Observations

A Monthly Publication Of The CHESTER COUNTY ASTRONOMICAL SOCIETY

Vol. 30, No. 10 ***Three-Time*** *Winner of the Astronomical League's Mabel Sterns Award ☼ 2006, 2009 & 2016* *October 2022*

In This Issue

Membership Renewals Due

10/2022	Abbott
	Conrad
	Kraynik
	Lamm
	Lane
	Lester
	Levin
	Mills
	Parker
	Rosenblatt
	Toole
	Vu
	Wirth
	Zug
11/2022	Buczynski
	Holenstein
	Romer
	Scovill
	Smith
12/2022	Damerau
	DeAngelo
	DellaPenna
	Gandhi
	Moynihan
	O'Leary
	Orso
	Watson & Metts

In Memoriam: Roger Taylor

Former CCAS president Roger Taylor passed away on Tuesday, September 6, 2022. Roger served the Chester County Astronomical Society for ten years as its president. A strong supporter of the Society and of astronomy, Roger was a frequent participant in public observing sessions and social events. See pp. 8-9 for his tribute and a personal message from his predecessor as CCAS president, Kathy Buczynski.

October 2022 Dates

2nd • The First Quarter Moon 8:14 pm EDT

8th • The Moon is near Jupiter

9th • Full Moon, the Full Hunter's Moon or the Full Animal Fattening Moon, 4:54 p.m. EDT

13th • Two moon shadows are visible on Jupiter at 7:53 p.m.

17th • Last Quarter Moon, 1:15 p.m. EDT

21st • The Orionid meteor shower peaks

25th • New Moon, 6:48 p.m. EDT

CCAS Upcoming Nights Out

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

☼ Friday, October 14th • CCAS Monthly Observing Session, Myrick Conservancy Center, BRC. The observing session starts at sunset.

☼ Friday, October 28th • CCAS Special Observing Session with the Atglen Public Library at Wolf's Hollow County Park, Atglen, PA. Non-CCAS members must register with the library to attend the event. For more information, contact our Observing Chair, Don Knabb.

☼ Friday, November 18th • CCAS Monthly Observing Session, Myrick Conservancy Center, BRC. The observing session starts at sunset.

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

Summer / Autumn Society Events

October 2022

11th • CCAS Monthly Meeting, Merion Science Center, Room 112. Guest Speaker: Guest speaker: Kevin Peter Hand, PhD, Jet Propulsion Laboratory, Caltech, "Alien Oceans: The Search for Life in the Depths of Space."

13th • The von Kármán Lecture Series: Near Earth Objects – Opportunities for Discoveries, 10:00 pm EDT. Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech.

14th • CCAS Monthly Observing Session, Myrick Conservancy Center, BRC. The observing session starts at sunset.

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

21st • Planetarium show at the Mather Planetarium at WCU, "Spectacular Saturn." For more information, visit the WCU Public Planetarium Shows webpage.

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

28th - CCAS Special Observing Session with the Atglen Public Library at Wolf's Hollow County Park, Atglen, PA. Non-CCAS members must register with the library to attend the event. For more information, contact our Observing Chair, Don Knabb.

November 2022

8th • CCAS Monthly Meeting, Merion Science Center, Room 112. Guest Speaker: Joseph Neilsen, PhD, Assistant Professor of Physics, Villanova University. His presentation is titled "The Shadow of a Sleeping Giant – An Astrophysical Adventure."

10th • The von Kármán Lecture Series: What's in a Name? How We Find, Name, and Investigate Exoplanets, 10:00 pm EDT. Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech.

18th • Planetarium show at the Mather Planetarium at WCU, "Black Holes: The Other Side of Infinity." For more information, visit the WCU Public Planetarium Shows webpage.

18th • CCAS Monthly Observing Session, Myrick Conservancy Center, BRC. The observing session starts at sunset. Last observing session for the year.

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

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

Monthly Meeting Minutes: September 2022

by Bea Mazziotta, CCAS Secretary

- Dave Hockenberry welcomed approximately 25 members and guests as CCAS meetings resumed after the summer break. The meeting was held In person at WCU and online via zoom and YouTube.
- Dave informed attendees that former club president Roger Taylor passed away on September 6, 2022. There will be a celebration of his remarkable life on September 24, 2022 at Downingtown United Methodist Church. To read and/or contribute to his tribute page follow this link: https://www.jamesterryfuneralhome.com/tributes/Roger-Taylor#tributewall
- Don Knabb spoke about upcoming viewing events and star parties. Please visit the club website for dates and details. http://www.ccas.us/
- Don then led a tour of the current night sky including the Ptolemy and Butterfly clusters, the Lagoon, Eagle and Trifid nebulae, and a September favorite, The Wild Duck Cluster.
- The evening's guest speaker was club member and NASA Ambassador John Conrad. His presentation was titled *DART: Double Asteroid Redirection Test, A Pioneering Planetary Defense Mission.*
  - Space exploration continues to give us more and more knowledge of 'what's out there'. Today we know that there are approximately 29,000 NEOs (near earth objects).
  - While the majority are not a threat to Earth, those that are could cause damage ranging from injuries and destruction in a localized area to global devastation and mass extinctions. It's critical that we learn how to deflect these potential impacts.
  - On September 24, 2022 the DART spacecraft will launch on a mission to crash into NEO Dimorphos. Its goal is to gather data at the crash scene and surrounding area, measure the mass of Dimorphos and slow down its speed. Launched on November 23, 2021, the impact is scheduled to happen on September 26, 2022. Stay tuned.

October 2022 CCAS Meeting Agenda

by Bruce Ruggeri, CCAS Program Chair

Our next meeting will be held on October 11, 2022, in person (as well as via Zoom) at West Chester University's Merion Science Center, Room 112. The Science Center is located at 720 S. Church St., West Chester, PA. Guest speaker: Kevin Peter Hand, PhD, Jet Propulsion Laboratory, Caltech, "Alien Oceans: The Search for Life in the Depths of 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 2022-2023 season and beyond. If you are interested in presenting, or know someone who would like to participate, please contact me at programs@ccas.us.

October 2022 Speaker Profile

by Bruce Ruggeri, CCAS Program Chair

Our guest presenter on October 11, 2022 is Kevin Peter Hand, Ph.D., Jet Propulsion Laboratory, Caltech. Dr. Hand is a Pre-Project Scientist on the Europa Lander Mission Concept, and a Staff Scientist and Campaign Science Lead on the Mars 2020 Mission, Perseverance. He is also the Director of NASA's Ocean Worlds Lab http://oceanworldslab.jpl.nasa.gov and a Co-Investigator on the Europa Clipper and Titan Dragonfly Missions. Joining us via Zoom at approximately 7:45 pm, Dr. Hand will present "Alien Oceans: The Search for Life in the Depths of Space."

