle** – this asterism, also known as the Winter Hexagon, makes up a large portion of the Winter sky using stars Rigel, Aldebaran, Capella, Pollux, Procyon, and Sirius as its points. Similarly, the **Winter Triangle** can be found using Procyon, Sirius, and Betelgeuse as points. **Orion's Belt** is also considered an asterism.
- **Diamond of Virgo** – this springtime asterism consists of



the following stars: Arcturus, in the constellation Boötes;

Cor Caroli, in Canes Venatici; Denebola in Leo, and Spica in Virgo. Sparkling at the center of this diamond is the bright cluster **Coma Berenices**, or Bernice's Hair – an ancient asterism turned constellation!

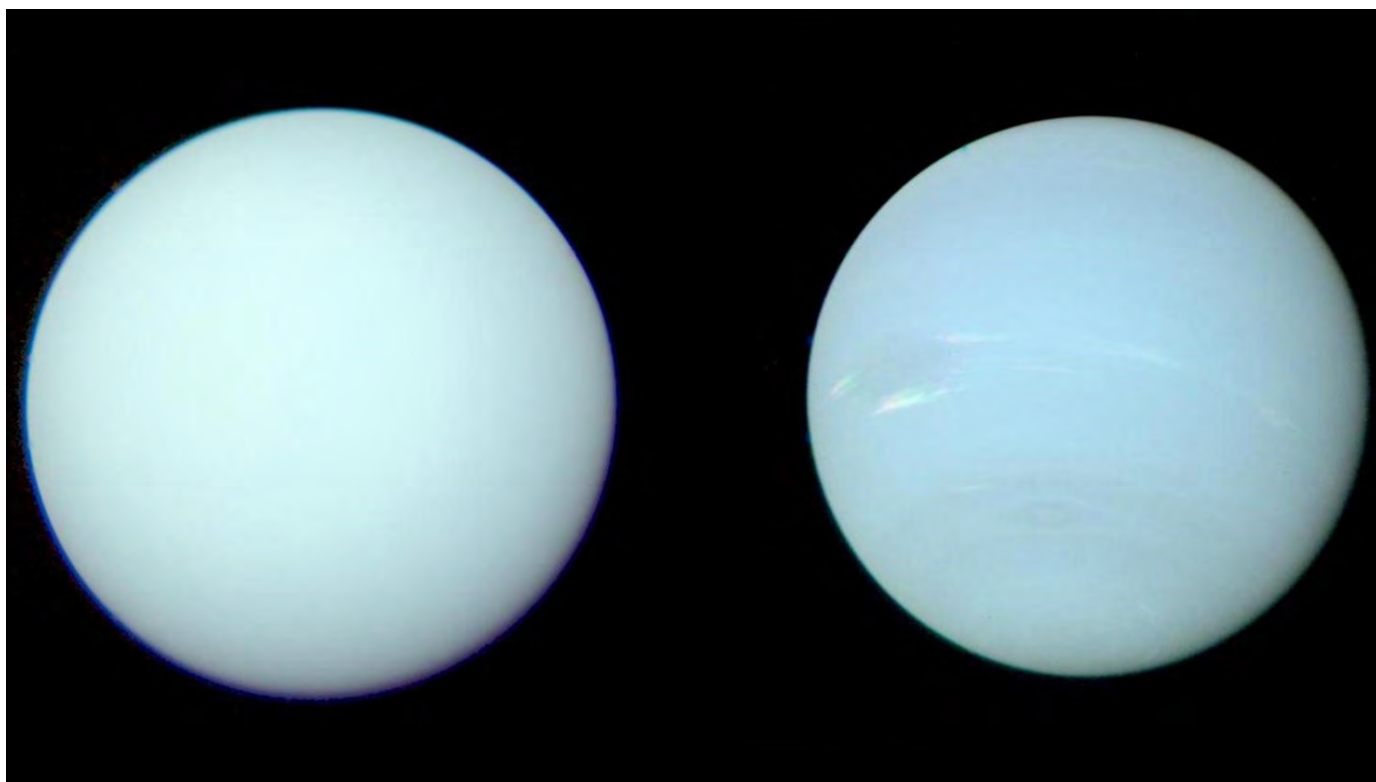
- **Summer Triangle** – as the nights warm up, the Summer Triangle dominates the heavens. Comprising the bright stars Vega in Lyra, Deneb in Cygnus, and Altair in Aquila, this prominent asterism is the

(Continued on page 12)



Stars that make up the Winter Circle, as seen on January 1, 2024
Image Created with Sky Safari

Color-Corrected Images (Cont'd)



Reprocessed images show the true colors of Uranus (left) and Neptune.

