



Observations

A Monthly Publication Of The
CHESTER COUNTY ASTRONOMICAL SOCIETY

Vol. 27, No. 10 **Three-Time** Winner of the Astronomical League's Mabel Sterns Award ☼ 2006, 2009 & 2016 October 2019

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M33, the Triangulum Galaxy



Image Data: Subaru Telescope (NAOJ), Hubble Space Telescope - Image Processing: Robert Gendler
Additional Data: BYU, Robert Gendler, Johannes Schedler, Adam Block - Copyright: Robert Gendler, Subaru Telescope, NAOJ

Membership Renewals Due

10/2019	Conrad Lane Lester Nair Rosenblatt Wirth
11/2019	Baker Bentley Buczynski Holenstein Kerkele McNeal & Talunas Smith Taylor Zacharkiw
12/2019	Bogusch Damerau DellaPenna Etherington Kozik Marshall Moynihan O'Leary

October 2019 Dates

- 5th** • First Quarter Moon, 12:47 p.m. EDT.
- 10th** • Neptune is at opposition.
- 13th** • Full Moon, the Full Hunter's Moon or the Animal Fattening Moon, 5:08 p.m. EDT.
- 13th** • Two moon shadows are visible on Jupiter at 7:53 p.m.
- 21st** • Last Quarter Moon, 8:39 a.m. EDT.
- 22nd** • The Orionid meteor shower peaks.
- 27th** • New Moon, 11:38 p.m. EDT.



CCAS Upcoming Nights Out

In addition to our monthly observing sessions at the Myrick Conservancy Center, BRC (see pg. 2), 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 4, 2019** - CCAS Monthly Observing Session, Myrick Conservancy Center, Brandywine Red Clay Alliance. The observing session starts at sunset.
- ☼ **Saturday, October 5, 2019** - CCAS Special Observing Session at Hoopes Park, West Chester, PA. The session is scheduled from 7:00 PM to 9:00 PM.
- ☼ **Saturday, October 19, 2019** - CCAS Special Observing Session at Willistown Run-a-Muck, Berwyn, PA. The session is scheduled from 6:00 PM to 8:00 PM.

Autumn Society Events

October 2019

4th • CCAS Monthly Observing Session, Myrick Conservancy Center, Brandywine Red Clay Alliance. The observing session starts at sunset.

5th • National Astronomy Day. CCAS Special Observing Session at Hoopes Park, West Chester, PA. The session is scheduled from 7:00 PM to 9:00 PM. For more information, contact our Observing Chair, [Don Knabb](#).

17th-18th • The von Kármán Lecture Series: [Darkness Surrounds Us: The Other 95% of the Universe](#), Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech.

8th • CCAS Monthly Meeting, Room 113, Merion Science Center (former Boucher Building), West Chester University. The meeting starts immediately after at 7:30 p.m. Guest Speaker: Dr. Joseph Neilsen, Associate Professor, Villanova University, will present “The Many Shadows of Black Holes.”

19th • CCAS Special Observing Session at [Willistown Run-a-Muck](#), Berwyn, PA.

20th • Open call for articles and photographs for the November 2019 edition of [Observations](#).

26th • Deadline for newsletter submissions for the November 2019 edition of [Observations](#).

November 2019

1st • CCAS Monthly Observing Session, Myrick Conservancy Center, BRC. The observing session starts at sunset. Last monthly observing session for 2019.

12th • CCAS Monthly Meeting, Room 113, Merion Science Center (former Boucher Building), West Chester University. The meeting starts immediately after at 7:30 p.m. Guest Speaker: Phil Rossomando, CCAS member and Instructor, Immaculata University will present “Interstellar Space Travel – Science Fiction or Future Reality?”

14th-15th • The von Kármán Lecture Series: [Science From the International Space Station](#), Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech.

20th • Open call for articles and photographs for the December 2019 edition of [Observations](#).

26th • Deadline for newsletter submissions for the December 2019 edition of [Observations](#).

