



# Observations

A Monthly Publication Of The  
CHESTER COUNTY ASTRONOMICAL SOCIETY

Vol. 32, No. 12 **Three-Time** Winner of the Astronomical League's Mabel Sterns Award ☼ 2006, 2009 & 2016 December 2024

## In This Issue

CCAS Autumn/Winter Events .....	2
November 2024 Meeting Minutes.....	2
January 2025 Meeting Agenda.....	2
Lowell Observatory Celebrates a Monumental Renewal.....	3
CCAS Original Astrophotography .....	3
The Sky Over Chester County: December 2024.....	4
December 2024 Observing Highlights .....	5
Through the Eyepiece: The Coal Car Cluster, NGC 1981 .....	6
Binocular Challenge for December 2024 .....	7
Night Sky Notes: Spot the King of Planets .....	8
Navigating the Mid-December 2024 Night Sky.....	10
Classic La Para.....	11
CCAS Directions: Brandywine Red Clay Alliance.....	11
Membership Renewals .....	14
New Member Welcome .....	14
CCAS Directions: WCU Map .....	14
Treasurer's Report .....	14
CCAS Information Directory .....	15-16

## Merry Christmas & Happy New Year!



## Membership Renewals Due

12/2024	Damerau DeAngelo DellaPenna Gandhi O'Leary Toth Watson & Metts
01/2025	Hockenberry & Miller Johnson Jose Kellerman Kennedy McElwee Schier
02/2025	Buki] Ruggeri Sutton

## December 2024 Dates

- 1st • New Moon, 1:21 a.m. EST
- 7th • Jupiter is at opposition
- 8th • First Quarter Moon, 10:26 a.m. EST, and Lunar Straight Wall this evening
- 14th • The Geminid meteor shower peaks in the pre-dawn hours
- 15th • Full Moon, the Full Long Night Moon, 4:01 a.m. EST
- 18th • Mars is close to the Moon
- 22nd • Last Quarter Moon, 5:18 p.m. EST, and the Ursid meteor shower peaks in the pre-dawn hours
- 30th • The second New Moon of the month, 5:26 p.m. EST



## CCAS Holiday Party

CCAS will host its annual holiday party for members and their families on Tuesday, December 10, 2024, at Iron Hill Brewery in West Chester. This is the same location the event was held for the past two years.

The restaurant is located at 3 West Gay St. and its phone number is 610-738-9600. We'll meet at 6 p.m. starting with appetizers and drinks with dinner to follow. This is a great venue, with a semi-private space Iron Hill calls "the Dugout" in the back of the restaurant. There are two parking garages about one block away.

(Continued on page 2)

## Autumn/Winter Society Events

### December 2024

**10th** • CCAS Annual Holiday Party, Iron Hill Brewery & Restaurant, West Chester, PA. The gathering starts at 6:00 p.m. EST.

**13th** • West Chester University Planetarium Show: “Guardians of the Andromeda Galaxy,” in the Schmucker Science Building. The show starts at 7 p.m. and runs approximately one hour in length. For more information and reservations, visit the [WCU Public Planetarium Shows](#) webpage.

**20th** • Open call for articles and photographs for the January 2025 edition of [Observations](#).

**22nd** • December Solstice, 4:20 am EST. First day of winter in northern hemisphere.

**26th** • Deadline for newsletter submissions for the January 2025 edition of [Observations](#).

### January 2025

**14th** • CCAS Monthly Meeting, in person (as well as via Zoom) at West Chester University’s Merion Science Center, Room 112. Guest Speaker: Dr. Bhuvnesh Jain, Dept of Astronomy and Astrophysics, University of Pennsylvania, “Dark Matter and Dark Energy and their Roles in Galaxy Formation and Evolution.”

**20th** • Open call for articles and photographs for the February 2025 edition of [Observations](#).

**26th** • Deadline for newsletter submissions for the February 2025 edition of [Observations](#).

## Holiday Party (Cont’d)

*(Continued from page 1)*

CCAS will be hosting appetizers only, so each person is responsible for your own drinks, entrees, and desserts. To make it easy on the wait staff, they are putting all the dinners together on one bill, SO BE SURE TO BRING CASH to reimburse us for the dinner portion. This makes it much easier on the restaurant folks who will be serving us and allows them to give us more attention.

Of course, spouses, friends and family members are welcome to join us for an evening of holiday cheer, good company, and good food. Please let Dave Hockenberry or Don Knabb know ASAP if you are attending and how many are in your party so we can let the restaurant know an approximate total number of people will be attending.

## November 2024 Meeting Minutes

by Bea Mazziotta, CCAS Secretary

- The November 2024 CCAS meeting was held in person on November 12th at West Chester University, as well as on YouTube and Zoom.
- Dave Hockenberry, CCAS president, welcomed members and guests. He thanked those who participated in the recent event held at the Helicopter Museum on November 2nd. It was a successful event and very well attended. CCAS will continue to participate in upcoming Museum events.
- Dave confirmed that the holiday party will take place in The Bull Pen area at Iron Hill Brewery in West Chester. The date is December 10th with a start time of 6 PM.
- Dave announced that Mike Manigly has retired from his post as CCAS Observing Chair. Many thanks to Mike for an outstanding job during his tenure.
  - Don Miller will be filling in temporarily until a new chair is installed. Anyone who is interested in the position please contact Dave Hockenberry, Don Knabb or Mike Manigly to discuss details.
- Bruce Ruggeri, Program Chair, introduced the evening’s speaker, Dr. Ravi Sheth. His presentation, “Making black hole out of... light? New perspectives” explored the possibility that light, as a form of energy, could make a black hole.
  - Dr. Sheth is a full professor and graduate chair at the UPenn Dept. of Physics and Astronomy.
  - His areas of interest include Cosmology, Galaxy Formation and Stochastic (involving chance, probability, random variables) processes.

## January 2025 CCAS Meeting Agenda

by Bruce Ruggeri, CCAS Program Chair

Our next meeting will be held on January 14, 2025, 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. Our guest speaker is Dr. Bhuvnesh Jain, Dept of Astronomy and Astrophysics, University of Pennsylvania. His presentation is titled, “Dark Matter and Dark Energy and their Roles in Galaxy Formation and Evolution.”

