



THE BLUE MOON OBSERVER

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Door Peninsula Astronomical Society

PO Box 331
Sturgeon Bay, WI
54235

www.doorastronomy.org

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The February general meeting will be held at the Astronomy Center at 7 PM on Tuesday, February 5. Tom Minahan will present the Mercury Program and U.S. Satellites. The video topic will be a program by Brian Cox, a British astrophysicist who will be at the Pabst Theater in Milwaukee on May 10.



Images of the lunar eclipse of January 20 by our webmaster, John W. Beck.

DPAS Activities of January, 2019

As per tradition, our January regular meeting was supplanted with our annual holiday banquet. Thirty-one members and guests made their selections from a special menu listing three meat choices, a fish entree, and an vegetarian dish; apparently all who dined were more than pleased with their meals. Thank you to Susan Basten for making the arrangements. In the absence of our president, David Lenius spoke a few words about the activities, accomplishments, status, and plans of the club.

January 5 was viewing night and despite some clouds, a number of members and guests arrived and learned about the Leif Everson Observatory as well as spotting a few deep sky objects.

January 20 was the total lunar eclipse. A video program on the Cassini-Huygens probe of Saturn was shown in the Astronomy Center prior to Earth's shadow beginning to

cover our view of the moon, and hot apple cider and cookies were provided by Barb and Gary Henkelmann for those wishing to warm up between outdoor views of the eclipse. Meanwhile, as the eclipse progressed, Dave Lenius linked the image from the observatory to the flat screen in the Astronomy Center. Between 25 and 30 people braved the cold night air until Earth's shadow was on its way to uncovering the moon.

Even before the penumbra reached the moon, Orion was easily discerned to the southwest of the moon. As the eclipse progressed, Orion became much brighter against the darkening sky. Gemini, washed out by the nearby full moon, became prominent as did Leo to the north of the moon and Cassiopeia in the northeast. The Pleiades were visible early but more spectacular as the sky darkened.

Our webmaster, John W. Beck, was not present but he watched and photographed the even as per the image above.



Who We Are

DPAS is a local club and chapter of the Astronomical League. We are also a club member of the International Dark-Sky Association and the Night Sky Network, teaching arm of the Astronomical Society of the Pacific. We meet on the first Tuesday of every month, with rare exception. Meetings are held at the Ray & Ruthie Stonecipher Astronomy Center unless otherwise announced. We operate and maintain the Leif Everson Observatory which houses a 16" Ritchey-Cretien telescope on a sophisticated tracking mount controlled by computer, and a new Maksutov-Cassegrain telescope for planetary viewing. A weather station is housed in the observatory. Current weather readings are shown on our web site:

www.doorastronomy.org

The StarGarden near the observatory is used for viewing the sky with unaided vision, binoculars and members' telescopes. There are also binocular mounts set in concrete which allow viewers of different heights to view the same object through the same binocular.

The Ray & Ruthie Stonecipher Astronomy Center provides for storage, projects, meetings, warm-up and toilet facilities. It also housed a StarLab, an inflatable planetarium with a sophisticated projection system. The planetarium was used for group presentations. See announcements page 6.

An Analemmatic Sundial was dedicated on October 20, 2012.

The "astronomy campus" as described here is reached by taking Utah Street east to the stop sign and turning left through the gate onto Stargazer Way. Or you can set your GPS to 2200 Utah.

Dwarf Planets and their Kin

It all started with the "demotion" of Pluto in 2006, thanks in large part to dwarf planets Makemake and Eris. Until then, Pluto was memorized by grade school children as the 9th planet. So what possessed the International Astronomical Union (IAU) to strip Pluto of its planetary title? It was the discovery of other objects which shared some of Pluto's credentials, yet it didn't seem right to keep adding planets to our list. So the IAU set out to define a planet in such a way that Pluto didn't qualify and subsequently came up with a category of dwarf planet into which could be fit Pluto and a few other bodies in our solar system.

It's only fair that we look first at Pluto, that beloved body which nobody had seen other than in pictures of a tiny point of light until the New Horizons flyby in 2015 held the world spellbound as images emerged during the approach and were spectacular from the closeup flyby. How our brilliant engineers were able to pull that off is a story in itself.

