The Blue Moon Observer
December, 2017

The December general meeting of the Door Peninsula Astronomical Society will be held on Tuesday, December 5 at 7 PM at the Ray and Ruthie Stonecipher Astronomy Center. The program will be "Common Misconceptions in Astronomy" by John J. Beck. Astronomy Basics will be a panel Q & A: "Ask the Amateur Astronomer"

Door Peninsula Astronomical Society

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Notes from Our Meeting 7 November, 2017

It was a cold and exceptionally clear night when ***President Gary Henkelmann*** welcomed us all. He noted the activities of the past month:

- Astronomy Day on the 14th
- 10th: Northern Astronomers at Newport with ***Barbara*** and ***Gary***
- 21st: the Brownies – 10+ of them and some of their Moms and visitors

And coming soon:

- 11th planned (but postponed) with ***Barbara***, doing maintenance on the garden
- 18th is viewing night – planning on M45 and M34
- 12/05: misconceptions and panel questions
- 01/09: our dinner, at Leathem Smith (as a preview of the NCRAL conference).

He also thanked ***Margie*** and ***Dan*** for the treats they brought for us.

Tom Minahan sprang to the front, asking on the way the two most important things needed for a telescope, and getting the right answers: a solid mount and quality optics. First he showed us a telescope for under $3 ($2.50 actually): it worked, but lacked both; next came a much larger Monocular: and for $20 it offered an adjustable magnification of 16 power; then came a Meade LightBridge Mini 82 scope, for $59 plus tax from Amazon, a Dobsonian-mount Newtonian, with a solid clamp-able base and decent optics, good for kids for Christmas. He demo-ed other handy gadgets: red lights, and a green laser (not, however, for teenagers!) Tom is always inventively fun.

Then ***Gary*** came back, with a "Basics" presentation, with beautiful background hi-lighting pictures, **A Beginner's Guide to Heavenly Objects: An Alphabetical Journey Thru the Sky:**

A for **Asteroids**, 504,000 of them, as noted by the Minor Planet Center of the IAU; 90% of Near-Earth Asteroids 1 km or larger are known …

also for **Aurora** the solar-plasma emissions, diverted to Earth's South and North Poles

C **Comets**, balls of ice and dust from the Kuiper Belt or the Oort Cloud, known for their highly elliptical or

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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 14" Celestron Schmidt-Cassegrain telescope on a sophisticated tracking mount controlled by computer, a weather station housed in the observatory with current readings 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 an object through the same binocular.

The Ray & Ruthie Stonecipher Astronomy Center, shown on the right at the top of this page, provides for storage, projects, meetings, warm-up and toilet facilities. It also houses a StarLab, an inflatable planetarium with a sophisticated projection system. The planetarium is available for group presentations.

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. Set your GPS to 2200 Utah.

Don't Buy A Department Store Telescope for Christmas

Let's assume you have a budding astronomer in the family or as a friend. If you are thinking about getting them a telescope for a holiday gift, please heed this sound advice from experienced amateur astronomers: **Don't buy a cheap department store telescope!** They typically have inferior optics (plastic lenses?) and shaky mounts. Some makers of inferior telescopes promote large magnifications that are beyond the limits of its stability and light- gathering and focusing ability, which can frustrate. Much better to spend a little more for a quality telescope that will give satisfying views of the heavens for years.

Two decisions are to be made when choosing a new telescope: *Refracting* vs. *reflecting* optics and *GoTo* vs. *point-yourself* mount.

Refracting telescopes have a convex glass called the *objective lens* that refracts the light coming in, reducing the image to eye-size. The image is collected by a smaller concave lens called the *eyepiece*, which straightens out the light to produce a magnified view. Because the eyepiece is positioned behind the focal point of objective, the image is upside-down and flipped left-to-right. Refractors are known to provide more contrast and a blacker background than reflectors of equal size. **Refracting telescopes are generally good for viewing the moon and the planets, but only small apertures are practical and affordable**. Reflecting telescopes have a concave mirror at the base of a tube and a slanted flat mirror that bounces the reduced image out the side of the tube into an eyepiece. Although they are splendid for viewing the moon and planets, **reflecting telescopes come in practical larger apertures needed to bring in dimmer galaxies and nebulae**.

