

REFLECTIONS

APRIL 2024



THE NEWSLETTER OF THE POPULAR ASTRONOMY CLUB - QUAD CITIES USA

Get ready for 'Eclipse Day'

Moon will block the Sun on April 8; partial here, total nearby

As you've probably heard by now, an eclipse of the Sun will be visible in the United States on Monday, April 8.

A solar eclipse happens when the orbits of the Earth, Moon and Sun align in a specific way. When this happens, the Moon is between the Sun and Earth, causing its shadow to cover a portion of our home planet. Solar (and lunar) eclipses would happen once a month if the

Moon's orbit was perfectly circular and on an even plane; because its orbit is in fact elliptical and slightly inclined, solar eclipses are rare events.

In some places such as Carbondale, Illinois, or Evansville, Indiana, the April 8 eclipse will be total, and the Moon will completely block the disk of the sun. In the Quad Cities, though, we will not be in a position to witness totality. Instead, we will see the Sun reduced to a bright crescent as the Moon covers the rest of it.

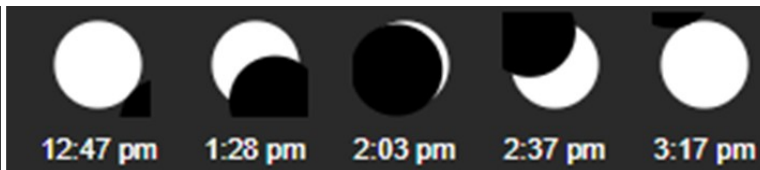
From Moline on April 8, at maximum eclipse, the Sun will be approximately 90% covered by the Moon. The eclipse will begin at 12:47 p.m., at the moment of "first contact." The Moon will slowly and incrementally take larger "bites" out of the Sun, until maximum eclipse is reached at 2:02 p.m.

As the eclipse continues, the Moon will slowly move off the disk of the Sun. By 3:18 p.m., the Moon will no longer cover the Sun and the eclipse will end here.

Whether observers see a total or a partial eclipse depends on their location. This is because two types of shadows are created in an eclipse: the umbra and the penumbra.



A large crowd turned out at Moline Public Library for a PAC public viewing session during the partial solar eclipse on August 21, 2017. PAC will host a similar event on April 8, and members are needed to provide support for what could be another big turnout.



This illustration shows the times of the stages of the partial eclipse in the Quad Cities and how the Sun will look at maximum coverage.

COURTESY OF NASA

The umbra is the darkest part of the Moon's shadow, and is only visible from the surface of the Earth where the shadow completely covers the Sun. The penumbra is much larger and is the

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LOOKING INSIDE



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The Popular Astronomy Club of the Quad Cities – a two-state region comprised of several communities along the Mississippi River in Iowa and Illinois – is a non-profit organization that was founded in 1936. PAC is dedicated to promoting and advancing amateur astronomy, and to informing and educating its members and the general public about astronomy in an engaging, inclusive manner. Because PAC believes that astronomy is for everyone, membership in PAC is open to anyone with an interest in the wonders of the night sky.

To learn more, visit PAC's website, at www.popularastronomyclub.org, or find us on Facebook at www.facebook.com/QCPAC. To contact PAC, send an email to popularastronomyclub@gmail.com.

REFLECTIONS

Reflections is a free monthly newsletter published by the Popular Astronomy Club. It is intended to serve all members of the club as well as the amateur astronomy community as a whole in the Quad Cities area.

Reflections serves as an open forum for PAC members and others with an interest in promoting amateur astronomy. Opinions expressed in Reflections are not necessarily those of the club, nor of any individual club officers or members, nor of any other businesses or organizations supporting PAC.

Submissions to Reflections are welcome and should be sent via email to levesque5562@att.net. Photos which are submitted should be high resolution in .jpeg format when possible. Text submissions need not be formatted and should be sent as Word attachments when possible. Submissions may be edited for spelling, grammar, style, clarity and length. Questions and comments should be sent to Paul Levesque, Reflections editor, at the email address above. Back issues of Reflections are available here: popularastronomyclub.org/news-letters.



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The Popular Astronomy Club is a founding member of the Astronomical League, and is a member of the North Central Region of the Astronomical League (NCRAL). To learn more, visit the Astronomical League's website at www.astroleague.org and the NCRAL website at ncral.wordpress.com



Dale Hachtel

REFLECTIONS FROM THE PRESIDENT

Our big public event for April, and for this year, is the solar eclipse. PAC will conduct public viewing at the Moline Public Library on April 8. We'll have telescopes with solar filters and other viewing methods available, and have solar eclipse glasses to hand out for free while supplies last. Please help at this event if you can; a similar public viewing during the 2017 eclipse drew a large crowd.

At our public programs leading up to the eclipse, we've emphasized safety by promoting the use of certified eclipse glasses and other safe means of viewing the eclipse. Since the eclipse will not be total in the Quad Cities, we've stressed that it will never be safe to look at the Sun on April 8, even when it is nearly 90 percent covered as it will be here.

As amateur astronomers, we need to share this information with the public, as some attendees at our public programs have heard incorrectly that welding helmets, quick glances at the sun, or other unsafe practices are acceptable for viewing the eclipse.

Media coverage of our pre-eclipse programs has resulted in additional requests for PAC public outreach programs. In addition to our monthly Niabi Zoo public viewing sessions, we have 13 planned public programs, three more proposed public programs, and four semi-public programs during the rest of the year. More can be expected later in the year as schools and libraries plan their fall programs.

We have uncovered the PACMO and prepared it for the season, and it will be getting plenty of use. Some of our members have also worked on the refurbishment of the observatory at Loud Thunder Scout Reservation.

We are providing an upgraded (i.e. ruggedized) library telescope to the Orion Library which will be available to be checked out to the public, and are looking at providing similar equipment to other libraries in the area.

An equipment day is being planned, where we will have club telescopes available for members and visitors to see what is available. These club telescopes, most of which were donated to PAC, can be borrowed by members for their own use, and for use at public programs.

Another donation from Stephen Saber to the club is the book "The Caldwell Objects," a very thorough and interesting reference. While the Messier list was made to identify objects that are not comets, the Caldwell list includes 109 additional objects, mostly clusters, nebulae, and galaxies, that have some interesting features. The book also includes 20 more objects of particular interest, and is available to any member to check out.

We are nominating Paul Levesque for the Astronomical League's Mabel Sterns award for *Reflections*, which continues to be one of the best newsletters you'll see in large part due to member submissions.

Although the Astronomical League has increased the portion of the club dues based on membership by \$1 per member, we have decided that we will not need to increase the PAC dues at this time.

This all gives us more reasons to keep looking up! 🚀

Special thanks for Roy and Jan Gustafson, who gave three presentations on the eclipse during March - to the Orion Public Library, Riverside Church in Orion, and the Moline Rotary Club - and have at least one more planned for April.

Solar eclipse

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portion of the shadow that partially blocks the sun.

In the Quad Cities, we will be in the penumbra on April 8. The penumbra will extend as far north as the panhandle of Alaska and as far south as the Panama Canal; in those areas, though, only a small part of the Sun will be covered by the lunar shadow. In the Quad Cities, the Sun will appear as a bright crescent at maximum eclipse, with about 10% of its surface showing.

The umbra shadow, which is the only place to experience totality, will cover a comparatively small area on the surface of the Earth as it travels across the planet on April 8. The characteristics of each eclipse varies, depending on your location, latitude, time of day, and season of the year.

During this eclipse, the umbra will be about 110 miles in diameter and will travel at a speed of more than 1,350 miles per hour, as the Moon moves and the Earth rotates.

This means that if you were positioned directly in the path of totality, as you would be in Carbondale, the total eclipse phase would last only about four minutes!

During totality, bright stars and planets visible only at night can be seen. With 90% coverage, it will not be dark enough in the Quad Cities for stars to be visible. But we may be able to see the planets Venus and Jupiter, which are very bright, if the skies are clear enough.

Looking directly at the Sun can seriously and permanently damage your eyes, and even cause blindness, so it's very important to use proper equipment when viewing an eclipse. You should only look at the Sun through special eclipse glasses certified for solar viewing. Before using these glasses, be sure they have no holes or tears or are otherwise damaged.

