Observations

A Monthly Publication Of The
CHESTER COUNTY ASTRONOMICAL SOCIETY

Vol. 27, No. 2 ***Three-Time*** *Winner of the Astronomical League's Mabel Sterns Award ☼ 2006, 2009 & 2016* *February 2019*

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The Umbra of Earth

Image courtesy of Astronomy Picture of the Day . Image Credit & Copyright: Antonio Finazzi

February 2019 Dates

4th • New Moon, 4:03 p.m. EST

11th • The Lunar X is visible around 10 p.m.

12th • First Quarter Moon, 5:26 p.m. EST

12th • The Lunar Straight Wall is visible

19th • Full Moon, the Full Snow Moon, 10:53 a.m. EST

22nd • Venus and Jupiter are close in the pre-dawn sky

26th • Last Quarter Moon, 6:27 a.m. EST

26th • Mercury is at greatest elongation and this is the best evening viewing of 2019

CCAS Upcoming Nights Out

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, March 8, 2019** - CCAS Monthly Observing Session, Myrick Conservancy Center, BRC. The observing session starts at sunset. Last regularly scheduled monthly session of the year.

☼ **Friday, April 5, 2019** - CCAS Monthly Observing Session, Myrick Conservancy Center, BRC. The observing session starts at sunset. Last regularly scheduled monthly session of the year.

☼ **Saturday, April 6, 2019** - Special CCAS Night Out event at Hoopes Park, West Chester, PA.

Winter Society Events

February 2019

7th-8th • The von Kármán Lecture Series: Ridiculous World of Scientific Ballooning, Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech.

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. CCAS member Phil Rossamondo will continue his series on Future Space Travel.

20th • Open call for articles and photographs for the March 2019 edition of Observations.

22nd • Live public presentation, *Our Milky Way Galaxy*, at the West Chester University Mather Planetarium. Doors open at 6:30 p.m. with presentation starting at 7:00 p.m. Cost is $6.00.

26th • Deadline for newsletter submissions for the March 2019 edition of Observations.

March 2019

8th • CCAS Monthly Observing Session, Myrick Conservancy Center, BRC. The observing session starts at sunset. The session is from 7:00 p.m. to 9:00 p.m.

10th • Daylight Saving Time begins. Set clocks ahead one hour.

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: TBA.

14th-15th • The von Kármán Lecture Series: The Golden Age of Exoplanet Exploration, Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech.

20th • Open call for articles and photographs for the April 2019 edition of Observations.

22nd • Live public presentation, *Killer Rocks from Outer Space,* at the West Chester University Mather Planetarium. Doors open at 6:30 p.m. with presentation starting at 7:00 p.m. Cost is $6.00.

26th • Deadline for newsletter submissions for the April 2019 edition of Observations.

CCAS Monthly Meeting Minutes

by Bea Mazziotta, CCAS Secretary

- Dave Hockenberry called the January 8th meeting to order and wished the 25 attending members and guests a Happy New Year.
- He then announced the new members of the executive board. As only one member volunteered for each position, elections were not held.
  - He, Dave Hockenberry, is now the club president. He expressed the club's gratitude to outgoing president Roger Taylor, who led the club for 9.5 years.
  - Pete Kellerman is the new Vice President.
  - Ann Hockenberry is the Public Relations Chair.
  - Don Knabb will remain the Observing Chair and Treasurer.
  - Barbara Knabb will remain Librarian.
  - Beatrice Mazziotta is the new club Secretary.
  - Don Knabb and Dennis O'Leary will share the Education Chair responsibilities.
  - A new Program Chair will be announced in May.
- Dave presented Don Knabb with a Certificate of Excellence from the Astronomical League Binocular Double Star Advanced Program.
  - Don is only the 31st person to receive the award, given to those who provide the league with documentation of their binocular observance of 52 double stars.
  - He also received a commemorative pin.
- Don announced the following CCAS March and April observing events.
  - 3/8 Brandywine Red Clay Alliance
  - 4/6 Hoopes Park
  - 4/26 Brandywine Red clay Alliance
  - 4/27 Wolfs Hollow Park in conjunction with the Atglen Public Library and Chester County Parks System
- Don reminded the club that a more complete observing and star party schedule is on Yahoo Groups.
- Don discussed objects in the January night sky, noting that it is an ideal month for binocular observing.

