



Reflections

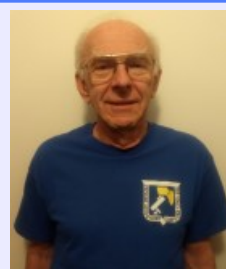
The Newsletter of the Popular Astronomy Club

ESTABLISHED 1936



October 2023

REFLECTIONS from the President



Dale Hachtel

New developments in astronomy have created more interest from the public as we receive the results of astronomical observations and try to

understand what they mean.

The James Webb Space Telescope has provided new images of some of the most interesting objects in the sky, along with many things never seen before. Spacecraft have returned comet dust and samples from the Moon and an asteroid, and are preparing samples to be returned from Mars in the future. The availability of these samples allows scientists to do a detailed analysis of the material from these objects.

The latest technology allows us to investigate elements detected in the stars, and in the atmospheres of exoplanets around those stars, even though we cannot reach them to retrieve samples.

At our annual banquet this year, we will have Larry Bartoszek's presentation titled "The Connection Between the Periodic Table and Astronomy." He will discuss how revealing the chemical composition of distant stars advances our understanding of the Universe and its origins. This should be a very interesting and informative program for attendees of the Popular Astronomy Club banquet.

If you haven't already, don't forget to make your reservation now for the banquet, which will be on Saturday, October 14, at the Riverfront Grille in Rock Island, starting at 5:30pm. After the buffet dinner, and feature presentation, we will have recognitions, awards, and some door prizes.

October 14 is also an important day in amateur astronomy, as we will have an annular eclipse of the sun, peaking around mid-day. Although the partial eclipse will be about 50% in the Quad Cities area, it will be an interesting one to watch, using eclipse glasses (be safe when viewing, please!).

This month's eclipse also serves as preview of the total eclipse coming next year on April 8. We won't experience totality in this area, but will see about 90% coverage of the Sun.

Before the eclipse, we have a public observing session on October 4, hosted by the Moline Public Library. You'll be able to get eclipse viewing glasses there, and have them in time to watch the Moon block out part of the Sun.

Other public sessions coming up are at Niabi Zoo on Saturday, October 21 (rain date October 28 if possible), and at the East Moline Library at Runners Park on Monday, October 30 (rain date November 3). We are also planning an observing session for Cub Scouts in Orion on October 17.

With Jupiter now rising in the evening soon after sundown, these sessions have one more reason to keep looking up.



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**RENEW YOUR
MEMBERSHIP
PAGE 22**



AstroCon 2025 site announced

The Astronomical League has announced that its 2025 annual convention will be held June 25-28 under the “spectacularly dark skies” of Bryce Canyon National Park in southern Utah.

Ruby’s Inn and Convention Center, located near the park entrance, will serve as the venue for AstroCon 2025. A special area a few miles east of the convention center will be available for evening viewing and astrophotography and imaging workshops.

The convention will also include workshops and presentations, social events, exhibitors and vendors, solar viewing opportunities, and observing and imaging contests. Volunteers are being sought to organize and lead workshops and presentations.

Registration for AstroCon 2025 is expected to open in July 2024. Check the Astronomical League website, at astro-league.org, for updates and more information.

Submissions to *Reflections* are always welcome! Send your photos, articles and other items to:
levesque5562@att.net

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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If you have questions or request,
or want more information on
PAC, send an e-mail to:
popularastronomy-club@gmail.com

SUMMARY OF SEPTEMBER PAC MEETING

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

Seventeen (17) PAC members and guests were present for the membership meeting, with another eight joining the meeting via Zoom, including guests and members of other astronomy clubs in the region.

PAC Vice President Dino Milani called the meeting to order; Dino led the meeting in place of PAC President Dale Hachtel, who was unable to attend in person due to health issues but did join via Zoom.

The minutes of the July meeting, posted as a story in the August issue of Reflections, were approved, following a motion by Al Sheidler and second by Wayland Bauer. (*Note that this story will serve as minutes for the September membership meeting.*)

Dino then summarized some of the actions taken at a PAC board meeting that was held the previous day (*September 10; see page 5 for a story on this meeting*). These include:

- Approval of the purchase of a telescope suitable for solar viewing, plus a bracket for the telescope.
- Discussion on which library should receive a library telescope won by Al during AL-CON 2023; the telescope probably will not arrive until December.
- The need to create an inventory of donated telescopes – PAC recently received more telescope donations – and deciding what to do with these telescopes, which will likely be made available for use by club members.
- The board's approval of the purchase of two \$5,000 short-term U.S. Treasury bills, which are currently paying interest of over 5 percent.
- The upcoming election of club officers at the December membership meeting, and



During the meeting, Dino Milani gave a presentation on Accidents in Space (Part 2).

need to get nominations for these positions.

Regarding the latter action, Dino encouraged new club members, and those members who have not served as officers in the past, to consider serving in PAC leadership positions. He noted that it took some time but was well worth it. Al said that he was heading the nomination committee (consisting only of himself so far), so those interested in running should contact him.

Observatory Director Rusty Case reported that “everything is working well” and that he and Al had made some adjustments to the telescope and dome at Castle Observatory. Hands-on training on how to use the telescope and other observatory equipment is always available.

As Observing Coordinator, Al said that many observing sessions had been held recently, including some impromptu sessions held when sky conditions were favorable. He said that club members should watch for emails announcing these sessions and encouraged members to participate.

Upcoming public outreach events were then reviewed. Dale noted that the event scheduled for the following night (September 12) at Riverdale Middle School was expected to draw a large crowd, especially if the weather is favorable. Requests have been received for outreach events at the libraries

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September membership meeting

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in Moline and DeWitt, but dates have not been set.

East Moline Public Library will host an outreach event at Runners Park on October 30; Dino noted that, even though this downtown location is bathed in artificial light, many objects can still be seen and people attending in the past were still satisfied with what they were shown and what they learned.

Treasurer Michael Haney reported that the club had a healthy checking account balance and was well funded, thanks in large part to distributions from the Terry Dufek trust. He reiterated that the club's board had approved the purchase of two \$5,000 T-bills, and that the purchases would be "laddered," i.e. purchased at varying maturity dates to maintain a steady flow of returns.

PAC has also purchased certified eclipse glasses from the Astronomical League, and Al invited those present to take some eclipse glasses home with them. The glasses can be used during the October 14 annular eclipse (*see the story on page 9*).

Dino said that articles are always needed for the monthly "Skywatch" article in the local newspapers and encouraged submissions.

Members should get their reservations in for the annual banquet on October 14. Due to the banquet, there will be no membership meeting next month; the agendas for the November and December meetings were presented.