Eye injuries can happen both quickly and painlessly, so if you do look at the Sun without proper protection, you may not know you've permanently damaged your eyesight until it's too late.

You can look at the Sun without eye protection when the Moon has totally covered the Sun, which only happens within the zone of totality and, even there, only for a few minutes. Because the Quad Cities will be outside the zone of totality on April 8, eye protection will always be needed.

Though time is short, if you have the chance to visit the path of totality for this eclipse, or any future eclipse, I recommend you do so. It is definitely an experience to have at least once in your lifetime. You can find more information about where to go to see the 2024 total eclipse at the NASA website, at <https://science.nasa.gov/eclipses/future-eclipses/eclipse-2024/where-when>.

The next total eclipse visible in the United States will not be until 2044, when the path of totality will reach Montana and parts of North and South Dakota. In 2045, a total eclipse will follow a path cutting across the continental United States from Northern California to Florida's Gulf Coast.



Al and Sara Sheidler set up their telescope in Columbia, Missouri, for the 2017 total eclipse. Some of images they took are shown below.



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Solar eclipse

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If you're staying in the Quad Cities for the eclipse, I recommend that you join us at the Moline Public Library on April 8. The Popular Astronomy Club will be there with telescopes and equipment which can be used to view the solar eclipse safely.

PAC will also have eclipse glasses which we will give out free to the public while supplies last. Club members will be there to answer questions about the eclipse and discuss any other questions you may have about astronomy.

A similar public viewing event was held at the library in August 2017, during a partial solar eclipse that also left us near to, but not in, the path of totality. (Carbondale and nearby communities in southern Illinois were in the path of totality for that eclipse, as they will be for this one.) A large crowd turned out then and is expected this time as well, especially if the weather cooperates and the sky is clear.

PAC members who aren't traveling that day are asked to come help out at the library. This is a great opportunity to promote our club and share the wonders of the night (and daytime) sky with the general public. ✈

Al Sheidler

Location	Partial Begins	Totality Begins	Maximum	Totality Ends	Partial Ends
Dallas, Texas	12:23 p.m. CDT	1:40 p.m. CDT	1:42 p.m. CDT	1:44 p.m. CDT	3:02 p.m. CDT
Idabel, Oklahoma	12:28 p.m. CDT	1:45 p.m. CDT	1:47 p.m. CDT	1:49 p.m. CDT	3:06 p.m. CDT
Little Rock, Arkansas	12:33 p.m. CDT	1:51 p.m. CDT	1:52 p.m. CDT	1:54 p.m. CDT	3:11 p.m. CDT
Poplar Bluff, Missouri	12:39 p.m. CDT	1:56 p.m. CDT	1:56 p.m. CDT	2:00 p.m. CDT	3:15 p.m. CDT
Paducah, Kentucky	12:42 p.m. CDT	2:00 p.m. CDT	2:01 p.m. CDT	2:02 p.m. CDT	3:18 p.m. CDT
Carbondale, Illinois	12:42 p.m. CDT	1:59 p.m. CDT	2:01 p.m. CDT	2:03 p.m. CDT	3:18 p.m. CDT
Evansville, Indiana	12:45 p.m. CDT	2:02 p.m. CDT	2:04 p.m. CDT	2:05 p.m. CDT	3:20 p.m. CDT
Cleveland, Ohio	1:59 p.m. EDT	3:13 p.m. EDT	3:15 p.m. EDT	3:17 p.m. EDT	4:29 p.m. EDT
Erie, Pennsylvania	2:02 p.m. EDT	3:16 p.m. EDT	3:18 p.m. EDT	3:20 p.m. EDT	4:30 p.m. EDT
Buffalo, New York	2:04 p.m. EDT	3:18 p.m. EDT	3:20 p.m. EDT	3:22 p.m. EDT	4:32 p.m. EDT
Burlington, Vermont	2:14 p.m. EDT	3:26 p.m. EDT	3:27 p.m. EDT	3:29 p.m. EDT	4:37 p.m. EDT
Lancaster, New Hampshire	2:16 p.m. EDT	3:27 p.m. EDT	3:29 p.m. EDT	3:30 p.m. EDT	4:38 p.m. EDT
Caribou, Maine	2:22 p.m. EDT	3:32 p.m. EDT	3:33 p.m. EDT	3:34 p.m. EDT	4:40 p.m. EDT

As seen by the chart above, the path of the April 8 total eclipse will go right over some major cities in the United States; it will also come close to others, including San Antonio, St. Louis and Indianapolis.

In addition, the eclipse path will cross over Mazatlán in Mexico and Hamilton and Montreal in Canada, also coming very close to Toronto.

The population of those living in the eclipse path is estimated at over 40 million, with about 32 million on them in the United States. About half the population of the U.S. lives within 250 miles of the path of totality.

Areas experiencing totality could get rather crowded on "Eclipse Day." It's estimated that a million Americans, and perhaps many more, are taking trips to view the total eclipse on April 8. So, if you waited until the last minute to reserve lodging, you're probably too late. ✈

Historical highlights of solar eclipses

Because many animals react strangely during total eclipses of the Sun, we can be fairly sure that early humans noticed them as well. The sight of the Sun darkening at midday likely triggered feelings of fear and awe in prehistoric people.

As civilization developed, so did humanity's ability to record experiences and observations. Some archaeologists believe that the earliest surviving account of a total solar eclipse can be seen in petroglyphs (i.e. stone carvings) found at Loughcrew Megalithic Monument in County Meath, Ireland, that date back to 3340 BCE. While this may not be the case, an "equinox stone" found at the same site is illuminated at the spring and fall equinoxes, showing that it was used to mark the seasons.

Archeologists do agree that a stone tablet found in Ugarit – an ancient city located on the Mediterranean coast in what is now Syria – definitely does record a solar eclipse that occurred on March 5, 1223 BCE. A translation of the tablet states, "On the 6th hour of the day of the new moon in the month *hiyaru*, the Sun went down." The tablet also refers to Mars, which would have been visible near the Sun during that eclipse.

Here are some other historical highlights regarding eclipses:

Saros Cycle: The ancient Babylonians were close observers of the night sky and maintained meticulous records of what they saw. More than 2,500 centuries ago, this led to their discovery of the Saros Cycle, which can be used to predict when the next solar or lunar eclipse could occur.

The Saros Cycle is a period of 223 synodic months, i.e. lunar months (the period between full moons, a little over 29.5 days). This is equal to about 18.029 years. When a cycle is complete, an eclipse of some sort is occurring somewhere on Earth.

While the Saros Cycle alone can show when the conditions are right for an eclipse, it cannot predict the exact time, place or path of an eclipse.

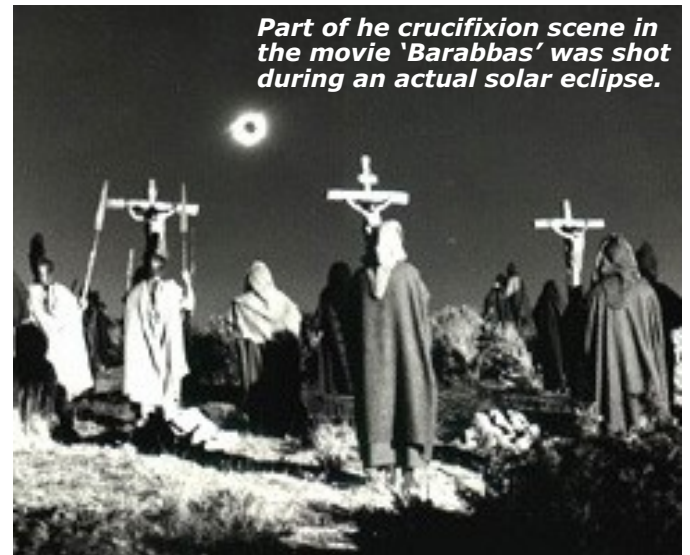
Thales: The ancient Greek philosopher Thales of Miletus may have been familiar with the Saros Cycle, and perhaps he used it to become the first person to successfully predict an eclipse – or not.