(Continued from page 3)

show the white clouds and winds of the planet's atmosphere.

“Although the familiar Voyager 2 images of Uranus were published in a form closer to ‘true’ color, those of Neptune were, in fact, stretched and enhanced, and therefore made artificially too blue,” said Patrick Irwin, a professor of planetary physics at the University of Oxford and author of a new study about the images, in a statement.

“Even though the artificially-saturated color was known at the time amongst planetary scientists — and the images were released with captions explaining it — that distinction had become lost over time.”

Hubble Space Telescope's Imaging Spectrograph and the Very Large Telescope's Multi Unit Spectroscopic Explorer instrument both capture a continuous spectrum of colors, resulting in better color accuracy. Irwin and his team applied data collected using those instruments to the original Voyager 2 images.

The corrected images (above) show that Neptune and Uranus have a similar greenish-blue hue. Both planets have atmospheric haze, but Neptune appears slightly bluer because it has a thinner haze layer.

“Applying our model to the original data, we have been able to reconstitute the most accurate representation yet of the color of both Neptune and Uranus,” Irwin said.

The team's results and the new image, published Thursday in the [Monthly Notices of the Royal Astronomical Society](#), not only address a long-standing question about the ice giants, they pave the way for a better understanding of the enigmatic planets, researchers say.