A GoTo telescope has a computer-controlled mount that aims the instrument at targets in the sky automatically - one need only pick from a database of objects on the controller. GoTos are great for beginners unfamiliar with the night sky and for more experienced stargazers who like efficiency. They would also be the choice if one has a disability like a bad back because they eliminate the need for awkward positions to sight through the finder. The downside of GoTos: they are more expensive than basic mounts - the cheapest I found on the internet is $250 - and they require an initial learning

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DPAS BOARD

Gary Henkelmann, President
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Thomas Minahan, Vice President, Outreach Coordinator, and Board Secretary

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

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

Jim Maki, Academic Coordinator

John W. Beck, Webmaster

Mike Egan, David Lenius, Jacque Axland, and Steve Ransom-Jones, Members at Large

Ray Stonecipher, in spirit

In addition, 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 scheduled for 7 PM on Monday, 8 days prior to the following general meeting, at the Astronomy Center. Members of DPAS are invited to attend Board meetings.

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hyperbolic orbits, charted by Charles Messier so as not to be confused with other heavenly bodies. There are more than 5000 known comets …

D **Daylight**. The Sun and the "green flash" at Sundown, the "Belt of Venus" in the East – Earth's shadow.

Double-Stars. Half of all the stars we see at night are binary stars. Alberio in Cygnus and Mizar and Alcor in Ursa Major are examples.

E **Eclipses**. Displaying John W's picture taken south of St Louis. There's an eclipse somewhere every 18 months, with an umbra only 90 miles wide.

M **Meteors**: passing through a comet's tail – named after the constellation it is radiating out of. The peak is before dawn.

Moon.

N **Nebula**. Dust and gasses, spread over millions of light years. Planetary nebulae: carbon, oxygen, nitrogen and neon. Thought once to be galaxies.

P **Planets**. The gas giants have rings, and exhibit regression in their paths.

S **Satellites**. 35,000 in Earth orbit. The Space Station and 180 others are visible.

Star Clusters: open, younger clusters with 10 to 1000 stars: we have 20,000 in our galaxy; plus 200 known clusters in our galaxy of 10k to 100k stars each.

V **Variable Stars**: some are binaries, with one passing another; others are intrinsic – cephids that oscillate. A group watches them: the American Organization of Variable Star Observers (AOVSO)

U **Universe**. With an AMNH short to demonstrate, working from near to far: shots of space junk, planets, human radio signals, the Milky Way, galaxies and quasars. Just beautiful, and instructive.

Then, as advertised, our dessert: Apple Whole Wheat glazed cake, delicious Brownies, fresh apple juice. The wait was worth it – thanks *Margie* and *Dan*!

Steve Ransom-Jones came in to announce a special treat: the Northern Lights making an appearance. We all went outside to view the magnificent spectacle of the Big Dipper spread horizontally above the northern horizon and the vertical columns of solar plasma emissions playing above it and to the side of its ladle. Thank you, Steve, for noticing them!

And then, *Dave Lenius*, on taking pictures of what we can barely see: pictures of planets and deep sky objects. Options are available to use your skills to move to the next level. Examples he showed: the Sun, with Mercury transiting, the Moon, the deep sky Orion nebula. But then he sharpened the images by "stacking" the pictures. Multiple frames of the same image increases the exposure time. The stacked pictures taken on the Malincam amount to 290 seconds, instead of just one at 1/29th of a second. He demoed 22+ stacked

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Astronomy Quiz

I. What red supergiant star in the constellation Cepheus is 1650 times the diameter of our sun and is one of the reddest stars known?

II. The Milky Way's closest companion galaxy is _____.

III. Albireo is a true binary system, the double star which with unaided vision appears to be a single star. The gold or orange star of the pair is:

A. larger and hotter

B. larger and cooler

C. smaller and hotter

D. smaller and cooler

than its companion.

IV. Titan was the first of Saturn's moons to be discovered. It was discovered by Dutch astronomer _____.

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and processed pictures, and 56 images of Jupiter, using Deep Sky Tracker, and 20 of the Moon, with Registax. Great differences in clarity! Photoshop is the "gold standard", with its add-ons and numerous tasks. He uses Photoshop to edit the stacked Master File. The nice thing about the whole process is that you (the user) are the final judge of whether you've gotten the result you intended. He capped off his presentation by a video of a person doing a stacking of Saturn, aligning all the frames until he was satisfied. Now we understand the perfection of pictures in astronomy magazines versus our own shots!