The eclipse in question happened on May 28, 585 BCE, and its path passed over the Mediterranean Sea onto what is now Turkey, where the Medes and the Lydians had been at war for six years. Here's what happened next, according to the ancient Greek historian Herodotus:

"(J)ust as the battle was growing warm, day was on a sudden changed into night. This event had been foretold by Thales, the Milesian, who forewarned the Ionians of it, fixing for it the very year in which it actually took place. The Medes and Lydians, when they observed the change, ceased fighting, and were alike anxious to have terms of peace agreed on."

Other chroniclers of the time also credit Thales with predicting the eclipse. It's still uncertain if he actually did and, if so, how he did it.

Crucifixion darkness: Three books of the New Testament, in
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The ancient Greek philosopher Thales may have predicted an eclipse; the 18th century British astronomer Edmond Halley certainly did, and made a map to prove it.

Eclipse history

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passages concerning the crucifixion of Jesus Christ, state that darkness descended over the land when Jesus died, beginning at noon and lasting for three hours. Per some translations, this is a description of a total eclipse.

However, an eclipse at the time of the crucifixion appears unlikely, if not impossible. The Bible states that Jesus was crucified at Passover, which is observed at the time of the full moon; solar eclipses only occur when the moon is in its new phase. Also, the longest solar eclipses last for less than eight minutes, not three hours.

The notion that a solar eclipse occurred during the crucifixion may have been burned into the public imagination by the 1961 movie "Barabbas." In an audacious, and ultimately successful, bit of movie making, director Richard Fleischer filmed part of the crucifixion scene during an actual solar eclipse that happened in Italy, where the movie was being produced.

Other than an eclipse, natural explanations for the crucifixion darkness proposed by Bible scholars include thick clouds, a dust storm, and even a volcanic eruption. Some scholars believe the New Testament writers were speaking allegorically about the "darkness" resulting from Jesus' unjust punishment. Still others believe that the eclipse happened outside the laws of nature as a miraculous event – a matter of faith, not science.

Halley's map: British astronomer Edmond Halley is best known for the comet that bears his name – a comet which he successfully predicted would return, proving that comets orbited the Sun.

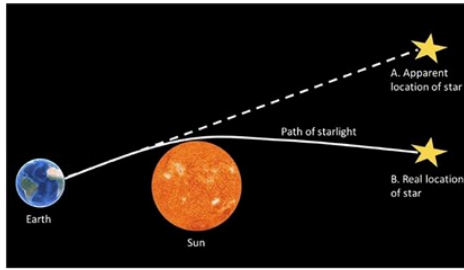
Halley also applied the laws of gravity and planetary motion deduced by Isaac Newton to create a map showing the path and timing of a solar eclipse predicted to pass over Great Britain on April 22, 1715. His map was off by about four miles and 20 minutes, crude by modern standards but very accurate for the time.

Following in Halley's footsteps, maps showing the predicted paths of eclipses became all the rage, first appearing in a popular publication known as "The Gentlemen's Magazine" in 1737. Thus, the public learned that eclipses, like comets, are predictable and the product of the movement of celestial objects, rather than evil omens happening at random.

Proof of relativity: In presenting his theory of relativity, Albert Einstein proposed that gravity bent light waves. Einstein's theory was largely based on thought experiments, so no real physical evidence of this notion existed, leading some to dismiss it out of hand.

But an experiment performed during a solar eclipse on May 29, 1919, provided proof positive that Einstein was right. Astronomers based in Brazil and Principe, an island off the west coast of Africa, observed stars near the Sun that briefly became visible during totality. The data they collected showed that the Sun's gravity did, indeed, bend the light waves emanating from these stars, by a tiny but measurable amount that was well within the parameters proposed by Einstein.

Professional astronomers will once again be out in force for the April 8 eclipse, gathering data that could help them learn more about the Sun, Earth and Moon. The rest of us will have an opportunity to experience an event that is sure to inspire awe and wonder among all who see it, and that can rightly be called one of nature's miracles. ✈



The New York Times reported that scientists were 'agog' over the eclipse data proving that gravity bent light waves.

LIGHTS ALL ASKEW IN THE HEAVENS

Men of Science More or Less Agog Over Results of Eclipse Observations.

EINSTEIN THEORY TRIUMPHS

Stars Not Where They Seemed or Were Calculated to be, but Nobody Need Worry.

CARBONDALE BEATS THE ECLIPSE ODDS

Total eclipses of the Sun really aren't as rare as you may think. In fact, they occur on average about once every 18 months.

Keep in mind, though, that about two-thirds of Earth's surface is covered by oceans, and much of its land mass is found in remote areas that are lightly populated or entirely void of people. Thus, many eclipses can only be seen by those willing to go to sea or travel to some inhospitable regions.

Total eclipses last for a limited amount of time, and the path of totality is relatively narrow, about 110 miles wide on average. Considering all these factors, a total eclipse passing over a well-populated area is indeed a rare event.

It's estimated that any given spot on Earth will experience a total solar eclipse about once every 360 years. But eclipses are randomly distributed, with some areas waiting much longer than others.

This brings us to Carbondale, Illinois, which was in the path of the eclipse of August 27, 2017, and will also see the Sun blotted out on April 8 – a gap of less than seven years between eclipses.

The Quad Cities area was just inside the path of totality for a solar eclipse on August 7, 1869. We'll next see a total eclipse here on October 27, 2153 – a gap of 284 years, not great but still better than average.

Then again, you could be in Los Angeles, which last saw a total eclipse on May 22, 1724, and won't see another until April 1, 3290 – a gap of more than 15 centuries. ✈

An observatory was set up on the roof of the Davenport National Bank Building during an eclipse on August 7, 1869.



PHOTO COURTESY OF DAVENPORT PUBLIC LIBRARY

COMET MAY BE VISIBLE DURING ECLIPSE

As the skies darken during a total eclipse, planets and bright stars become visible to the naked eye in the daytime sky. It's possible that a comet might also be seen by those looking up during the April 8 eclipse.

Comet Pons-Brooks, which can currently be seen in the night sky, may make an appearance during the eclipse, though whether it will or not depends on a number of factors, including local atmospheric conditions and the comet's apparent brightness at the time.

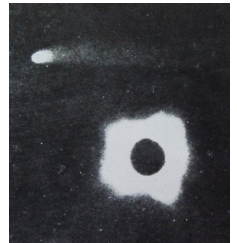
At totality, Comet Pons-Brooks will be located a little over 24 degrees east of the eclipsed Sun and about 6 degrees west of Jupiter.

This certainly wouldn't be the first time that a comet popped into view during an eclipse. Numerous ancient and modern accounts state that a comet could be seen during totality.

Comet C/1948 V1 was dubbed the "Eclipse Comet" because it was discovered during a solar eclipse on November 1, 1948. The comet was successfully photographed during the eclipse and seen by observers on the ground. It shone brightly in the night sky in the Southern Hemisphere through the end of December. We won't see the "Eclipse Comet" again anytime soon, as its orbital period is estimated at over 62,000 years. ✈



This illustration shows where Comet Pons-Brooks will be during the April 8 eclipse. The image at right was taken of the 'Eclipse Comet' in 1948.



TAKE ME OUT TO THE ECLIPSE GAME....

Two major league baseball stadiums that are in the path of April 8's total solar eclipse will host home games on "Eclipse Day." This is believed to be a first for baseball or any other major league sport.

The path of totality will pass over both Progressive Field in Cleveland, home of the Cleveland Guardians, and Globe Life Field in Arlington, Texas, home of the Texas Rangers.

The Guardians game vs. the Chicago White Sox is scheduled to start at 5:10 p.m., nearly two hours after the eclipse reaches totality in Cleveland at 3:13 p.m. However, the Guardians have announced that they will let fans in at 2 p.m. so they can witness the eclipse from their seats.

The Rangers game against the Houston Astros won't begin until 7:05 p.m., long after the eclipse peaks at 1:42 p.m. in Arlington. No special events related to the eclipse have been announced by the Rangers. ✈

SUMMARY OF PAC MARCH MEETING

The Popular Astronomy Club held a general membership meeting at the Butterworth Center in Moline on March 11 at 7 p.m.

The meeting was attended in person by 21 PAC members and guests, with another 10 joining the meeting via Zoom.

PAC President Dale Hachtel called the meeting to order. As he began the meeting, he noted that Anne Bauer had set up a display in the lobby outside the meeting room on Dave Hilmers, an astronaut from DeWitt, Iowa, who has recently gone back to work for NASA.