The meeting proceeded with a presentation by PAC member Byron Davies on how he uses free software, such as Siril, to sharpen and improve astronomical images taken with his camera. Byron went through the step-by-step process used to brighten the colors and improve the focus of stacked images; he noted that the software also works on stand-

Popular Astronomy Club Balance Sheet As of August 31, 2023

	Aug 31, 23
ASSETS	
Current Assets	
Checking/Savings	
Business Special	45.44
Cash	0.66
Checking	31,349.18
Money Market	5,416.16
Savings	10.23
U.S. Treasury	4,913.73
Total Checking/Savings	41,735.40
Total Current Assets	41,735.40
TOTAL ASSETS	41,735.40
LIABILITIES & EQUITY	
Equity	
Opening Balance Equity	9,422.33
Unrestricted Net Assets	27,157.64
Net Income	5,155.43
Total Equity	41,735.40
TOTAL LIABILITIES & EQUITY	41,735.40

alone images.

Dino then made a presentation on space accidents, part two of a similar presentation made at a previous meeting. The brief presentation discussed the recent successful landing of a lunar probe by India's space agency, following an unsuccessful mission in 2019, and the crash of Luna-26, a lunar probe launched by Russia in August.

The Otter Pup – a satellite designed to dock with and service other satellites – faced a near-catastrophe following its launch in June when it began to spin uncontrollably. Dino showed how ground controllers used the Earth's magnetism to gradually slow the Otter Pup's spin rate, thus saving the satellite.

The meeting adjourned at 8:25 p.m. A recording of the meeting is available on YouTube via the following link: <https://youtu.be/tCc3ofGK3II>.

SUMMARY OF PAC BOARD MEETING

The board of the Popular Astronomy Club held a meeting on Sunday, September 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 Past President / Observing Coordinator Alan Sheidler; Treasurer Michael Haney; Secretary Paul Levesque; Observatory Director Rusty Case; and ALCOR Correspondent Roy Gustafson. Joann Hachtel and Sara Sheidler were also present. Vice-President Dino Milani was absent due to a scheduling conflict.

Michael presented a treasurer's report which showed net income of \$25,676.29, based on income and expenses for the last 12 months. The club's assets currently total \$41,735.40. Much of the club's income during the past year came from distributions from Terry Dufek's trust; the final distribution from the trust has been made.

In response to a query, it was confirmed that the annual insurance payment for the PACMO has been made.

The minutes for the last board meeting, held in June, were then approved, following a motion by Roy and second by Al.

The PAC website is being updated by Dino, but many people now rely on social media for information. Sara said that she is updating the club's Facebook page and is also sure to connect to Facebook postings by public libraries when they post something on PAC out-

reach events held at these libraries.

In his report, Rusty stated that he and Al had worked on the dome at Castle Observatory and made adjustments to it and to the telescope. He said that he plans to recoat the deck around the observatory sometime soon.

Al said that plenty of observing sessions had been held in recent weeks and that he would like to see more members come and participate in these sessions. He has tried to keep everyone informed about the sessions and of the objects visible for observation.

Roy said that he had contacted the Astronomical League and finally got them to correct the listing of PAC's president, to Dale Hachtel; Al had been listed as president.

In his report, Dale said that he was still recovering from the injury he suffered earlier this year in a hiking accident. Rehabilitation and treatment have restricted his activities and he is unable to lead membership meetings and participate in many other club events. Dale cannot drive at this time and Joann restricts herself to driving in daylight hours.

Dale has designed and printed new business cards for the club, using a Word template and Avery card stock. A sample of what he printed was shown to board members. Board members liked the cards and agreed that more should be printed for distribution at outreach events. Copies of the PAC brochure, which was also recently updated, are also available for distribution.

The possibility of providing a portapotty at the monthly public observing sessions at Niabi Zoo was discussed at the previous board meeting, and Dale said

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The telescopes that were donated to PAC by Lee Farrar are displayed in Al Sheidler's driveway.

PAC board meeting

Continued from Page 5

that a “luggable loo” and privacy tent could be purchased at a total cost of a bit over \$100. The loo is basically a bucket with a toilet seat and disposable bag. Niabi Zoo may need to approve any porta-potty brought on site. Sara said that, when she announces the Niabi observing sessions on Facebook, she adds a sentence at the end stating that no restroom facilities are available.

Paul said that he had tried to contact Festival of Trees about possibly putting together a PAC / Astronomy basket for their raffle, but had received no response to his queries. He said that he had given up for this year on trying to contact them and that it was getting late to put a basket together in any case, since Festival of Trees begins the week of Thanksgiving.

Discussion then turned to the “Porch Party” at the Butterworth Center on Sunday, September 17. A large crowd is expected, so this should be a good outreach opportunity. There will be a scavenger hunt consisting of information that attendees can get from organizations present at the Porch Party, and PAC should be sure to participate.

A Hydrogen Alpha telescope suitable for solar viewing is being offered for sale from Wayland Bauer for \$800, which is a fair price for this item. Al said that the scope would also require a bracket that could cost up to \$175 plus shipping. The telescope could be set up in the PACMO for use at public events. Following a motion by Roy and second by Paul, the board approved an expenditure of up to \$1,000 to purchase the telescope and mount.

PAC has obtained 1,000 eclipse glasses from the Astronomical League for a cost of 34 cents apiece. They are certified to ISO standards as being safe for solar viewing, unlike

Popular Astronomy Club Income & Expenses September 2022 through August 2023

	Sep '22 - Aug 23
Ordinary Income/Expense	
Income	
Banquet Inc.	666.00
Donation	
Member	25,245.89
Misc.	187.25
Program	2,756.50
Total Donation	28,189.64
Interest Income	34.48
Membership	
Family Member	127.50
Patron	80.00
Regular	760.00
Supporting	80.00
Sustaining	240.00
Total Membership	1,287.50
Misc. Inc.	65.00
Sales	17.00
Total Income	30,259.62
Expense	
Bank Service Charges	37.59
Banquet Exp.	493.42
Castle Observatory	301.00
Dues and Subscriptions	190.00
Equipment	271.40
Honorarium	150.00
Miscellaneous Expense	50.00
PACMO	
Operation	1,321.41
Rent	612.00
Repairs and Maintenance	60.00
Total PACMO	1,993.41
Reimbursement	86.55
Supplies	1,009.96
Total Expense	4,583.33
Net Ordinary Income	25,676.29
Net Income	25,676.29

some eclipse glasses sold online from less reputable sources. The eclipse glasses could be used for upcoming annular eclipse on October 14 and for next year’s solar eclipse.

Given the low cost of the eclipse glasses, board members agreed that they should be distributed for free to the public at future outreach events. Sara said that the Butterworth Center may be willing to compensate PAC for any eclipse glasses given away at the September 17 Porch Party.