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

As for future meetings, we are looking for presenters for beyond our 2024-2025 season. If you are interested in presenting, or know someone who would like to participate, please contact me at [programs@ccas.us](mailto:programs@ccas.us).

## Lowell Observatory Celebrates a Monumental Renewal

courtesy David J. Eicher, Astronomy.com



The Lowell Observatory's trustee, Lowell Putnam, is the great-grandnephew of Percival Lowell. He spoke proudly on the morning of the observatory's rededication. Credit: David J Eicher

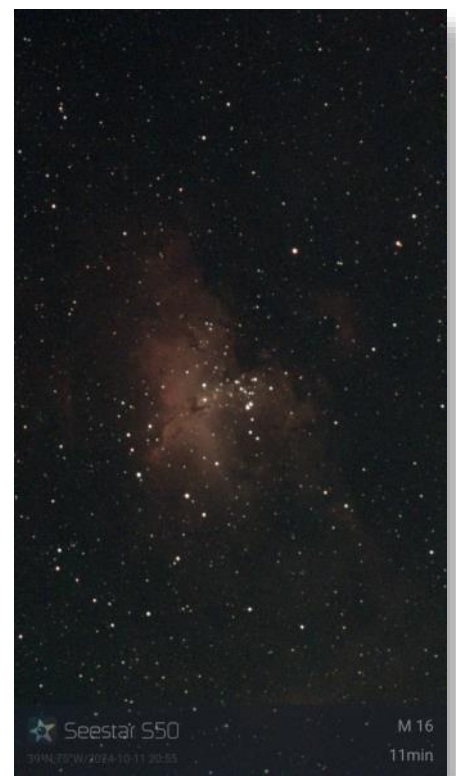
On Saturday, November 16, 2024, in Flagstaff, Arizona, the astronomy world changed a bit.

Lowell Observatory has long been a beacon of history in the cosmic universe. Here, Boston Brahmin Percival Lowell founded an institution to study the heavens from the far west in 1894. Here he famously studied Mars, an early obsession, believing it to be crisscrossed with canals that indicated an alien civilization. Here, one of Lowell's associates, Vesto M. Slipher, employed his famous spectrograph with the observatory's 24-inch Clark refractor to discover that most "spiral nebulae," as

(Continued on page 7)

## CCAS Original Astrophotography

by CCAS member Michael Hopper, Jr.

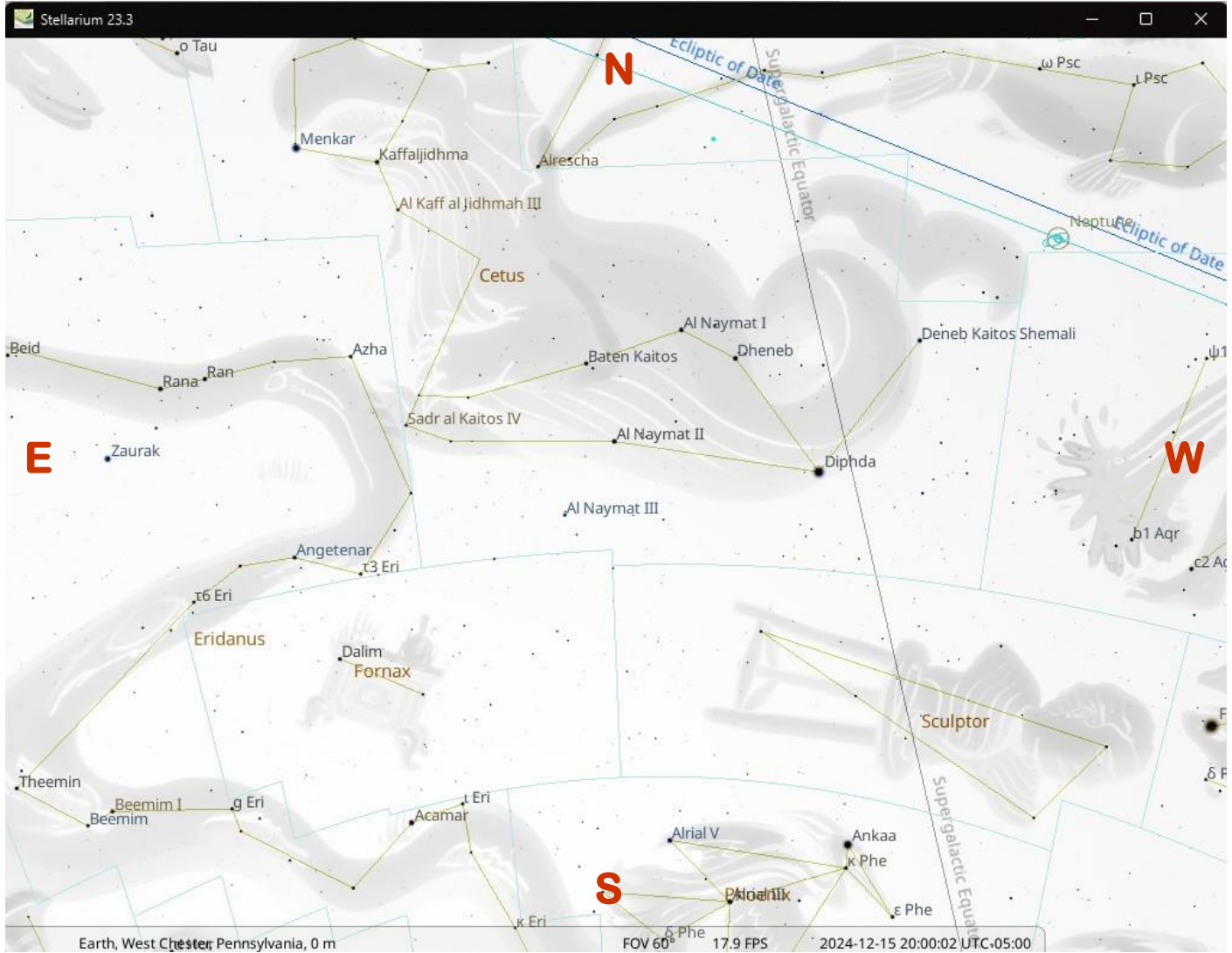


CCAS member Michael Hopper, Jr. captured these images of the Andromeda Galaxy (M31), the moon, and the Eagle Nebula (M16) at our public observing event on Friday October 11, 2024, at Wolf's Hollow Park in Atglen, Pa using his Seestar S50 smart telescope.