Minutes from the September 10, 2019, Meeting

by CCAS Secretary *Bea Mazziotta*

- Club President Dave Hockenberry called the meeting to order and welcomed 23 attendees, including one new member.
- He noted that the first West Chester Sidewalk Astronomy event, held on 9/7/19, was a great success with some 200 to 300 people stopping to look at the night sky through members’ telescopes.
- The club outing to Cherry Springs was also a great success. Both nights were clear with ideal observing conditions. Plans for the 2020 outing are underway.
- Dave announced the date of the holiday party, Saturday 12/7. Many thanks to Don and Barb Knabb for hosting again.
- The club now has a more active social media presence on both Facebook and Instagram. All are encouraged to follow and members may add posts. Look for information on upcoming events on these platforms too.
- Don Knabb gave a tour of some notable objects in the September night sky including the Hercules Cluster, the Little Dipper, Ptolemy’s Cluster and the Lagoon Nebula.
- Dave introduced the guest speaker, Dr. Sarah Dodson- Robinson, an associate professor at the University of Delaware in the Physics & Astronomy Dept. Her research focuses on planet formation (especially giant planets such as Jupiter, Saturn, Uranus & Neptune), planets outside the solar system and disks of gas and dust where planets form. She has received numerous honors, awards, and fellowships in her fields of Astronomy and Astrophysics.
- Her presentation was entitled “Cassini Collage - You Be the Astronomer.” It was an interactive question / answer format. Sarah showed slides that also featured questions about some of the many things that were discovered and/or confirmed on NASA’s Cassini mission to Saturn. Club member and guests, aka the class, raised their hands to answer the questions posed on the slides. She discussed what the Cassini mission told us about Saturn’s rings, the effects its moons on the rings and the characteristics of those moons. Prometheus has an odd donut shape and travels inside the rings. Enceladus ejects icy materials that fall back onto its surface creating a smooth effect. The same side of Iapetus always leads its orbit collecting space dirt in its path, which makes the moon appear much darker on that side than on the other. Attendees gained many new insights and enjoyed the opportunity to ask questions during the program. A thumping good time was had by all!

October 2019 CCAS Meeting Agenda

by *Bruce Ruggeri, CCAS Program Chair*

Our next meeting will be held on October 8, 2019, starting at 7:30 p.m. The meeting will be held in Room 113, Merion Science Center (former Boucher Building), West Chester University. Guest speaker: Dr. Joseph Neilsen, Associate Professor, Villanova University, will present “The Many Shadows of Black Holes.”

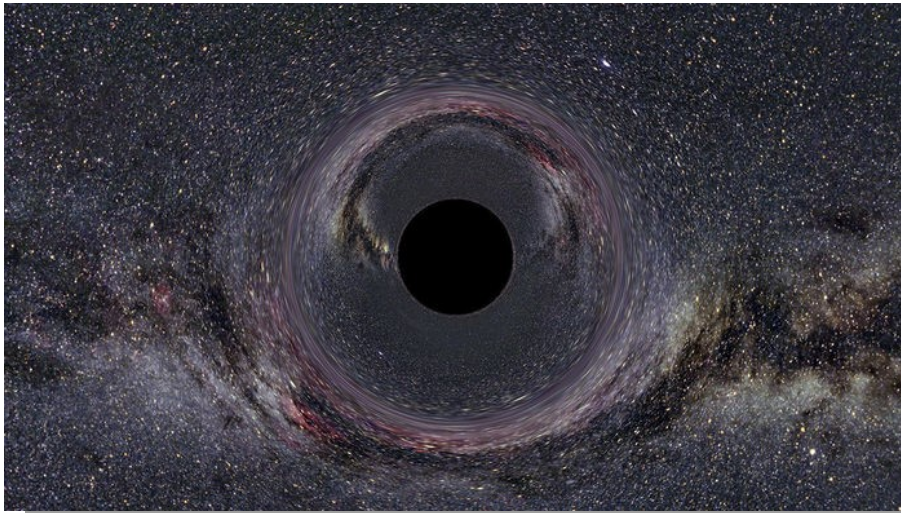
Please note that inclement weather or changes in speakers’

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 2019-2020 season. If you are interested in presenting, or know someone who would like to participate, please contact me at programs@ccas.us.

'Planet Nine' May Actually Be a Black Hole

by Sid Perkins, *Science Magazine*



GALLERY OF SPACE TIME TRAVEL/CREATIVE COMMONS ATTRIBUTION-SHARE ALIKE 2.5 GENERIC

For nearly 5 years, growing numbers of scientists have blamed the weird orbits of distant solar system objects on the gravitational effects of an as-yet-undiscovered “Planet Nine” that lies in the icy realm far beyond Neptune. But a pair of physicists is now floating an intriguing idea that could offer a new way to search for the object: What if that supposed planet is actually a small black hole?

Previous studies have suggested Planet Nine, which some astronomers refer to as “Planet X,” has a mass between five and 15 times that of Earth and lies between 45 billion and 150 billion kilometers from the sun. At such a distance, an object would receive very little light from the sun, making it hard to see with telescopes.

To detect objects of that mass, whether planets or black holes, astronomers can look for weird blobs of light formed when light “bends” around the object’s gravitational field on its journey through the galaxy (simulated image above). Those anomalies

would come and go as objects move in front of a distant star and continue in their orbit.