(Continued on page 9)

February 2019 CCAS Meeting Agenda

by Dave Hockenberry, CCAS Program Chair

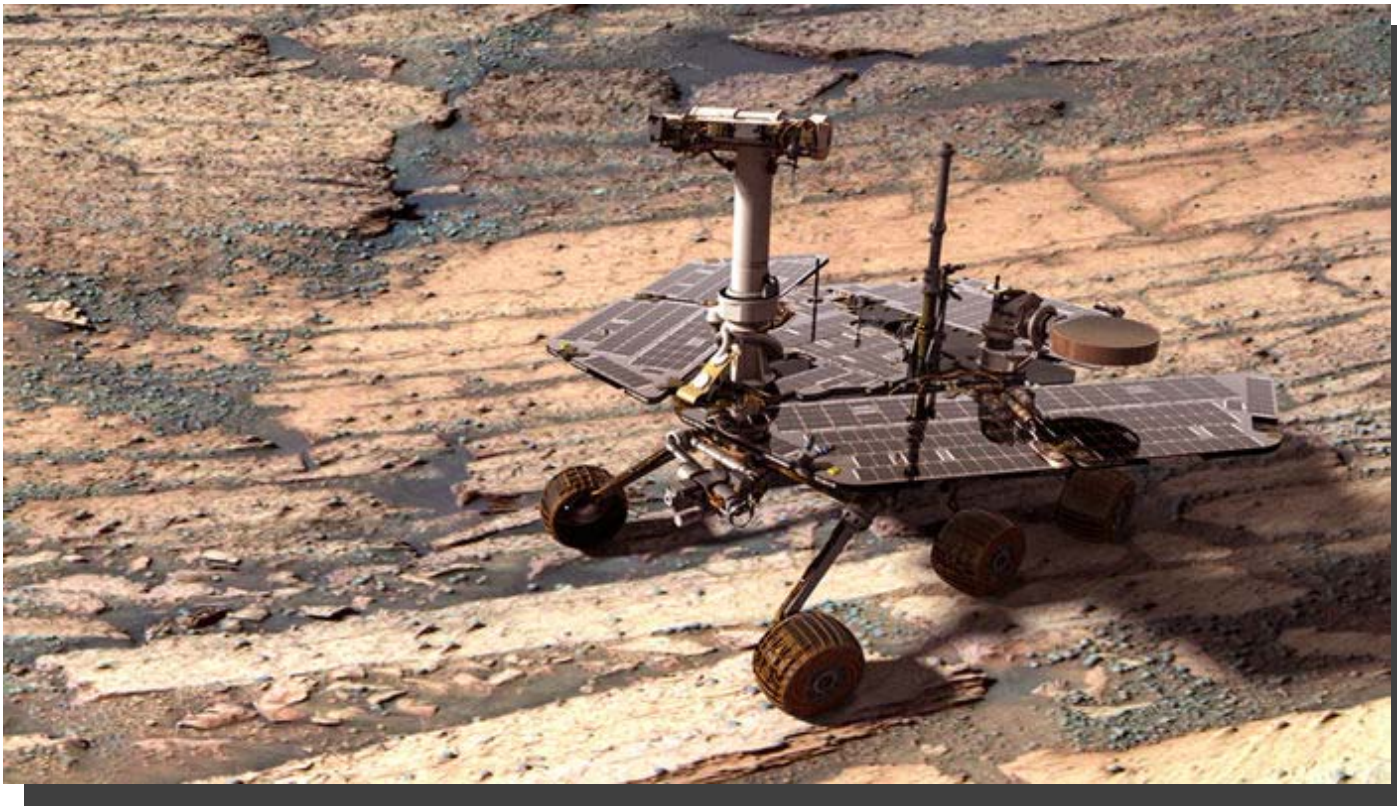
Our next meeting will be held on January 8, 2019, starting at 7:30 p.m. The meeting will be held in Room 113, Merion Science Center (former Boucher Building), West Chester University. CCAS member Phil Rossamondo will continue his series on Future Space Travel.

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

Winds Fail to Revive NASA's Opportunity Rover

by Paul Joosen, Science Magazine



NASA's Opportunity rover, seen here in a composite image, landed on Mars 15 years ago. Its end is nigh.
MARS EXPLORATION ROVER MISSION/CORNELL/JPL/NASA

There's little hope left for rousing NASA's Opportunity rover, which landed on Mars 15 years ago this month. For the past 6 months, the rover has sat silently and NASA's Jet Propulsion Laboratory (JPL) in Pasadena, California, is running out of tricks to revive it. In the next few weeks, officials at the agency's headquarters will decide whether to continue the search, the mission's scientists say.

In June 2018, a planet-encircling dust storm blotted out the sun over Opportunity for several months, weaning it off solar power and draining its batteries. Since then, JPL has sent the golf cart–size rover 600 commands to revive it. Engineers hoped seasonal winds, running high between November 2018 and the end of January, would clear the solar panels of dust, allowing for its recovery. But that hasn't happened.