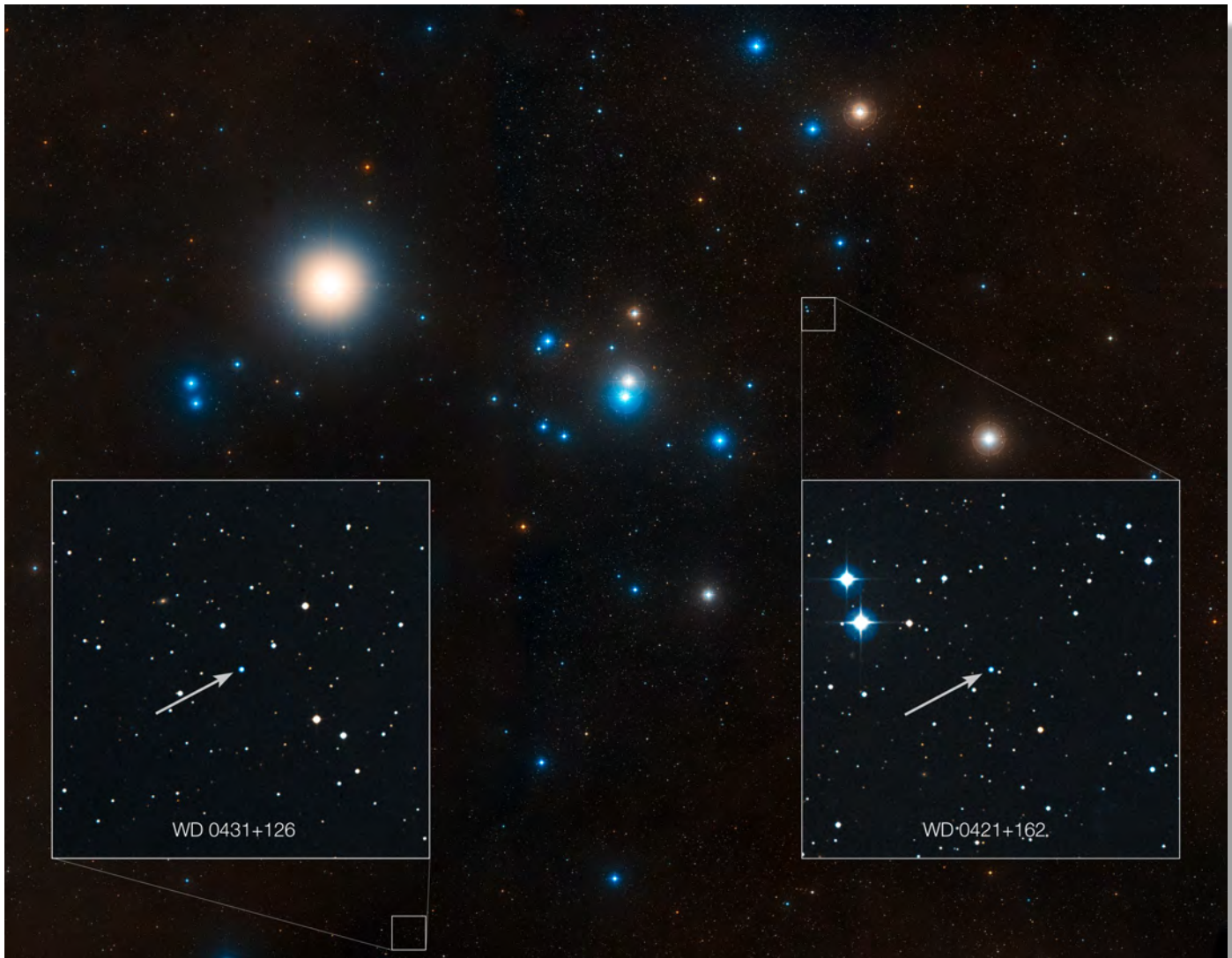
Uranus' Shifting Colors

While solving one planetary mystery, the research team seized the opportunity to answer another: why Uranus seems to change colors as it orbits the sun, as seen in the [video loop](#) online.

A year on Uranus lasts 84 Earth years. While the planet seems greener during its summer and winter solstices, it has

(Continued on page 14)

Night Sky Network (Cont'd)



This image shows the region around the Hyades star cluster, the nearest open cluster to us. The Hyades cluster is very well-studied due to its location, but previous searches for planets have produced only one. A new study led by Jay Farihi of the University of Cambridge, UK, has now found the atmospheres of two burnt-out stars in this cluster — known as white dwarfs — to be “polluted” by rocky debris circling the star. Inset, the locations of these white dwarf stars are indicated — stars known as WD 0421+162, and WD 0431+126. Image Credit: NASA, ESA, STScI, and Z. Levay (STScI)

(Continued from page 10)

inspiration behind the cultural festival [Tanabata](#). Also found is Cygnus the Swan, which makes up the **Northern Cross** asterism.

- **Great Square of Pegasus** – by Autumn, the Great Square of Pegasus can be seen. This square-shaped asterism takes up a large portion of the sky, and consists of the stars: Scheat, Alpheratz, Markab and Algenib.

Tracing these outlines can guide you to objects like galaxies and star clusters. The Hyades, for example, is an open star cluster in the Taurus constellation with [evidence of rocky planetary debris](#). In 2013, Hubble Space Telescope’s [Cosmic Origins Spectrograph](#) was responsible for breaking down light into individual components. This observation detected low levels of carbon and silicon – a major chemical for planetary

bodies. The Hyades can be found just outside the Winter Circle and is a favorite of both amateur and professional astronomers alike.

How to Spot Asterisms

- **Use Star Maps and Star Apps** – Using star maps or stargazing apps can help familiarize yourself with the constellations and asterisms of the night sky.