But if the object is a planet-mass black hole, the physicists say, it would likely be surrounded by a halo of dark matter that could stretch up to 1 billion kilometers on every side. And interactions between dark matter particles in that halo—especially collisions between dark matter and dark antimatter—could release a flash of gamma rays that would betray the object’s presence, the researchers propose in a forthcoming paper posted on the preprint server arXiv.

The physicists will soon start to comb through publicly available data from the Earth-orbiting Fermi Gamma-ray Space Telescope, which has covered the sky in all directions since 2008. They’ll be looking in particular for groups of sporadic gamma ray flashes that would move slowly across the sky, as Planet Nine would be expected to do as seen from Earth. Although the

(Continued on page 10)

Items for Sale

by CCAS Member Frank Angelini



OBERWERK FIELD BINOCULARS - \$200.

20x80mm OPTICS for serious binocular astronomy or long-range terrestrial viewing on a budget. Features full broadband multi-coating (all air-to-glass surfaces, including prisms), all-metal (not plastic), braced and hinged objective tubes, built-in tripod mount. These binoculars have a 2.4° field of view, with very good sharpness across the entire field. The eyepieces have twist-up eyecups, fold-down eyecups- both work well with glasses (eye relief is a comfortable 18mm).

Includes:

- 20 x 80mm Oberwerk Binoculars
- Objective & Ocular caps
- Padded bag for storage
- Oberwerk aluminum tripod
- Homemade aluminum parallelogram mount for viewing while sitting or reclining.



iOptron - German Equatorial GOTO mount with Tripod - \$250.

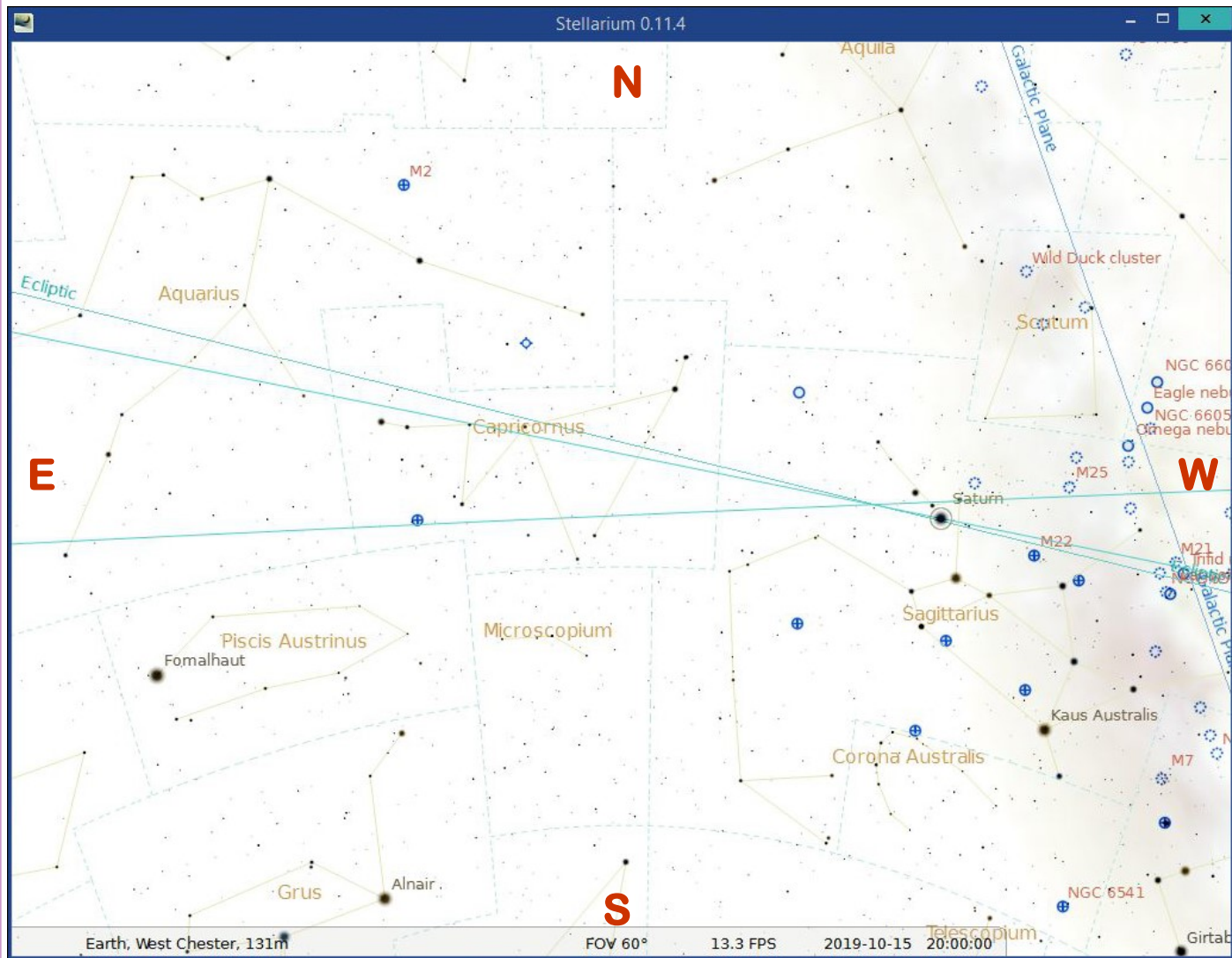
SmartEQTM Pro is a fully computerized GEM mount with a database of 59,000 objects. It is ideal for visual observation and wide field astrophotography.