# The Sky Over Chester County

December 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](http://www.stellarium.org).



Date	Civil Twilight Begins	Sunrise	Sunset	Civil Twilight Ends	Length of Day
12/01/2024	6:35 a.m. EST	7:05 a.m. EST	4:37 p.m. EST	5:07 p.m. EST	09h 32m 13s
12/15/2024	6:46 a.m. EST	7:17 a.m. EST	4:38 p.m. EST	5:08 p.m. EST	09h 20m 59s
12/31/2024	6:53 a.m. EST	7:24 a.m. EST	4:47 p.m. EST	5:17 p.m. EST	09h 23m 24s

Moon Phases					
			New Moon	12/01/2024	1:21 a.m. EST
First Quarter	12/08/2024	10:26 a.m. EST	Full Moon	12/15/2024	4:01 a.m. EST
Last Quarter	12/22/2024	5:18 p.m. EST	New Moon	12/30/2024	5:26 p.m. EST

**December 2024 Observing Highlights**  
*by Don Knabb, CCAS Interim Observing Chair*

1	<b>New Moon, 1:21 a.m. EST</b>
7	<b>The elusive Lunar X is visible at 11:00 p.m. EST, and Jupiter is at opposition, so it is visible all night</b>
8	<b>First Quarter Moon, 10:26 a.m. EST, and the Lunar Straight Wall is visible</b>
14	<b>The Geminid meteor shower peaks in the pre-dawn hours</b>
15	<b>Full Moon, the Full Long Night Moon, 4:01 a.m. EST</b>
18	<b>Mars is close to the Moon</b>
22	<b>Last Quarter Moon, 5:18 p.m. EST, and the Ursid meteor shower peaks in the pre-dawn hours</b>
30	<b>The second New Moon of the month, 5:26 p.m. EST</b>

**The best sights this month:** The Geminid meteor shower and the Lunar X are highlights of December. Planetary viewing is also excellent with Venus, Mars, Jupiter, Saturn, Uranus and Neptune visible.

**Mercury:** Mercury is an early morning planet during December.

**Venus:** The “evening star” is impossible to miss in the western sky not long after sunset. On December 4th Venus is close to the crescent Moon.

**Mars:** The red planet rises around 8:30 early in the month, so wait until late evening to search for our neighbor planet. Mars is close to M44, the Beehive Cluster, early in the month and close to the Moon on December 18th.

**Jupiter:** Jupiter reaches opposition on December 7th, so it will rule the evening sky. This is the best apparition in a decade for northern observers! Look for the four Galilean moons: Io, Europa, Ganymede and Callisto. Watch their dance around Jupiter that changes by the hour.

**Saturn:** Look for the ringed planet high in the south just after darkness falls.

**Uranus and Neptune:** Uranus is about 7° southwest of the Pleiades, so use the Seven Sisters as a starting point to “star hop” to Uranus. Neptune sets before midnight by the end of the month, so look for it just after darkness falls.

**The Moon:** Full Moon is on December 15th. This is the Full Cold Moon, or the Full Long Night Moon. It is also sometimes called the Moon before Yule. The term Long Night Moon is appropriate because the midwinter night is indeed long, and because the Moon is above the horizon for a long time. The midwinter full Moon has a high trajectory across the sky because it is opposite a low Sun. Native Canadians called this the Chief Moon or the Elder Moon.

**Constellations:** Ah, December skies! It’s cold enough to be quite clear, but not the freezing, bone chilling cold of January and February. It seems odd to go outside after sunset and still see the Summer Triangle, but indeed there it is diving into the west. Look to the east and you will see the constellations that make it worth dressing warmly and spending some time outside during the cold December nights. Bright Capella in Auriga is high in the east to the upper left of the “V” of Taurus the Bull. Just behind Taurus is Orion the Hunter, the most easily recognized constellation of the winter months.

**Messier/deep sky:** There is so much to see in the December sky you won’t be lacking targets if Santa brought you any new astronomy equipment! If it is not too cold, there is a long list of beautiful objects in easy reach of a small telescope or any pair of binoculars. First look for the Andromeda galaxy high in the south, then head east to the three open clusters in Auriga. Use a low power eyepiece in your telescope and zoom in to the Pleiades, although they are better captured in binoculars. Then look nearly straight up and find the Double Cluster in Perseus. And of course, don’t miss M42, the Orion Nebula, which is a truly awesome telescopic object.

**Comets:** There are no bright comets in the December sky.

**Meteor showers:** The Geminid meteor shower, one of the most reliable meteor showers of the year, peaks on the night of December 13/14. The best

*(Continued on page 14)*

## Through the Eyepiece: The Coal Car Cluster, NGC 1981

by Don Knabb, CCAS Treasurer & ALCOR

As the cold months arrive, I always try to find interesting objects that can be seen using hand held binoculars. Once you have them focused, you can scan the sky with your gloves on and not get terribly cold.

Probably the best winter object to view is the Orion Nebula, M42. NGC 1981 is a nice open cluster that is easily found after you have zeroed in on the nebula. Slowly pan your binoculars upwards from M42 toward Orion's belt stars and you should

come across a small cluster of stars. This is known as the "Coal Car Cluster" and is also designated Collinder 73.

The cluster lies 1,300 light years from Earth and consists of around ten or so 6th and 7th magnitude stars forming a distinctive shape. The stars of the cluster are spread over a region of the sky nearly half a degree across (only slightly less than the face of the Moon) but the individual stars of the cluster are too faint to be seen with the naked

eye. Some see it as the 'coal cart' while others see it as a dog. Some liken its shape to an alligator or crocodile seen from above with the easternmost star as the snout, the westernmost the tail and the two groups of three stars in the middle two sets of legs.