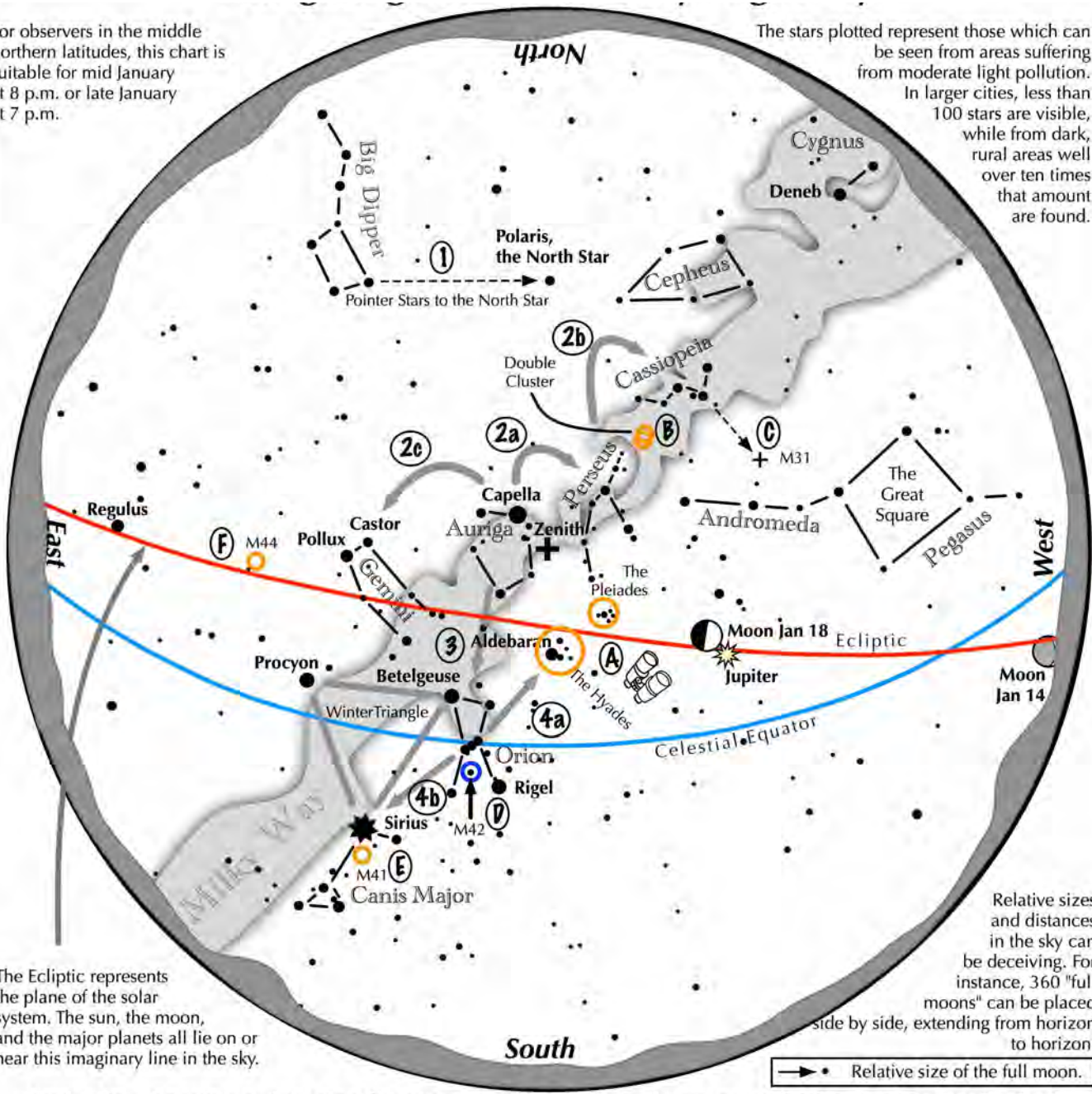
(Continued on page 18)

Navigating the January 2024 Night Sky

by *Astronomical League*

For observers in the middle northern latitudes, this chart is suitable for mid January at 8 p.m. or late January at 7 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 winter night sky: Simply start with what you know or with what you can easily find.

- 1 Above the northeast horizon rises the Big Dipper. Draw a line from its two end bowl stars upwards to the North Star.
- 2 Face south. Overhead twinkles the bright star Capella in Auriga. Jump northwestward along the Milky Way first to Perseus, then to the "W" of Cassiopeia. Next Jump southeastward from Capella to the twin stars Castor and Pollux of Gemini.
- 3 Directly south of Capella stands the constellation of Orion with its three Belt Stars, its bright red star Betelgeuse, and its bright blue-white star, Rigel.
- 4 Use Orion's three Belt stars to point to the red star Aldebaran, then to the Hyades, and the Pleiades star clusters. Travel southeast from the Belt stars to the brightest star in the night sky, Sirius.