PAC has no outreach events scheduled for

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PAC board meeting

Continued from Page 6

the annular eclipse, though the club may discuss the eclipse at events leading up to it. Paul will write an article on the eclipse for the Skywatch column in the local newspaper, which would be timely for October.

The library telescope won by Al at "ALCON 2023," the annual convention of the Astronomical League, will likely not arrive until December. The board can then decide what library should receive the donation. Al said that the Astronomical League is encouraging donations of telescope to local libraries, but added that PAC may be called to perform maintenance and repairs on any telescopes which it donates.

PAC has received three more telescopes donated by member Lee Farrar, who has moved into assisted living and is no longer able to do any observing. Discussion then turned to what to do with these telescopes and with other telescopes that have been donated to the club. It was agreed that these telescopes should be offered to club members, for their personal use and also for use at outreach events. The telescopes are too complex for use as library telescopes, which must be easy to operate by inexperienced observers.

Board members agreed that an inventory of donated telescopes that are available for distribution should be developed. Roy said that he had astronomical binoculars that he wanted to donate, and Al also has some binoculars for donation. These may be given away at the October 14 banquet as door prizes. A plan for distributing the donated telescopes will be developed after the inventory is complete.

The telescopes currently in the PAC inventory includes a handmade "museum piece" made by a club member in 1934; the scope

needs a new eyepiece and a little work but is otherwise functional. Because it has some historical interest, Dale will ask the Rock Island Historical Society if they are interested in receiving it. An individual with an interest in old telescopes was also mentioned as someone who might take this telescope.

Given the number of donated telescopes and other PAC-owned items that are currently being held by individual members, Michael asked if it would be advisable for the club to obtain a storage shed, or otherwise rent storage space. This suggestion will be explored and discussed in the future.

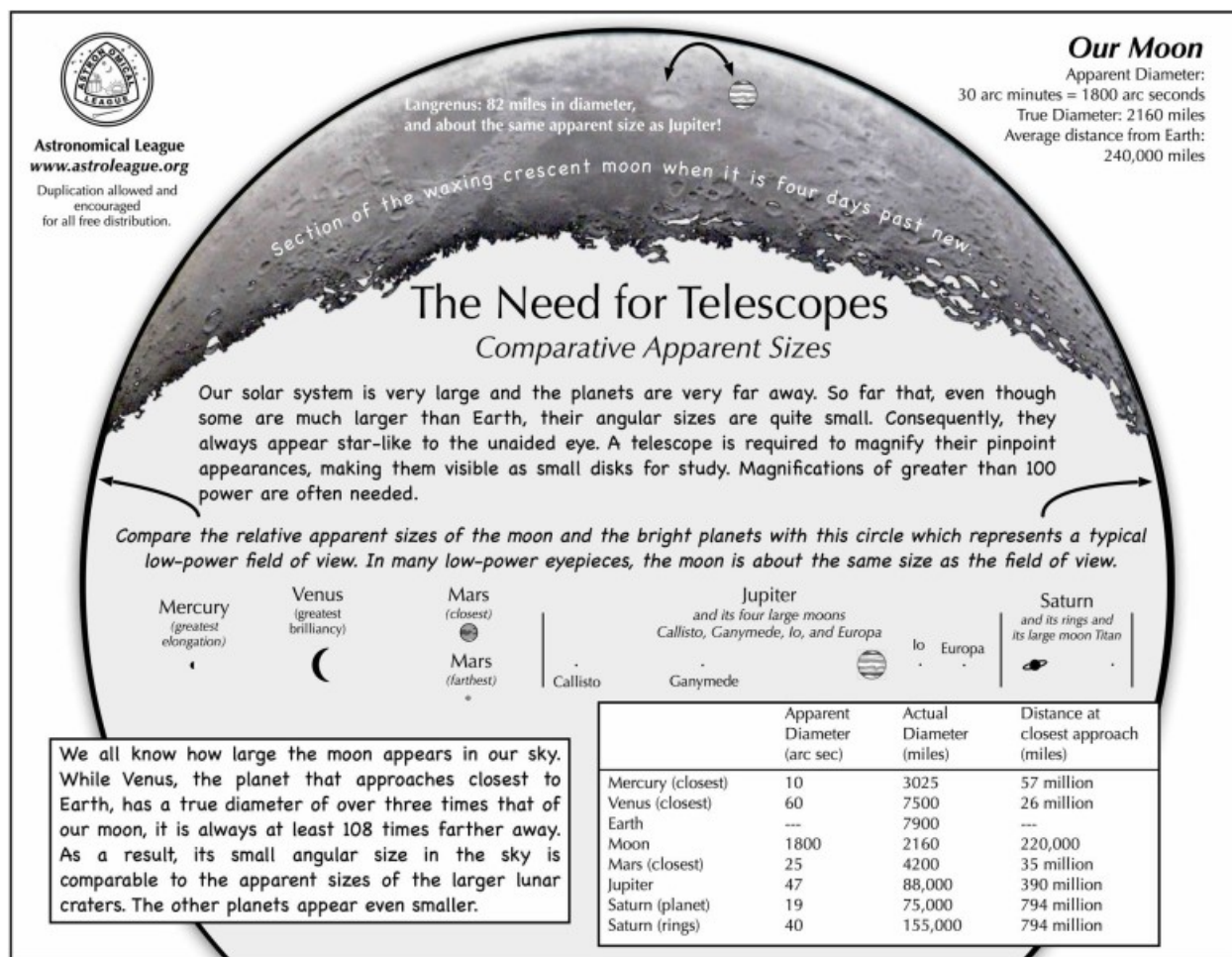
Given the healthy balance in the checking account, which pays a very low interest rate, Michael suggested that the club purchase more short-term U.S. Treasury bills. These "T bills" currently pay over 5 percent interest if held for 17 weeks. The board agreed to the purchase of two Treasury bills of \$5,000 each. The purchases will be "laddered," i.e. purchased at varying maturity dates to maintain a steady flow of returns. This action will bring more revenue to the club while still assuring that enough cash is on hand to cover anticipated expenses.

The proposed expenditure of \$10,000 for the purchase of Treasury bills was approved by the board, following a motion by Roy and second by Al.

The Moline Public Library has received another "Project Next Generation" grant and so will continue to host presentations by PAC. The library is especially interested in activities centered around next year's solar eclipse, which will be total in some areas of the United States but partial in the Quad Cities area.

Following a motion by Roy and second by Michael, the board approved expenditures for the purchase of eclipse glasses, the repair

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PAC board meeting

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of the PACMO telescope bag, and lodging for Carl Wenning during his appearance in August.

Upcoming public outreach events dating out to July 2024 were reviewed, and board members agreed that we have enough events planned for the remainder of this year; some requested events do not have dates yet.

Six reservations for the banquet from club members, plus one guest, have been received so far. Dale will contact honorary members Marietta Castle and the Nordick family and invite them to the banquet as guests of the club.