Mike Egan

Countdown to NCRAL 2018

With magic wand in one hand and gavel in the other, our NCRAL 2018 chairperson, Jacque Axland, had things well under control nearly 6 months ahead of the event. Speakers have been confirmed, biography clips and presentation titles recorded, T shirts ordered, group photos arranged, venue secured and menus planned. The registration form has been finalized and will go online at the first of the year on the NCRAL 2018 website, the skeleton of which is already up and running. PayPal is being set up so that registrants can pay with their online registrations if they so choose. The event is being coordinated with the president of the North Central Region, Astronomical League. Links to our NCRAL 2018 will appear on their website.

In coming months, Jacque and her committee will be looking for interested volunteers. Folks will be needed for checking in attendees, handing out door prizes when they are announced, setup of displays, cleanup after the event, and many other activities. Details such as compiling votes on the photography contest and poetry contest could use help.

Keep Friday and Saturday, May 4 & 5, at the Lodge at Leathem Smith in mind. Mark your calendar. We're looking forward to great programs, great food, and camaraderie.

Countdown to Annual Banquet

Every year our January general meeting is replaced with our annual banquet. The January 2018 banquet will be held on **Tuesday, January 9**. Note the deviation from the first Tuesday of the month; the Board felt that January 2 was too close to the New Year holiday to be convenient for many of our members. Like NCRAL 22018, the banquet will be held at the Lodge at Leathem Smith.

Viewing Nights

December 16
January 13

Viewing targets for December:
The Orion Nebula (M42) and The Salt & Pepper Cluster (M37)

Poetry Corner

The town does not exist
except where one black-haired tree slips
up like a drowned woman into the hot sky.
The town is silent. The night boils with
eleven stars.
Oh, starry starry night! This is how
I want to die.

It moves. They are all alive.
Even the moon bulges in its orange irons
to push children, like a god, from its eye.
The old unseen serpent swallows up the
stars.
Oh, starry starry night! This is how
I want to die.

into that rushing beast of the night
sucked up by that big dragon, to split
from my life with no flag,
no belly,
no cry,

http://emilyspoetryblog.com/2013/04/04/the-starry-night-by-anne-sexton/

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period and a nightly, sometimes tricky alignment process.

Many amateur astronomers prefer to learn their own way around the constellations and s*tar hop* to targets.
For this, a manual *altitude-azimuth* or an *equatorial* mount are the choices. Either on a tripod or tabletop, an **altitude-azimuth mount** allows the telescope to be aimed anywhere above the horizon - the altitude is measured in degrees of angle above the true horizon (the zenith is at 90°) and azimuth is measured in degrees of the circle with North at 0° and East at 90°. One need only rotate and tilt the telescope. An **equatorial mount** has a rotational axis parallel with the Earth's axis of rotation. The mount must be aligned with the north star - not real hard - but it allows easy compensation of the Earth's rotation to keep the telescope on target. One need only turn a knob incrementally to keep an object in the field of field. They frequently have an electric clock-drive that does this automatically. Another advantage of manual targeting: Some amateur astronomers spend much of their viewing time just randomly exploring magnified areas of the night sky. No GoTo control needed and personal discoveries can be made!

What is the most effortless way to get magnified views of the night sky? **Buy a good pair of binoculars.** Think of them as a giant pair of bug-eyes that can increase your "depth of view" by imaging astronomical targets several times dimmer than what can be seen with the naked eye. Because ours brains are better able to filter out visible noise when using binocular vision, binoculars generally give a 40% increase in contrast over viewing throughout a single lens of equal size and magnification. Therefore fainter objects can be seen. The most preferable size for stargazing is in the vicinity of 7 x 50, i.e. a magnification of seven (a 6° field of view) and objectives lenses that are each 50 mm in diameter. Magnifications 10x or higher make it difficult to keep the image steady when held in your hands. Objective lenses larger than 60 mm start to get heavy and are tiresome to hold. Feel free to get a pair of larger, more powerful binoculars, but you will need a sturdy mount. Most quality binoculars are compatible with an inexpensive tripod-binocular connector to lock down the binoculars. Also: Binoculars provide a view that is right-side-up, not flipped like in a telescope, and ... they are great for lounge chairs!

Here are some buying options for products < $200 that should

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Astronomy Quiz Answers

I. Mu Cephei, the Garnet star.

II. The Sagittarius Dwarf Elliptical Galaxy, or SagDeg. It is about half the distance from the Milky Way Galaxy to the Large Magellanic Cloud companion galaxy.

III. The companion is a smaller, hotter star, so the answer is B.

IV. Christiaan Huygens discovered Titan and suggested that a thin, flat ring circled the planet Saturn.

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provide quality views of the night sky. When shopping in store or online, look for major astronomy brands like Orion, Celestron, Meade, etc. [I do not work for any of these companies and shall not accept any money for these recommendations.]