(Continued on page 7)

The Sky Over Chester County

October 15, 2019 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
10/01/2019	6:29 a.m. EDT	6:56 a.m. EDT	6:43 p.m. EDT	7:10 p.m. EDT	11h 46m 39s
10/15/2019	6:43 a.m. EDT	7:10 a.m. EDT	6:21 p.m. EDT	6:48 p.m. EDT	11h 10m 38s
10/31/2019	7:00 a.m. EDT	7:28 a.m. EDT	5:59 p.m. EDT	6:27 p.m. EDT	10h 31m 30s

Moon Phases					
First Quarter	10/05/2019	12:47 p.m. EDT	Full Moon	10/13/2019	5:08 p.m. EDT
Last Quarter	10/21/2019	8:39 a.m. EDT	New Moon	10/27/2019	11:38 p.m. EDT

October 2019 Observing Highlights

by Don Knabb, CCAS Treasurer & Observing Chair

3	The Moon is near Jupiter
5	First Quarter Moon and the Lunar X is visible at 11 p.m.
5	The Moon is near Saturn
6	The Lunar Straight Wall is visible
13	Full Moon, the Full Hunter's Moon or the Animal Fattening Moon, 5:08 p.m. EDT
13	Two moon shadows are visible on Jupiter at 7:53 p.m.
21	Last Quarter Moon, 8:39 a.m. EDT
22	The Orionid meteor shower peaks and Lunar Curtis X is visible at 12 a.m.
27	New Moon, 11:38 p.m. EDT
28	Uranus at opposition
29	The Moon, Mercury, and Venus are close together in evening twilight
31	The crescent Moon, Jupiter, and Saturn are in the southwest after sunset

The best sights this month: With a bit of effort we can see 6 planets in the evening sky during October: Mercury and Venus before the sky is fully dark, Jupiter and Saturn in the southern sky and Uranus and Neptune late in the evening. And it that's not enough, look for the elusive Lunar X around 11 p.m. on October 5th.

Mercury: Look for Mercury on October 19th when it is at its greatest eastern elongation. Use binoculars to look low in the glow of the setting Sun.

Venus: We welcome Venus back to the evening sky. Venus will be quite low in the glow of the setting Sun throughout October.

Mars: The red planet rises about an hour before sunrise during October and is a dim red speck in the sky.

Jupiter: Jupiter sets about 3 hours after sunset and shines brightly in the evening sky.

Saturn: The ringed planet sets around 11 p.m. during October, so look for it as soon as the sky darkens.

Uranus and Neptune: Uranus is at opposition on October 27th so it will be visible all night. I saw Uranus in late September and it was beautiful at 200X. Neptune is well positioned for evening viewing but shines dimly at magnitude 8, so look for this distant gas giant on a clear, still, dark evening.

The Moon: Full moon occurs on October 13th. This full Moon is called 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.

Constellations: During October the Summer Triangle and all the delights it holds sinks toward the west late in the evening, but here come the fall and winter treasures! The dim but huge Great Square of Pegasus dominates the southern sky and by 9:00 we can find the jewels of the night – the Pleiades - rising in the east. Stay up late and Taurus the Bull leads Orion the Hunter up from the eastern horizon.

Messier/deep sky: The deep sky highlight of this time of year for me is the Andromeda Galaxy, M31. You don'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 22nd. You could see up to 15 "shooting stars" per hour. This shower is made up of dust particles from Comet Halley. The peak of this shower is broad, so look for shooting stars a few days before and after the peak.

Through the Eyepiece: Uranus, the Distant Green Jewel

by Don Knabb, CCAS Treasurer & Observing Chair

I'm sure most of us can list Mercury, Venus, Mars, Jupiter and Saturn on your list of planets that you have seen with your naked eyes or with the help of binoculars or a telescope. How about making an effort this month and adding Uranus to that list? October is a great time to see Uranus during late evening observing hours. This distant gas giant reaches opposition on October 27th, so it will be visible all night.