Prior to getting to the business portion of the meeting, Dale welcomed three guests who were in attendance, Ron Fritz, Paula Moller and Kris Rennison.

Dale said that PAC activities for the observing season were “off to a fast start,” noting that the coming week alone included a presentation and solar observing session on Tuesday at John Deere Middle School; a project at the Boy Scout observatory at Loud Thunder Forest Preserve on Wednesday; unwrapping and preparing the PACMO for observing on Thursday (weather permitting); and the first Niabi Zoo public observing session on Saturday.

Also coming up, of course, is the solar eclipse on April 8, with presentations planned before the eclipse at the Moline and Rock Island public libraries and “Eclipse Day” viewing at Moline Public Library. Members then discussed the availability of eclipse glasses, which will be distributed both by PAC and the Moline library and are on sale at Hy-Vee and other locations.

Roy Gustafson said he had received an eclipse toolkit from NASA’s Night Sky Network which included items such as posters and a tactile exhibit designed to allow those with visual impairments to experience the eclipse. He brought the toolkit and invited members to look at its contents. Roy and his wife, Jan, have done eclipse presentations already and have more planned.

Dale then said that minutes for the past three membership meetings had been posted in *Reflections* and reviewed by board members prior to publication. Following a motion by Roy and second by Megan Warren, the minutes were accepted as published.

Mike Haney then presented the treasurer’s report, which showed a healthy balance in large part due to the donation from Terry Dufek’s estate. He explained that PAC had purchased five Treasury bills of \$5,000 each and was earning over 5 percent interest on this investment. Members voted to accept the treasurer’s report subject to audit, following a motion by Dino Milani and second by Megan Warren.

In his vice president’s report, Dino said that an equipment list was available to members via DropBox. The telescopes and other items on the list can be borrowed by PAC members. He said that an “equipment day” at which all available items would be displayed was planned, perhaps sometime in May.

Dino noted he had made some changes and updates to the PAC website and

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During the smorgasbord talks, Anne Bauer demonstrated a stand depicting the Apollo lunar missions, while Dino Milani discussed his plan to view the April 8 solar eclipse in Chester, Illinois, which is best known as the hometown of the cartoon sailor Popeye.



March meeting

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pointed out that back issues of *Reflections* and other items of interest could be found on the site.

Observatory director Rusty Case reported that everything was in place to get the PACMO ready for observing, but that the tarp should not be removed and put away if it is wet; otherwise, mold will form. While the unwrapping of the PACMO is planned for Thursday, rain in the forecast may force postponement.

Observing coordinator Al Sheidler said that he sends out e-mail messages to all members when he plans to go to Castle Observatory, inviting others along. Rolando Gamino asked if there was a way to determine who had responded so others could know who might be at the observatory.

ALCOR Roy Gustafson reported that the Astronomical League is updating its website, which meant that he had to check that information about PAC on the site was correct. AL dues were recently raised by \$1 per member, but this will not cause an increase of PAC's membership dues.

Following the business portion of the meeting, four "smorgasbord" presentations were given by Roberta Wright, Anne Bauer, Paul Levesque and Dino Milani.

Roberta's presentation was on black holes, which she noted were not "a portal to another universe" as some believe. She discussed the closest, furthest, largest and smallest black holes discovered so far.

Roberta also said that she was in the habit of reading the newspaper every day and had found that the club's Skywatch article on the star Betelgeuse had been published that day. Dale remarked that this was the third month in a row that the Skywatch article had appeared in print on the same day as PAC's membership meeting.

Anne's presentation was on "rocket scientists," and she noted that she was related to or closely acquainted with three scientists involved with the space program: Her uncle, her cousin, and the husband of her close friend and college roommate. She discussed their careers and contributions, and also showed a stand, which she ordered as a Christmas present, that honors the Apollo lunar missions and includes a model of the Moon showing the landing sites.

Paul's presentation was on solar eclipses throughout history, including the first known recordings of an eclipse on stone tablets; the discovery of the Saros cycle by the ancient Babylonians; the possible prediction of a solar eclipse by the Greek philosopher Thales; whether or not a total eclipse occurred during the crucifixion of Jesus Christ; the creation of a map accurately predicting the path of an eclipse over Great Britain by Edmond Halley, namesake of the famous comet; how observations taken during a 1919 eclipse showed that Albert Einstein was right when he said that light waves were bent by gravity; and a look at some upcoming eclipses.

Dino's presentation was on his plan to travel to southern Illinois to view the total eclipse on April 8. He will set up a public viewing site in a park in Chester, Illinois, which is best known as the hometown of E.C. Segar, the cartoonist who created Popeye the Sailor Man.

Dale then reviewed upcoming PAC events, including those mentioned previously, and asked for club members to assist in these events. He reminded those who haven't renewed their memberships to do so soon. In response to a question, he said that PAC's "membership cycle" ran from October to September. Reminder e-mail messages may soon go out to those who have not renewed yet.

Al then presented some member observations, including images taken by Byron Davies and photos of Comet Pons-Brooks.

The meeting adjourned at 8:35 p.m. A recording of the meeting is available on YouTube via the following link: <https://youtu.be/igPqDfAwDIU>.

The next membership meeting is scheduled for April 8 at 7 p.m. at the Butterworth Center and via Zoom. ✎

SUMMARY OF PAC BOARD MEETING

The board of the Popular Astronomy Club held a meeting on Sunday, March 10 at the home of PAC President Dale Hachtel in Port Byron. Dale called the meeting to order at 2:30 p.m.

Those present were Vice-President Dino Milani; Treasurer Michael Haney; Secretary Paul Levesque; Observing Coordinator Alan Sheidler (with his wife, Sara); and Observatory Director Rusty Case. ALCOR Correspondent Roy Gustafson joined the meeting via telephone.

The minutes of the board meeting held December 3, as published in the January issue of *Reflections*, were approved as submitted, following a motion by Roy and second by Rusty.

Michael presented a treasurer's report which showed net income of \$27,423.74, based on income and expenses for the last 12 months. Club assets currently total \$42,602.96; this total includes \$25,000 which the club will receive from Treasury bills purchased at discount rates. Michael said that he was uncertain how to account for the T-bills in his report but that they still should be counted as an asset. He noted that PAC was earning over \$1,000 in interest per year from the T-bills.

Al pointed to a line showing that PAC was paying the Nordicks \$300 a year for the use of electricity and utilities at Castle Observatory. He said that this amount had been informally agreed to several years ago and should perhaps be raised, given the increase in utility costs. He will discuss the possibility of raising the payment with the Nordicks.

It was noted that any financial report that goes to the IRS or the Illinois Department of Revenue to validate PAC's non-profit status should cover the calendar year, not the past 12 months.

Dino presented a charge of \$20 from SquareSpace for the PAC website; he will receive compensation for this charge.

Following a motion by Dino and a second by Al, the board approved the treasurer's report, subject to audit.

In his Vice-President's report, Dino said that he had made some changes to the documents on the PAC website and had also updated the schedule, which does change frequently. Dale said that the date for the Bishop Hill public observing event has not been finalized, because it is contingent on the availability of storyteller Brian "Fox" Ellis.

Dino then presented a document listing all the equipment owned by PAC, including photos and brief descriptions. He said that the document could be used as a sign-out sheet by club members who want to borrow a particular piece of equipment.

Board members agreed that an "equipment day," at which all telescopes and other equipment held by the club could be displayed to club members, should still be held. Some proposed dates were discussed but no final decision was reached on when or where such an event will take place.

In the Observatory Director's report, Rusty said the observatory was "doing well." He noted that breakers for the observatory are located both inside the dome and on a nearby pole.