NGC 1981 was discovered by John Herschel on January 4<sup>th</sup>, 1827. Its apparent magnitude is 4.2. The cluster and nearby neb-

*(Continued on page 12)*

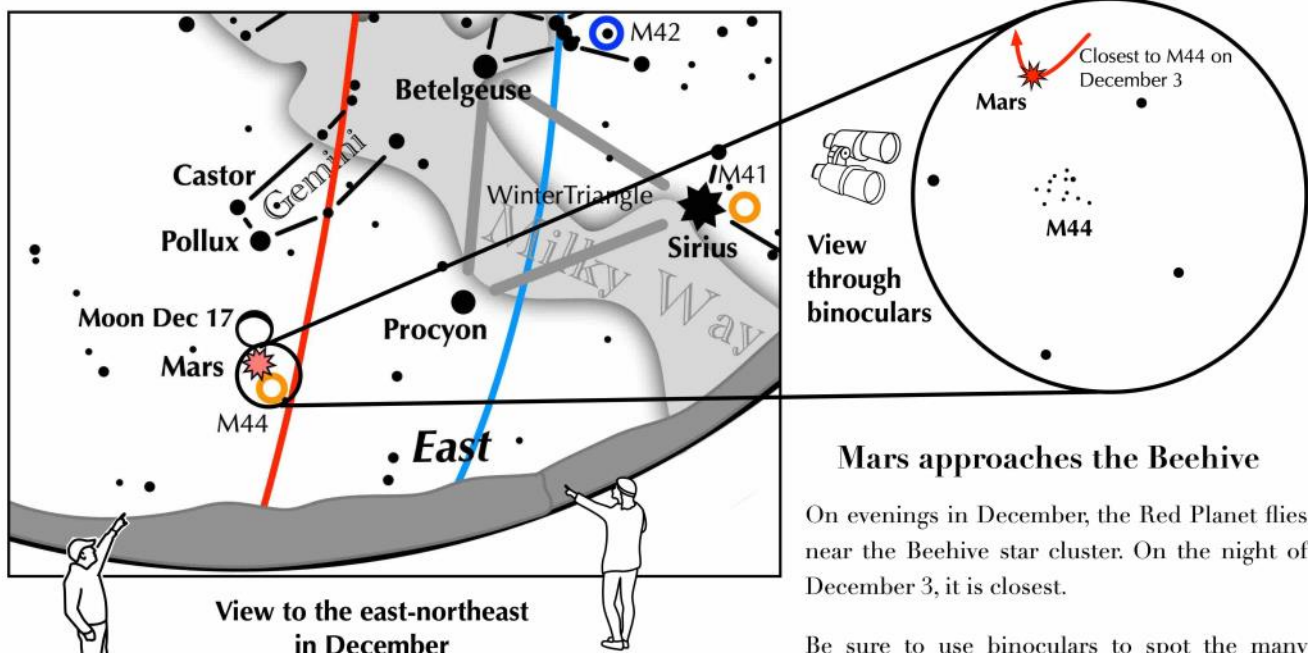


*Sky map made using Stellarium, the free planetarium software*

## Binocular Challenge for December 2024

courtesy of the Astronomical League

### On a moonless evening in December, try this challenge:



View to the east-northeast  
in December  
90 minutes after sunset

On December 7, Mars starts its retrograde motion, moving slightly each evening westward until February.

Even though Mars and M44 lie near each other in binoculars, they are nowhere near each other in three-dimensional space. M44 is 50 million times farther than the Mars!

It has taken the light from M44's stars over 575 years to reach your eyes!

### Mars approaches the Beehive

On evenings in December, the Red Planet flies near the Beehive star cluster. On the night of December 3, it is closest.

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



## Lowell Observatory (Cont'd)

(Continued from page 3)

they were known in 1912, were moving away from each other. This was the first key to understanding that the universe is expanding. And here, in 1930, a young astronomer named Clyde Tombaugh discovered Pluto with a 13-inch astrographic camera.

Lowell Observatory has gone on to glory as a modern, ambitious observatory with a full slate of research projects in all areas, from the solar system to distant galaxies. It has erected a 4.3-meter instrument, the Low-

ell Discovery Telescope, and employs a range of experienced astronomers. It is a rare gem that powers ahead with such far-ranging research goals and a deep historical record that continues to fascinate visitors to this day. Much of the current progress at Lowell has recently been overseen by Executive Director Jeff Hall, who has just retired, passing the torch to fellow astronomer Amanda Bosh. And the observatory's programs in all respects are overseen by Lowell Putnam, the sole trustee, who is Percival Lowell's great-

grandnephew.

Now, Lowell Observatory has entered the most exciting phase of its entire 130-year history. On Nov. 16, the observatory hosted about 1,000 people, who flocked to Mars Hill for the grand opening of the Marley Foundation Astronomy Discovery Center (ADC), a unique and utterly amazing museum facility that is unlike anything else in the world.

I should say that for a number of years I've been privileged to

(Continued on page 13)

## Night Sky Notes: Spot the King of Planets

by Dave Prosper; updated 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](https://nightsky.jpl.nasa.gov) to find local clubs, events, stargazing info and more.

Jupiter is our solar system's undisputed king of the planets! Jupiter is bright and easy to spot from our vantage point on Earth, helped by its massive size and banded, reflective cloud tops. Jupiter even possesses moons the size of planets: Ganymede, its largest, is bigger than the planet Mercury. What's more, you can easily observe Jupiter and its moons with a modest instrument, just like Galileo did over 400 years ago.