Let's clear up the first question everyone asks about Uranus: what is the correct pronunciation for this gas planet? I've looked at a few sources and most suggest one say "YOOR-a-nus", or "YER-a-nus" not "your-AY-nus" or "urine us". Using the correct pronunciation can save some embarrassment when dealing with middle school aged astronomy fans.

At magnitude 5.8 Uranus is at the threshold of naked eye vision. But with binoculars you can find Uranus relatively easily in the southeastern skies in October.

Above and right is a screen shot from Stellarium planetarium software for 10:00 p.m. on October 20th. A good sky chart to use for finding Uranus is on the Sky and Telescope website. Just go to skyandtelescope.com and search for Uranus. Or use your favorite astronomy app which will plot Uranus' position to the second.

I have difficulty seeing much color with regular binoculars, but with almost any telescope at 50X or higher the bluish green planet looks markedly different from a star and is a dis-



Star chart credit: Stellarium, the free planetarium software: <http://stellarium.org/>

tinct greenish disk. At 200X it really stands out from the background stars.

Uranus is the seventh planet from the Sun and third largest planet in the solar system. It is named after the ancient Greek deity of the sky Uranus, the father of Kronos (Saturn) and grandfather of Zeus (Jupiter).

Uranus was the first planet discovered in modern times. It was discovered by William Herschel while systematically searching the sky with his 6 inch Newtonian reflector telescope on March 13, 1781. It had actually been seen many times before but ignored as simply another star. Herschel named it "the Georgium Sidus" (the Georgian Planet) in honor of his patron, King George III of England. Others

called it "Herschel". The name "Uranus" was first proposed by Bode in conformity with the other planetary names from classical mythology but didn't come into common use until 1850.

The picture on the next page is from Voyager 2, the only spacecraft that has been to Uranus. Voyager 2 was launched in 1977 and took this picture while performing a flyby in January 1986.

Like the other gas planets, Uranus has rings. Like Jupiter's, they are very dark but like Saturn's they are composed of fairly large particles ranging up to 10 meters in diameter in addition to fine dust. There are 11 known rings, all very faint. The Uranian rings were the first after

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Eyepiece (Cont'd)

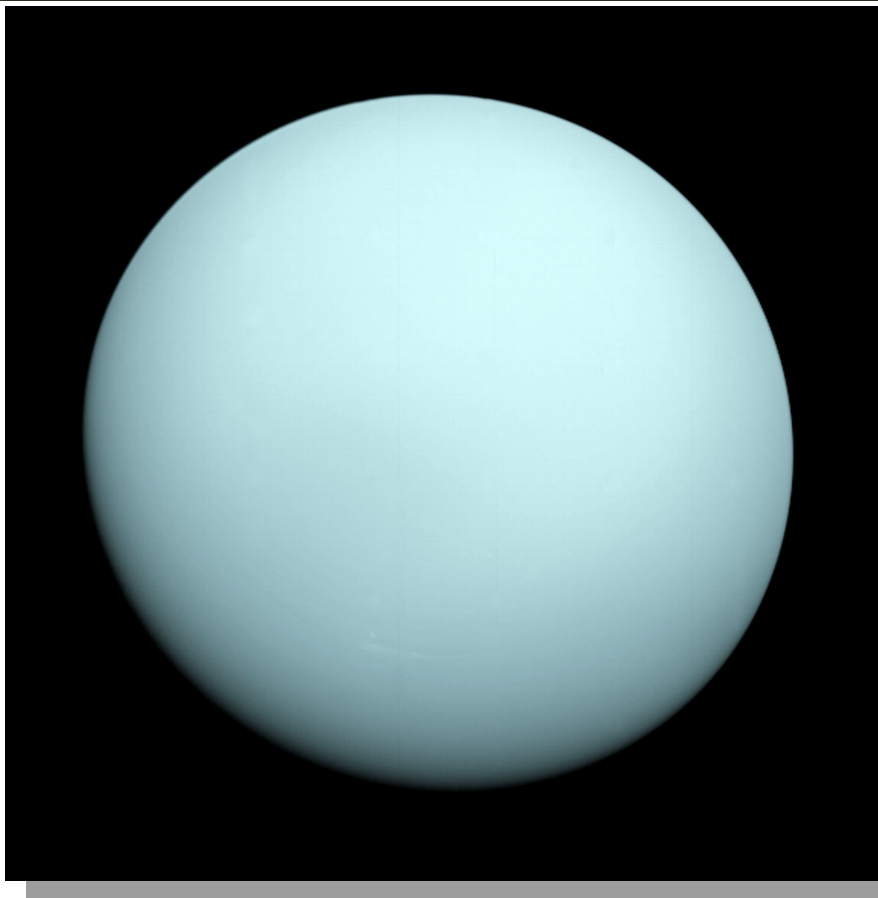


Photo credit: NASA Voyager 2

(Continued from page 6)

Saturn's to be discovered. This was of considerable importance since we now know that rings are a common feature of planets, not a peculiarity of Saturn alone. The rings cannot be seen from Earth, other than with electronically amplified imaging equipment.