A speaker has been contacted about making a presentation at the April 2024 member-

ship meeting.

Dale, Michael and Al compared notes on membership and assured that membership records were up to date. New members will be added to the list sent to the Astronomical League next June; eight of these individuals need new member welcome packages.

New club officers will be elected at the membership meeting on December 11. Nominations will be needed for some positions, so members who are willing to take on these positions should be contacted. Al, as past president, has agreed to act as head of the nominating committee. Dale said that his health issues may prevent him from accepting another term as club president.

The meeting adjourned at 4:45 p.m.

Eclipse will turn Sun into a ‘ring of fire’

Partial eclipse visible in the Quad Cities on October 14

“Annulus” is a little-used word meaning “ring,” and it’s the root of a term describing a natural phenomenon that transforms the Sun into a ring of fire.

On October 14, parts of the United States and other nations in North, Central and South America will see the ring of fire, which unfortunately will not be visible in the Quad Cities area. From here, we’ll see a partial eclipse that will cover about half the Sun.

A solar eclipse occurs when the Moon, in its orbit around Earth, blocks out the Sun. We’d see an eclipse once a month if the Moon’s orbit was perfectly circular and perfectly aligned; however, that is not the case.

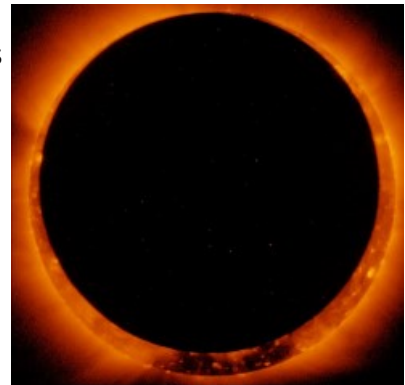
The orbit of the Moon is elliptical and comes to points where it is farthest (apogee) and closest (perigee) to Earth. In addition, the plane of the Moon’s orbit is inclined at an angle of about 5 degrees relative to Earth. As a result, solar eclipses are rather rare and cover a small portion of the Earth when they do occur.

On October 14, the Moon’s orbit will be aligned with the Sun, but will also be near apogee. Thus, the Moon’s shadow will be a bit too small to cover the entire Sun.

The result is an annular eclipse, during which a bit of the Sun is visible around the lunar shadow, forming a ring-like shape. That’s when you see the ring of fire.

WARNING: It is **NEVER** safe to look at the Sun during an annular eclipse with your naked eyes. Never! It is possible to observe the Sun during its “ring of fire” phase, but only when using properly certified gear (*see accompanying article, page 10*).

If you want to see the annular eclipse in all its glory, you’ll need to travel. The path of the eclipse will enter the United States on the coast of Oregon, then cut at an angle to the south-east before exiting via the Gulf Coast of Texas. Some places and cities where the “ring of fire” will be visible include Crater Lake National Park, Oregon; Bryce Canyon National Park, Utah; Mesa Verde National Park, Colorado; Albuquerque, New Mexico; and both San Antonio and Corpus Christi, Texas.



NASA’s Hinode spacecraft took this photo of an annular eclipse in January 2011. The path of the October 14 annular eclipse will cut from Oregon to Texas and generate a partial eclipse visible from the Quad Cities.

After cutting across the Gulf of Mexico, the path of the annular eclipse will pass over the Yucatan Peninsula and several Central American nations, coming very close to the Panama Canal. The path then moves across Colombia and Brazil before heading over the South Atlantic Ocean, where the eclipse will end at sunset.

As happens during a total eclipse, areas off the path of eclipse will see part of the Sun blocked by the Moon’s shadow. In the Quad Cities, the partial eclipse will be visible beginning at about 10:30 a.m., peak at about 11:55 a.m., and end at about

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Viewing the October eclipse: Safety first

If you plan to travel to see the October 14 annular eclipse in all its “ring of fire” glory, or plan to stay in the Quad Cities and view the partial eclipse visible in this area that day, be aware that you should **NEVER** look at the Sun during this celestial event without proper protection.

Staring at the sun with your naked eyes can cause permanent damage to your eyesight. This can happen both quickly and painlessly, meaning you might be unaware of what you’ve done to yourself until it’s too late.

The one and only safe way to view an annular and/or partial eclipse is by using solar viewing glasses – often called “eclipse glasses” – that are certified to the ISO 12312-2 international standard. Eclipse glasses from reputable sources will be clearly marked as being ISO certified. Be aware that some less than reputable sources have been known to sell non-certified eclipse glasses; always check to be sure.

If you have some old eclipse glasses on hand, do not use them if they are scratched, torn or damaged in any way. The safe approach is to get new solar viewing glasses for each eclipse.

It is definitely **NOT** safe to don eclipse glasses and then look at the Sun through your camera, binoculars, telescope or other viewing device. Doing so could both damage your eyes and the device you’re using.

It is possible to view and photograph an eclipse through a camera, binoculars or telescope, but only when using specialized solar filters. Again, you must assure that these filters are certified to international safety standards.

You can view the partial eclipse safely on October 14 by attending either of two viewing events being held by the Quad Cities Astronomical Society. Both begin at 10:30 a.m. and are free and open to the public.

The events will be held at the Rogalski Center at St. Ambrose University in Davenport, and at the Coffee Hound at the BettPlex in Bettendorf. Sun-safe viewing devices will be set up, and free certified eclipse glasses will be available for distribution.

While the Popular Astronomy Club has no events planned for October 14, PAC has distributed about 500 eclipse glasses at public events held in the past few months. The glasses were obtained from the Astronomical League and were given out free of charge.



Certified eclipse glasses like these have been distributed free of charge by PAC.

Annular eclipse

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1:20 p.m. Peak coverage of the Sun will be about 50 percent, and will vary depending on your exact location.

Though not near as spectacular as a total or annular eclipse, a partial eclipse is still worth observing – safely, please! – so let’s hope for clear skies on October 14.

The next eclipse we’ll see in the United States will happen next year, on April 8. It will again be partial here but total in a northeasterly path running from Texas to Vermont. You can learn more about this eclipse, and about eclipses in general, at NASA’s website: solarsystem.nasa.gov/eclipses.