"The end of the windy season could spell the end of the rover," says Steven Squyres, the mission's principal investigator at Cornell University. "But if this is the end, I can't imagine a better way for it to happen … 15 years into a 90-day mission and taken out by one of the worst Martian dust storms in many years."

John Callas, the mission project manager at JPL, says, "We've got another week. We're running out of time."

The Martian winter, which in 2011 ended the mission of Opportunity's twin rover, Spirit, is months away. Sunlight is waning in the southern hemisphere and temperatures are dropping. Efforts to revive the rover have now lasted as long as the past campaign to revive Spirit. JPL is trying a few more long shots, such as commands that would tell Opportunity to switch to back antennas, if it had barely revived and was trying to use a broken antenna. "After that, I don't know what to do next, if anything," Callas says. Before the 5-week U.S. government shutdown, the plan was to have NASA headquarters weigh in on whether to continue the efforts after the windy season, he adds. With a plan now in place to reopen the government, such a decision could come soon from NASA science chief Thomas Zurbuchen.

Whenever its mission ends, Opportunity will leave a trail of

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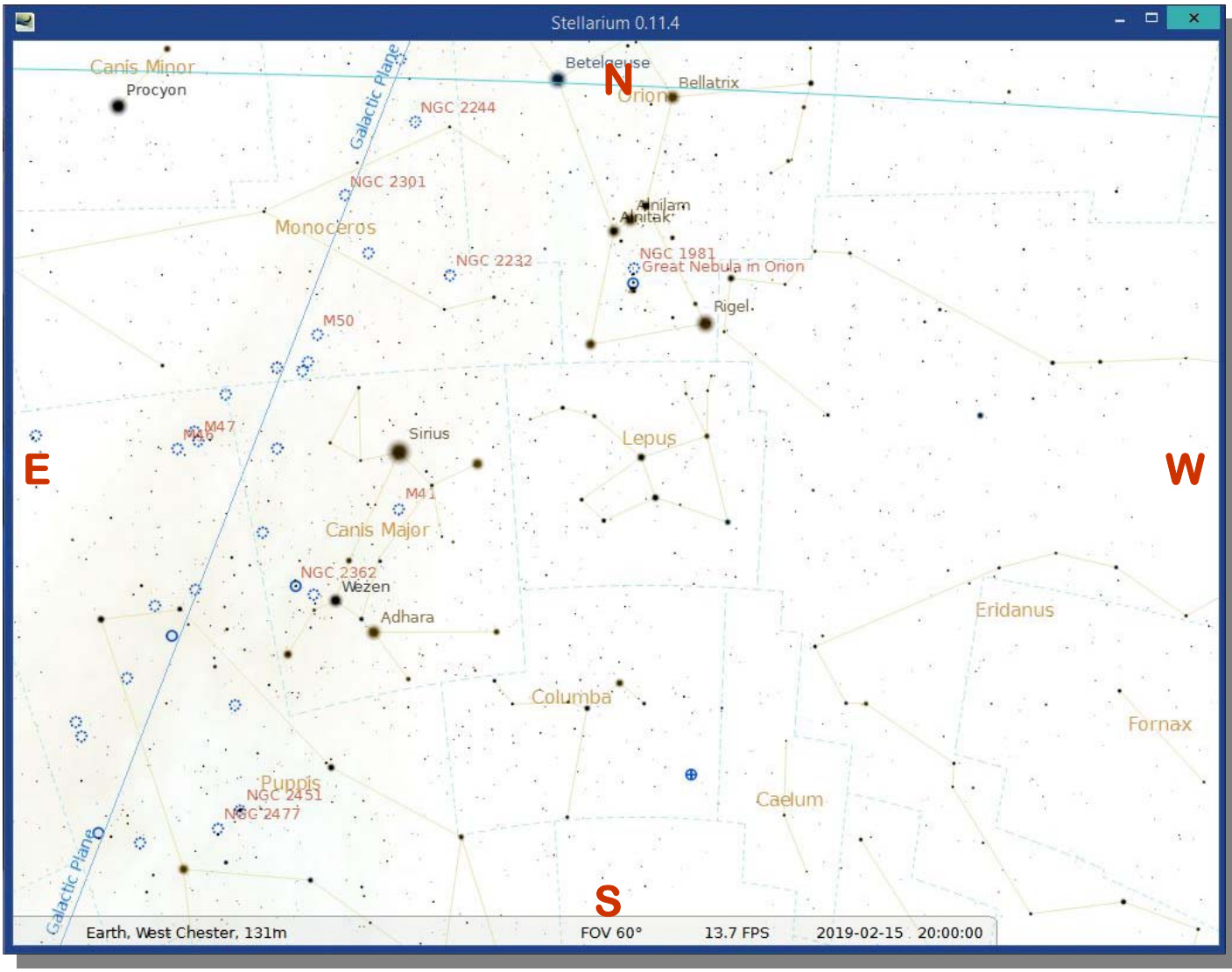
The Sky Over Chester County