Binocular Highlights

A: Examine the stars of the Pleiades and Hyades, two naked eye star clusters. **B:** Between the "W" of Cassiopeia and Perseus lies the Double Cluster. **C:** The three westernmost stars of Cassiopeia's "W" point south to M31, the Andromeda Galaxy, a "fuzzy" oval. **D:** M42 in Orion is a star forming nebula. **E:** Look south of Sirius for the star cluster M41, a star cluster barely visible to the naked eye, lies to the southeast of Pollux. **F:** M44, a star cluster barely visible to the naked eye, lies to the southeast of Pollux.



Color-Corrected (Cont'd)

(Continued from page 11)

a bluer hue during the equinoxes.

The unusual world spins on its side, so one of the planet's poles points toward Earth and the sun during solstices.

During their comparison of images of Uranus for the study, the researchers looked at measurements of the planet's brightness recorded by the Lowell Observatory in Arizona from 1950 to 2016.

The team developed a model comparing light data from the polar regions versus the equatorial regions and determined that the polar regions are more reflective in green and red wavelengths of light. This model involved adding a "hood" of a gradually thickening haze made of methane ice, which has been observed when the planet moves from equinox to solstice.

"In this way, we have demonstrated that Uranus is greener at the solstice due to

the polar regions having reduced methane abundance but also an increased thickness of brightly scattering methane ice particles," Irwin said.

Dr. Heidi Hammel, vice president for science at the Association of Universities for Research in Astronomy, has spent decades studying the ice giants. "The misperception of Neptune's color, as well as the unusual color changes of Uranus, have bedeviled us for decades," said Hammel, who was not involved in the study, in a statement. "This comprehensive study should finally put both issues to rest."

Investigating Ice Giants

Many mysteries remain about the ice giants. The James Webb Space Telescope recently revealed a [new portrait of Uranus](#) showcasing its often invisible rings and hidden features of its atmosphere.

In recent years, researchers have detected [X-rays coming](#)

[from Uranus](#). Scientists also found a weird "blip" in Voyager 2 data indicating the [spacecraft flew through a plasmoid](#), a giant magnetic bubble that likely pinched off part of the planet's atmosphere and floated out into space.

"A mission to explore the Uranian system — from its bizarre seasonal atmosphere, to its diverse collection of rings and moons — is [a high priority for the space agencies](#) in the decades to come," said study coauthor Leigh Fletcher, a planetary scientist at the University of Leicester, in a statement.

"Earth-based studies like this, showing how Uranus' appearance and color has changed over the decades in response to the weirdest seasons in the Solar System, will be vital in placing the discoveries of this future mission into their broader context."

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

Observing (Cont'd)

(Continued from page 9)

Beehive Cluster M44 in Cancer, Caldwell 7 (NGC2403), the Orion Nebula M42, the Horseshoe Nebula (IC434), the Pleiades M45, the Andromeda galaxy M31. Also, NGC457, also known as the Owl Cluster, is viewable.

Comets: 12P/Pons-Brooks passes near the Crescent Nebula (NGC6888) in Cygnus in early twilight on the 12th. Also, 144P/Kushida approaches Aldebaran from the west.

Asteroids: Asteroid Juno is stationary 6:00 a.m. EST on the 15th. To find Asteroid 4 Vesta, start by finding Aldebaran, then look to the east along the southern horn of the bull to find Zeta Tauri. at magnitude 6.4 is available for view on the 19th. Look through binoculars or a small telescope to see.