The Uranian system is unique in the solar system because its axis of rotation is tilted sideways, nearly into the plane of its revolution about the Sun; its north and south poles lie where the other planets have their equators. Seen from Earth, Uranus' rings appear to circle the planet like an archery target and its moons revolve around it like the hands of a clock. In addition

to the rings, Uranus has 27 moons, the largest being Miranda, Ariel, Umbriel, Titania and Oberon.

Information sources:

- <http://www.nineplanets.org/uranus.html>
- <http://en.wikipedia.org/wiki/Uranus>
- Pasachoff, Jay M. 2000. *A Field Guide to the Stars and Planets*. New York, NY. Houghton Mifflin.
- Dickinson, Terence 2006. *Nightwatch: a practical guide to viewing the universe*. Buffalo, NY. Firefly Books .

For Sale (Cont'd)

(Continued from page 3)

This mount can easily carry a payload of 6.2 lbs. This more than adequate for many telescopes and binoculars on the market today.

- Low power consumption (8 AA batteries for 16 hours consecutive tracking)
- Retractable counterweight shaft
- ST-4 compatible Guiding Port
- AccuAlign™ illuminated polar scope
- Serial port for firmware upgrade and computer controller
- Tracking without hand controller connected
- Vixen-type dovetail saddle
- 3/8" threads to fit on camera mount
- Standard 1.25-inch heavy-duty stainless-steel tripod (5.9lbs)

Includes:

- GOTO Mount
- Hand Controller
- Field Tripod

Go2Nova® Hand Controller is intuitive with a large LCD screen.



MEADE 2045 SCT SCHMIDT CASSEGRAIN TELESCOPE - \$240.

I bought this scope to take with me on business trips to South America. I've owned it for about 15 years and still use it occasionally. It's small, relatively light weight, and comes with a sturdy aluminum carrying case. This MEADE scope is "pre-plastic", with very good fit and finish, made in the Meade CA plant.

You can set up this scope on a tabletop or use your own tripod with or without a wedge. Also can be used as a mirror-telephoto lens with your 35mm camera.

- 4-inch, F/10 mirror
- Quartz controlled clock drive
- JMI Declination Motor
- DC adapter
- Tabletop tripod legs
- 25mm eyepiece

Contact Frank Angelini for further details at 610-873-7929, or by email at angelini@verizon.net

NASA Night Sky Notes: Find Strange Uranus in Aries 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.

Most of the planets in our solar system are bright and easily spotted in our night skies. The exceptions are the ice giant planets: Uranus and Neptune. These worlds are so distant and dim that binoculars or telescopes are almost always needed to see them. A great time to search for Uranus is during its opposition on October 28, since the planet is up almost the entire night and at its brightest for the year.

Search for Uranus in the space beneath the stars of Aries the Ram and above Cetus the Whale. These constellations are found west of more prominent Taurus the Bull and Pleiades star cluster. You can also use the Moon as a guide! Uranus will be just a few degrees north of the Moon the night of October 14, close enough to fit both objects into the same binocular field of view. However, it will be much easier to see dim Uranus by moving the bright Moon just out of sight. If you're using a telescope, zoom in as much as possible once you find Uranus; 100x magnification and greater will reveal its small greenish disc, while background stars will remain points.

Try this observing trick from a dark sky location. Find Uranus with your telescope or binoculars, then look with your unaided eyes at the patch of sky where your equipment is aimed. Do you see a faint star where Uranus should be? That's not a star; you're actually seeing Uranus with your naked eye! The ice giant is just bright enough near opposition - magnitude 5.7 - to be visible to observers under