Jupiter's position as our solar system's largest planet is truly earned; you could fit 11 Earths



along Jupiter's diameter, and in case you were looking to fill up Jupiter with some Earth-size marbles, you would need over 1300 Earths to fill it up – and that would still not be quite enough! However, despite its formidable size, Jupiter's true rule over the outer solar system

comes from its enormous mass. If you took all of the planets in our solar system and put them together, they would still only be half as massive as Jupiter all by itself. Jupiter's mighty mass has shaped the orbits of countless comets and asteroids. Its gravity can fling these tiny objects towards our inner solar system and also draw them into itself, as famously observed in 1994 when Comet Shoemaker-Levy 9, drawn towards Jupiter in previous orbits, smashed into the gas giant's atmosphere. Its multiple fragments slammed into Jupiter's cloud tops with such violence that the fireballs and dark impact spots were not only seen by NASA's orbiting Gali-

*(Continued on page 9)*



NASA's Juno mission captured this look at the southern hemisphere of Jupiter on Feb. 17, 2020, during one of the spacecraft's close approaches to the giant planet. This high-resolution view is a composite of four images captured by the JunoCam imager and assembled by citizen scientist Kevin M. Gill. Credit: NASA, JPL-Caltech, SwRI, MSSS | Image processing by Kevin M. Gill, © CC BY



## Night Sky Notes (Cont'd)



Look for Jupiter near the Eye of the Bull, Aldebaran, in the Taurus constellation on the evening of December 15, 2024. Binoculars may help you spot Jupiter's moons as small bright star-like objects on either side of the planet. A small telescope will show them easily, along with Jupiter's famed cloud bands. How many can you count? Credit: Stellarium Web

(Continued from page 8)

leo probe but also by observers back on Earth!

Jupiter is easy to observe at night with our unaided eyes, as well-documented by the ancient astronomers who carefully recorded its slow movements from night to night. It can be one of the brightest objects in our nighttime skies, bested only by the Moon, Venus, and occasionally Mars, when the red planet is at opposition. That's impressive for a planet that, at its closest to

Earth, is still over 365 million miles (587 million km) away. It's even more impressive that the giant world remains very bright to Earthbound observers at its furthest distance: 600 million miles (968 million km)! While the King of Planets has a coterie of 95 known moons, only the four large moons that Galileo originally observed in 1610 – Io, Europa, Ganymede, and Calisto – can be easily observed by Earth-based observers with very modest equipment. These are called, appropriately enough, the

Galilean moons. Most telescopes will show the moons as faint star-like objects neatly lined up close to bright Jupiter. Most binoculars will show at least one or two moons orbiting the planet. Small telescopes will show all four of the Galilean moons if they are all visible, but sometimes they can pass behind or in front of Jupiter or even each other. Telescopes will also show details like Jupiter's cloud bands and, if powerful enough, large storms like its famous Great Red

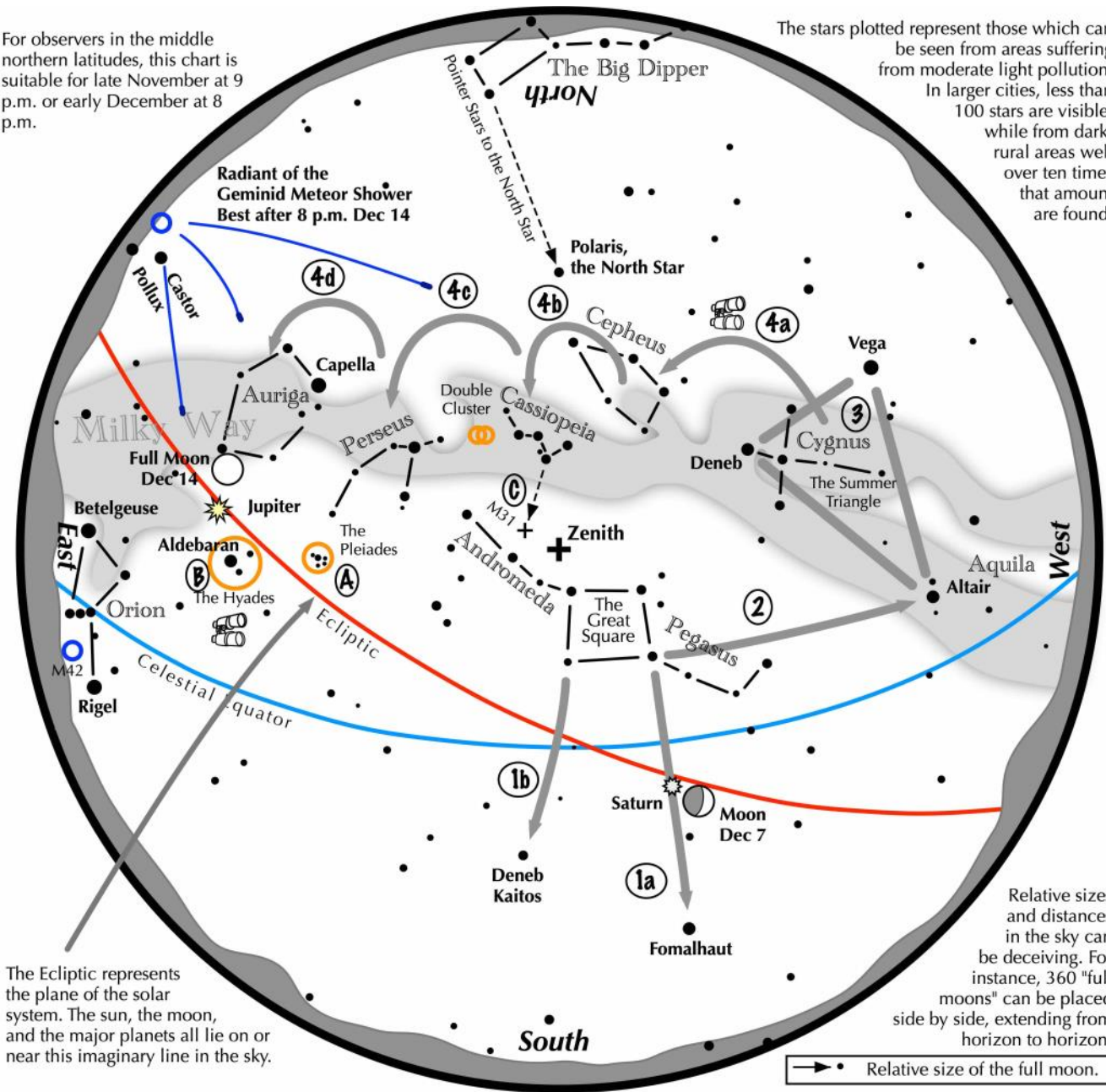
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# Navigating the Mid-December 2024 Night Sky

courtesy of the Astronomical League

For observers in the middle northern latitudes, this chart is suitable for late November at 9 p.m. or early December at 8 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 December night sky: Simply start with what you know or with what you can easily find.