Pluto's existence was theorized long before it was discovered. Following the discovery of Neptune in 1846, astronomers suspected that a ninth planet might be responsible for irregularities in that planet's orbit. In 1902, Percival Lowell spoke of what he later dubbed "Planet X" in his lectures at MIT and wrote about it in his book *The Solar System* in 1903.

The first phase of his search was

from 1905 to 1909. Calculations were by a team of "computers" led by Elizabeth Williams. He searched the likely spots based on the calculations, but the field of view of his 24" Clark refractor was too small for such work and he switched to a 5-inch Brashear telescope. 1910 until his death in 1916 marked the second, or competitive, phase of his search; his rival was William Pickering. During this phase he utilized a Millionaire calculating machine which is still on display at Lowell Observatory, and he replaced the Brashear with a 9-inch telescope from Swarthmore College's Sproul Observatory. In 1915 he published his estimate of the location of "Planet X" in *Memoir on a Trans-Neptunian Planet*. But he didn't live to photograph the calculated target area.

Clyde Tombaugh took over Lowell's search in 1929 using a new 13 inch astrograph. On February 18, 1930, Tombaugh announced the discovery of a planet later to be named Pluto. Ironically it was not the "Planet X" sought by Lowell, but was found in the vicinity of the target area. It was determined that the mass of Pluto was far too small to cause perturbations in the orbits of Uranus and Neptune, and Planet X was based on incorrect estimates of the mass of Neptune.

After the discovery of Make-make and Eris, the new designation of Dwarf Planet was created and currently there are 5 bodies which are recognized as members: Ceres, Pluto, Haumea, Makemake and Eris. With the *continued on page 4*

DPAS BOARD

Gary Henkelmann, President
president@doorastronomy.org

David Lenius, Vice President

Thomas Minahan, Outreach
Coordinator

Susan Basten, Secretary,
Membership Chairperson, and
ALCOR.
treasurer@doorastronomy.org

Jacque Axland, Membership
Chairperson and Recording
Secretary of the Board

John J. Beck, Past President
and Editor
editor@doorastronomy.org

John W. Beck, Past President
and Webmaster

Dennis Sundin, Member at
Large

Ray Stonecipher, in spirit

Barbara Henkelmann serves as
the DPAS Archivist.

The business of the DPAS is largely conducted at the Board meetings to leave the general meetings open for programs. The Board meetings are held at the Astronomy Center at 7 PM on Monday, 8 days prior to the following general meeting. Members of DPAS are invited to attend Board meetings.

Hexagon at Night, Quartet in the Morning

David Prosper

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 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

This article is distributed by NASA



Night Sky Network

The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.org to find local clubs, events, and more!



Astronomy Quiz

1. How often does the moon's orbit intersect with the ecliptic?
2. Which is hotter, red Beatleuse or blue-white Vega?
3. An astronomer, earning 25 cents/hour, added nearly 230,000 stars to the Draper Catalog and classified them according to their color temperature using spectral lines, and also discovered and cataloged 300 variable stars. Who was that astronomer?
4. Astronomy clubs from what states belong to the NCRAL?
5. What was the first mammal in space? What was the first mammal to orbit earth in space?

New Members

Welcome back to DPAS:

Ann Hickey

Ann is a former board member and former editor of the Blue Moon Observer.



The Blue Moon Observer

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exception of Ceres, which is located in the asteroid belt, the other dwarf planets are found in the outer solar system. In the 76 years between Pluto's discovery and its reclassification as a dwarf planet, Pluto had travelled less than one third of the way around its orbit. It is the largest of the recognized dwarf planets and has 5 moons.

Ceres was discovered in 1801 by Giuseppe Piazzi, who was looking for a star and when he saw Ceres he initially thought it was a comet. Other astronomers confirmed his find and initially thought it was an asteroid. In 2006, with the formation of the class of dwarf planets, it was redesigned as such. Ceres was visited by the Dawn spacecraft in 2015. Although Ceres constitutes 1/4 of the mass of the entire asteroid belt, it is only 1/14 the mass of Pluto. It is the smallest of the 5 recognized dwarf planets and the closest to Earth. Ceres has no moons.