Presentation Synopsis: A key discovery from the past six decades of solar system exploration is that liquid water oceans may be a common planetary phenomenon. At least six ice-covered moons of the outer solar system present compelling evidence for subsurface oceans, and as such provide highly compelling targets in our search for life beyond Earth, and for the nascent field of comparative oceanography.

These alien oceans of the outer solar system have likely persisted for much of the history of the solar system and as a result they are highly compelling targets in our search for life beyond Earth. Within these oceans may reside a second origin of life itself, and the answer to whether or not we live in a biological universe, or one in which life on Earth represents a biological singularity.

Dr. Hand will explain the science behind why we think we know these oceans exist and what we know about the conditions on these worlds. He will focus on Jupiter's moon Europa, which is a top priority for future missions and provide an overview of approved and proposed missions that will explore these worlds in the coming decades. Dr. Hand will also detail how the exploration of Earth's oceans is helping to guide our understanding of the potential habitability of worlds like Europa.

Biosketch: Dr. Kevin Peter Hand is a planetary scientist at NASA's Jet Propulsion Laboratory in Pasadena, California. His research focuses on the origin, evolution, and distribution of life in the solar system with an emphasis on Jupiter's moon, Europa. His work involves both theoretical and laboratory research on the physics and chemistry of icy moons in the outer solar system. He served as co-chair for NASA's Europa Lander Science Definition team and he is the Project Scientist for the Pre-Phase-A Europa Lander mission.

From 2011 to 2016 he served as Deputy Chief Scientist for Solar System Exploration at JPL. He is a staff scientist and campaign science lead for NASA's Perseverance mission on Mars, a Co-I on the Europa Clipper mission, and a Co-I on the Titan Dragonfly mission. He served as a member of the National Academies Committee on Astrobiology and Planetary Sciences.

His work has brought him to the Dry Valleys of Antarctica, the sea ice near the North Pole, the depths of the Earth's oceans, and to the glaciers of Kilimanjaro. Dr. Hand was a scientist

(Continued on page 14)

Mysterious Deep-space Radio Burst May Have Extreme Origins

by Jeff Nagle, Inverse.com

Over the last 15 years, mysterious radio bursts — first from other galaxies, and then our own — have puzzled astronomers from around the world by repeating irregularly with no clear mechanism to cause it. Were they the collision of black holes? Blasts from supernovae? Ultra-magnetized neutron stars? Aliens?

Two papers released this month dealing with one of these fast radio bursts (or FRBs) might have an answer — for at least some of them. In *Nature*, a team argued that one recently detected FRB is from an unusual spot with an unusual nature. In *Nature Communications*, another team analyzed its oddities to determine that that signal is coming not from one star, but from two.

What's new — Fast Radio Burst 20201124A — as its name might suggest — first showed up on November 24, 2020, at the massive Five-hundred Meter Aperture Spherical Telescope. FAST, which is nestled in the mountains of southwest China, is the world's biggest filled-in radio telescope by a large margin and has been instrumental in better understanding FRBs.

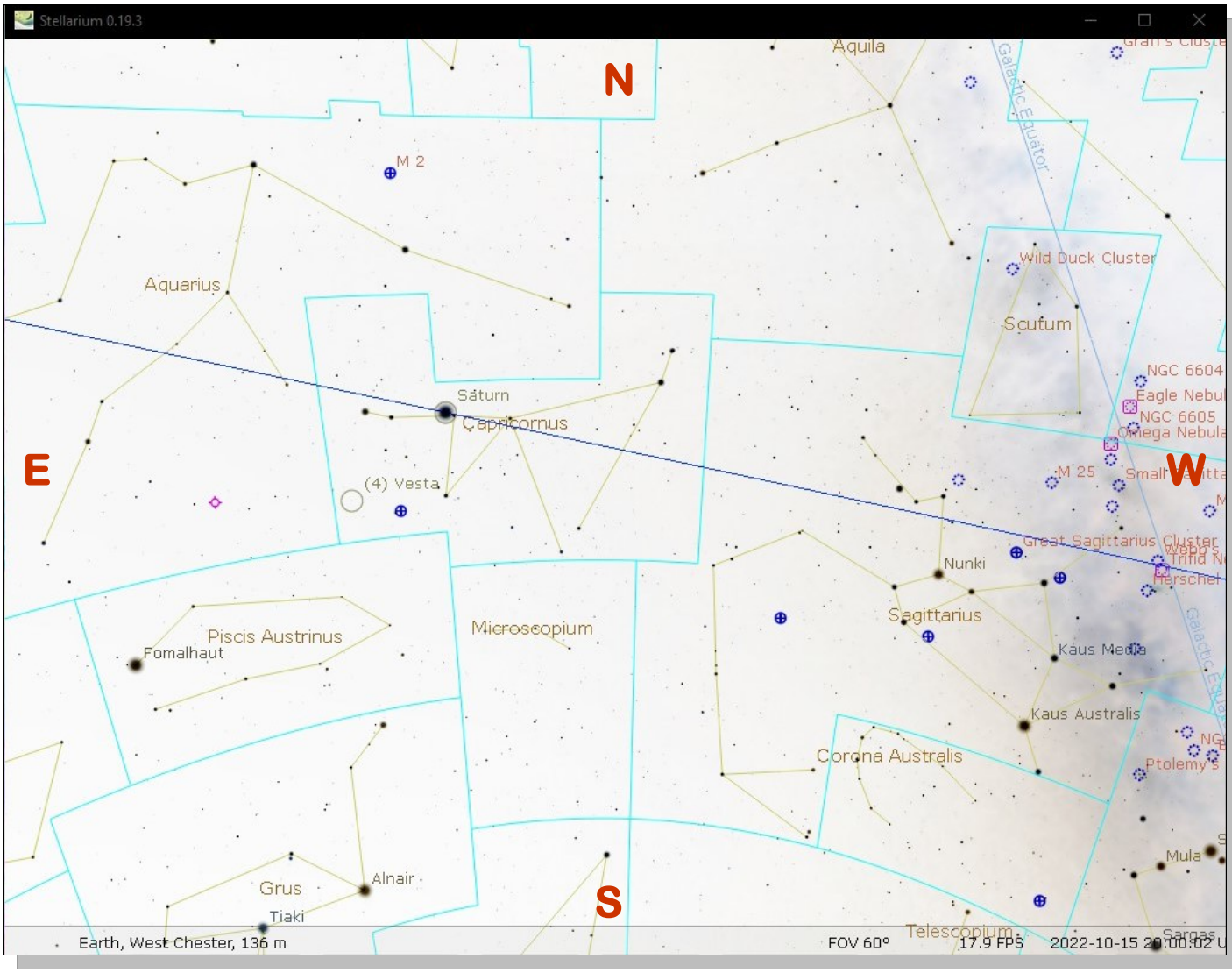
All fast radio bursts are unusual, but FRB 20201124A was an especially odd one. First of all, its polarization and signal strength swung wildly, even over the course of just one single day. Over the course of 82 hours of observation spread over two months, according to the work published in *Nature*, FAST detected 1,863 different bursts.