- 1 Face south. Almost overhead is the "Great Square" with four stars about the same brightness as those of the Big Dipper. Extend an imaginary line southward following the Square's two westernmost stars. The line strikes Fomalhaut, the brightest star in the southwest. A line extending southward from the two easternmost stars, passes Deneb Kaitos, the second bright star in the south.
- 2 Draw another line, this time westward following the southern edge of the Square. It strikes Altair, part of the "Summer Triangle."
- 3 Locate Vega and Deneb, the other two stars of the "Summer Triangle." Vega is its brightest member while Deneb sits in the middle of the Milky Way.
- 4 Jump along the Milky Way from Deneb to Cepheus, which resembles the outline of a house. Continue jumping to the "W" of Cassiopeia, to Perseus, and finally to Auriga with its bright star Capella.

### Binocular Highlights

**A and B:** Examine the stars of the Pleiades and Hyades, two naked eye star clusters.

**C:** The three westernmost stars of Cassiopeia's "W" point south to M31, the Andromeda Galaxy, a "fuzzy" oval.

**D:** Sweep along the Milky Way from Altair, past Deneb, through Cepheus, Cassiopeia and Perseus, then to Auriga for many intriguing star clusters and nebulous areas.



Astronomical League [www.astroleague.org/outreach](http://www.astroleague.org/outreach); duplication is allowed and encouraged for all free distribution.

## Jupiter (Cont'd)

(Continued from page 9)

Spot, and the shadows of the Galilean moons passing between the Sun and Jupiter. Sketching the positions of Jupiter's moons during the course of an evening – and night to night – can be a rewarding project! You can download an activity guide from the Astronomical Society of the Pacific at [bit.ly/drawjupitermoons](http://bit.ly/drawjupitermoons)

Now in its eighth year, NASA's Juno mission is one of just nine spacecraft to have visited this impressive world. Juno entered Jupiter's orbit in 2016 to begin its initial mission to study this giant world's mysterious interior. The years have proven Juno's mission a success, with data from the probe revolutionizing our understanding of this

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## Classic La Para

by Nicholas La Para

### GIFT IDEAS FOR ASTRONOMERS

USE WITH ANY TELESCOPE...

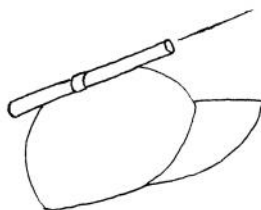
...FILTER WHEEL



FOOT-WARMING OBSERVING BOOTS



HANDS-OFF ANSWER TO



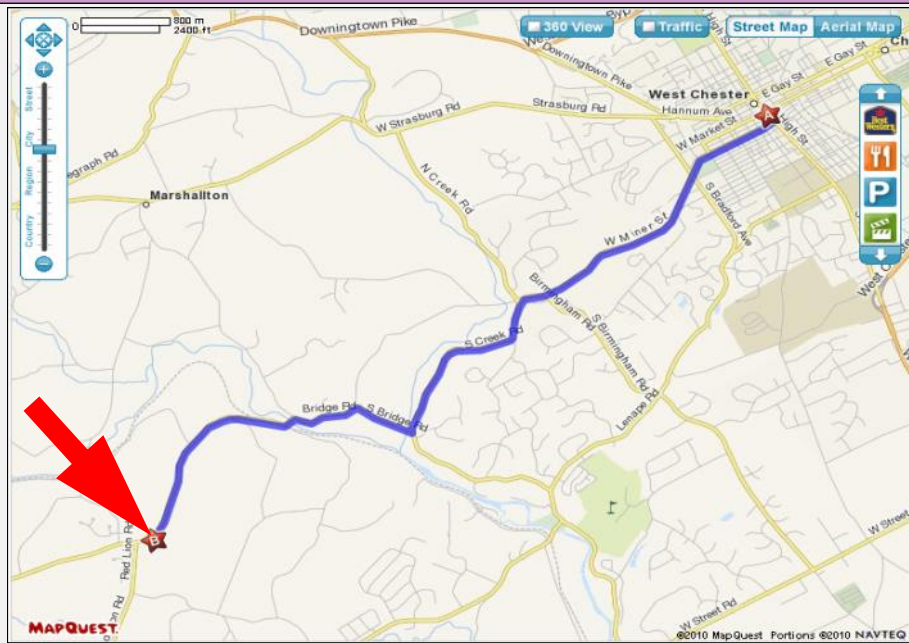
"WHAT ARE YOU LOOKING AT?"

SPECIALTY T-SHIRTS



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.

## Eyepiece (Cont'd)



*Image credit: By David St. Louis - M42 HaRGB Composite Feb 2012 PUploaded by ComputerHotline, CC BY 2.0, <https://commons.wikimedia.org/w/index.php?curid=18486543> NOTE: the original image was cropped for this article*

*(Continued from page 6)*

ulae are closely related, arranged together at about 1,300 light years from Earth. Some of the light by which we see the form of the Running Man Nebula to the south is reflected from the stars of the cluster.

NGC 1981 is a young cluster of stars only recently formed from their surrounding nebula. Glowing hot and blue, these stars are still surrounded by clouds of material, remnants of the nebula from which they originally formed. NGC 1981 is not a densely populated cluster, but its comparatively bright blue stars stand out distinctly against their background. Indeed, in many ways this cluster is reminiscent of the much closer Pleia-

des, though its relatively much greater distance means that at least binoculars are needed to fully appreciate its structure.

So, when the sky is clear and the temperatures are not too cold, look for the Coal Car Cluster. And if you see the alligator shape, don't worry, it won't bite.

