

**Reflections** The Newsletter of the Popular Astronomy Club ESTABLISHED 1936

#### President's Corner: November 2021



I am still basking in the pleasurable afterglow of the club's banquet last month. In this month's issue of the newsletter, you can find some of what went on at

the banquet, which marked the 85th anniversary of the founding of the Popular Astronomy Club.

As banquets go, this was one of the best. The Riverfront Grille in Rock Island provided the meeting room and a sumptuous buffet dinner for about 40 club members.

You can find out more about the banquet, the celebration and club members honored at the event elsewhere in "Reflections." I can't wait to see what's in store for the 86th anniversary!

The November 8 regular PAC meeting will feature one of our own as a guest speaker. Former member Katie Melbourne, who is now a student in the PhD program in Aerospace Engineering Sciences at the University of Colorado in Boulder, will provide the program for the meeting via Zoom videoconferencing.

Katie has been involved in the research on the solar systems of M dwarf stars as candidates for exoplanets, including temperate, Earth-sized planets. She may also be able to give us an update on the status of the James Webb Space Telescope, which is scheduled for launch before the end of the year. You won't want to miss this meeting!

Don't forget, during the December regular meeting, we will have elections for club officers. The two-year terms for all your club officers' positions will end at the end of the year. So this is your chance to throw your hat in the ring and run for an office.

Please see me or any of your current club officers to inquire about what they do and nominate yourself or another deserving club member. Keep looking up! Al.



### November 2021



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PAC president Alan Sheidler speaks at the club's annual banquet on October 23. About 40 club members and guests attended the event.



## **THANKS BYRON!**

It's been a rough year for PAC member Terry Dufek, who has battled some major health issues. While there have been some recent setbacks, Terry continues to fight, and we wish him the best.

At a time like this, it's good to have support from friends. That support was demonstrated in October when fellow PAC member Byron Davies put his electrical wiring skills to work and installed a new porch light at Terry's residence.

Thank you, Byron, for taking the time to reach out and help a friend in need. And keep fighting, Terry – we're here for you, so don't hesitate to ask for help.

Both Byron and Terry were honored at the PAC banquet on October 23; turn to page 5 to find out about the welldeserved awards they received.

## **ANNOUNCEMENTS / INFO**



NCRAL Seasonal Messier Marathon Program

NCRAL's Seasonal Messier Marathon observing program is NOT designed to qualify observers for the Astronomical League's Messier Observing program; the two programs are unrelated and observing requirements are quite different. In the NCRAL program, the main requirement is to quickly observe and essentially check off items from one of four seasonal lists of Messier objects as noted in the section to follow.

NCRAL recognition will consist a suitable printed certificate and a 3/4-inch enameled star pin (a different color for each season). There will be no direct cost to the membership for participating in the award program; the cost of the program (pins, certificates, mailers, postage) will be borne by the Region as a benefit of affiliation. Relevant program documents are linked below

NCRAL Seasonal Messier Marathon Rules

NCRAL SPRING Seasonal Messier List

NCRAL SUMMER Seasonal Messier List

NCRAL AUTUMN Seasonal Messier List

NCRAL WINTER Seasonal Messier List

## HOW'S THE WEATHER?







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# November night sky features a lunar eclipse

In the early morning of Friday, November 19, there will be a lunar eclipse visible from the Quad Cities (if we have clear skies). A lunar eclipse occurs when the Earth passes between its satellite (the Moon) and the Sun.

The Earth's shadow sort of resembles a "bullseye," with a very dark inner region called the umbra and a less dark outer region called the penumbra. As the Moon enters this bullseye, it will slowly and unperceptively (at first) dim as it enters the penumbra.

If the Moon's orbit is well aligned with the Earth's shadow, as it will be for the November 19 lunar eclipse, the Moon will venture into the umbra. If the Moon's entire disk enters into the umbra, the result is a total lunar eclipse. This means direct illumination by the Sun of the Moon's entire surface would be completely blocked by the Earth.