(Continued on page 12)

The Sky Over Chester County

October 15, 2022 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
10/01/2022	6:31 a.m. EDT	6:58 a.m. EDT	6:44 p.m. EDT	7:11 p.m. EDT	11h 45m 54s
10/15/2022	6:45 a.m. EDT	7:12 a.m. EDT	6:22 p.m. EDT	6:50 p.m. EDT	11h 09m 54s
10/31/2022	7:02 a.m. EDT	7:30 a.m. EDT	6:01 p.m. EDT	6:29 p.m. EDT	10h 30m 49s

Moon Phases					
First Quarter	10/02/2022	8:14 p.m. EDT	Full Moon	10/09/2022	4:54 p.m. EDT
Last Quarter	10/17/2022	1:15 p.m. EDT	New Moon	10/25/2022	6:48 p.m. EDT

October 2022 Observing Highlights

by Don Knabb, CCAS Treasurer & Observing Chair

2	**First Quarter Moon, 8:14 pm EDT**
3	**The Lunar Straight Wall is visible this evening**
8	**The Moon is near Jupiter**
9	**Full Moon, 4:54 p.m. EDT, the Full Hunter's Moon or the Full Animal Fattening Moon**
11	**Uranus is very close to the Moon**
13	**Two moon shadows are visible on Jupiter at 7:53 p.m.**
17	**Last Quarter Moon, 1:15 p.m. EDT**
21	**The Orionid meteor shower peaks**
25	**New Moon and a partial solar eclipse is visible in Europe, Africa and the Middle East, 6:48 p.m. EDT**

The best sights this month: Jupiter and Saturn rule the evening sky, but this is also a great month for open star clusters. The Double Cluster leads this list and is easily visible with binoculars beneath Cassiopeia in the evening sky. By 8:30 the incomparable Pleiades will rise in the east. The Pleiades are perhaps the best object in the entire sky to view with binoculars. Then on October 21st the Orionid meteor shower peaks and the Moon will not interfere with the show of "shooting stars"!

Mercury: October is a great month to see Mercury if you are willing to rise about an hour before dawn. I think I'll wait for the planet closest to the Sun to appear in the evening sky.

Venus: Our sister planet is not visible during October as it passes behind the Sun on October 22nd, an event known as superior conjunction. Venus will return as the "evening star" in December.

Mars: Mars is between the horns of Taurus the Bull on the 30th as it continues to brighten, reaching magnitude -1.2 by month's end.

Jupiter: The king of the planets rules the evening sky shining high and bright in the south. On October 8th Jupiter is close to the Moon.

Saturn: October is an excellent month to view Saturn and its amazing rings. Saturn is well positioned when the sky darkens so set up your telescope and share the view with your neighbors for a sight they won't soon forget.

Uranus and Neptune: Uranus is visible most of the night as it approaches opposition in November. The evening of the 11th Uranus will be less then a degree from the Moon. Neptune is just past opposition, so it is visible all night.

The Moon: Full Moon is on October 9th. This full Moon is the Hunter's Moon, Blood Moon, or Sanguine Moon. Many moons ago, Native Americans named this bright moon for obvious reasons. The leaves are falling from trees, the deer are fattened, and it is time to begin storing up meat for the long winter ahead. Because the fields were traditionally reaped in late September or early October, hunters could easily see fox and other animals that come out to glean from the fallen grains. Probably because of the threat of winter looming close, the Hunter's Moon is generally accorded with special honor, historically serving as an important feast day in both Western Europe and among many Native American tribes. Native Canadians called this the Animal Fattening Moon or the Turns Leaves White Moon.

Constellations: High up in the sky we see the Summer Triangle overhead. Look to the left of the large triangle and you will find another geometric shape in the sky, the Great Square of Pegasus. And a bit toward the east and nearly overhead is the constellation Cassiopeia in the shape of a large "W". According to Greek myths, Cassiopeia was the Queen of Ethiopia. Her husband, Cepheus the King is honored by the constellation just to the west of Cassiopeia that is in the shape of a house. Look for Herschel's Garnet Star in the foundation of the house. This is one of the brightest red stars in the sky. In the east we see the Pleiades rising like a "mini-dipper" of jewels.

Messier/deep sky: October is a great month to study the Andromeda galaxy, M31. This is the most distant object you can ever see without binoculars

(Continued on page 11)

Through the Eyepiece: York County Star Party Observing

by Don Knabb, CCAS Observing Chair & Treasurer

Pleaides image. Credit: NASA, ESA, AURA/Caltech, Palomar Observatory. Taken with the Mount Palomar 48-inch Schmidt telescope

For this month's article I will deviate from the usual description of a single celestial object. Instead, I'll relate the stargazing Barb and I did at the recent York County Star Party. This event is a small-scale regional gathering at Susquehannock State Park, which is south of the city of Lancaster. Yes, the York County Star Party is not held in York County, it is held in Lancaster County. The reason is a bit of a story that I will not include here, you'll need to ask the organizer for the explanation.

Barb and I arrived Wednesday afternoon and set up camp with about a half dozen other campers, including Pete Kellerman. We only stayed two nights, departing Friday morning. Many more campers arrived Friday for the weekend, but we could not stay.

Wednesday evening had mixed clouds and clear skies, so we just sat outside with hand-held binoculars and gazed around the sky, retiring early after a long day of packing, traveling and setting up camp.

Thursday started off dry but by mid-morning we had showers. However, by the afternoon the sky cleared as a weather front moved in from the north, bringing with it crisp, clear skies and a stiff wind.

The early evening saw some clouds pass over but by 9:00 the sky was nearly cloud free. We set up our 120mm APM binoculars. These are essentially two 120mm refractor telescopes mounted side by side with prisms to bring the 90-degree eyepieces together for viewing. They are mounted on a hefty tripod that adjusts in height.