Information sources:

- <http://www.spacegazer.com/index.asp?pageid=681757>
- [https://en.wikipedia.org/wiki/NGC\\_1981](https://en.wikipedia.org/wiki/NGC_1981)
- <https://www.glyphweb.com/esky/clusters/ngc1981.html>
- <https://skyandtelescope.org/observing/overlooked-wonders-in-orions-shadow02102016/>

## Jupiter (Cont'd)

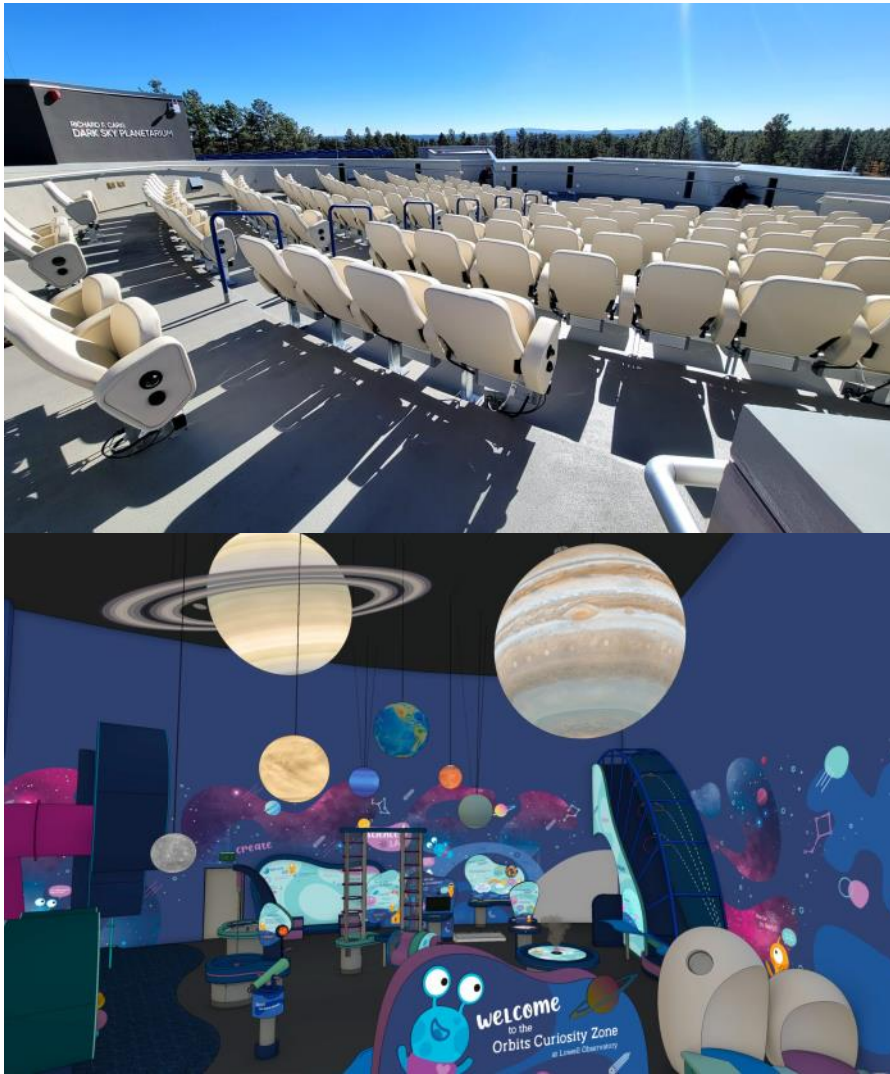
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gassy world's guts. Juno's mission has since been extended to include the study of its large moons, and since 2021 the plucky probe, increasingly battered by Jupiter's powerful radiation belts, has made close flybys of the icy moons Ganymede and Europa, along with volcanic Io. What else will we potentially learn in 2030 with the Europa Clipper mission?

Find the latest discoveries from Juno and NASA's missions to Jupiter at [science.nasa.gov/jupiter/](https://science.nasa.gov/jupiter/)

*Originally posted by Dave Prosper: February 2023  
Last Updated by Kat Troche: November 2024*

## Lowell Observatory (Cont'd)



Roof-top "planetarium" (image courtesy of David J. Eicher) & the Orbits Curiosity Zone inside the ADC (image courtesy of Lowell Observatory)

(Continued from page 7)

serve on Lowell's Advisory Board, and I find it exhilarating to be involved with such a unique place for astronomy. Walking into the ADC for the first time, I was astonished, even after seeing pictures of the facility. The 40,000-square-foot (3,700 square meters) building seems like a colossus and serves all levels of visitor experiences.

The building's atrium features a sculpture and multimedia screens that follow the origin of life on Earth, from simple atoms

combining at the ceiling, down into films of creatures below. Multiple exhibit rooms allow visitors to experience all aspects of astronomy with interactive displays and activities, and the kids who visit Lowell will now be going berserk with joy as they play and learn in the Orbits Curiosity Zone. The primary theater in the building is unlike any other on the planet, its main screen boasting 60 million pixels for extraordinary views of the universe and of simulations and animations that will bring the cos-

mos to life. Multiple auditoriums allow for talks of various sizes from distinguished speakers who will visit the hill.

And perhaps the coolest of all the new features is on the building's roof — an open-air "planetarium" that will allow sky shows under the real sky itself, complete with heated seats. It seems that the team responsible for building this amazing new facility thought of everything.

And of course, the longstanding features of Lowell Observatory are there as always for visitors. The historic 24-inch Clark refractor, the main instrument, was key for Lowell's amazing and interesting observations of Mars and so many other targets. The Pluto Camera, with which Tombaugh discovered that distant body in 1930, still stands.

The grounds are covered with paths and statues, and a lengthy walk around the hill allows visitors to discover many things to learn from. The Collections Center holds countless treasures from the archives that include Percival Lowell's Big Red Car, V.M. Slipher's spectrograph, a letter from Ringo Starr thanking astronomers for his named asteroid, personal artifacts of Percival Lowell, and much more.