February 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
01/01/2019	6:40 a.m. EDT	7:09 a.m. EDT	5:19 p.m. EDT	5:48 p.m. EDT	10h 10m 27s
01/15/2019	6:25 a.m. EST	6:53 a.m. EST	5:36 p.m. EST	6:04 p.m. EST	10h 42m 40s
01/28/2019	6:08 a.m. EST	6:35 a.m. EST	5:51 p.m. EST	6:18 p.m. EST	11h 15m 25s

Moon Phases					
			New Moon	02/04/2019	4:03 p.m. EST
First Quarter	02/12/2019	5:26 p.m. EST	Full Moon	02/19/2019	10:53 a.m. EST
Last Quarter	02/26/2019	6:27 a.m. EST			

February 2019 Observing Highlights

by Don Knabb, CCAS Treasurer & Observing Chair

2	**The Moon, Saturn, Venus, and Jupiter form a line in the morning sky**
4	**New Moon, 4:03 p.m. EST**
11	**The Lunar X is visible around 10 p.m.**
12	**First Quarter Moon and the Lunar Straight Wall is visible**
18	**Venus and Saturn are very close in the morning sky**
19	**Full Moon, the Full Snow Moon, 10:53 a.m. EST**
20	**The Zodiacal Light is visible after evening twilight for the next two weeks**
26	**Last Quarter Moon, 6:27 a.m. EST**
26	**Mercury is at greatest elongation and this is the best evening viewing of 2019**

The best sights this month: Although you will need to rise before dawn, the Moon, Saturn, Venus and Jupiter form a line in the morning sky on February 2nd. If you haven't seen Mercury, late February is the best time of 2019 to see this small planet that is closest to the Sun. But the sight I am most looking forward to is late in the evening on February 11th when the famous Lunar X is visible near the terminator on the Moon.

Mercury: February is the best month to look for the planet closest to the Sun, and February 26th is the best day since Mercury reaches greatest eastern elongation from the Sun that day. On that evening Mercury will be 9 degrees above the horizon 45 minutes after sunset.

Venus: Venus shines brightly but gets lower each day as February progresses and makes a close approach to Saturn on February 18th in the pre-dawn sky.

Mars: Mars is visible all month during the evening hours and can be found high in the southwest after the glow of the sunset has faded. On February 12th Mars is only 1 degree away from Uranus.

Jupiter: The king of the planets rises between 2 a.m. and 3 a.m. during February and is growing larger as we catch up to it in our race around the Sun.

Saturn: On February 18th, Saturn is only 1 degree away from Venus in the morning sky.

Uranus and Neptune: Uranus is close to Mars on February 12th. Neptune is too low in the sky to be observed after the middle of February.

The Moon: The Moon is full this month on February 19th. According to Native Americans this is the Full Snow Moon since the heaviest snow usually falls during this month. Some tribes also referred to this Moon as the Full Hunger Moon, since harsh weather conditions in their areas made hunting very difficult.

Constellations: Go outside around 8 p.m. and look south to see Orion the Hunter filling the southern sky. Above and to his right is the "V" shape of the face of Taurus the Bull with bright Aldebaran shining like one of the bull's eyes. Just beyond the bull's head is the Pleiades, the Seven Sisters. Running under Orion's feet is Lepus the Rabbit and to the east (left) of Lepus is Canis Major, Orion's "big dog" hunting companion with the brightest star in the sky, Sirius, shining like a jewel in Canis Major's collar. The twins of Gemini are nearly overhead and glancing to the east you'll see Leo the Lion rising, a sign of warmer spring nights to come!

Messier/deep sky: Winter is a great time to use binoculars to seek out Messier objects in the sky since the cold temperatures make it difficult to set up a telescope. Messier objects are a set of over 100 astronomical objects first listed by French astronomer Charles Messier in 1771. Messier was a comet hunter, and was frustrated by objects that resembled comets, but were not comets. So, he compiled a list of them to avoid being fooled by them as he searched for comets. M42, the Orion Nebula, is easy to find in Orion's sword. Below and to Orion's left is M41, the Little Beehive, near Sirius in Canis Major. Harder to find because of the lack of bright stars in the area of Cancer the Crab is M44, the "big" Beehive. For more of a challenge, look toward the North, above and to the left of the Big Dipper to find M81 an M82, a pair of relatively bright galaxies.