Technically, this particular lunar eclipse is not a total lunar eclipse, but it will be darn close. In this case, at maximum eclipse, about 97% of the Moon will be covered by the Earth's umbra shadow. So this will be an excellent opportunity for anyone wanting to enjoy one of nature's most interesting astronomical events.

The eclipse technically starts with the full Moon entering the penumbra at around 12:02 a.m. However, you may not be able to notice anything happening for another half hour or so, when you may just be able to notice a slight darkening of the one side of the Moon.





Al Sheldler took this photo of a lunar eclipse on April 15, 2014; note the "Blood Moon" effect, caused by sunlight filtered through Earth's atmosphere.

At 1:19 a.m., the Moon will begin entering into the dark umbra shadow. Soon thereafter, you should notice very dark "bite" increasing in size as the Moon treks further into the Earth's umbra.

By around 3:03 a.m., the moon will be about 97% enveloped by the dark umbra. At this point, much of the Moon's surface will be significantly dimmer and may take on a very interesting shade of a dull red, brick red, orange, copper, or even gray color. The 3% of the Moon's surface not inside the umbra will probably be yellowish and slightly brighter than the darker reddish umbra.

We won't know the colors we will be able to see until the eclipse happens. Theoretically, the Earth's umbra region should be completely dark and devoid of sunlight. But this typically is not the case.

If you could be an astronaut standing on the surface of the Moon and looked up in the lunar sky during the eclipse, what

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This illustration (drastically not to scale) shows how the Earth's shadow blocks sunlight to the Moon during a lunar eclipse.

# Lunar eclipse happens on November 19

#### Continued from Page 3

you would see would be something beautiful and miraculous. As you watch the Earth pass in front of the Sun, you would still see the Earth's atmosphere glowing like a reddish halo as sunlight is refracted or bent around the Earth.

This reddish halo is caused in the same way we have red sunsets or sunrises on Earth. Of course, the major difference is you are seeing the light of sunsets or sunrises as they would appear way out in space (on the surface of the Moon, in this case) rather than on Earth's surface.

The refracted sunlight from the Earth's atmospheric halo dimly illuminates the Moon's surface. So even though there is no direct sunlight falling on the portion of the Moon lying within the umbra, it will still be visible as a dim orange, red or copper color.

The colors seen on the Moon may be very different depending on if there have been recent volcanic eruptions, clouds or thunderstorms on Earth prior to the eclipse. Dust particles and clouds can filter the sunlight, causing dramatic shades of red. Total lunar eclipses sometimes are referred to as a "Blood Moon" because they can look almost blood red.

This month's lunar eclipse should be a good one. Seek a location with a clear view of the southwestern sky and bring a pair of binoculars or a small telescope.

# This map of the November 19 shows where it will be visible, including the Quad Cities.



Often when we hear or read the word eclipse, it's followed by some kind of warning to protect your eyes. This warning, however, only applies to a solar eclipse (which occurs during the daytime when the Moon passes in front of the Sun). For a lunar eclipse, which occurs at night, there is no danger to your eyes, so you can safely look at it without any eye protection and use binoculars or a telescope without a filter.

As you may have gathered, a lunar eclipse is only possible when the Moon is full. Because the full moon is very bright, the sky glow or light pollution from the bright moon will drown out dimmer, deep sky objects. As the lunar eclipse proceeds, however, the Moon will dim way down and allow other nearby objects to shine through.

One example of this is a beautiful open star cluster called the Pleiades or the Seven Sisters, which will be very near the Moon during this month's eclipse. You may initially have difficulty seeing the Pleiades but, after the Moon has darkened, the cluster should easily be visible as a fuzzy patch of light to the naked eye.

The Pleiades will be a little higher up in the sky from the eclipsed moon. A pair of binoculars will reveal the beautiful nature of this open cluster of stars.

If you miss this month's lunar eclipse because of bad weather, don't worry. There will be another, even better lunar eclipse on May 16, 2022. This one will be total, with the Moon passing deep within the Earth's umbra shadow. Totality will begin at around 10:30 p.m., so you won't have to stay up to the wee hours of the morning either.