(Continued on page 7)

Eyepiece (Cont'd)

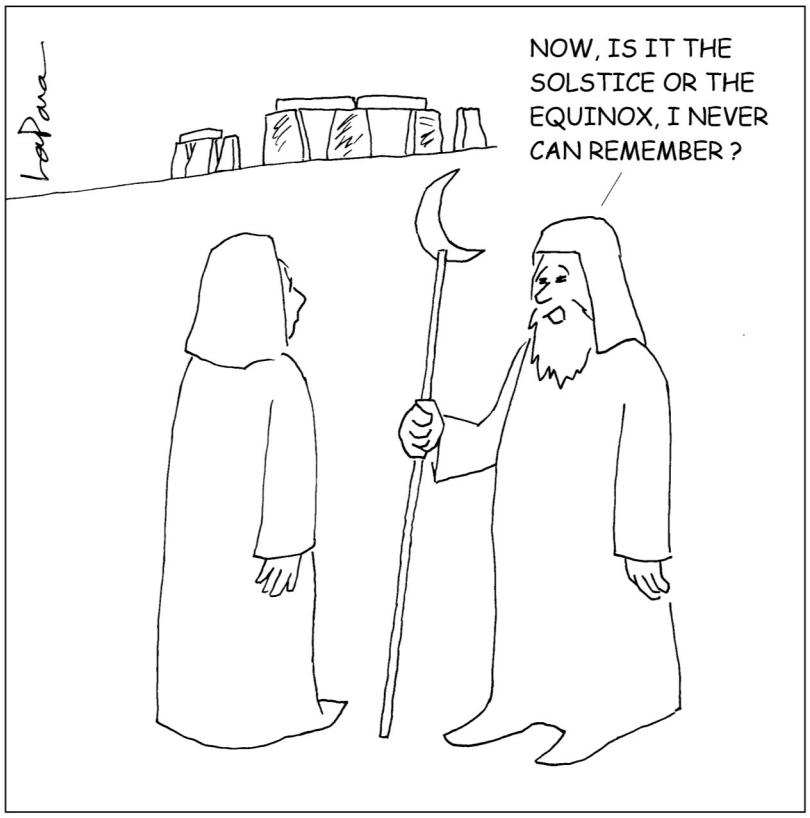
(Continued from page 6)

We started with 18mm eyepieces to provide 37 power for wide field viewing. The first target was Jupiter, which was shining brightly in the east. Once it was in the field of view, we switched to 6.5mm eyepieces to yield about 100 power. At this high a magnification I need to rotate the eyepieces so the images merge, but when that happens the view is amazing. Two eyes really are better than one!

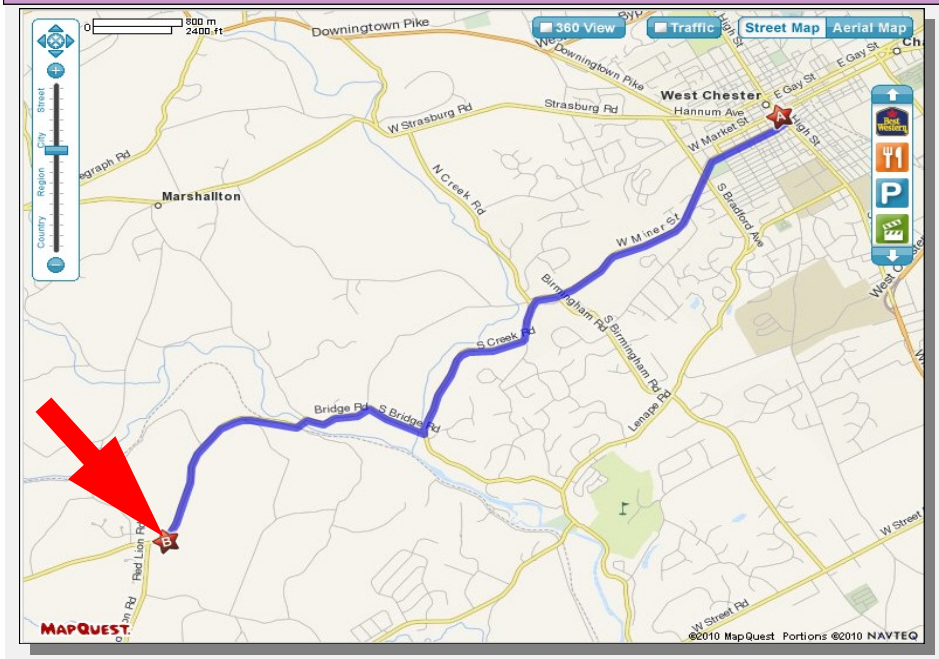
After Jupiter we found Saturn, which was nearly due south. The rings never fail to amaze us. Next on the list was Neptune. That took a few minutes of star hopping from Jupiter, but there was a nice string of stars to lead

(Continued on page 13)

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).

In Memoriam: Roger Taylor

by Former CCAS President Kathy Buczynski

On September 6, 2022, our Society lost one of its most active and longtime members. Roger Taylor, passed away of a sudden illness.

The first time I remember meeting Roger was at the October 1995 CCAS meeting when he gave a presentation on what he called "The $200 Bolt" that maybe should have been called "The misadventures and misfortunes of making your own telescope."

It seems that Roger somehow obtained a stainless steel bolt that he had to find a use for in this new telescope. This is how the November 1995 edition of *Observations* reviewed the talk:

"Our own Roger Taylor had to learn about optics, physics, machining, and engineering in order to create his beautiful 12" telescope. It all grew out of [a] free stainless steel bolt which had to be used somewhere! Roger's humorous talk kept the members smiling and laughing throughout the presentation which ended with the assembly of the 'scope right there in the room. Many thanks to Roger for all his efforts to make this one of the best programs of the year!"

As he spoke and kept us laughing about his misadventures, he assembled the telescope right in front of us. This was my introduction to Roger Taylor. His curiosity, humor and perseverance would be his trademark – along with his booming voice!

Roger was a dedicated member of CCAS. He was not always able to attend every meeting, but his presence was always felt—especially at observing sessions and community events.