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Through The Eyepiece: Valentine's Day Galaxies - NGC 4038 and NGC 4039, the Antenna Galaxies

by Don Knabb, CCAS Treasurer & Observing Chair

With Valentine's Day approaching I thought I'd write about the image below that was taken by CCAS member Dave Hockenberry. The "heart in the sky" seemed appropriate for the February newsletter. Dave captured the heart shape extremely well, although the streamers that give the galaxies their name The Antenna Galaxies are fairly faint. They can be seen sweeping out and up from both sides of the bottom of the heart.

The Antennae Galaxies are a pair of colliding galaxies located in the constellation Corvus the Crow. The interacting galaxies have the designations NGC 4038 and NGC 4039 in the New General Catalogue. They were discovered by William Herschel in 1785.

The Antennae Galaxies are one of the youngest examples of colliding galaxies, as well as one of the nearest pairs of interacting galaxies to Earth. The nuclei of the two galaxies are joining to become one giant galaxy. Most galaxies probably undergo at least one significant collision in their lifetimes. This is likely the future of our Milky Way when it collides with the Andromeda Galaxy.

The galaxies are locked in a deadly embrace. The pair have spent the past few hundred million years sparring with one another. This clash is so violent that stars have been ripped from their host galaxies. In wide-field images of the pair the reason for their name becomes clear — far-flung stars and streamers of gas stretch out into space, creating

(Continued on page 7)

Photo credit: Dave Hockenberry - Chester County Astronomical Society

Photo credit: Hubble & NASA

Eyepiece (Cont'd)

Image credit: Stellarium, the free planetarium software

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long tidal tails reminiscent of antennae.

About 1.2 billion years ago, the Antennae were two separate galaxies. NGC 4038 was a barred spiral galaxy and NGC 4039 was a spiral galaxy. Before the galaxies collided, NGC 4039 was larger than NGC 4038. 900 million years ago, the Antennae began to approach one another. 300 million years ago, the Antennae's stars began to be released from both galaxies. Today the two streamers of ejected stars extend far beyond the original galaxies, resulting in the antennae shape.

Within 400 million years, the Antennae's nuclei will collide and become a single core with stars, gas, and dust around it. Observations and simulations of colliding galaxies suggest that the Antennae Galaxies will eventually form an elliptical galaxy.

The NASA/ESA Hubble Space Telescope has snapped the best ever image of the Antennae Galaxies. Hubble has released images of these stunning galaxies twice before, once using observations from its Wide Field and Planetary Camera 2 (WFPC2) in 1997, and again in 2006 from the Advanced Camera for Surveys (ACS). Each of Hubble's images of the Antennae Galaxies has been better than the last, due to upgrades made during the famous servicing missions, the last of which took place in 2009.

This image uses visible and near-infrared observations from

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NASA Night Sky Notes: Hexagon at Night, Quartet in the Morning

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.

The stars that make up the Winter Hexagon asterism are some of the brightest in the night sky and February evenings are a great time to enjoy their sparkly splendor. The Winter Hexagon is so large in size that the six stars that make up its points are also the brightest members of six different constellations, making the Hexagon a great starting point for learning the winter sky. Find the Hexagon by looking southeast after sunset and finding the bright red star that forms the "left shoulder" of the constellation Orion: Betelgeuse. You can think of Betelgeuse as the center of a large irregular clock, with the Winter Hexagon stars as the clock's hour numbers. Move diagonally across Orion to spot its "right foot," the bright star Rigel. Now move clockwise from Rigel to the brightest star in the night sky: Sirius in Canis Major. Continue ticking along clockwise to Procyon in Canis Minor and then towards Pollux, the brighter of the Gemini twins. Keep moving around the circuit to find Capella in Auriga, and finish at orange Aldebaran, the "eye" of the V-shaped face of Taurus the Bull.