Rusty said that he had tested the batteries removed from the PACMO and that they were ready to

Popular Astronomy Club Balance Sheet As of February 29, 2024

	Feb 29, 24
ASSETS	
Current Assets	
Checking/Savings	
Business Special	45.44
Cash	0.66
Checking	12,130.20
Money Market	5,416.43
Savings	10.23
U.S. Treasury	
Treasury Bill	24,305.17
U.S. Treasury - Other	-24,305.17
Total U.S. Treasury	0.00
Total Checking/Savings	17,602.96
Total Current Assets	17,602.96
TOTAL ASSETS	17,602.96
LIABILITIES & EQUITY	
Equity	
Opening Balance Equity	9,422.33
Unrestricted Net Assets	12,511.21
Net Income	-4,330.58
Total Equity	17,602.96
TOTAL LIABILITIES & EQUITY	17,602.96

Continued on Page 12

Board meeting

Continued from Page 11

go. A planned date to uncover the PACMO for the observing season had been postponed due to wet weather; the PACMO may now be uncovered on Thursday (March 14), again depending on the weather.

The PACMO should not be uncovered while the tarp is wet, Rusty said, because mold could then form on the tarp and ruin it. If necessary, the PACMO can be uncovered and made ready on Saturday the 16th, the date of the first Niabi Zoo public observing session.

In the Observing Coordinator report, Al said that he would continue to prepare lists of objects that could be observed on a particular night, and that he was encouraging other clubs in the North Central Region of the Astronomical League to do the same. In his role as NCRAL chair, Al is continuing to visit other clubs in the region.

Al said that he needed to get a requisition of some sort from John Deere Middle School so PAC could be compensated from the programs it runs at the school. He will ask Chad Potter about this at the JDMS event that will take place on Tuesday (March 12).

Al also said that a donation letter should be provide to Sue Ervin for a telescope given to the club by Tom Ervin, her late husband.

Discussion then turned to the telescope that Al won at last year's Astronomical League convention. The board had previously agreed that this "go-to" telescope should be donated to a library when it is ready for us. Rusty has machined a new eyepiece holder for the telescope, which means it is now ready.

On a motion by Dino and second by Roy, the board decided to donate the telescope to the Orion Public Library. It was also agreed that a presentation ceremony should be held. Roy will contact the library board to set up a date and time for such a presentation.

Board members then discussed the possibility of purchasing other "go to" telescopes - which cost about \$250 - and donating them to local libraries. This is feasible given PAC's healthy financial condition, and would be in keeping with its mission of promoting amateur astronomy. The library in El-dridge has one telescope available for patrons but would like to get another, due to high demand. The library in Port Byron has also asked about obtaining a telescope.

In the ALCOR report, Roy said that the Astronomical League website had been updated and that all clubs, including PAC, needed to assure that their listing was correct. He said that he had obtained an eclipse "toolkit" from NASA's Night Sky Network which he will bring to Monday's membership meeting.

The Astronomical League has increased its membership dues by \$1 per member; board members agreed that PAC could absorb this cost and that there was no need to increase the club's dues in response.

Al noted that NCRAL's bylaws had been updated and were available for review and comment by members.

Dale said that he intended to nominate *Reflections* for the Mabel Sterns Award, which honors the Astronomical League's best newsletter. He will send a nomination letter to Paul for his review and



The PAC board voted to donate this 'go-to' telescope to the Orion Public Library and considered a plan to donate more telescopes to local libraries.

Continued on Page 13

Board meeting

Continued from Page 12

to decide which issue to send forward.

Paul noted that he was taking a lengthy overseas trip, departing in late March, so he would try to get the April issue of *Reflections* out early. The May issue may be delayed due to the trip.

PAC's schedule of upcoming events was then reviewed. Several board members plan to be present at the March 12 program at John Deere Middle School. If the sky is clear, the program will include solar observing. Al said that Chad Potter does not want the students to look at the Sun through eyepieces and optics due to safety concerns; instead, images will be projected onto screens.

On Wednesday (March 13), PAC will send a team to the observatory at the Boy Scout camp at Loud Thunder Forest Preserve to perform repairs and maintenance needed to make the observatory operational. Any parts needed will be paid for by the Boy Scouts.

In advance of the April 8 eclipse, indoor presentations followed by outdoor observing will be held both at the Moline Public Library (March 20) and the Watts Midtown Branch of the Rock Island Public Library (April 4).

PAC will hold an observing session at Moline Public Library on "eclipse day"; if the session held on the day of the August 2017 eclipse is any indication, a large crowd could turn out. Eclipse glasses will be distributed for free while supplies last; in 2017, the supply ran out and people had to share.

Al and Dale will attend WQPT's annual gala banquet on April 26 and provide an observing session. In exchange, WQPT will provide PAC with \$1,000 worth of free publicity for club events.

Other events were discussed, including requests from the Riverdale school system, a Vacation Bible School at a Port Byron church, and a Girl Scout troop in Bettendorf.

The date of PAC's annual picnic has been set for August 10, and the annual banquet has been scheduled for October 12 at the Riverfront Grille in Rock Island. The cost of the banquet will be the same as last year. The Nordicks will be personally invited to the banquet at no cost to them.

A reference book titled "The Caldwell Objects" has been donated to PAC and will be available for borrowing by members. PAC no longer has a library but does have books that can be borrowed.

The Nordicks have raised concerns about minor property damage that may have been caused during a recent observing session at Castle Observatory. Measures will be taken to assure that such damage does not occur in the future.

The meeting adjourned at 4:25 p.m. The next board meeting has been tentatively scheduled for June 9, at a time and place to be determined. ✈

Popular Astronomy Club Income & Expenses March 2023 through February 2024

	Mar '23 - Feb 24	Mar '22 - Feb 23
Ordinary Income/Expense		
Income		
Banquet Inc.	866.00	666.00
Birdies for Charity	215.00	0.00
Discount on T-Bill	434.43	0.00
Donation		
Member	6,077.09	26,223.80
Misc.	0.00	437.25
Program	2,998.50	2,546.10
Total Donation	9,075.59	29,207.15
Interest Income	290.33	12.01
Membership		
Family Member	97.50	120.00
Patron	190.00	80.00
Regular	748.00	767.50
Supporting	0.00	80.00
Sustaining	120.00	240.00
Total Membership	1,155.50	1,287.50
Misc. Inc.	50.00	215.00
Sales	997.00	15.00
Total Income	13,083.85	31,402.66
Expense		
Bank Service Charges	37.59	0.00
Banquet Exp.	775.21	593.42
Castle Observatory		
Repairs and Maintenance	330.96	0.00
Castle Observatory - Other	0.00	301.00
Total Castle Observatory	330.96	301.00
Charitable Contributions	500.00	50.00
Dues and Subscriptions	190.00	250.00
Equipment	800.00	271.40
Honorarium	100.00	250.00
Miscellaneous Expense	950.00	50.00
PACMO		
Operation	1,411.04	1,286.41
Rent	612.00	612.00
Repairs and Maintenance	252.74	0.00
Total PACMO	2,275.78	1,898.41
Reimbursement	86.55	314.69
Repairs and Maintenance	20.00	0.00
Supplies	1,009.96	0.00
T-Bill Investment	25,000.00	0.00
Total Expense	32,076.05	3,978.92
Net Ordinary Income	-18,992.20	27,423.74
Net Income	-18,992.20	27,423.74

You know why April's a special month in the sky

April will be a very special month in the sky because there will be an eclipse of the Sun on April 8.

Totality in the United States will be along a narrow path from central Texas to northern New York and Maine. The rest of the country will experience a partial eclipse, with the amount that the Moon covers the Sun varying by the distance to the central eclipse path.

A solar eclipse happens when the Moon is lined up perfectly with the Sun, and the Moon's shadow falls on the Earth. This shadow is a relatively small spot, about 100 miles in diameter on average.

The spot of totality moves at a high rate of speed as the Moon orbits and the Earth rotates. The result is a long, narrow path where observers will experience the eclipse at different times.

Totality will last about four minutes at any one place, but it will take from about 1:30 to 2:30 p.m. Central Time for the total eclipse to move across the U.S. The partial eclipse will last longer, with the maximum partial eclipse occurring in Eastern Iowa and Western Illinois at about 2 p.m.

The partial eclipse can be observed by using eye protection, or by projecting the image of the Sun through a small hole and onto another surface. CAUTION: Do not look directly at the partially eclipsed Sun without proper protection.

If you are able to witness totality, look for the last bit of sunlight, the diamond ring, peeking through a valley on the Moon. You can then take off your eye protection and enjoy the ghostly corona surrounding the eclipsed Sun.

You may want to look about a fist width at arm's length to the west of the Sun to spot Venus. Jupiter will follow about 3 fist widths behind the Sun.