Roger & Linda Taylor

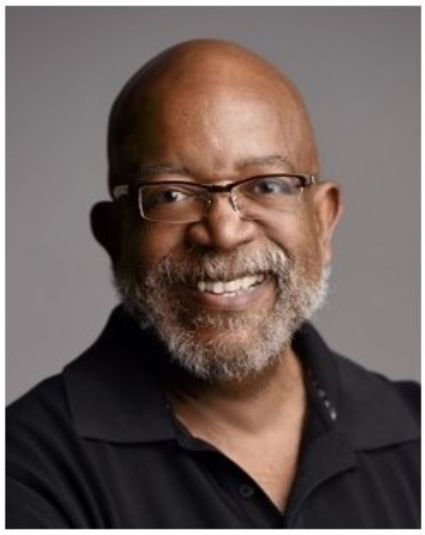
One observing session at Brandywine Valley Association (now Red Clay Alliance), Roger brought his new 7" refractor. Yes, a REFRACTOR! (I've only seen refractors that big at universities!) As he unpacked this beast from his SUV (the counter weight was just shy of what I weighed at the time!) those present were all looking forward to a glimpse of a planet, nebula, or cluster. His generosity did not disappoint.

I was never big on equipment

(Continued on page 9)

Roger presenting CCAS founder Ed Lurcott with a service award from the Astronomical League

In Memoriam Cont'd)



Former CCAS President Roger Taylor

Roger's Tribute

(Adapted from https://www.jamesterryfuneralhome.com/tributes/Roger-Taylor)

Roger K. Taylor 72 of West Chester passed away on Tuesday, September 6, 2022 at Chester County Hospital with his family by his side. He was the husband of Linda (Boden) Taylor, sharing 50 years of marriage.

Born in Martinsville, VA on March 1, 1950, he was the son of the late Robert Keith and Susie (Pritchett) Taylor. Roger graduated from Abington High School and went on to receive his BA from East Stroudsburg University. He was a veteran of the United States Army. Roger worked as a technical specialist in hospital laboratory equipment for various companies. He was a member of Downingtown United Methodist Church, past District Governor of Rotary International, a former President of the Chester County Astronomical Society, and a former member of the Downingtown School Board. Roger enjoyed amateur astronomy, cooking and birding with his wife, camping, photography and participating in amateur theater, including Barley Sheaf in Lionville. Always one to host people at his home, his deep, resonant voice and homemade meatballs will certainly be missed at the annual spaghetti dinner that followed Thanksgiving. Most of all, Roger was a loving husband, father, grandfather and brother who loved spending time with his family, especially his grandchildren.

Surviving in addition to his wife Linda are his children Hillary Taylor-Hartle (Christoffer Taylor-Hartle) of East Greenwich, RI, Adrienne Taylor (Andrei Baumann) of Providence, RI; grandchildren Corwin, Kai and Moriah; sister Michelle Taylor Zdankiewicz (the late William A. Zdankiewicz, Jr.); and nephew Robert Zdankiewicz.

A Celebration of Life service was held on Saturday, September 24, 2022 at 11 AM at Downingtown United Methodist Church, 751 E Lancaster Avenue, Downingtown, PA 19335. A recording of the service is available at https://youtu.be/hteNST8Cpc0 and contributions may be made in Roger's memory to Community MusicWorks.

(Continued from page 8)

for observing: a laser pointer, an easy Dobsonian, or binoculars with some star charts were my mode of observing. But just a few years ago I had another observing opportunity with Roger, his wife Linda and a few others at Don and Barb Knabb's Pocono home called Starry Nights. It was a beautiful clear night with no moon.

One object I always heard about was the North America nebula. It sits near the tail of Cygnus, the Swan and every binocular observing book has it listed. I could never find it in our light polluted Chester County skies. This was my opportunity. Telescopes were no good; it's too diffuse. Roger hands me his binoculars. After star hopping and staring intently at the correct spot in the sky – Eureka! "I SEE MEXICO!" I exclaimed. We all got a good chuckle but I wouldn't have been able to see it without Roger's binoculars.

From June 2005 to May 2009, I found myself as president of the Society, gleefully following in the footsteps of our founder, Edwin Lurcott. During my tenure as president, we continued Introductory Astronomy and Backyard Observing classes for the general public. These classes had evolved into coordination with the Chester County Night School. At this point, I was unable to present any of the classes and Roger, thankfully, took my spot and presented the Sun/Earth class. He was always willing to give a hand to the Society.

In his private life he served his country and his community. As a member of CCAS he served us with his humor, his knowledge, his kindness and his humanity. And he ultimately served our Society as my successor as president – OK, I talked him into it,

(Continued on page 11)

NASA Night Sky Notes: Fomalhaut—Not So Lonely After All

by David Prosper

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

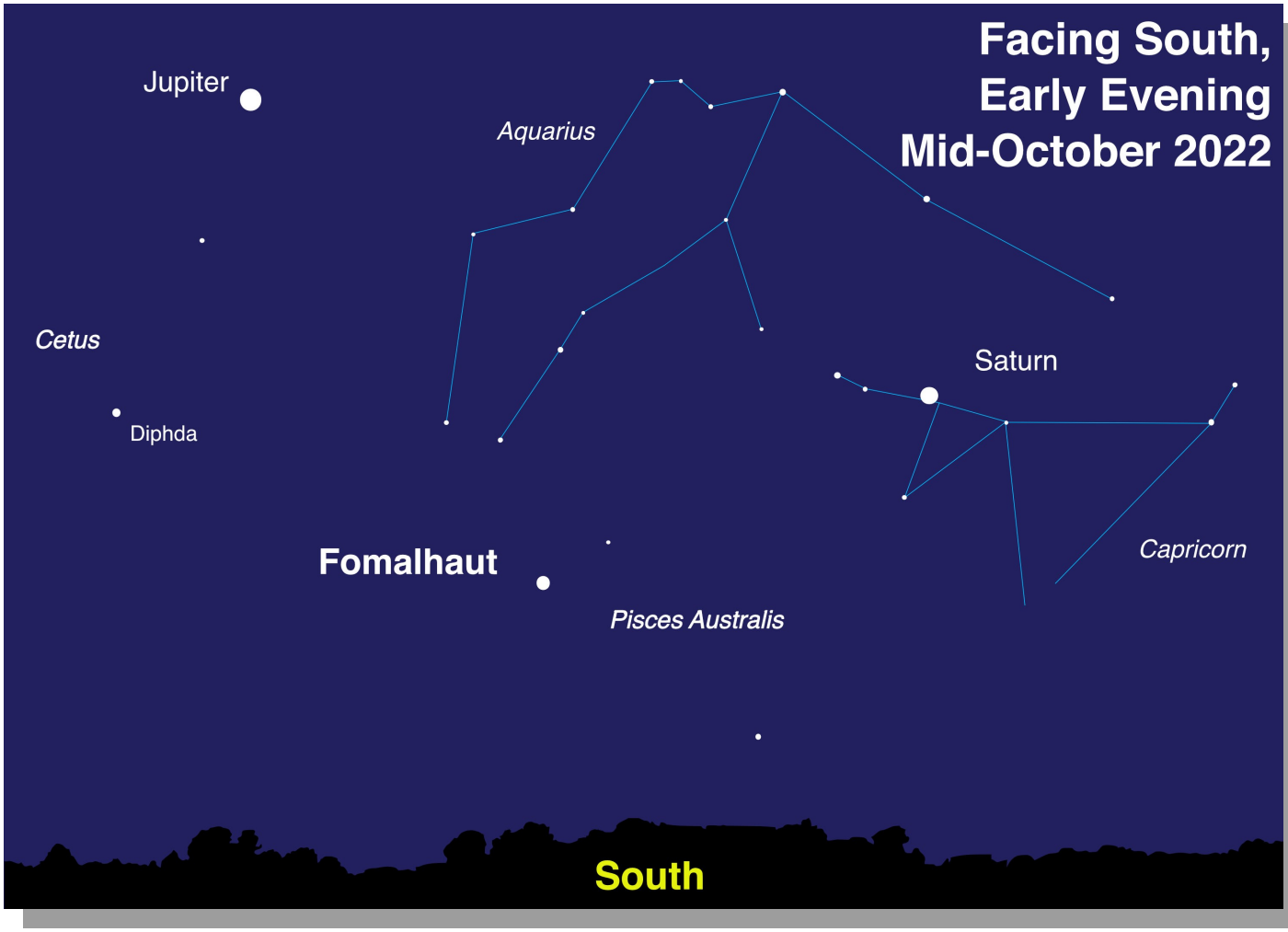
Visit nightsky.jpl.NASA.gov to find local clubs, events, stargazing info and more.