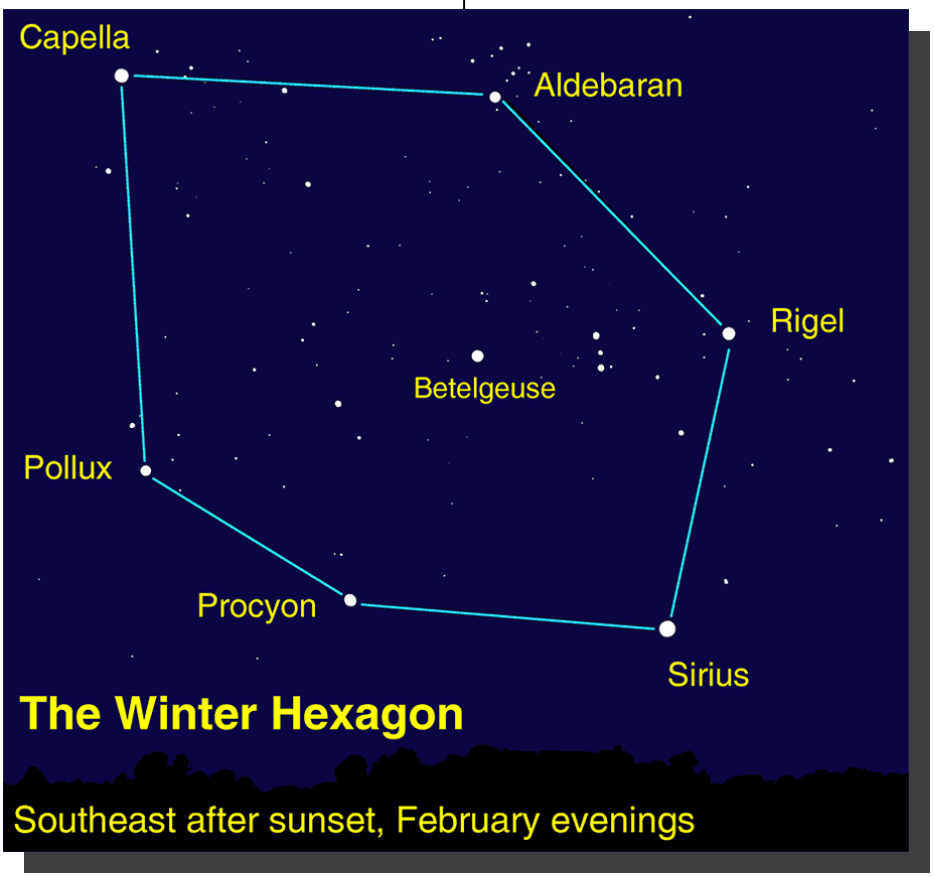
Two naked-eye planets are visible in the evening sky this month. As red Mars moves across Pisces, NASA's InSight Mission is readying its suite of geological instruments designed to study the Martian interior. InSight and the rest of humanity's robotic Martian emissaries will soon be joined by the Mars

2020 rover. The SUV-sized robot is slated to launch next year on a mission to study the possibility of past life on the red planet. A conjunction between Mars and Uranus on February 13 will be a treat for telescopic observers. Mars will pass a little over a degree away from Uranus and larger magnifications will allow comparisons between the small red disc of dusty Mars with the smaller and much more distant blue-green disc of ice giant Uranus.

Speedy Mercury has a good showing this month and makes its highest appearance in the evening on February 27; spot it above the western horizon at sunset. An unobstructed western view and binoculars will greatly help in catching Mercury against the glow of evening twilight.

The morning planets put on quite a show in February. Look for the bright planets Venus, Jupiter, and Saturn above the eastern horizon all month, at times forming a neat lineup. A crescent Moon makes a stunning

(Continued on page 9)



Caption: The stars of the Winter Hexagon
Image created with help from Stellarium

Night Sky Notes (Cont'd)

(Continued from page 8)

addition on the mornings of February 1-2, and again on the 28th. Watch over the course of the month as Venus travels from its position above Jupiter to below dimmer Saturn. Venus and Saturn will be in close conjunction on the 18th; see if you can fit both planets into the same telescopic field of view. A telescope reveals the brilliant thin crescent phase of Venus waxing into a wide gibbous phase as the planet passes around the other side of our Sun. The Night Sky Network has a simple activity that helps explain the nature of both Venus and Mercury's phases at bit.ly/venusphases

You can catch up on all of NASA's current and future missions at nasa.gov

Eyepiece (Cont'd)

(Continued from page 7)

Hubble's Wide Field Camera 3 (WFC3), along with some of the previously-released observations from Hubble's Advanced Camera for Surveys (ACS).

Corvus the Crow can best be viewed in April when it will be low in the southern sky. To see the Antenna Galaxies, you will need a good size telescope and clear dark skies because the galaxies brightness is estimated at magnitude 10. Even under the best conditions the view in the eyepiece will be of a faint, fuzzy gray blob. But use your mind's eye and picture the antennas and the heart shape that is formed by these merging galaxies and enjoy the view of light traveling to your eye from 45 million light years away.