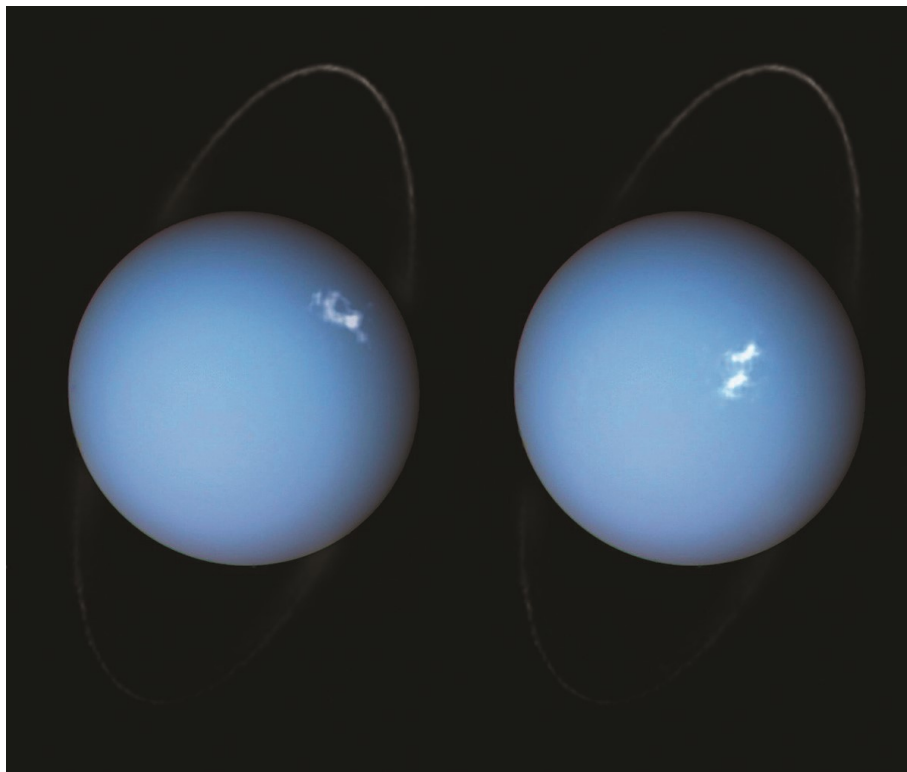


clear dark skies. It's easier to see this ghostly planet unaided after first using an instrument to spot it, sort of like "training wheels" for your eyes. Try this technique with other objects as you observe, and you'll be amazed at what your eyes can pick out.

By the way, you've spotted the first planet discovered in the

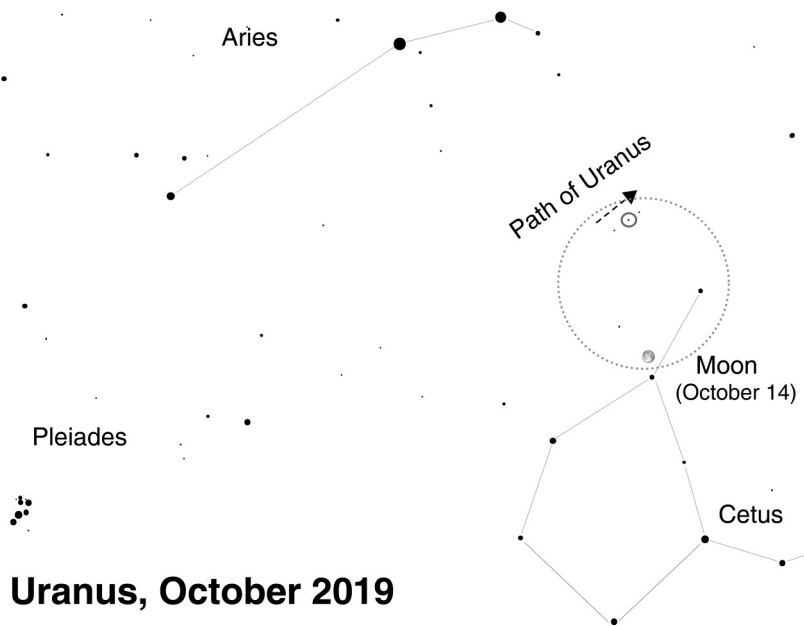
modern era! William Herschel discovered Uranus via telescope in 1781, and Johan Bode confirmed its status as a planet two years later. NASA's Voyager 2 is the only spacecraft to visit this strange world, with a brief flyby in 1986. It revealed a strange, severely tilted planetary system possessing faint dark rings, dozens of moons, and eerily featureless cloud tops. Subsequent observations of Uranus from powerful telescopes like Hubble and Keck showed its blank face was temporary, as powerful storms were spotted, caused by dramatic seasonal changes during its 84-year orbit. Uranus's wildly variable seasons result from a massive collision billions of years ago that tipped the planet to its side.

(Continued on page 9)



Caption: Composite images taken of Uranus in 2012 and 2014 by the Hubble Space Telescope, showcasing its rings and auroras. More at bit.ly/uranusauroras Credit: ESA/Hubble & NASA, L. Lamy / Observatoire de Paris

Night Sky Notes (Cont'd)



Uranus, October 2019

Caption: The path of Uranus in October is indicated by an arrow; its position on October 14 is circled. The wide dashed circle approximates the field of view from binoculars or a finderscope. Image created with assistance from Stellarium.

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Discover more about NASA's current and future missions of

exploration of the distant solar system and beyond at nasa.gov.