Fall evenings bring a prominent visitor to southern skies for Northern Hemisphere observers: the bright star **Fomalhaut**! Sometimes called "The Autumn Star," Fomalhaut appears unusually distant from other bright stars in its section of sky, leading to its other nickname: "The Loneliest Star." Since this star appears so low and lonely over

the horizon for many observers, is so bright, and often wildly twinkles from atmospheric turbulence, Fomalhaut's brief but bright seasonal appearance often inspires a few startled UFO reports. While definitely out of this world – Fomalhaut is about 25 light years distant from us – it has been extensively studied and is a fascinating, and very identified, stellar object.

Fomalhaut appears solitary, but it does in fact have company. Fomalhaut's entourage includes two stellar companions, both of which keep their dis-

(Continued on page 11)



Sky map of the southern facing sky for mid-latitude Northern Hemisphere observers. With Fomalhaut lying so low for many observers, its fellow member stars in the constellation Piscis Australis won't be easily visible for many without aid due to a combination of light pollution and atmospheric extinction (thick air dimming the light from the stars). Fomalhaut is by far the brightest star in its constellation, and is one of the brightest stars in the night sky. While the dim constellations of Aquarius and Capricorn may also not be visible to many without aid, they are outlined here. While known as the "Loneliest Star," you can see that Fomalhaut has two relatively close and bright visitors this year: Jupiter and Saturn! Illustration created with assistance from Stellarium

Night Sky Notes (Cont'd)

(Continued from page 10)

tance but are still gravitationally bound. Fomalhaut B (aka TW Piscis Austrini, not to be confused with former planetary candidate Fomalhaut b*), is an orange dwarf star almost a light year distant from its parent star (Fomalhaut A), and Fomalhaut C (aka LP 876-10), a red dwarf star located a little over 3 light years from Fomalhaut A! Surprisingly far from its parent star – even from our view on Earth, Fomalhaut C lies in the constellation Aquarius, while Fomalhaut A and B lie in Piscis Australis, another constellation! – studies of Fomalhaut C confirm it as the third stellar member of the Fomalhaut system, its immense distance still within Fomalhaut A's gravitational influence. So, while not truly "lonely," Fomalhaut A's companions do keep their distance.

Fomalhaut's most famous feature is a massive and complex disc of debris spanning many billions of miles in diameter. This disc was first detected by NASA's IRAS space telescope in the 1980s, and first imaged in visible light by Hubble in 2004. Studies by additional advanced telescopes, based both on Earth's surface and in space, show the debris around Fomalhaut to be differentiated into several "rings" or "belts" of different sizes and types of materials. Complicating matters further, the disc is not centered on the star itself, but on a point approximately 1.4 billion miles away, or half a billion miles further from Fomalhaut than Saturn is from our own Sun! In the mid-2000s a candidate planetary body was imaged by Hubble and named Fomalhaut b. However, Fomalhaut b was observed to slowly fade over multiple years of observations, and its trajectory appeared to take it out of the system, which is curious behavior for a planet. Scientists now suspect that Hubble observed the shattered debris of a recent violent collision between two 125-mile wide bodies, their impact driving the remains of the now decidedly non-planetary Fomalhaut b out of the system! Interestingly enough, Fomalhaut A isn't the only star in its system to host a dusty disc; Fomalhaut C also hosts a disc, detected by the Herschel Space Observatory in 2013. Despite their distance, the two stars may be exchanging material between their discs - including comets! Their co-mingling may help to explain the elliptical nature of both of the stars' debris discs. The odd one out, Fomalhaut B does not possess a debris disc of its own, but may host at least one suspected planet.

While Hubble imaged the infamous "imposter planet" of Fomalhaut b, very few planets have been directly imaged by powerful telescopes, but NASA's James Webb Space Telescope will soon change that. In fact, Webb will be imaging Fomalhaut and its famous disc in the near future, and its tremendous power is sure to tease out more amazing discoveries from its dusty grains. You can learn about the latest discoveries from Webb and NASA's other amazing missions at nasa.gov.

**Astronomers use capital letters to label companion stars, while lowercase letters are used to label planets.*

Observing (Cont'd)

(Continued from page 5)

or a telescope to help, although you will need to go to a dark sky site to pick out its soft glow. It is many times further away than any star in the sky. It is so far away that the light you see as that fuzzy spot in the sky left Andromeda 2.5 million years ago! In Chester County skies we need to use binoculars or a telescope, but the view is still wonderful. In addition to M31, you won't need to be up late to catch the wonderful Double Cluster in Perseus and the compact star cluster M34 is just a bit to the south, also in Perseus. Stay up until 10:00 and you can see the star clusters in Auriga rising: M36, M37 and M38.

Comets: There are no bright comets visible during October.