If you can see Jupiter, look a short distance above it for Comet 12P/Pons-Brooks. You may need to use binoculars to see it, but if you do, be extremely careful. Totality will last only a short time, and you don't want to be caught accidentally looking at the Sun when it reappears.

Also during totality, take a look at the distant horizon all around you. You will be looking out of the Moon's shadow, and you will be surrounded by the colors of sunrise and sunset.

Jupiter will be the only planet that will be readily visible during April. It will be low and unmistakable in the western early evening sky, and it will be dropping lower each day as it prepares to go behind the Sun from our perspective.

Before it goes, Jupiter will put on one last show. On the evening of April 10, there will be a close grouping of Jupiter to the lower left of the Moon and blue-green Uranus, visible with binoculars, just above Jupiter. They will remain close until they are lost in the twilight glow in a few days.

Some observing highlights for April:

April 8: The solar eclipse.

April 10: The Moon will be to the upper right of very bright Jupiter, with Uranus visible with binoculars just above Jupiter



This eclipse map from NASA shows the time of totality for select locations. The inset photo was taken by David Voigts in northwest Oregon during the 2017 eclipse.

Focused Sun can melt plastic (and fry your eyes)

Back in 2009, Al Sheidler was doing some solar observing with the PACMO. He inadvertently forgot to remove an unfiltered finderscope from the main scope, which was fitted with the proper solar filter.

As seen from the photo, the plastic material holding the finderscope's lens melted, with some of the hot plastic vaporizing and condensing on the lens. Fortunately, Al was able to make the finderscope usable again by taking it apart and cleaning it.

Al wants you to learn from his mistake by always assuring that all certified solar filters are in place before pointing your equipment at the Sun, during the partial phase of the April 8 eclipse and whenever else you do solar observing. Using unfiltered optics will focus the sun's energy to a fine point and generate very high temperatures, which can damage the optics.

According to Al, using a sun funnel or eyepiece projection of solar images will likely not work if you also use a full-aperture solar filter on the scope or binoculars; the image would probably not be bright enough to be seen that way. So, if you build a sun funnel, use a cheap eyepiece. 🔭

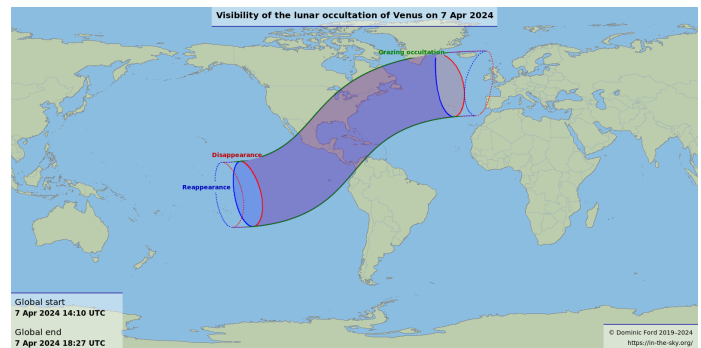


Moon to occult Venus one day before solar eclipse

While the total solar eclipse on April 8 is getting all the attention, a rare event in the sky also involving the Moon will take place the day before.

A lunar occultation of Venus will happen during the day on April 7. During the occultation, Venus will briefly disappear behind the Moon, then reappear.

The occultation will be seen in the eastern United States, parts of Canada and Mexico, and all of Central America, as well as the Caribbean Sea and swaths of the Atlantic and Pacific Oceans. The Quad Cities area will be on the edge of the path of the occultation, which should happen here shortly before 11:30 a.m. 🔭



April sky

Continued from Page 14

April 11: The Moon will be to the right of Aldebaran, the bright reddish eye of Taurus (the Bull), and above the Pleiades open star cluster.

April 14: The Moon will be below the two bright stars of Gemini (the Twins). Slightly brighter Pollux will be on the left and Castor on the right. These stars represent the heads of the twins, with two lines of dim stars that represent their bodies extending almost to Orion (the Hunter).

April 17: The Moon will be to the upper right of Regulus, the bright heart of Leo (the Lion). The Moon will move to the left of Regulus on the 18th.

April 22: Very bright Jupiter will be passing about a Moon's width to the left of Uranus. Look as soon as it is dark with binoculars to see Uranus.

April 22: The Moon will seem to almost touch Spica, the brightest star in Virgo (the Maiden), if you can pick it out of the Moon's glare.

April 26: The Moon will be to the right of Antares, the bright reddish heart of Scorpius (the Scorpion) after they rise late in the evening. The Moon will be to the left of Antares on the 27th. 🔭

Citizen scientists will gather data during eclipse

April is NASA's Citizen Science Month, and there is no shortage of projects available. Here are some citizen science projects that you can participate in on April 8, on and off the path of totality, right from your smartphone!

Eclipse Soundscapes: Eclipse Soundscapes will compare data from a 1932 study on how eclipses affect wildlife – in this case, crickets. There are a number of ways you can participate, both on and off the path of totality.

You must be 13 and older to submit data. Participants 18 and older can apply to receive the free Data Collector kit. Learn more at: eclipsesoundscapes.org.

GLOBE Eclipse: Folks who participated in GLOBE Eclipse 2017 will be glad to see that their eclipse data portal is now open. With the GLOBE Observer smartphone app, you can measure air temperature and clouds during the eclipse, contributing data to the GLOBE program from anywhere you are. Learn more at: observer.globe.gov.

HamSCI: HamSCI stands for Ham Radio Science Citizen Investigation. HamSCI has been actively engaged in scientific data collection for both the October 14, 2023, annular solar eclipse and the upcoming April 8 total eclipse.

Two major activities that HamSCI will be involved in around the eclipse will be the Solar Eclipse QSO Party (SEQP) and the Gladstone Signal Spotting Challenge (GSSC), which are part of the HamSCI Festivals of Eclipse Ionospheric Science. Learn more about these experiments and others at: hamsci.org/eclipse.

SunSketcher: If you're traveling to the path of totality, help the SunSketcher team measure the oblateness, or shape, of the Sun during the eclipse by timing the flashes of Bailey's Beads. You will need a smartphone with a working camera for this, along with something to hold the phone in place.

The app needs to run from five minutes before the eclipse starts until the end of the eclipse. Any additional phone use will result in Sun Sketcher data loss. Learn more at: sunsketcher.org.

Don't stop at the eclipse; NASA has citizen science projects you can do all year long – from cloud spotting on Mars ([link](#)) to hunting for distant planets ([link](#)).



By contributing to these research efforts, you can help NASA make new discoveries and scientific breakthroughs, resulting in a better understanding of the world around us, from the critters on the ground to the stars in our sky.

We'll be highlighting other citizen science projects on the Night Sky Network page; we wish all you eclipse chasers out there a very happy, and safe solar eclipse! More ideas for eclipse activities are available at our [Solar Eclipse Resources section](#). 🦋

Kat Troche

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



The Eclipse Soundscapes citizen science project will measure the chirping of crickets during the eclipse, while the GLOBE project will measure temperature changes; shown below is a graph of data collected during the August 21, 2017 eclipse.