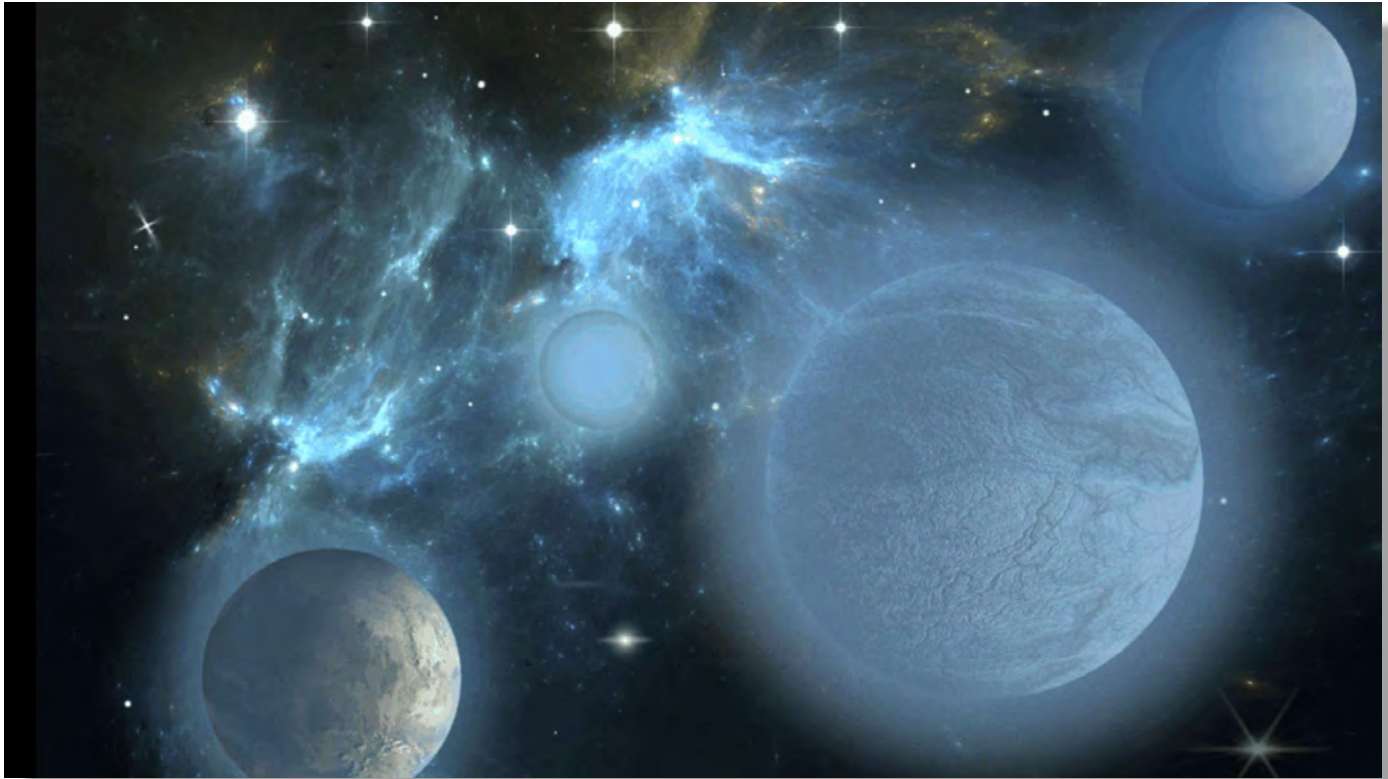
Meteor showers: Quadrantids (ZHR = 100) peak on the 3rd and 4th and are best viewed in the hours before dawn. Through the night look for an occasional fireball.

On the Cover

Lyssa Han's seven-year old son Alaric has provided us with the cover image for the January 2024 Observations newsletter. He has titled his artwork, "The Solar System." I count nine planets in his composition (kids really seem to like Pluto). He certainly has an artistic flair in his color choices and spatial organization! Perhaps he'll contribute more of his space art in the future!

JWST Could Look for 'Carbon-lite' Exoplanet Atmospheres in Search for Alien Life

by Robert Lea, *Space.com*



An illustration of different exoplanets. ©Christine Daniloff, MIT; iStock

When it comes to detecting the presence of liquid water on planets outside the solar system, and thus the conditions needed for life, the James Webb Space Telescope (JWST) might want to look for what is missing rather than what is there. Here's what that means.

A team of researchers, including scientists from the Massachusetts Institute of Technology (MIT) and the University of Birmingham, suggest that if rocky worlds like Earth outside the solar system have a lower quantity of carbon dioxide in their atmospheres than other planets in the same system, this could be a sign they harbor liquid water. And as we know from the formation of life on our own planet, and the conditions needed to

support life here, the presence of liquid water is a key indicator of potential habitability.