Meteor showers: The Orionid meteor shower peaks in the early morning hours of October 21st. You could see 15 to 20 "shooting stars" per hour. This shower is made up of dust particles from Comet Halley. This is a good year for the Orionid shower because the Moon will not rise until 3 a.m.

In Memoriam (Cont'd)

(Continued from page 9)

but he continued to serve in that role for 10 years! And he grew the Society in its outreach and successfully doubled our membership.

The sky is a little bit brighter now that Roger is in it. I will miss Roger for his stories, his humor and his grace. He will be missed here on Earth and the Chester County Astronomical Society is a better organization because of him.

Radio Burst (Cont'd)

(Continued from page 3)

Speaking with *Inverse*, lead author Fayin Wang of Nanjing University noted that this is the first FRB to show these kinds of variations in its radio waves. It's the widest burst yet seen, its signal is circularly polarized, and the rotation of its signal "had a short-time variation during the first 36 days of FAST observations, followed by a constant RM during the later 18 days" — meaning the signal was interfered with, then free from interference.

Polarization can tell astronomers a lot about FRBs. The degree of polarization in the waves helps to show what it might have passed through on the way to being picked up on a radio telescope, like what makes up the cosmic web between galaxies.

Beyond this, FRB 20201124A wasn't coming from the usual place for a fast radio burst. Instead of coming from a new magnetar formed by the explosion of a supernova or at the center of a galaxy, this signal came from a relatively empty area just outside the arms of a barred spiral galaxy — the same sort of galaxy as the Milky Way.

So for the last two years, this has been an especially mysterious fast radio burst. But Wang and his team believe they understand what's causing 20201124A's strange behavior. This fast radio burst was caused not by just a lone super-magnetized neutron star, but by a super-magnetized neutron star and its larger buddy, a Be star — a blue giant star with strange spectral lines corresponding to rapid rotation.

Mysterious new deep-space radio burst may have extreme origins — study© Provided by Inverse

Magnetars are physically tiny — only about 20 kilometers across — but have more mass than the Sun, and extremely strong magnetic fields, about a trillion times stronger than the Earth's. Be stars, on the other hand, are extremely bright, extremely blue, much larger than the Sun, and are spinning fast enough that they eject a disc of hydrogen around themselves.

Based on their modeling, what the astronomers think happened is this: the magnetar and the Be star were once a binary system. When the soon-to-be magnetar went supernova, the tremendous amount of energy released knocked the two out of alignment, so the magnetar passes through the disk twice every approximately 80 days.

As the magnetar approaches periastron — its nearest approach to the Be star — it passes behind the disc, which in turn interferes with the radio signals it gives off. This would explain the strange signals coming from 20201124A.

Since the first FRB was discovered by an Australian telescope in 2007, the cause of the phenomenon has been unclear. Some of them repeat regularly, some of them spit out signals at random. Many of them seem to be magnetars, but others may be the result of white dwarves. This result is also not the only possible source of FRBs from a binary system — in the past, other researchers have proposed some of them may come from the collapse and merger of binary stars.

Binary pairs might not explain all these mysterious signals, but FSB20201124A's origin isn't alone. Of the about 30 magnetars we know about, another one is already suspected to be in a binary system as well.

The existence and the patterns of FRBs are still mysterious, but Wang notes that this model "can also naturally explain the RM variations of other FRBs" that have already been discovered. These include 2019's FRB 20190520B and 2018's FRB 20180916B. This may not be the explanation for all these bursts, but these results show how extremely complex local environments produce these strange signals.

[Read the original article online at Mysterious new deep-space radio burst may have extreme origins — study (msn.com)]

Eyepiece (Cont'd)

(Continued from page 7)
us to Neptune. It was quite small with the 18mm eyepieces, but a distinct blue color was perceived.

Switching our view toward the south, we found a few deep space objects. M11, the Wild Duck Cluster was first. It is a small cluster that almost looks like a globular cluster but is an open cluster. From there we moved to the left of Ophiuchus to find "the other double cluster", IC4756 and NGC 6633, which are also called the Tweedledee and Tweedledum clusters. They don't compare to the actual Double Cluster but are nice anyway.

Next was the large and sparse open cluster IC4665, a favorite of our Madame Secretary Bea Mazziotta. From there we scanned up and west to find M13, the Great Globular Cluster in Hercules. And that name is appropriate, the glow of a half million or so stars is amazing in the eyepieces. Not far from M13 is our favorite double star, Nu Draconis, also known as "the cats' eyes".

Next it was time to look to the east toward the Great Square of Pegasus and Cassiopeia. You can probably guess that our first target was M31, the Andromeda Galaxy. We could not quite make it out naked eye, but in the binoculars, it was an incredible sight.

While in that area of the sky we star hopped to another galaxy, M33, the Pinwheel Galaxy. However, this galaxy was the faintest smudge against the dark background, best viewed with averted vision.

The next target was easier, M34, an open cluster known as the Spiral Cluster. From there we headed to the area around Cassiopeia. First was an old favorite, NGC 457, the ET or Dragonfly Cluster.

Then we aimed down a bit to find the Double Cluster, which was visible to the naked eye. This is also known as Caldwell 14 and consists of the open clusters NGC 869 and NGC 884. From the Double Cluster it is easy to follow a string of stars to Stock 2, a very large open cluster, also called the Muscleman Cluster.

At this point I switched eyepieces to a set of 21mm Denkmeier 3D eyepieces. These are novel eyepieces that give an illusion of a 3D image that works best with open clusters or globular clusters. Yes, it is an illusion, but it is a great one with a real impression of depth between the stars in the field of view. These work great for the Double Cluster and NGC 457.

Switching back to the 18mm eyepieces we found Herschel's Garnet Star in Cepheus. You might recall that the constellation Cepheus is roughly in the shape of a house with 4 stars making up the house and a star at the peak of the roof of the house. Look for Herschel's Garnet Star in the foundation of the house. Herschel's Garnet Star, called Erakis, is one of the brightest red giant stars in the sky.

Aiming downward from there we found Kemble's Cascade. This is a string of more than 20 stars that appears to "flow" into the compact open cluster NGC 1502.

At some point Barb had enough stars in her eyes and she headed to bed, but I revisited some of the sights from earlier in the evening as I waited for one more object to rise above the trees.