OBSERVATIONS & ACTIVITIES



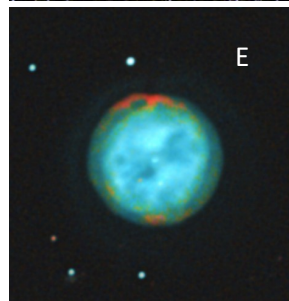
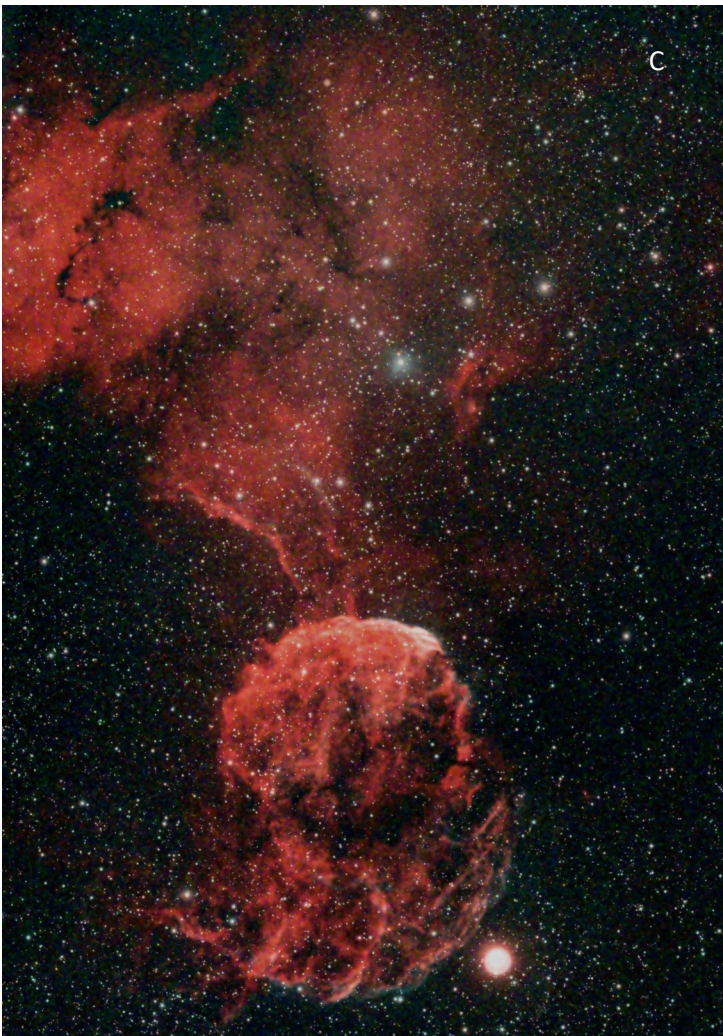
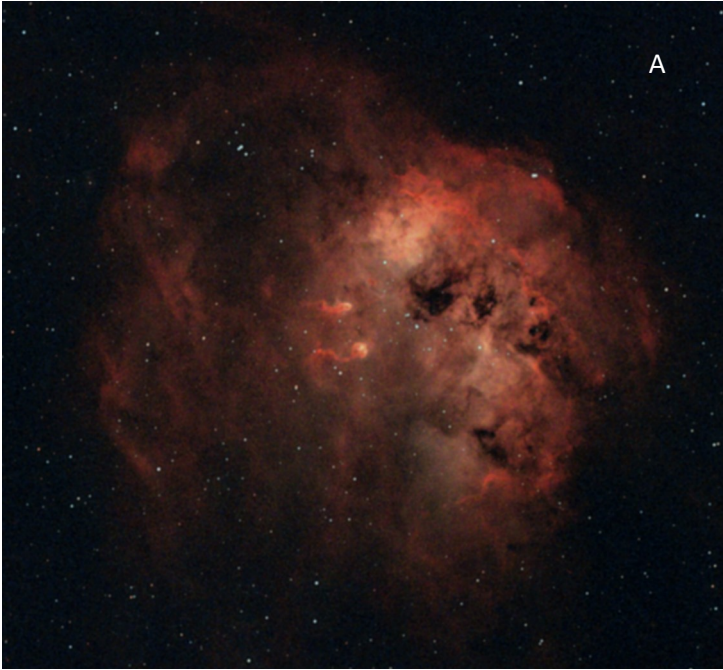
Under PAC's partnership with the Moline School District, PAC held a solar observing event and presentation at John Deere Middle School on March 12. JDMS science teacher Chad Potter helped organize the event, which attracted media coverage from all three local TV news stations and the Quad City Times / Dispatch Argus. Students observed the sun safely and were also provided with safety tips for observing the solar eclipse on April 8. PAC participants included Al Sheidler, Dino Milani, Frank Stonestreet, Rusty Case, Dale Hachtel and Paul Levesque.

GROUP PHOTOS BY CANDACE SOUNTRIS, MOLINE SCHOOL DISTRICT



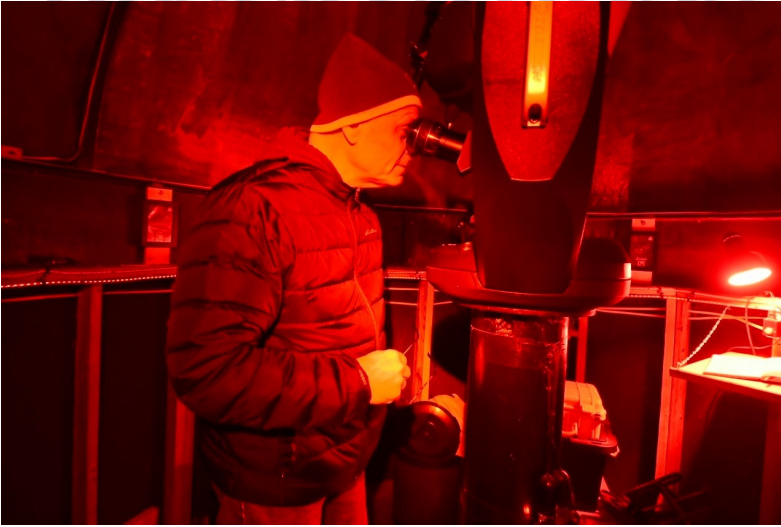
This group of PAC members and guests braved blustery, chilly weather on March 16 to take part in the club's first Saturday evening public observing session of the year. The objects observed included Mercury, Jupiter, Uranus, and Comet Pons-Brooks. Public observing at the zoo will continue on the third Saturday of the month through November; come and bring a friend!

OBSERVATIONS & ACTIVITIES



Presenting six great images taken by Byron Davies during March. Shown are (A) IC401(Tadpole Nebula (B) IC2177 (Seagull Nebula); (C) IC433 (Jellyfish Nebula); (D) NGC2395 (Thor's Helmet); (E) M97 (Owl Nebula); (F) NGC2073 (Iris Nebula). Taking these photos required three hours of camera time each.

OBSERVATIONS & ACTIVITIES



Al Sheidler, Erik Bakken, Megan Warren and Dan Cusack got together at Paul Castle Observatory on March 2; during the observing session, Erik completed the Winter Messier list, and an image of Comet Pons-Brooks (A) was captured. Also shown is an image of the comet (B) taken one week later at the observatory; Al, Dan, Rolando Gamino and guest Paul McCredie were there that night. We're also sharing a very nice image of the comet (C) taken by Jim Dole of the Planetary Studies Foundation at Firebaugh Observatory in Freeport, Illinois.

Comet Pon-Brooks is nicknamed the "Devil Comet" because its tail can appear bifurcated, like the horns of a demon. The comet, which has an orbital period of 71 years, will soon disappear behind the Sun before reemerging in mid-April; it will be then best seen in the Southern Hemisphere. Will it be visible during the total eclipse on April 8? More on that topic on page 8 of this issue.

SEND US YOUR PHOTOS!

Whether you're traveling to the path of totality or staying here in the Quad Cities, Reflections asks that you share your solar eclipse photos. Send the images to: levesque5562@att.net. We look forward to seeing them!



This eclipse photo was taken on August 21, 2017 in Linn, Missouri, by Alvin Lavoie, a friend of Paul Levesque.

OBSERVATIONS & ACTIVITIES



On March 20, PAC members Rusty Case, Dale Hachtel, Mike McDonald and Al Sheidler met with Boy Scout leader Ryan Dawson (and Rusty's dog, Lucy) to take a close look at the observatory at the Loud Thunder Scout Reservation. The observatory needs to be refurbished to become operational again, and PAC will work to get it up and running by the time Scouts arrive for summer camping.



PAC President Dale Hachtel made a presentation on the upcoming solar eclipse at the Moline Public Library on March 20 as part of the library's Project Next Generation program. During the presentation, Dale showed how to create a pinhole viewer to safely view the eclipse, and Sara Sheidler gave out eclipse glasses and other items. After darkness fell, an observing session was held using telescopes set up in the library parking lot.