Whereas looking for key chemical components that indicate habitability on extra-solar planets, or exoplanets, is only just within reach of current technologies, depleted carbon dioxide is a signature the JWST is now ready to spot.

"The Holy Grail in exoplanet science is to look for habitable worlds and the presence of life, but all the features that have been talked about so far have been beyond the reach of the newest observatories," Julien de Wit, discovery team member and an assistant professor of planetary sciences at MIT, said in a statement. "Now we have a way

to find out if there's liquid water on another planet. And it's something we can get to in the next few years."

Currently, scientists are very good at using instruments to determine how far a planet is from its host star and thus whether it is in that star's "habitable zone"—defined as the region that's neither too hot nor too cold to allow for the existence of liquid water.

In our own solar system, however, Earth, Mars and even Venus are all in the habitable zone around the sun. Yet, only one of those planets currently has the capability to support life as we know it. That means habitability and preserving liquid water for exoplanets isn't all location, loca-

(Continued on page 16)

Carbon-lite Atmospheres (Cont'd)

(Continued from page 15)

tion, location. So, currently, scientists don't have a robust way of confirming if a planet is habitable or not.

Thinking about Earth, Mars and Venus as well as the differences between the trio, the team realized that the only one with habitability, Earth, also has an atmosphere depleted of carbon dioxide in comparison to its habitable zone neighbors.

"We assume that these planets were created in a similar fashion, and if we see one planet with much less carbon now, it must have gone somewhere," Triaud pointed out. "The only process that could remove that much carbon from an atmosphere is a strong water cycle involving oceans of liquid water."

Over the course of billions of years, our planet's oceans have been responsible for depleting huge amounts of carbon dioxide from the atmosphere, meaning it has less now than Venus or Mars.

"On Earth, much of the atmospheric carbon dioxide has been sequestered in seawater and solid rock over geological timescales, which has helped to regulate climate and habitability for billions of years," Frieder Klein, research co-author and a scientist at the Woods Hole Oceanographic Institution (WHOI), said in the statement.

That led the team to think that a similar depletion of carbon dioxide in an exoplanet's atmosphere could also indicate the presence of a liquid ocean.

Conducting a search with these parameters would be best suited to "peas-in-a-pod" planetary systems that, like the solar system, host multiple rocky or terrestrial worlds of similar sizes that orbit their star at similar distances.

The first step in the investigation suggested by the team is to hunt for carbon dioxide and use this as an indicator that the exoplanet targets have an atmosphere. Once multiple planets in a single system are determined to have atmospheres, the next step would be to determine just how much carbon dioxide is in the atmospheres.

This should reveal if one or more of the planets have significantly less carbon dioxide than the others, indicating that it likely has oceans of liquid water and could thus be habitable.

Of course, there is a little more to this method than just comparing carbon dioxide abundances. "Habitability" doesn't equal "inhabited." To check if life may actually exist on an exoplanet highlighted by a lack of carbon dioxide, the team suggests looking for another molecule: Ozone.

Composed of three oxygen atoms, ozone is a molecule created when lifeforms like plants and microorganisms strip carbon dioxide from the atmosphere of Earth then emit oxygen molecules that are struck by sunlight. Ozone is a good gauge of these processes on alien worlds because it is easier to detect in the atmosphere of distant exoplanets than oxygen itself is.

The team says that if a planet's atmosphere shows signs of depleted carbon dioxide coupled with an abundance of ozone, then it could well be both habitable — and inhabited.

"If we see ozone, chances are pretty high that it's connected to carbon dioxide being consumed by life," Triaud added. "And if it's life, it's glorious life. It would not be just a few bacteria. It would be a planetary-scale biomass that's able to process a huge amount of carbon and interact with it."

The researchers believe the JWST is already capable of measuring abundances of carbon dioxide and ozone in multi-planet systems close to Earth.

This includes the TRAPPIST-1 system, located 40 light-years away, which is known to host seven earth-like planets, several of which are in the habitable zone of their cool star.