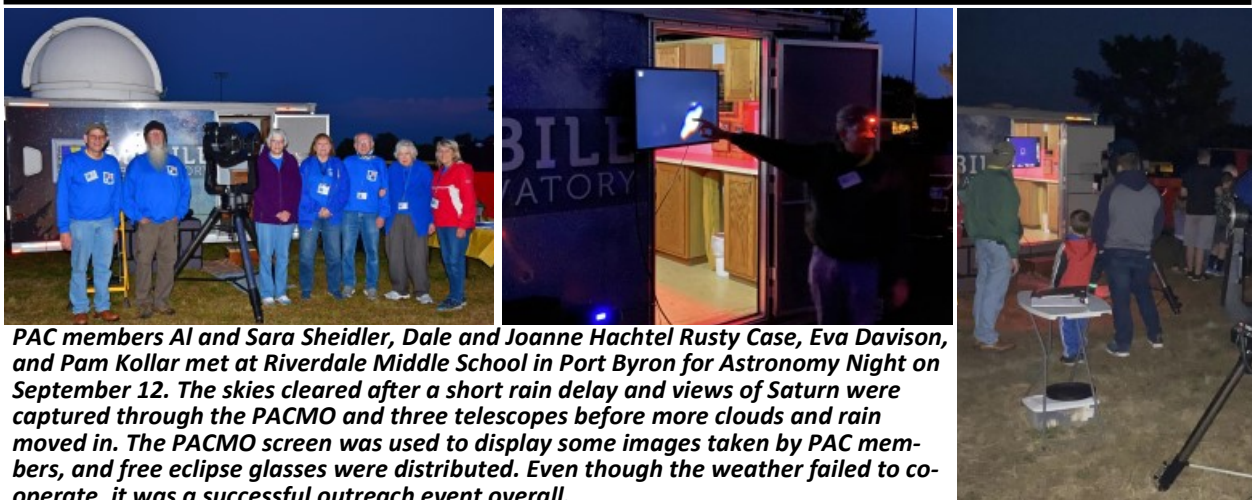


This illustration shows what the partial eclipse will look like in the Quad Cities.

MEMBER OBSERVATIONS & CLUB ACTIVITIES

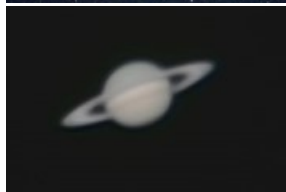
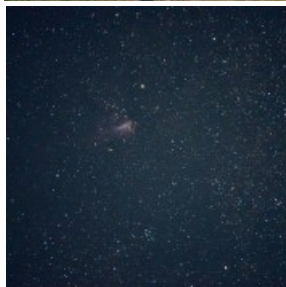


PAC participated in the annual Porch Party at the Butterworth Center on September 17. Sara Sheidler and Joanne Hachtel staffed the information table indoors, while Al Sheidler, Ken Boquist and Dale Hachtel offered solar observing to the public outdoors. Viewing conditions were good overall, despite a few passing clouds, and Al got this image of the Sun showing sunspot activity.

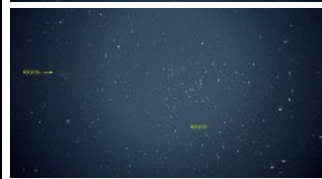
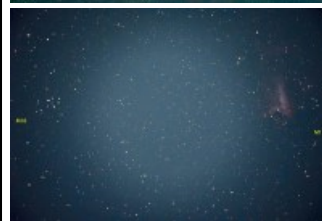


PAC members Al and Sara Sheidler, Dale and Joanne Hachtel Rusty Case, Eva Davison, and Pam Kollar met at Riverdale Middle School in Port Byron for Astronomy Night on September 12. The skies cleared after a short rain delay and views of Saturn were captured through the PACMO and three telescopes before more clouds and rain moved in. The PACMO screen was used to display some images taken by PAC members, and free eclipse glasses were distributed. Even though the weather failed to cooperate, it was a successful outreach event overall.

MEMBER OBSERVATIONS & CLUB ACTIVITIES



Mike Donatsch, Rolando Gamino, Steve Sinksen, Al Sheidler and Dan Cusack got together at Paul Castle Observatory on September 8, taking advantage of a night that featured excellent viewing conditions. Al continued his pursuit of the 'Two in the View' certificate and caught the Epsilon Lyrae 'Double' with the bright star Vega (upper left). Images of M17 and M18 (upper right), NGC869 and NGC884 (lower right) and Saturn were also captured.



Six telescopes were set up at Paul Castle Observatory on September 1; those taking part in the session were Rolando Gamino, Dan Cusack, Al Sheidler, Jessie Reilly, Eric Sheidler, Sara Sheidler, Byron Davies, Wayland Bauer and John Douglas (not in photo). Dan caught images of the Andromeda Galaxy (M31) and the North America Nebula (NGC7000); Al continued his pursuit of the Astronomical League's 'Two in the View' certificate; and Rolando took this photo of Saturn.



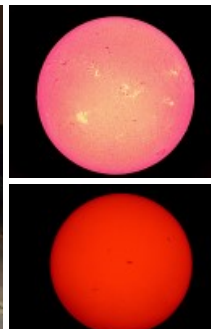
Al Sheidler and Rob McDonald did some observing at Paul Castle Observatory on September 14 and got some nice images of the Wild Duck Cluster (M11, upper left), the Swan Nebula (M17, upper center), and the Sagittarius Cluster (M22, right), along with Neptune, with its moon Triton, and Pluto.



MEMBER OBSERVATIONS & CLUB ACTIVITIES



Let's once again enjoy some amazing astrophotography done by Byron Davies during September. Shown are (A) NGC700 (North America Nebula); (B) M27 (Dumbbell Nebula); (C) M31 (Andromeda Galaxy); (D) LDN 1235 (Shark Nebula); (E) M8 & M20 (Lagoon & Trifid Nebulae); (F) a different view of NGC7000; (G) Caldwell 9 (Cave Nebula); (H) NGC6888 (Crescent Nebula).



Clouds rolled in on the evening of September 23, but the public observing session at Niabi Zoo went on anyway. The visitors who did show up enjoyed a slide show featuring images of the Sun taken earlier that day. One new member signed up and is interesting in learning to use the observatory telescope. PAC members present were Al Sheidler, Dan Cusack, Rusty Case, Eva Davison, Pam Kollar, Dale Hachtel, and Dino Milani (not in picture).

Plenty to enjoy in the October sky

October will be a special month in the night sky. The main event will occur October 14, when an annular eclipse of the Sun will move along a narrow path from the Oregon Pacific coast to the Texas Gulf coast. At maximum eclipse, the Sun will appear as a narrow ring of light around the Moon.