Haumea was discovered in 2003 and reported in 2004. It resides in the Kuiper belt and is roughly the same size as Pluto. Haumea is one of the fastest rotating large objects in our solar system, completing one rotation every 4 hours, thus distorting its shape to look like a football. It was discovered to have moons in 2006, and to have rings in 2017 when the dwarf planet passed in front of a star. About 1/14 the radius of Earth, Haumea orbits about 43 AU from the sun. While Haumea makes one trip around the sun, Earth has completed 285 journeys

around its orbit. All information about Haumea has come from observation by earth-based telescopes around the world.

Slightly smaller than Pluto, Makemake is the second-brightest object in the Kuiper Belt as seen from Earth (while Pluto is the brightest). It takes about 305 Earth years for this dwarf planet to make one trip around the sun. Makemake was first observed in March 2005 by M.E. Brown, C.A. Trujillo, and D.L. Rabinowitz at the Palomar Observatory. Its unofficial codename was Easterbunny, and before this dwarf planet was confirmed, its provisional name was 2005 FY9. It was the fourth body identified as a dwarf planet. Makemake is large enough and bright enough to be studied by a high-end amateur telescope. Its elliptical orbit takes it from 38 to 53 AU from the sun. It rotates 22.5 times per Earth day. That Makemake has no atmosphere was determined during an occultation of a star. Observation using the Hubble telescope in 2015 showed that Makemake has one moon, nicknamed MK2.

Eris is about the same size as Pluto, but is three times farther from the Sun. Although Pluto is the largest of the dwarf planets, Eris is the most massive. It was discovered in 2003 by the same team that found Makemake. Its radius is about 1/5 that of Earth, and it orbits about 68 AU from the sun, taking 557 Earth *continued on page 5*

Manifesto Moon

We always write about the moon
why shouldn't we when it rises
like a big orange Caesar—
hailed by the armies of bare
trees under winter's blush?
We always write about the moon,
her smooth yellow arc across
darkening amaranthine.
I always want to tear the cover off,
pry it open with a blunt screw-
driver;
peer inside to the clockwork
and the fulcrum that balances pain
on sting.
I need to know what is red about
red;
what is wet about ocean;
what is blood about sky.
We always write about the moon
because she has seen everything.

Dan Collins

A long time internet friend, Dan is from the Dallas/Fr. Worth area of Texas. In addition to his day job, Dan is an artist and published poet. He gave his permission for his poem to be included here.

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years to orbit the sun once. Its orbit is well outside the plane of the solar system and extends far beyond the Kuiper belt. When farthest from the sun, its atmosphere freezes and forms an icy glaze. It rotates on its axis in 25.9 hours. Eris has a very small moon called Dysnomia. In case you wonder whatever happened to the Dwarf planet Xena, that's what Eris was called before the name was officially changed.

That's all of the officially designated dwarf planets. But there are two "kin" to the dwarf planets, Sedna and Quaoar. Sedna is a nearly Pluto-size object that, at 3 times as far from the sun as Pluto, is the most distant object identified that orbits the sun. At its closest approach to the sun, the sun would appear so tiny, according to NASA, that you could blot it out with a pin. It is the second reddest object in the solar system after Mars. It takes about 10,000 years to orbit the sun once in a very elongated orbit, suggesting that it encountered a massive object which is no longer present. Discovered by the same team which found Makemake and Eris, they used the 48-inch Samuel Oschin Telescope at Caltech's Palomar Observatory near San Diego.

Quaoar is a planetoid that lies beyond Pluto's orbit in the solar system in the Kuiper belt about 42 AU from the sun. It takes about 288 years to orbit the sun in a nearly circular orbit. It was discovered in 2002 by the same team that reported Makemake and Eris. Quaoar is probably massive enough to be considered a dwarf

planet, but it has not been classified as such yet. Its diameter lies between those of Ceres and Pluto.