• Binoculars. Quality binoculars will have optics that are coated - look for Porro-Prism BAK4 glass. They provide sharper imaging, brighter edges in the field of view and a nice circular exit pupil. Here are just a few binocular choices: Orion Scenix 7 x 50 $130, Celestron SkyMaster DX 8 x 56 $200, Vixen 10 x 50 Ascot Super-Wide $200, Bushnell 7 x 50 PermaFocus $70.

• Small telescopes. Inexpensive refracting telescopes from a major astronomy brand start at $80 (like the Celestron PowerSeeker 70AZ) and go up from there. These will come with either a ground or tabletop tripod and one or two eyepieces. Be sure the telescope has high-transmission *coated optical glass*.

A great choice for a beginner or novice is a **tabletop altitude-azimuth reflector** such as the Meade Lightbridge Mini 82 at $59 **(**see figure) - they provide quality imaging, are EASY to use and lightweight and portable and not expensive. A stable, relatively level surface is required, but the tripod shakes are eliminated. They come with two eyepieces and a 2x barlow lens, so four different magnifications are provided out-of-the-box.

• Larger Telescopes. A **Dobsonian telescope** is a reflector at the bottom of a long tube, which is mounted on a base allowing the telescope to be swiveled and tilted. The eyepiece is conveniently located near the top of the tube. Easy to set up and easy to use. Comes in sizes with larger mirrors and is a good choice for pulling in dim deep sky objects. $285 and up.

• Accessories. An excellent accessory for beginners in a **green laser pointer**, about $50. The ability to accurately point out targets in the night sky makes teaching others much easier. These lasers are powerful enough to damage the retina, so never point them at people or airplanes. A red flashlight which preserves night vision, a planisphere or book of star maps, lens defogger, wide-angle eyepieces - there are too many choices to list here.

For some inspiration, tell your budding astronomer about these **discoveries made by amateurs** [from listverse.com].

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• Unknown dwarf galaxy discovered while photographing a large galaxy (NGC 253) in a farmer's field. • Famous astronomer William Herschel discovered the planet Uranus

(the first planet found not visible to the naked eye) when he was but a novice. • Two amateur astronomers spot comet Hale-Bopp on the same night in 1995 independently. • In 2009, a scar on the surface of Jupiter was discovered from a backyard in Australia. • A pair of amateurs discover a Neptune-sized exoplanet that appears to have two suns, which are also part of a quadruple star system - the first ever found. • While viewing Hubble photographs of galaxies available on the internet, a schoolteacher notices a mass of bright gas "looking like an irregular galaxy" but with a huge hole in the middle of it. Researches labeled her find a *cosmic ghost*, thought to be the result of a huge black hole erupting! • While it is known that Jupiter takes many hits from comets and asteroids (strong gravity), in 2016 amateur video recorders in Iceland and Austria independently captured the event as it happened and the videos were quickly posted on YouTube.

The preceding article by Tom Minahan was published in the Peninsula Pulse in November and is used by permission of the Peninsula Pulse and doorcountypulse.com.

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'Oumuamua, the Interstellar Cigar

In the days after the discovery of 'Oumuamua, the first (real) interstellar object ever known to pass through our solar system, astronomers worldwide went on the astronomical equivalent of "Red Alert" and pointed their biggest guns at the unexpected interloper. "We dropped everything," explains Laura Ferrarese, who coordinated observations by the Gemini South observatory in Chile.

Artist's concept of interstellar asteroid 1I/2017 U1 ('Oumuamua) as it passed through the solar system after its discovery in October 2017. The aspect ratio of up to 10:1 is unlike that of any object seen in our own solar system. *ESO / M. Kornmesser*

The result was a torrent of observations — and speculations — that have already found their way into many analyses posted online.

Early looks at these data show that 1I/2017 U1, as it's now known officially(with "I" denoting "interstellar"), has a reddish color not unlike the surfaces of comets and other distant, primitive objects in the solar system. Yet not even the most powerful telescopes revealed any hint of cometary activity — even though this body passed well inside Mercury's orbit at about 0.25 astronomical unit from the Sun.

While the mystery object's spectrum seems reasonable, its shape borders on bizarre. According to rapid-response observations pooled from five large telescopes in Hawai'i and Chile, the apparent brightness of 1I/2017 U1 varies periodically and shows about 2½ magnitudes of range. Of the roughly 750,000 asteroids now known, only five display light curves with swings of at least 2.2 magnitudes — and none as high as 2½. As Karen Meech (University of Hawai'i and others explain in a *Nature* article posted online on November 20th, this wide swing implies that the object has an *extremely*elongated shape - perhaps 10 times longer than it is wide.