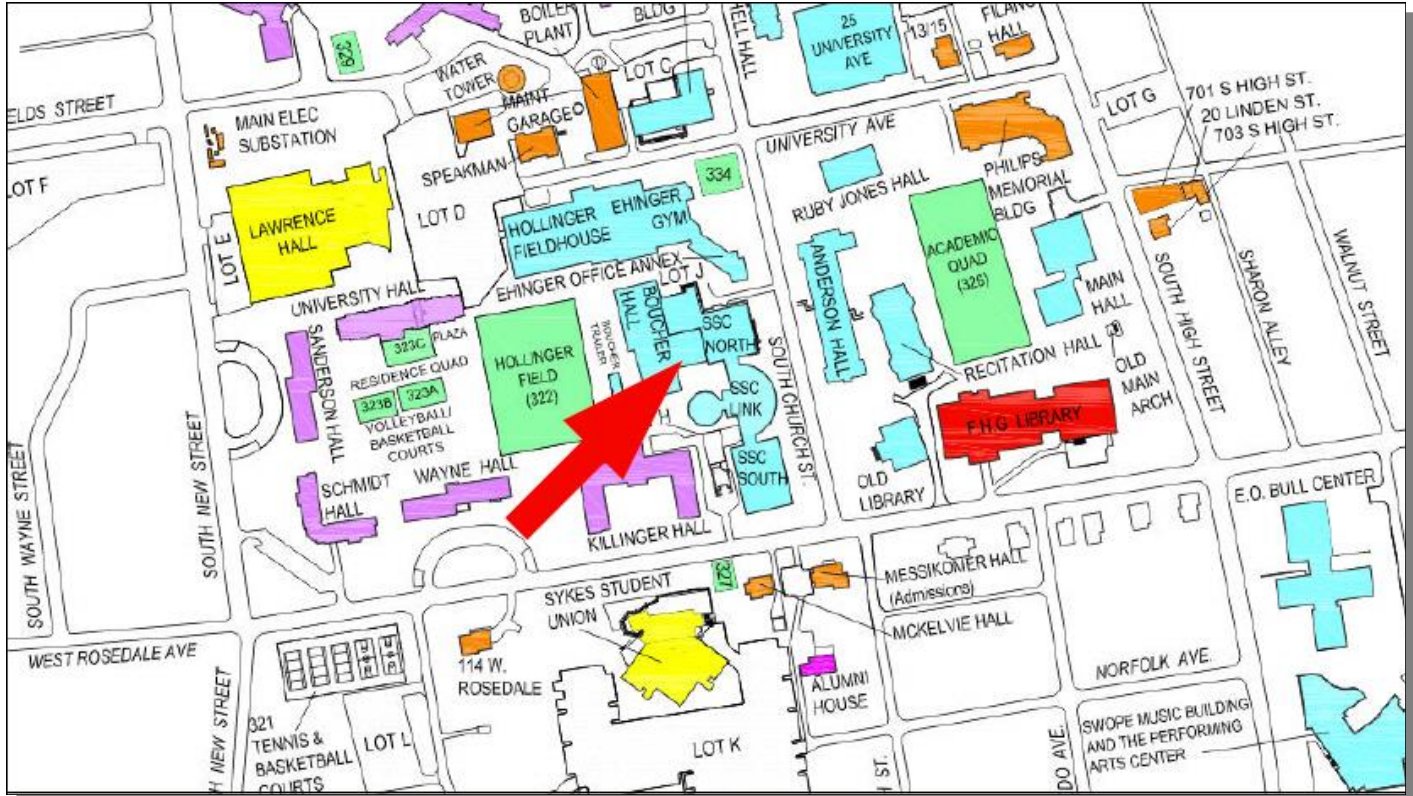
A trip to Lowell Observatory should be on the list for everyone interested in the night sky. Especially now, even more than ever, Lowell is clearly America's Observatory. You can find out more on the observatory's web site at [lowell.edu](http://lowell.edu).

[Editor's Note: Read the original article online at [Astronomy.com](http://Astronomy.com)]

## 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).



### Observing (Cont'd)

*(Continued from page 5)*

viewing is after 11:00 p.m. on the 13th through the early morning hours of the 14th, although the nearly full Moon interferes. Over 100 “shooting stars” per hour are possible from this shower.

Then on December 22nd, the Ursid meteor shower peaks. This shower pales in comparison to the Geminids but it’s still worth a look.

### CCAS Membership Information and Society Financials

#### Treasurer’s Report by Don Knabb

##### Nov. 2024 Financial Summary

Beginning Balance	\$1734
Deposits	\$475
Disbursements	-\$0
Ending Balance	\$2209

#### New Member Welcome!

Welcome to new CCAS members Tina Nasserzad WCU, West Chester, PA, and Dennis Kearns, Coatesville, 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](mailto:ida@darksky.org)

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

<http://www.darksky.org>

**Dark-Sky Website for PA**



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

<http://www.POLCouncil.org>

**Find out about Lyme Disease!**

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

<http://www.lymebasics.org>

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

**Good Outdoor Lighting Websites**

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



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

Phone: 520-280-3846

<http://www.starrynightlights.com>



**LIGHTHOUSE**  
 OUTDOOR LIGHTING

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

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

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

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

**Local Astronomy-Related Stores**

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



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

**High Point Scientific**  
 442 Route 206  
 Montague NJ, 07827

Phone: 800-266-9590

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



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

**4403 Main Street**  
**Philadelphia, PA 19127**

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

**Hours:**  
 Monday thru Friday: 9AM to 5PM

<http://www.spectrum-scientifics.com>

## CCAS Information Directory

### CCAS Lending Telescopes

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

### Contributing to Observations

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

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

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

### CCAS Newsletters via E-mail

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

**Interim Observing:** Don Knabb  
610-436-5702

**Secretary:** Beatrice Mazziotta  
610-933-2128

**Program:** Bruce Ruggeri  
610-256-4929

**Education:** Don Knabb  
610-436-5702

Dennis O'Leary  
610-701-8042

**Webmaster & Newsletter:** John Hepler  
484-883-0533

**Public Relations:** Ann Miller  
610-558-4248



### CCAS Membership Information

The 2023 membership rates are as follows:

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

### Membership Renewals

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

**Don Knabb**  
988 Meadowview Lane  
West Chester PA 19382-2178

Phone: 610-436-5702  
e-mail: [treasurer@ccas.us](mailto:treasurer@ccas.us)

### Sky & Telescope Magazine

The club membership subscription cost for *Sky and Telescope* magazine has increased to **\$45.75**. This is still a good saving from the regular rate of **\$57.75**.

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.