Since the resulting ring of sunlight will leave the sky only slightly darker, an annular eclipse is not as dramatic as a total solar eclipse. However, it will still be worth observing. Outside of the narrow eclipse path, there will be a partial eclipse of the Sun. (*See page 9 for more on the annular eclipse.*)

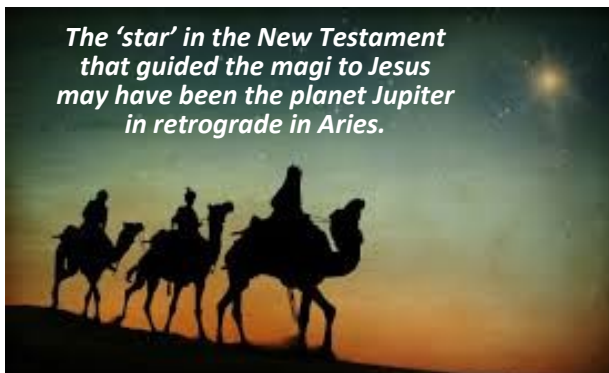
Three bright planets will be in the sky during October. Brilliant Venus will be at its highest point in the morning sky and will rise about four hours before the Sun. After early November, it will begin to slowly drift lower.

Saturn will be midway up in the southern evening sky. It will be in the constellation Aquarius (the Waterbearer) to the lower right of its dim water jug and far above the only other bright star, Fomalhaut in Piscis Austrinus (the Southern Fish).

Very bright Jupiter will rise in the eastern sky at about 8:30 p.m. as October begins and during the evening twilight at the end of the month. It will be in the constellation Aries (the Ram), at least a fist width at arm's length below a nearly horizontal line of Aries' three moderately bright stars.

Jupiter will be moving slowly in a retrograde, or westward, motion and will do so until December. This should be observable by comparing the location of Jupiter to the brighter stars of Aries.

Since an outer planet in retrograde motion moves westward slightly faster than the background stars, in ancient times it was referred to as moving ahead of the stars. According to a theory of Michael Molnar, this may have



been the source of the phrase in the Bible (*Matthew 2:9*), when the Magi (astrologers) were on their way to Bethlehem and saw that the star that they had been observing "went ahead of them."

When a planet ends retrograde motion, it stops before resuming its normal eastward motion. Ancient astrologers considered this to be a time when a planet had its most powerful effects.

It is also known that Jupiter referred to kings, and that Aries referred to Judea. In 6 B.C., during the time when Jesus may have been born, Jupiter stopped its retrograde motion in Aries. According to Molnar, this could be the source of the phrase in Matthew that the star "stopped over the place (in the zodiac?) where the child was (Judea?)"

If so, when the Magi saw this, it would explain why they were overjoyed (*Matthew 2:10*). This year, we can also observe Jupiter's retrograde motion in Aries, much like the Magi may have seen it.

Some observing highlights for October:

October 1: The Moon will rise close to the upper left of Jupiter and to the lower left of the brighter stars of Aries.

October 2: The Moon will be above Aldebaran, the bright eye of Taurus (the Bull), after they rise at about 10 p.m.

October 10: After rising at about 4 a.m.,

Continued on Page 17

From Galileo to Clipper

NASA mission will explore icy moon of Jupiter

"...We, too, are made of wonders, of great and ordinary loves, of small invisible worlds, of a need to call out through the dark."

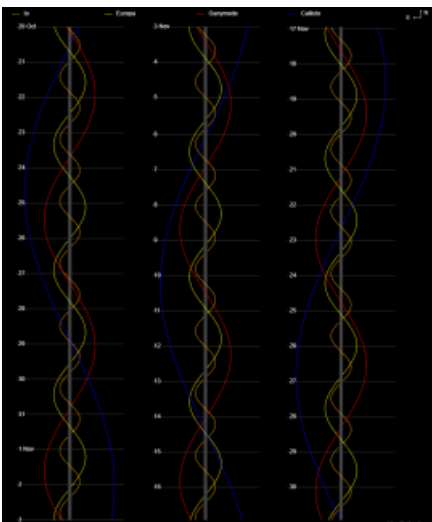
From *In Praise of Mystery: A Poem for Europa* by Ada Limon, U.S. Poet Laureate

As autumn begins, if you're up late, you may notice a bright point of light rising in the east. Look a bit closer, with a pair of binoculars, and you'll notice it's not a star at all.

While stars look point-like no matter how big your backyard telescope, this light appears as a circle under closer examination. You may also see a line of smaller dots on one or both sides. Congratulations! You've rediscovered the king of the planets – majestic Jupiter – and its four largest moons.

In the 17th century, Galileo famously chronicled the four moving dots near Jupiter and surmised that they were orbiting the distant world. While Jupiter has over 80 discovered moons, these brightest four are called the "Galilean Moons" - Io, Europa, Ganymede and Callisto. (Great mnemonics exist to remember these in order of distance from Jupiter, such as "I Eat Green Caterpillars.")

You can follow these like Galileo did, using



stargazing apps that weren't around in his time. A favorite beginning observing challenge is to track the movement of the Gali-



Launching next year, NASA's Europa Clipper mission will explore a moon of Jupiter that may harbor life.

lean moons ([link](#)) over the course of many nights. Within a few hours, you will notice them moving in relation to Jupiter, just as Galileo did.

Fast forward more than 400 years from Galileo, and NASA will be sending a robotic mission to investigate the surface of one of these distant worlds. The Europa Clipper Mission ([link](#)) will be launched to the cold, icy moon in 2024, and begin orbiting it in 2030.

With its salty oceans covered by ice, Europa was chosen as an excellent location to continue the search for life outside Earth. Clipper will be the largest spacecraft ever sent to another planet, designed to withstand Jupiter's punishing radiation. Once it arrives at Jupiter in 2030, NASA plans to do about 50 flybys of Europa, mapping almost the entire surface of this watery world.

Once only dreamed of in the small telescope of Galileo, or in works of fiction, NASA is turning our wildest imagination into reality.

One of the celebrated quotes from the

Continued on Page 17

This chart tracks the movement of the four Galilean moons of Jupiter from mid-October through the end of November.



**October
2023**

A comet for the centuries

When David Rossetter and I began our observing session at the Tucson Amateur Astronomy Association's Chiricuaha Astronomy Complex on the evening of August 5, we did not expect that we would be treated to an evening of cosmic history.

That was the night we glimpsed Comet Pons-Brooks, which has an orbit that, like Halley's comet, takes almost an average human lifetime to orbit the Sun. I might have spotted it the night before, but on this night David and I saw the same thing – a spot of haze in the darkness.

It was a faint misty cloud that bears the names of two of the most famous comet discoverers in all history, a spot of haze with quite a story to tell.

Comet Pons-Brooks was first identified by Jean-Louis Pons, the great French comet hunter, during the summer of 1812. In the late summer of 1883, on its subsequent pass around the Sun, it was rediscovered by another famous comet hunter, William Robert Brooks.

I first encountered Brooks in a *Sky & Telescope* article I read in the second issue I received, at age 14, in April 1963. As I digested the story, I learned how Brooks might have politely entertained a visitor to his observatory, and how that visitor eventually learned that Brooks was one of the world's most famous comet discoverers.

As I relished these words, I foresaw myself, some day, also as a hunter of comets. Not a discoverer, because that would be hard. But a hunter; that's easy.