If 'Oumuamua has a very dark surface that reflects only 4% of sunlight, then its average diameter must be a bit more than 100 meters (330 feet) across. But that's a rather meaningless mean given the extreme light curve. Instead,

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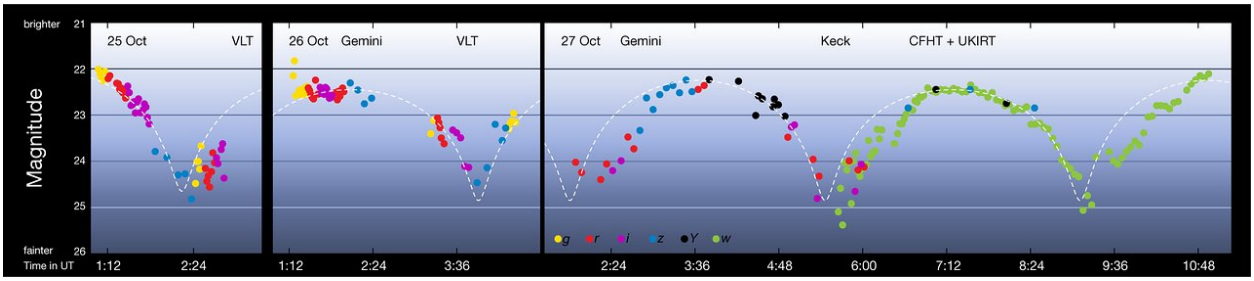
'Oumuamua continued from page 7

note Meech and her colleagues, the true shape mustbe 800 m (0.5 mile) long and only 80 m across — more

Instead, this interstellar cigar seems to have entered our solar system from the direction of the constellation Lyra at about 26 km (16 miles) per second. This velocity and

holds true for the castoffs of other stars, then by any reasonable odds 'Oumuamua should have been a comet.

And finally, consider that,



This plot shows how the interstellar asteroid `Oumuamua varied in brightness by a factor of 10 during three days in October 2017. The colored dots represent measurements through different filters, covering the visible and near-infrared part of the spectrum. The dotted line shows the light curve expected if `Oumuamua were a cigar-shaped ellipsoid with a 1:10 aspect ratio. The deviations from this line are probably due to irregularities in the object's shape or surface albedo. ESO / K. Meech et al.

like a gigantic spindle or cigar than a ball of rock. As the team notes, "It raises the question of why the first known [interstellar object] is so unusual."

The combined light curve shows that 'Oumuamua rotates every 7.8 hours. Assuming that the spin axis goes through its shortest dimension (the most likely situation), this interstellar visitor must be made of rocky or metallic compounds with a fair amount of tensile strength to keep from flying apart.

So where did this thing come from? Conceivably, it could have come from our solar system — you can imagine that it might have been circling the Sun somewhere in the no man's land of the inner Oort cloud when it had a chance close encounter with some massive unseen planet that abruptly flung it sunward. But no one is exploring this scenario seriously.

incoming direction, dynamicists note, matches the mean motion of stars in the Sun's neighborhood almost exactly. We might never determine which star 'Oumuamua escaped from. It could be a renegade from a young system just a few million years old — or perhaps it's been floating freely among the stars for billions of years. Fittingly, 'Oumuamua loosely means "a messenger that reaches out from the distant past."

Meech and her colleagues point out one other oddity about 1I/2017 U1. In their infancy, the young planets of our solar system tossed untold trillions of objects out to the distant Oort cloud and beyond. And while a handful of asteroidal bodies do lie at the solar system's outer fringe, ice-rich comets dominate overwhelmingly — at estimated ratios of 200:1 to 10,000:1. If this proportion

statistically, interstellar objects (ISOs) shouldn't be rare. "Our estimates suggest that there is always about one ISO of about 250 m diameter (assuming 4% albedo) within 1 a.u. of the Sun, that is, interior to Earth's orbit," the team writes. These objects might not be rare after all — we simply need to be alert for the next one to pass our way.

www.skyandtelescope.com/astronomy-news/meet-oumuamua-the-interstellar-cigar/

New Members*

Shauna Simonar and Family

Michael and Linda Wember

Kay Nelson

David and Janet Daniel

Coggin Heeringa

*Includes rejoined