So mark your calendars for next May. But do take the opportunity to view this month's lunar eclipse too – they don't come around very often.

Alan Sheidler

## PAC celebrates anniversary at annual banquet

The Riverfront Grille in Rock Island was the setting for PAC's 85th Anniversary Banquet on the evening of October 23. A total of 44 reservations were received for our annual celebration of the club's founding by Carl H. Gamble.

After a buffet dinner, Gerry Pearson introduced our speaker, Dr. Russet McMillian, a professional astronomer at Apache Point Observatory in New Mexico. During her virtual presentation, Dr. McMillian described her work with lasers and retroreflectors left on the surface of the Moon by Apollo astronauts. These instruments are used to study the dynamics of the Earth-Moon system, with the aim of verifying Einstein's Theory of Relativity.

After her program, the Attendance Award drawing was conducted and a gift card was presented to Rusty Case. Wayland Bauer presented the Astronomical League Basic Outreach awards to Mike and Wanda Gacioch, Hugh and Tim Holt, Byron Davies, and Paul Levesque (not present). Al Sheidler received his AL Globular Cluster and Planetary Nebula awards.

Al then spoke about the dedication and service of Terry Dufek, who joined PAC in 2016 and quickly became one of the most active members the club has ever had. He has written articles, handled our Facebook page, and served as the club's secretary and newsletter editor.

Terry's hard work on the newsletter led to him receiving the AL's Mabel Stearns Award in 2018, which is a highly coveted award in the 20,000-



member strong organization named after the first Astronomical League newsletter editor.

Terry has enthusiastically supported countless outreach requests, our Niabi nights, and our private observing sessions. Al presented Terry with the Carl H. Gamble award, the highest award a club member can receive. He is only the eighth recipient of this award. Terry gave us a few words about his first visit to a club meeting and how he has enjoyed being a part of PAC.

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During the banquet, Terry Dufek was presented with the Carl H. Gamble award (above), and Byron Davies was honored as Member of the Year (below right). A table filled with door prizes was available, meaning no one went home empty-handed.





# PAC banquet features awards, door prizes

#### Continued from Page 5

Al then announced the Member of the Year, an honor that went to Byron Davies. Byron helps with outreach requests and our Niabi nights. He assisted with the Paul Castle Observatory work in 2020 and regularly suggests club member observing sessions. Byron has helped many of us with his astrophotography expertise, and has become a good friend to many of us!

Door prizes ended our celebration. Frank Ston-

street chose the 4-inch Meade telescope.

After everyone received their first pick, the leftover items were free to choose from. No one went home empty handed! Hugh Holt tried on his Space Camp outfit.

Special thanks to Mike Haney, Roberta Wright, Gail Sederquist, and Cindy Pippert for their door prize donations this year, and thanks to everyone who helped make the banquet possible.

Sara Sheidler



#### **ASTRONOMY AND SPACE HISTORY – IT HAPPENED IN NOVEMBER**

November 1, 1917:

"First light" is seen at the new 100-inch Hooker Telescope at the Mount Wilson Observatory, located in the San Gabriel Mountains in southern California. The telescope was the largest in the world at the time, a distinction it held until 1949. Astronomers used the Hooker Tele-



scope to make many important discoveries over the years; however, light pollution from nearby Los Angeles has since rendered it useless for deep-sky observing.

November 12, 1833: An astronomical event that became known as the "Great Leonid Meteor Storm" reaches its peak. The annual meteor shower was particularly intense that year due to a close approach by Comet Temple-Tuttle, which produced the meteors, and came on a dark moonless night in a time before electric lights. Some feared that the world was ending, and one newspaper reported that the meteors "showered down so thickly and fast that it looked as though every star in the heavens was falling ... Never before had there been such a sight witnessed." In an early example of crowdsourcing, American astronomer Dennis Olmstead put out a call for information about the meteor storm through newspapers, and used the data he collected to publish a paper on the origin of meteors.