Those ideas stayed with me until December 17, 1965, when I began my program of searching for comets. Since then, my own life has

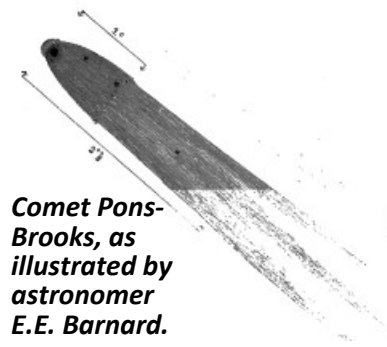
been punctuated by several sparks of cometary light, as each new comet added brightness to the field of my telescope. I joined a group of people linked not by nation, but by being citizens of the world united by a love of comets.

Emboldened by the offer by Hulbert Harrington Warner of an award of \$200 for each comet discovered, Brooks managed to find three comets within five weeks of each other, on April 17, April 30, and May 22, 1886. He must have known how his colleague Edward Emerson Barnard built his "comet house" partly out of funds also earned from Warner's award. The Warner prize has survived through history.

NOTE: The Astronomical Society of the Pacific offered its "Donohoe Comet Medal" for a time, and later Roger Tuthill gave a plaque, and now there exists the Edgar Wilson Award, which is sponsored by the Central Bureau for Astronomical Telegrams (CBAT) of the International Astronomical Union.

Like all serious comet hunters, Brooks was far more interested in discovering comets than in the money he could earn from these finds. In later years, his success as a comet hunter earned him a professorship in astronomy at Hobart College in Geneva, New York. With Brian Marsden's 1979 Catalogue of Comet Orbits as a guide, we can surmise that Brooks discovered a minimum of 22 comets in his lifetime.

Despite this remarkable accomplishment,



Continued on Page 17

Comet hunters

Continued from Page 13

Brooks is only the second most prolific comet finder in history. The winning ticket goes to Jean-Louis Pons himself, who was “the first “discoverer” of Comet Pons-Brooks.

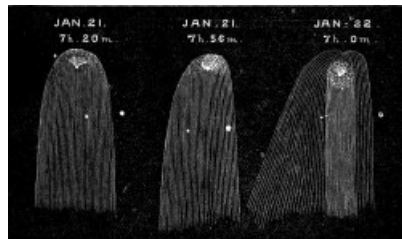
Truly, Pons was also not the first. This comet might have been observed by Chinese astronomers in the late summer of 245 CE, then definitely by the Chinese in 1385, and in 1457 by Paolo del Pozzo Toscanelli.

Pons today is considered to have discovered about 30 comets. I observed a second Pons periodic comet, Pons-Gambart, in January 2013. By the way, Pons had a most humble and trusting nature, and in his younger years he was ridiculed by astronomers who should have known better.

These days, it is almost impossible for an individual to discover more than half a dozen

comets. My total is 23, but as CBAT director Dan Green (possibly correctly) stated, “He discovered 9 comets and lucked out on 11 more,” before graciously adding Comet Shoemaker-Levy 9 to my total.

Pons and Brooks shared a passion for telescopes and the fleeting comets they could detect parading about the sky. I like to imagine that finding new comets was secondary to their pure enjoyment of the night sky, its treasures, and the secrets that it infrequently shared with those people who truly lived, and still live, for its precious hours of darkness.



Comet Pons-Brooks, as illustrated by astronomer H.C. Wilson.

October sky

Continued from Page 11

the crescent Moon will form an almost straight line with Regulus, the brightest star in Leo (the Lion), to its lower right, and brilliant Venus farther to the lower right.

October 14: The Grout Museum and the Black Hawk Astronomy Club will host a partial solar eclipse viewing party at Washington Park in Waterloo beginning at 10 a.m.

October 18: The crescent Moon will be to the upper left of Antares in Scorpius (the Scorpion) low in the evening twilight.

October 23: The Moon will form a large triangle with Saturn to its upper left and Fornalhaut farther to its lower left.

October 28: The Moon again will be close above Jupiter. This time, the Moon will be full.

October 30: The Moon will again be above Aldebaran after they rise at about 8 p.m.

David Voigts, Black Hawk Astronomy Club

Europa

Continued from Page 12

classic 1982 novel *2010: Odyssey Two* warns, “All these worlds are yours, except Europa. Attempt no landing there.” Science fiction fans can feel relieved, knowing that writer Arthur C. Clarke gave his blessing for the Europa Clipper mission.

You can join the Europa “Message in a Bottle Campaign” at europa.nasa.gov/participate. Click to have your name engraved on the spacecraft; read and listen to the rest of poem; and learn more about the wonders of space travel with the Europa Clipper.

A Clipper webinar with Dr. Cynthia Phillips, planetary geologist with the mission, can be viewed here: [Clipper Webinar](#).

Vivian White

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.

Comet Nishimura puts on a show, then fades away

A comet recently discovered by an amateur astronomer has faded from our view, but not before putting on a show in the sky for the past few months.

Comet Nishimura is named for Hideo Nishimura of Kakegawa, Japan, who spotted the comet while photographing the night sky on August 12. News of the discovery soon spread, and the comet was subsequently spotted and photographed by hundreds of amateur astronomers worldwide, including some in the Popular Astronomy Club.

The comet peaked in brightness in late August and early September, as it approached the Sun in its hyperbolic orbit traveling at an estimated speed of 240,000 miles per hour. Nishimura's closest approach to Earth came on September 13, and it came closest to the Sun on September 18.

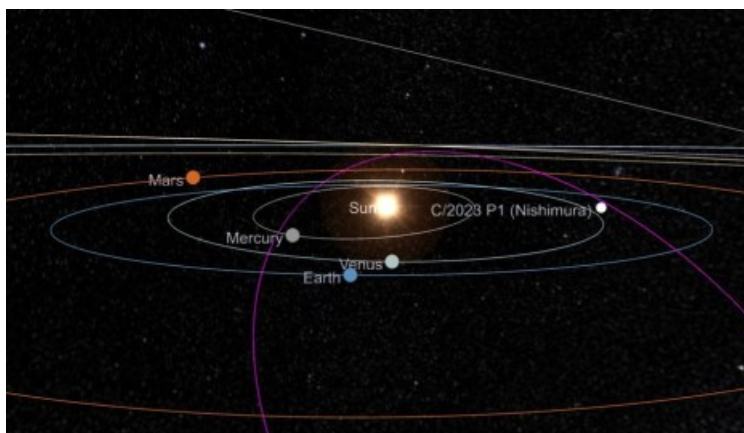
The comet's proximity to the Sun meant it was visible only for a brief period shortly before sunrise and sunset, and also caused it to soon be lost from view in the glare of sunlight. The comet could reappear sometime in November, but may then be too dim and distant to be successfully seen and imaged.