The IAU determined that for an object to be a "planet," it must be big enough to be round, it must orbit the sun without orbiting another body and it must clear debris around its orbit. "Dwarf planet" meant any planetary-mass object that is neither a planet nor a natural satellite that fits two basic criteria. For one, it must be in direct orbit of the Sun and not be a moon around another body. Second, it must be massive enough for it to have become spherical in shape under its own gravity. And, unlike a planet, it must have not cleared the neighborhood around its orbit.

Your editor speculates that since so many of these "planetoids" were discovered by the same team largely concentrating on a small portion of the sky, that more such objects will be discovered in the future.

See images page 6.

John J. Beck

References:

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Astronomy Quiz Answers

1. The moon's orbit intersects with the ecliptic twice a lunar month, roughly every 14 days.
2. Vega is hotter. Stars are classified on the basis of their spectral classification, labelled respectively O, B, A, F, G, K, M with "O" stars being the coolest (least hot) and "M" stars the hottest. Betelgeuse is a spectral type "M" star, Vega is a spectral type "A" star.
3. Annie Jump Cannon.
4. Illinois, Wisconsin, Iowa, Minnesota, and the Upper Peninsula of Michigan. North Dakota and South Dakota are also included but currently there are no affiliates from those two states.
5. The first mammal in space was Albert 1, a rhesus monkey launched into space by the USA in 1948. The dog Laila was the first mammal to orbit Earth in space, launched on Sputnik 2 in 1957.

Viewing Nights

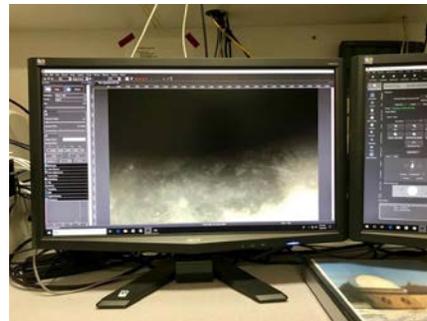
The following is the tentative list of viewing nights for 2019. Changes will be posted here and at www.doorastronomy.org

- February 2
- March 9
- April 6
- May 4
- June 1
- July 6
- August 3 (and/or 28)
- September 28
- October 26
- November 23
- December 28

Note: some summer viewing may be canceled because it gets dark so late.

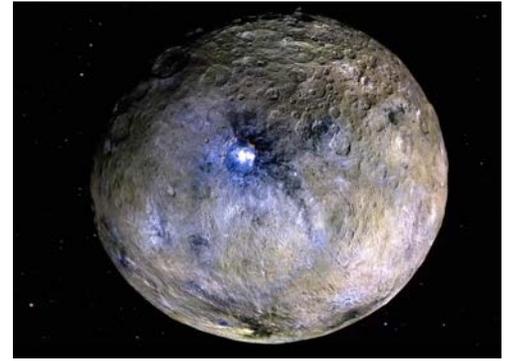
Photos by Sharon Murrock

While participating in the DPAS total lunar eclipse viewing at the Astronomy Campus, Sharon took several photos. Shown below is a view inside the observatory of the new Richey-Cretien 16" telescope on the left, and the new 7" Maksuov-Cassegrain telescope on the right. The red object lower left is part of the Paramount.



Above, also taken in the observatory, is a view from inside the Leif Everson Observatory with the telescope image appearing on the monitor. She also captured views of members operating the telescopes, and the image transmitted to the new large flat screen inside the Ray and Ruthie Astronomy Center, but these were scrollable images which can't be shown here.

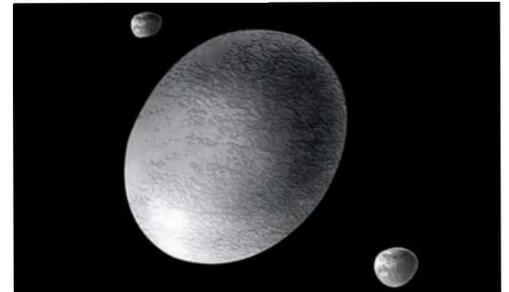
Thanks, Sharon!



Ceres



Pluto



Haumea



Makemake



Eris