**November 13, 1968**: Members of the Popular Astronomy Club receive a special preview tour of the new John Deere Planetarium on the campus of Augustana College in Rock Island. The tour was conducted by Dr. Harry Nelson, a professor of mathematics and astronomy at the college who was then president of PAC. Those taking the tour got the first look at the Carl H. Gamble Memorial Observatory, named for PAC's founder and first president. The planetarium was formally dedicated the following May; in December 2018, a new digital projector was unveiled, replacing the original projector built by Spitz Laboratories.

November 14, 2003: A NASA-funded research team confirms the discovery of a minor planet that was given the common name of Sedna, after the Inuit goddess of the sea. The discovery upended con-



ventional notions of the architecture of the Solar System, since at the time Sedna was 89.6 astronomical units from the Sun, far outside the planetary domain. (An astronomical unit is the distance from the center of the Sun to the center of the Earth.) Sedna's highly elliptical orbit lies outside the Kuiper belt and borders on the Oort cloud. Scientists are continuing to learn about Sedna's size, composition, rotation period, and other aspects of an object that remains largely mysterious, especially in regard to its origin.

**November 28, 1660**: The Royal Society of London for Improving Natural Knowledge – commonly known as the Royal Society – is founded by a group of 12 men following a lecture by Christopher Wren, then professor of astronomy at Gresham College. Still in operation today, the Royal Society is the world's oldest national scientific society. Isaac Newton served as president of the society from 1703 to 1727, and in 1919 the society sponsored a famous expedition to a solar eclipse which gathered data that provided proof of Albert Einstein's theory of relativity.

# **MEMBER OBSERVATIONS**









About 30 visitors, joined by 13 PAC members turned out for the monthly public observing session at Niabi Zoo on October 16 ('Observe the Moon Night'). The PACMO peered at Jupiter and caught a conjunction of Io and Europa, which amazed visitors, and also captured images of the 'Poor Man's double-double and Neptune with its largest moon, Triton.







Al Sheidler, Wayland Bauer and Byron Davies took advantage of clear skies on October 8 to do some observing and try out the Mallincam Exterminator video camera on the observatory's scope. The results were mixed, though they did come away with this interesting colorized image of Jupiter.



## November 2021

### 'Hating' galaxies

A few weeks ago, I received a message from Cameron Gillis, an amateur astronomer who wrote that he liked galaxies. Just for fun, I decided to take the opposite approach, a philosophical reversal. If he likes galaxies, then I hate them.

As we prepared for our meeting, I began to explain the various reasons why I hate them. When, for example, I am observing with a telescope and the Andromeda galaxy enters my field of view, I quickly leave the telescope and ride my bicycle to the end of our driveway and back.

The more I stretch the story, the greater the laughter becomes. I especially get annoyed by the dark Hydrogen-II regions that stretch across its hideous girth. The cluster of galaxies in the Virgo cluster, particularly Messiers 84 and 86, are so bland that I sometimes have to leave the telescope altogether!

The worst galaxy is our own. When I look up at the evening sky, the Milky Way obstructs my view as it straddles the sky from Cassiopeia all the way down to Sagittarius. The stars are so thick that I can hardly see black sky between them.

Except of course, when I come across Baade's window. This area of sky rattles me because there, some darkness appears. Discovered by Walter Baade, this window allows us to see almost to the center of our galaxy. It is an awful sight.

The majesty of the night is nowhere more apparent than when I am viewing the center of our galaxy, in Scorpius and in Sagittarius, through my telescope. It is wondrous. So wondrous that I still hate it, because it wastes my time when I am mesmerized by it; the emotion of viewing the galaxy from my backyard is so strong that it strengthens my heart and pierces my soul.

The worst part of seeing our own galaxy on a clear autumn night is that the dark lanes of hydrogen dust straddle its length. Dark areas are called giant molecular clouds. They are not lit by nearby stars; they just are there.

In the far distant future, they will generate new systems of stars and planets like our Earth. They are called giant molecular clouds or hydrogen (HII) regions.