Free to a Good Home: 60mm Refractor

by Don Knabb

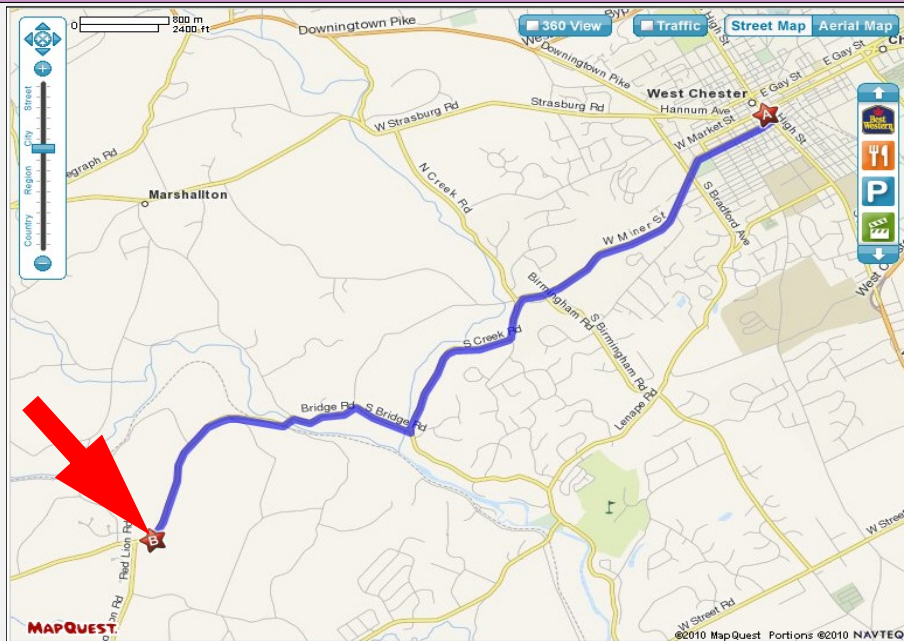


The club recently received a donation of a telescope. This scope is not suitable as a lending scope, so it is free to the first person to contact Don Knabb at dknabb01@comcast.net.

The scope is a 60mm refractor. The scope is not new, but it is still sold for around \$100. Current versions use 1 ¼ inch eyepieces, whereas this scope comes with three 0.965 eyepieces. The tripod is fairly sturdy

(Continued on page 10)

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).

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).



Black Hole (Cont'd)

(Continued from page 3)
 physicists' proposal is speculative, their search may yield all sorts of information about dark matter and the sources of gamma ray flashes—whether they lie within our solar system or far across the universe.

Free Scope (Cont'd)

(Continued from page 9)
 and the scope is light weight and easy to set up. The focuser slips a bit but works OK and the scope has slow motion controls for easy tracking of objects.

The weak point of the scope is the eyepieces. Much better eyepieces are available from OPT corporation for a very reasonable cost. The scope also packs into a convenient bag for storage and transport. I viewed Jupiter with it and the moons and bands on the planet were easily visible. It is not a great scope but is a good starter scope for someone who doesn't have a telescope.

CCAS Membership Information and Society Financials

Treasurer's Report by Don Knabb

Sept. 2019 Financial Summary

Beginning Balance	\$655
Deposits	\$165
Disbursements	-\$0
Ending Balance	\$820

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

New Member Welcome!

Welcome new CCAS members Janet Holloway from Philadelphia, Jeff Johnson from Chester Springs, and Hyunjin Christina Lee from Chesterbrook. We're glad you decided to join us under the stars! Clear skies to you!

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
 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>



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
21103 Striper Run
Rock Hall, MD 21661

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 (410) 639-4329 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
410-639-4329

Public Relations: Ann Miller
610-558-4248



CCAS Membership Information

The present membership rates are as follows:

REGULAR MEMBER.....\$25/year
SENIOR MEMBER.....\$10/year
STUDENT MEMBER.....\$ 5/year
JUNIOR MEMBER.....\$ 5/year
FAMILY MEMBER.....\$35/year

Membership Renewals

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

Don Knabb
988 Meadowview Lane
West Chester PA 19382-2178

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

Sky & Telescope Magazine Group Rates

Subscriptions to this excellent periodical are available through the CCAS at a reduced price of **\$32.95**, much less than the newsstand price of \$66.00, and also cheaper than individual subscriptions (\$42.95)! Buying a subscription this way also gets you a 10% discount on other Sky Publishing merchandise.

To **start** a new subscription, make **sure** you make out the check to the **Chester County Astronomical Society**, note that it's for *Sky & Telescope*, and mail it to Don Knabb.

To **renew** your "club subscription" contact Sky Publishing directly. Their phone number and address are in the magazine and on their renewal reminders. If you have **any** questions call Don first 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). If you want to participate in this special Society discount offer, **contact our Treasurer Don Knabb**.