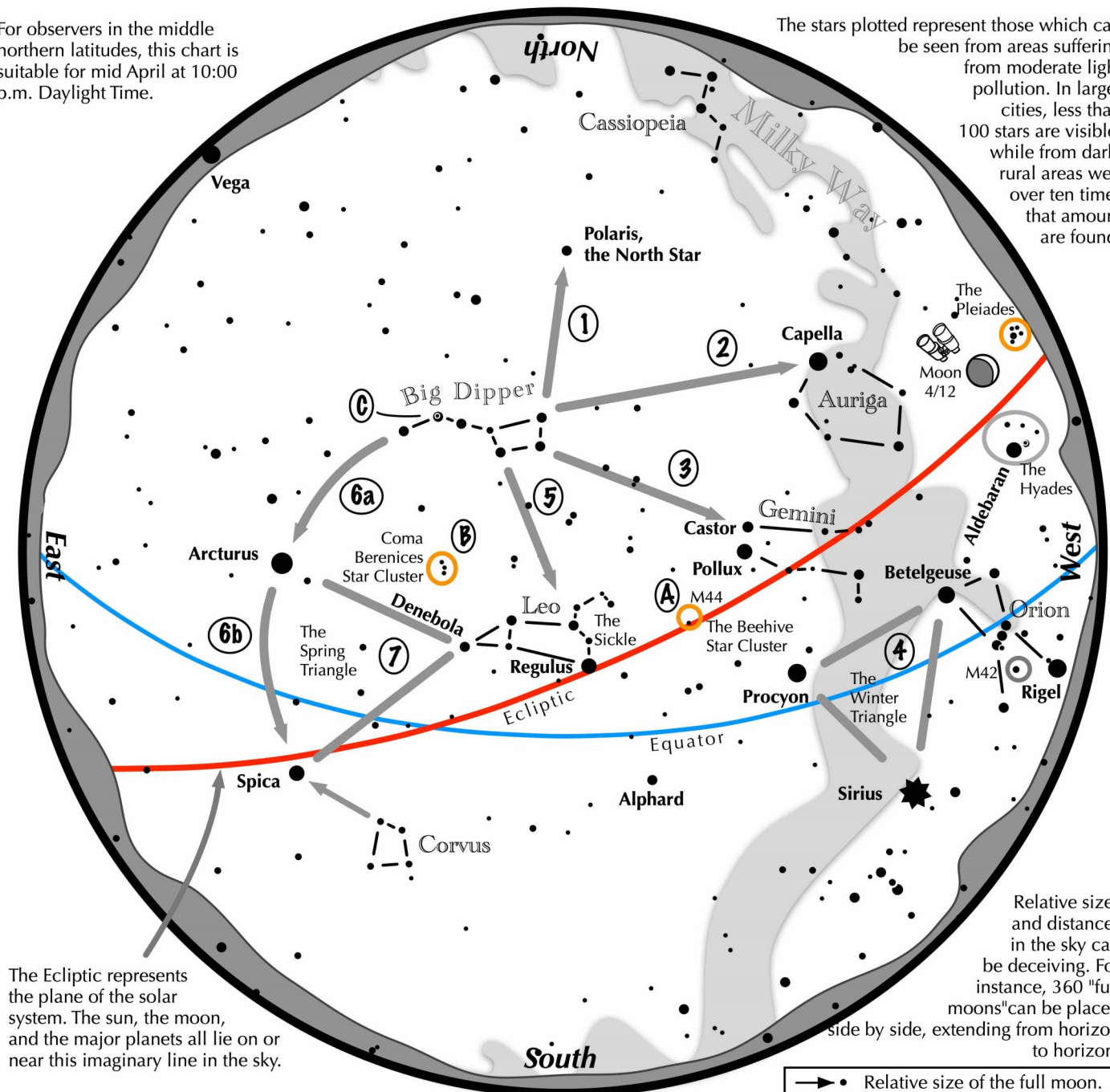


Al Sheidler installs a new ceiling vent cover on the PACMO during the unwrapping of the mobile observatory on March 21. The PACMO is now ready to go; thanks to Al, Rusty, Dale, Mike Gacloch and Rolando Gamino for coming to SunRys to help with this annual project.

Navigating the April Night Sky, Northern Hemisphere

For observers in the middle northern latitudes, this chart is suitable for mid April at 10:00 p.m. Daylight Time.

The stars plotted represent those which can be seen from areas suffering from moderate light pollution. In larger cities, less than 100 stars are visible, while from dark, rural areas well over ten times that amount are found.



The Ecliptic represents the plane of the solar system. The sun, the moon, and the major planets all lie on or near this imaginary line in the sky.

Relative sizes and distances in the sky can be deceiving. For instance, 360 "full moons" can be placed side by side, extending from horizon to horizon.

→ • Relative size of the full moon.

Navigating the April night sky: Simply start with what you know or with what you can easily find.

- 1 Extend an imaginary line north from the two stars at the tip of the Big Dipper's bowl. It passes Polaris, the North Star.
- 2 Draw another imaginary line west across the top two stars of the Dipper's bowl. It strikes Capella low in the northwest.
- 3 Through the two diagonal stars of the Dipper's bowl, draw a line pointing to the twin stars of Castor and Pollux in Gemini.
- 4 Look in the west-southwest for the bright Winter Triangle stars of Sirius, Procyon, and Betelgeuse.
- 5 Directly below the Dipper's bowl reclines the constellation Leo with its primary star, Regulus.
- 6 Follow the arc of the Dipper's handle. It first intersects Arcturus, then continues to Spica.
- 7 Arcturus, Spica, and Denebola form the Spring Triangle, a large equilateral triangle.

Binocular Highlights

- A:** M44, a star cluster barely visible to the naked eye, lies to the southeast of Pollux.
B: Look nearly overhead for the loose star cluster of Coma Berenices.
C: In the Big Dipper's handle shines Mizar next to a dimmer star, Alcor.



Astronomical League
www.astroleague.org

CALENDAR OF CLUB EVENTS

APRIL 4: Eclipse presentation at Rock Island Public Library, Watts Midtown Branch, 7:30 p.m.; night sky observing follows

APRIL 6: QCAS Public Night, Menke Observatory

APRIL 8: Monthly membership meeting at Butterworth Center / via Zoom, 7 p.m. Program: "Solar Flares and Neptune's Chemistry" by Robert Gregory, Astronomy Professor, Scott Community College

APRIL 20: Public observing at Niabi Zoo; sunset at 7:49 p.m.

MAY 11: QCAS Public Night, Menke Observatory

MAY 13: Monthly membership meeting at Butterworth Center / via Zoom, 7 p.m. Program: "Keep Looking Up - One Sky, One World" by Dave Weinrich, former Director of Minnesota State University-Moorhead Planetarium

MAY 18: Astronomy Day; QCAS public event, site / time TBD

MAY 18: Public observing at Niabi Zoo; sunset at 8:18 p.m.

JUNE 1: Solar observing at Giant Goose Conservation Area, Atkinson

JUNE 15: Public observing at Niabi Zoo; sunset at 8:38 p.m.

JUNE 24: "Stars & S'mores" public observing session at Scott County Public Library, Eldridge, 8:30 p.m.; June 27 rain date

JUNE 29: Public observing session at Illiniwek Campground; July 6 rain date

JULY 11: Public observing session at Silvis Public Library; celebrating library's centennial; July 18 rain date

AUGUST 10: Annual PAC Picnic / Perseid meteor shower observing, Paul Castle Observatory

SEPTEMBER 28-30: Eastern Iowa Star Party, Menke Observatory

OCTOBER 12: Annual PAC Banquet, Riverfront Grille, Rock Island, 5:30 p.m.

Events subject to change; check your email for updates

NCRAL 2024 early registration deadline is April 1

The early registration deadline is fast approaching for NCRAL 2024, the annual convention of the North Central Region of the Astronomical League.

The fee to attend the convention is \$120 for those who register by April 1, with the fee then increasing to \$150. The convention will be held May 17-18 at St. Norbert College in DePere, Wisconsin, and hosted by the Neville Public Museum Astronomical Society of Green Bay.

"The Universe in Color" is the theme for NCRAL 2024, which will include presentations on topics such as astro-sketching, deep sky imaging and the aurora borealis. A banquet dinner, astro-photography contest, door prizes, awards, and an observatory tour are also on the agenda.

Go to this link to register for NCRAL 2024 and for more information: [NCRAL2024](https://www.ncral.org/2024).

APRIL 8: Eclipse viewing at Moline Public Library; set-up beginning at 11 a.m.; partial eclipse peaks at 2:03 p.m.