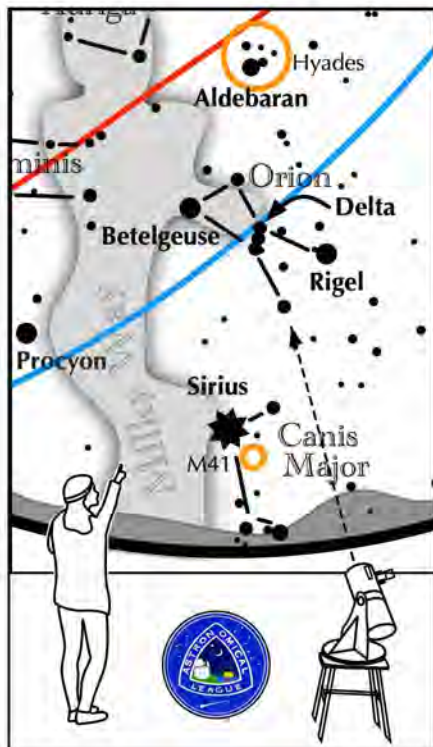
"TRAPPIST-1 is one of only a handful of systems where we could do terrestrial atmospheric studies with JWST," de Wit concluded. "Now we have a roadmap for finding habitable planets. If we all work together, paradigm-shifting discoveries could be done within the next few years."

The team's research was published on Dec. 28 in the journal *Nature Astronomy*.

[Editor's note: Read the [original article](#) online.]

Astronomical League Double Star Activity

by Astronomical League



Other Suns: Delta Orionis (Mintaka)

How to find Delta Orionis on a January evening

Face southeast. Look at Orion above Sirius. Orion's Belt is the three stars of equal brightness between bright Rigel and Betelgeuse. Delta Orionis is the western star of the Belt.

Delta Orionis

A-C separation: 53 sec

A magnitude: 2.4

C magnitude: 6.8

Position Angle: 0°

Colors:

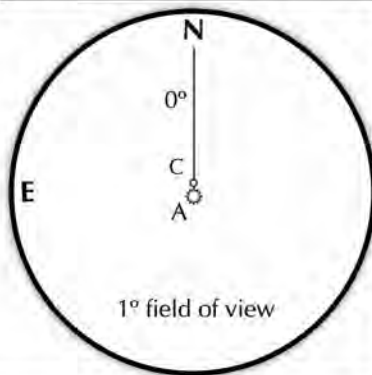
yellow-white

blue-white

Component B is a 14th magnitude star, not visible in most small telescopes.

Suggested magnification: >20x

Suggested aperture: >3 inches



CCAS Funds Library Telescope

by Don Knabb, CCAS Treasurer & ALCOR

CCAS funded the purchase of a "Library Telescope" for the Avon Grove Library. The project was started by the Education Chair of Delaware Astronomical Society, but DAS did not want to fund the purchase. We had sufficient funds for it in our budget, so we paid for the scope. Therefore, it is a joint CCAS/DAS venture.

The Library Telescope program is an Astronomical League program and also an international program. Jim Kerschen of DAS made the required modifications to the scope and Don Miller is our primary support from CCAS for the library and users.

If this first library scope goes well, we will consider a scope



(l. to r.) Dave Payne, Library Director, Joshua Jett, CCLS, Don Miller, CCAS, & Jim Kerschen, DAS

for Atglen Library. They believe they could purchase the scope themselves. CCAS will modify and support the scope. This would be a great collaboration

since we hold a star party at Wolf's Hollow County Park every year with the Atglen Library.

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).



Night Sky Network (Cont'd)

(Continued from page 12)

- **Get Familiar with Constellations** – Learning the major constellations and their broader shapes visible each season will make spotting asterisms easier.
- **Use Celestial Landmarks** – Orient yourself by using bright stars, or recognizable constellations. This will help you navigate the night sky and pinpoint specific asterisms. Vega in the Lyra constellation is a great example of this.

Learn more about how to stay warm while observing this Winter with our upcoming mid-month article on the [Night Sky Network page](#) through NASA's website!

CCAS Membership Information and Society Financials

Treasurer's Report by Don Knabb

<u>Dec. 2023 Financial Summary</u>	
Beginning Balance	\$1609
Deposits	\$365
Disbursements	-\$157
Ending Balance	\$1817

New Member Welcome!

Welcome to our new CCAS member Steve Harner of West Chester, 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.ida.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.



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 & 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.