Credits:

https://en.wikipedia.org/wiki/Antennae_Galaxies

https://www.constellation-guide.com/antennae-galaxies/

Dickinson, Terence 2006. Nightwatch: a practical guide to viewing the universe. Buffalo, NY. Firefly Books

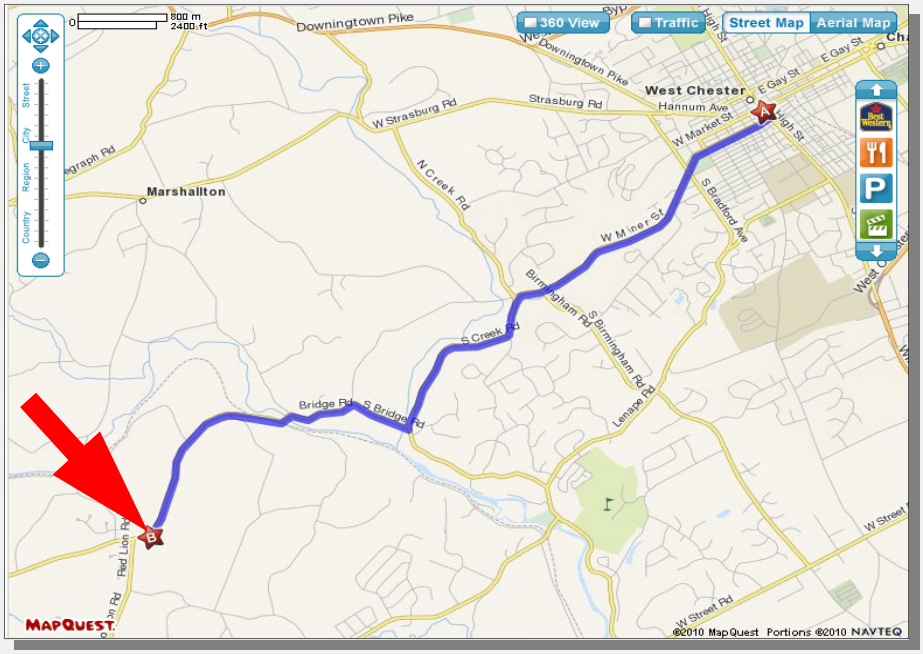
https://www.spacetelescope.org/images/potw1345a/

Minutes (Cont'd)

(Continued from page 2)

- The evening's program was presented by Dennis O'Leary, a CCAS member and a NASA Solar System Ambassador.
  - The topic was New Horizons extended mission to fly by and collect information on Ultima Thule, one of two potential observable objects Hubble found in the Kuiper Belt.

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).

Opportunity (Cont'd)

(Continued from page 3)

superlatives. Although it was only guaranteed to last 90 days on Mars, it ended up enduring at least 5000. It traversed a path 45 kilometers long, often driving backward because of an overheating steering control. It explored ever-larger impact craters as it went, with their deposits revealing more and more of the Martian interior. Even after all that time, its 1-megapixel cameras were still working beautifully, says Jim Bell, a planetary scientist at Arizona State University in Tempe who leads the rover's color camera team. Bell, for one, isn't giving up hope. The rover is perched on the rim of Endeavor crater, he notes, and a wind gust could still come and revive Opportunity. "No one has ever won a bet against it. I'm not about to start."

From its landing in Meridiani Planum in 2004, Opportunity quickly revealed the sulfate-rich sandstones it drove on. The stones likely formed as shallow muds in lagoon-like environments, says Raymond Arvidson, a planetary scientist at Washington University in St. Louis, Missouri, and the rover's deputy principal investigator. "There was an ephemeral lake system, going dry, going wet. That's a huge discovery." The rover was intended to explore where Mars could have been habitable in the deep past, Bell adds, and Opportunity was the first to provide possible evidence for it.

Subsequent craters explored by the rover revealed that periods of habitability extended far longer in the Martian past than once thought. It spotted veins of the mineral gypsum near crater rims, which form thanks to evaporating water. And, in 2013, it provided the first surface observations of 4-billion-year-old clays, from a time on Mars older than the rocks probed by the Curiosity rover, when water could have truly been abundant. The finding, 9 years into its mission, validated observations from orbit, expanding the hunt for such clays, says Alberto Fairén, a planetary scientist at Cornell. "A beautiful example of how collaborative science should be done."

Few expected when they signed up for the Spirit and Opportunity rovers that they'd still be working on one 15 years later. In the end, though, Bell adds, "Mars always wins."

CCAS Original Astrophotography

by Dave Hockenberry, CCAS Program Chair

Van den Bergh 118 and 119. Reflection nebulae in Sagittarius. Images acquired with QSI 583wsg camera through a Hyperion 12.5" telescope between 6/20/2017 and 7/28/2018. Guiding with SX Lodestar X2 camera off axis and SX Active Optics unit. Observatory and camera control with MaxIm DL6. Images calibrated, stacked, RGB creation, and Lum deconvolution with CCDStack. L-RGB merge and further processing in Photoshop CC. 5 hours of 15 minute Lum exposures, 2.5 hours 10 minute Red, Green and Blue filter exposures through Astrodon Gen 2 filters.