In distant external galaxies, dark clouds like these can straddle their whole length. The Andromeda galaxy has several of these HII regions that one can observe through a small telescope if one looks carefully enough.

Deep in the southern sky, but still visible from most of North America, lies Caroline Herschel's galaxy. It is No. 253 in the NGC, the New General Catalogue. Under a bright sky, it is hardly anything, but from a dark site it resembles a long resting caterpillar. It has a most prominent dark hydrogen lane running across its length.

Along with globular star clusters – those round conglomerations of hundreds of thousands of stars that orbit the outskirts of galaxies, including our own – galaxies are the oldest structures in the universe. The oldest ones started to build within half a million years of the Big Bang, when the universe was in its infancy.

So much for hating galaxies. When I say that I hate them, I write merely for the sake of argument and humor.

Galaxies are almost like people, each one different, each one with its special characteristics. One way of looking at them is to compare their gigantic sizes with our puny selves. But there is another way.

Small as we may be, each of us is unique. Galaxies are huge, but aside from their differing shapes, they are still much alike. But in all this universe, among all these galaxies, there is just one, only one, of each of us. Our ideas, our personalities, are precious.



Baade's window allows us to see into the center of our home galaxy, the Milky Way.

# 'Handy' ways to measure the night sky

Fall and winter months bring longer nights, and with these earlier evenings, even the youngest astronomers can get stargazing. One of the handiest things you can teach a new astronomer is how to measure the sky – and if you haven't yet learned yourself, it's easier than you think!

Astronomers measure the sky using degrees, minutes, and seconds as units. These may sound more like terms for measuring time - and that's a good catch! – but today we are focused on measuring angular distance.

Degrees are largest, and are

each made up of 60 minutes, and each minute is made up of 60 seconds. To start, go outside and imagine yourself in the center of a massive sphere, with yourself at the center, extending out to the stars: appropriately enough, this is called the celestial sphere. A circle contains 360 degrees, so if you have a good view of the horizon all around you, you can slowly spin around exactly once to see what 360 degrees looks like, since you are in effect drawing a circle from inside out, with yourself at the center!

Now break up that circle into quarters, starting from due north; each quarter measures 90 degrees, equal to the distance between each cardinal direction. It measures 90 degrees between due north and due east, and a full 180 degrees along the horizon between due north and due south.

Now, switch from a horizontal circle to a vertical one, extending above and below your head. Look straight above your head: this point is called the zenith, the highest point in the sky. Now look down toward the horizon; it measures 90 degrees from the zenith to the horizon. You now have some basic measurements for your sky.

Use a combination of your fingers held at arm's length, along with notable objects in the night sky, to make smaller measurements. A full Moon measures about half a degree in width – or



1/2 of your pinky finger, since each pinky measures 1 degree. The three stars of Orion's Belt create a line about 3 degrees long.

The famed "Big Dipper" asterism is a great reference for Northern Hemisphere observers, since it's circumpolar and visible all night for many. The Dipper's "pointer stars," Dubhe and Merak, have 5.5 degrees between them – roughly three middle fingers wide. The entire asterism stretches 25 degrees from Dubhe to Alkaid - roughly the space between your outstretched thumb and pinky.

On the other end of the scale, can you split Mizar and Alcor? They are separated by 12 arc minutes – about 1/5 the width of your pinky.

Keep practicing to build advanced starhopping skills. How far away is Polaris from the pointer stars of the Big Dipper? Between Spica and Arcturus? Missions like Gaia and Hipparcos measure tiny differences in the angular distance between stars, at an extremely fine level. Precise measurement of the heavens is known as astrometry. Discover more about how we measure the universe, and the missions that do so, at nasa.gov.

#### **David Prosper**

This article is courtesy of NASA's Night Sky Network program, which supports astronomy clubs across the USA and is dedicated to astronomy outreach. Visit nightsky.jpl.nasa.gov to learn more.