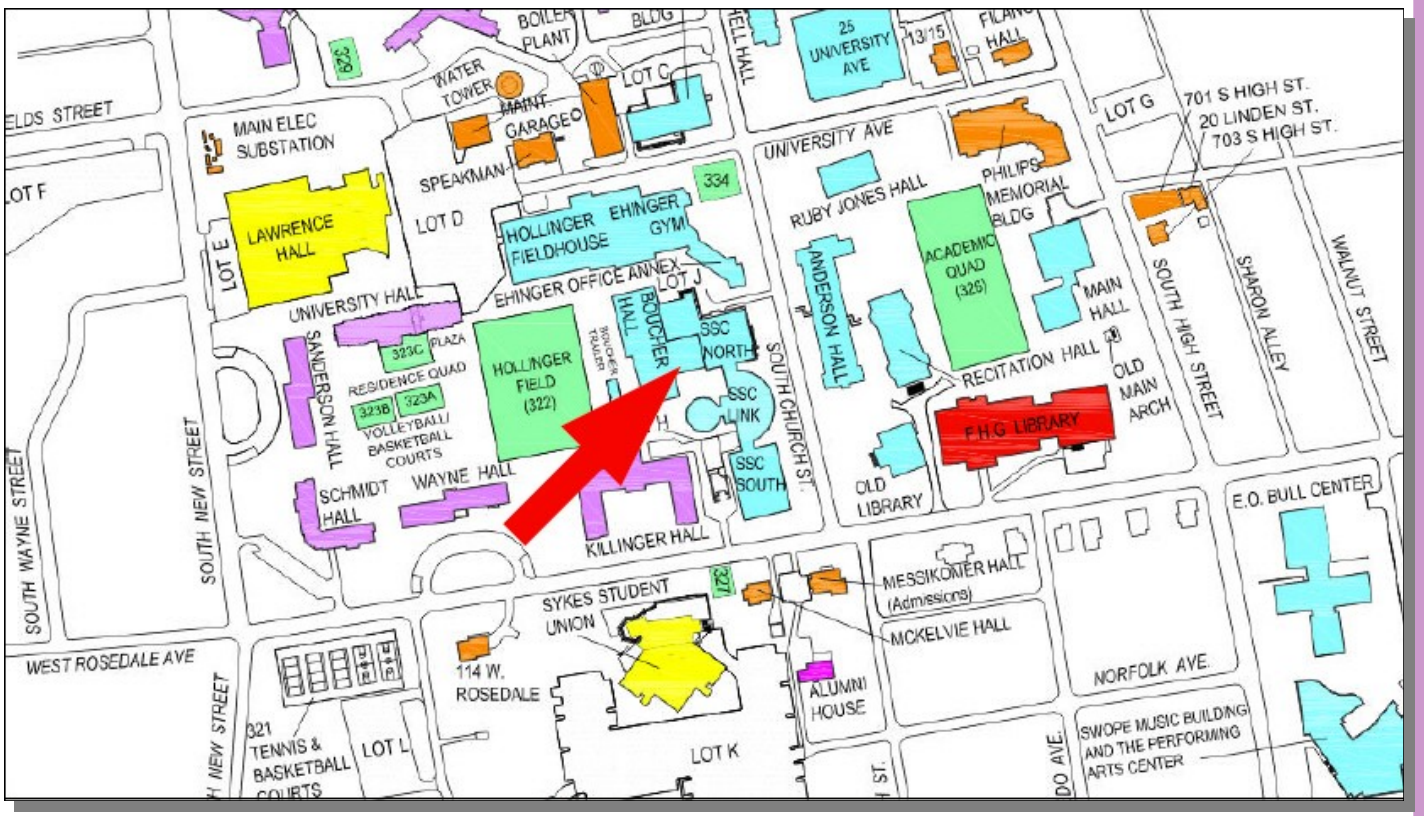
The final target of the evening was the Pleiades, M45. This is a huge cluster that filled the field of view at 37X. I always love seeing the Pleiades, also known as The Seven Sisters, but this evening was special. The combination of the low position in the sky which meant I was looking through a lot of atmosphere, along with the stiff wind, made the stars in the Pleiades twinkle as if they were Christmas lights! This was one of the most beautiful sights I have ever seen in the eyepiece.

This ended an amazing evening of star gazing. If you have never been to a regional star party, I encourage you to attend one. Even though most of your viewing is done alone, there is something special about knowing the field has other stargazers enjoying the night sky. The York County Star Party will be held in 2023 in both June and September. Let's try to get a group of CCAS stargazers to attend these events.

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).



October Presenter (Cont'd)

(Continued from page 3)

onboard James Cameron's 2012 dive to the bottom of the Mariana Trench, and he was part of a 2003 IMAX expedition to hydrothermal vents in the Atlantic and Pacific oceans. He has made nine dives to the bottom of the ocean. In 2011 he was selected as a National Geographic Explorer.

Dr. Hand earned his Ph.D. from Stanford University and bachelors degrees from Dartmouth College. He was born and raised in Manchester, Vermont. His book *Alien Oceans: The Search for Life in the Depths of Space*, was recently published by Princeton University Press.

CCAS Membership Information and Society Financials

Treasurer's Report
by Don Knabb

Sept. 2022 Financial Summary

Beginning Balance	$1369
Deposits	$135
Disbursements	-$0
Ending Balance	$1504

New Member Welcome!

Welcome to our new CCAS members Amanda Borrelli, Chadds Ford, PA, and WCU students Ian Salisbury, Lily Struzzieri, Katherine Drummond, Kimberly Suarez, and Max Hutchinson.

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

Membership Renewals

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

Don Knabb
988 Meadowview Lane
West Chester PA 19382

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

CCAS Information Directory

Join the Fight for Dark Skies!

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

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

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

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

http://www.darksky.org

Dark-Sky Website for PA

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

http://www.POLCouncil.org

Find out about Lyme Disease!

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

http://www.LymePA.org

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

Good Outdoor Lighting Websites

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

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

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

http://www.starrynightlights.com

★ ★ ★ ★ ★

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

Phone: **484-291-1084**

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

Local Astronomy-Related Stores

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

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

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

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

http://www.skiesunlimited.net

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

4403 Main Street
Philadelphia, PA 19127

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

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

http://www.spectrum-scientifics.com

CCAS Information Directory

CCAS Lending Telescopes

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

CCAS Lending Library

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

Contributing to *Observations*

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

Or mail the contribution, typed or handwritten, to:

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

CCAS Newsletters via E-mail

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

CCAS Website

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

http://www.ccas.us

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

CCAS Purpose

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

CCAS Executive Committee

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

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

CCAS Membership Information

The 2021 membership rates are as follows:

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

Membership Renewals

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

Don Knabb
988 Meadowview Lane
West Chester PA 19382-2178

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

*Sky & Tel*escope Magazine

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

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

https://skyandtelescope.org/subscribe/

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

Astronomy Magazine Group Rates

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

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