Van den Bergh 118 and 119 are the blue reflection nebulae, with VdB 119 near the center of the image. At the top of the image is a small portion of IC1283, a bright red emission nebula. In the lower part of the image is part of Sharpless2-35, with many gold colored small stars that make up the Sagittarius star cloud. VdB 118 and 119 occupy a "gap" in the Sagittarius star cloud through which we can "peer" through the usual dense star fields and dust clouds of the Milky Way galaxy. VdB 118 and 119 lie approximately 5,900 light-years distance from Earth, and are located just about halfway between the Trifid and Lagoon nebula in this portion of the sky.

Observing Beyond the Eclipse

by CCAS Member Steve DellaPenna

Super Blood Wolf Moon Lunar Eclipse. Image credit: CCAS Member Don Knabb

The January 21, 2019 total lunar eclipse, the "Super Blood Wolf Moon," was a treat for those stargazers who braved the early-morning chill to observe it. I would have liked to see it but I was several days out from a hip replacement and my mobility was severely restricted.

The night before the eclipse, I was on my computer checking when it would be at its peak, when my thirteen-year-old daughter asked what I was doing.

When I told her, she expressed genuine interest, which wasn't surprising since she often joins me in peering through my telescopes. I went to bed telling myself it would probably be cloudy, just so I wouldn't feel so bad for missing the eclipse.

The next morning, my daughter told me she saw the eclipse. I thought she was joking since, like most teenagers, she's fond of her sleep and can never seem to get enough of it. I asked her what it looked like and she went into a detailed description of how beautiful it was.

What impressed me most was that she took the time to appreciate one of the wonders of nature, something kids today don't seem to understand. When I was young, I spent hours outside traipsing through the local woods and being in touch with the natural world. I grew up watching the original *Cosmos* with Carl Sagan and have always had a telescope at my disposal. Over the years, my passion for science and astronomy has not abated; I still seek to understand the mysteries of the natural world with the same eagerness and fervor.

My daughter's willingness to observe the eclipse demonstrated the same sense of wonder. In the age of cell phones and Facebook, it's important to appreciate our place in the cosmos. For our children, the "wow" moments are few and far between; they have become jaded by everyday life. As an adult, I still often gaze at the night sky and wonder what strange and mysterious worlds reside in that endless, black expanse.

I believe it is the duty of parents to encourage that curiosity in children. The greater knowledge they have of the natural world, the more enlightened adults they will become. My daughter's early morning observation of the lunar eclipse proves, in a society overrun by social media, that there is still room for good, old fashioned science.

Upcoming Spring 2019 Astronomy Classes

by Don Knabb, CCAS Treasurer & Observing Chair

Once again, CCAS has collaborated with the Chester County Night School to offer our class, *Astronomy, a Beginner's Guide*. Classes are Monday evenings from 7:00 to 8:00 p.m. at Rustin High School. Registration fee is $59.00. To register yourself or a friend or family member, visit the Chester County Night School website.

- March 18 - Spaceship Earth – Roger
- March 25 - Our Moon: Phases and Faces - Steve
- April 1 - Other Kids on the Block - Dennis
- April 8 - Star Charts and Planetarium Software – Don
- April 15 - Using a Telescope - Dave
- April 29 - Beyond Naked Eye Observing (Deep Sky Stuff) - Don Miller or John Conrad

No class scheduled on April 22nd due to the Easter holiday weekend. Please contact Don Knabb if you can assist the instructors.

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)

Comets: Comet 46P/Wirtanen will be visible through all of February but the best viewing is during the first week when the Moon is new. A sky map is in the February issue of Astronomy magazine, or use your favorite astronomy app.

Meteor showers: There are no meteor showers during February. However, from February 20th until March 6th is a good time to look for the Zodiacal Light, a cone-shaped glow of light that is created when sunlight reflects off dusty debris in the inner solar system.

CCAS Membership Information and Society Financials

Treasurer's Report
by Don Knabb

Jan. 2019 Financial Summary

Beginning Balance	$1,306
Deposits	$55
Disbursements	-$244
Ending Balance	$1,117

New Member Welcome!

Welcome new CCAS members Steve DellaPenna from Coatesville, and Chris Etherington from West Chester, PA. We're glad you decided to join us under the stars! Clear skies to you!

Membership Renewals

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

Don Knabb
988 Meadowview Lane
West Chester PA 19382

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

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

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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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Spectrum Scientifics
Quality Science Products for All Ages

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:	Dave Hockenberry 610-558-4248
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 & Tele*scope 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.**