# Date November 8, 2021

Event: Regular Meeting @ 7 p.m. Location: Zoom / Butterworth Center

- Program : M Dwarf Stars and the
- James Webb Space Telescope"

All these events, dates and times are tentative and subject to change! Please check your emails for any updates and changes!

## MORE UPCOMING EVENTS:

- November 1: Outreach at Eldridge Public Library
- November 2: Presentation for Girl Scouts, Trinity Lutheran School, Davenport
- November 17: Observing / presentation at John Deere Middle School, Moline (November 18 inclement weather date)
- November 19: Outreach at Niabi Zoo; sunset VOLUNTEERS NEEDED FOR THESE EVENTS

MONTH	NEWSPAPER ARTICLES	MEMBER PRESENTATION	MEETING / PROGRAM	
DEC 2021	Dale & Joann Hachtel	AVAILABLE	December 13 - Presentation: The Year in Review by Roy Gustafson	
JAN 2022	AVAILABLE	AVAILABLE	January 10 - Presentation: "Curiosity Paving the Way for Perseverance" by Dr. Rebecca M E. Williams, Planetary Science Institute	
FEB 2022	AVAILABLE	AVAILABLE	February 14 - Presentation: "Seeing Stars: How Birds Use the Night Sky During Migration" by Dr. Jennifer C. Owen, Corey Marsh Ecological Research Center, Michigan State University	
MAR 2022	AVAILABLE	AVAILABLE	March 14 - Business Meeting; Smorgasbord of Member Presentations	
APR 2022	AVAILABLE	AVAILABLE	April 11 - Presentation: "Fantastic Space Discoveries: Theories of Solar System Formation" by Jim Kovac, Chicago Society for Space Studies	
MAY 2022	AVAILABLE	AVAILABLE	May 9 - Presentation: "Technology for the Astronomical Community & More" by Matt Dieterich, Technical Services Manager, PlaneWave Instruments, Inc., Adrian, Michigan	
JUNE 2022	AVAILABLE	AVAILABLE	June 13 - Presentation: "Sky With Ocean Joined: Scaling the Stars at the U.S. Naval Observatory, 1830 to the Pre- sent" by Geoff Chester, Public Affairs Officer, U.S. Naval Observatory, Washington D.C.	
JULY 2022	AVAILABLE	AVAILABLE	July 11 - Presentation: "OSIRIS-REx Mission Update" by Dolores Hill, Senior Research Specialist, Lunar & Planetary Laboratory, University of Arizona, Tucson, Arizona	



Thank you for your interest in the Popular Astronomy Club. To renew your membership or to apply as a new member, please fill in the information and either mail this form to the address below, or bring it to a PAC event. The membership year runs from October 1<sup>st</sup> through September 30th. There is a pro-rated amount if you join anytime during the year (see below). Our club newsletter, REFLECTIONS, will be e-mailed to you and it will be posted on the club website.

#### Submission of this application and payment confirms the applicant's agreement to abide by the policies and procedures detailed in the PAC Policy & Procedures Document available at our website: www.popularastronomyclub.org.

Membership pro-rated (for new members) amount by month: Oct-\$30.00, Nov-\$27.50, Dec-\$25.00, Jan-\$22.50, Feb-\$20.00, Mar-\$17.50, Apr-\$15.00, May-\$12.50, Jun-\$10.00, Jul-\$7.50, Aug-\$5.00, Sep-\$2.50

#### PAC renew or new member:

(a) Regular Membership	\$30.00		\$				
(b) Additional family member (\$7.50 each) x	\$						
Or you can elect c. d. or e (this includes the \$30.00 membership, with the balance a tax deductible gift to PAC):							
(c) Supporting Member	\$40.00		\$				
(d) Sustaining Member	\$60.00		\$				
(e) Patron Member	\$80.00		\$				
(f) Student Member	\$10.00		\$				
		Grand Total	\$				
Your Name:							
Address:							
City	State	Zip					
E-Mail							
Home Phone: Cell Phone							
Please enter name (s) of ADDITIONAL FAMILY MEMBERS:							
Emergency Contact:		phone #					
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