Assuming that Comet Nishimura's nucleus isn't torn apart by the Sun's powerful gravitation – which some astronomers see as a possibility – the comet won't be seen from Earth until sometime late in the 25th century, since the irregular orbital path it follows through the Solar System takes about 450 years to complete.

Comet Nishimura gives off a greenish glow, similar to a Comet ZTF, which made an appearance in the night sky earlier this year. The color comes from the breakdown of reactive molecules of diatomic carbon – two carbon atoms merged together – by the solar wind.

Due to its orbit, some astronomers thought that Comet Nishimura may have originated outside our Solar System, making it one of the few interstellar objects found near Earth. However, research now indicates that the comet likely did originate within the Solar System's Oort Cloud, where most comets are born.

Al Sheidler took this photo of Comet Nishimura at about 5:35 a.m. on September 6, using a 10-inch Meade LX200 telescope and Nikon D7500 camera. Light pollution and moonglow made the comet hard to find.



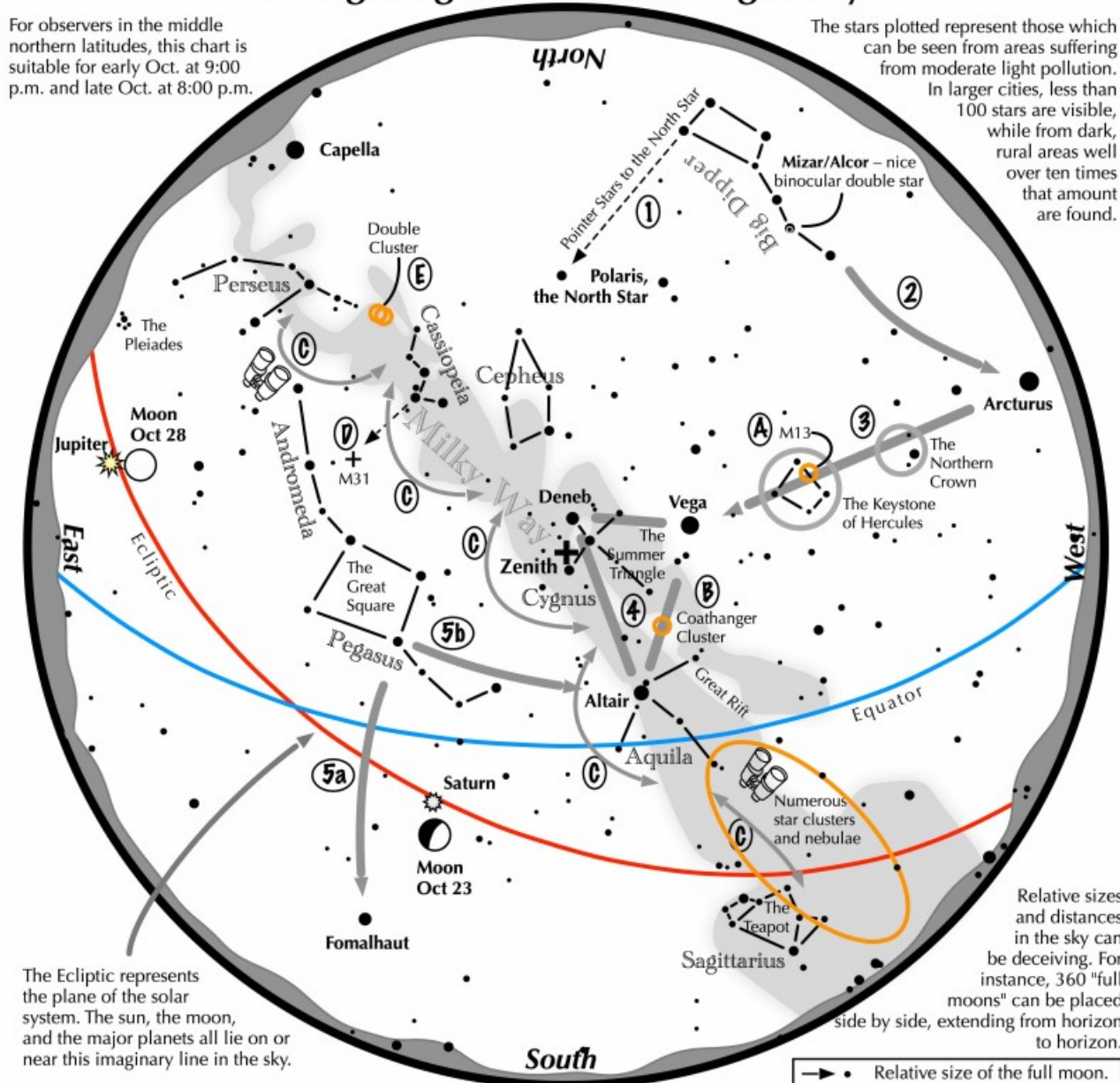
It's possible that the debris left by Nishimura is the source of the Sigma-Hybrid meteor shower, a minor but known event which occurs in mid-December. Elevated activity in this year's Sigma-Hybrids could provide conclusive evidence for this theory.

This illustration traces the hyperbolic orbit of Comet Nishimura, which takes more than 450 years to complete.

Navigating the October Night Sky

For observers in the middle northern latitudes, this chart is suitable for early Oct. at 9:00 p.m. and late Oct. at 8:00 p.m.

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.



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

- 1 Extend a line north from the two stars at the tip of the Big Dipper's bowl. It passes by Polaris, the North Star.
- 2 Follow the arc of the Dipper's handle. It intersects Arcturus, the brightest star in the early October evening sky.
- 3 To the northeast of Arcturus shines another star of the same brightness, Vega. Draw a line from Arcturus to Vega. It first meets "The Northern Crown," then the "Keystone of Hercules." A dark sky is needed to see these two dim stellar configurations.
- 4 Nearly overhead lie the summer triangle stars of Vega, Altair, and Deneb.
- 5 High in the east are the four moderately bright stars of the Great Square. Its two southern stars point west to Altair. Its two western stars point south to Fomalhaut.

Binocular Highlights

A: On the western side of the Keystone glows the Great Hercules Cluster, a ball of 500,000 stars. **B:** 40% of the way between Altair and Vega, twinkles the "Coathanger," a group of stars outlining a coathanger. **C:** Sweep along the Milky Way for an astounding number of fuzzy star clusters and nebulae amid many faint glows and dark bays, including the Great Rift. **D:** The three westernmost stars of Cassiopeia's "W" point south to M31, the Andromeda Galaxy, a "fuzzy" oval. **E:** Between the "W" of Cassiopeia and Perseus lies the Double Cluster.

Astronomical League www.astroleague.org/outreach; duplication is allowed and encouraged for all free distribution.



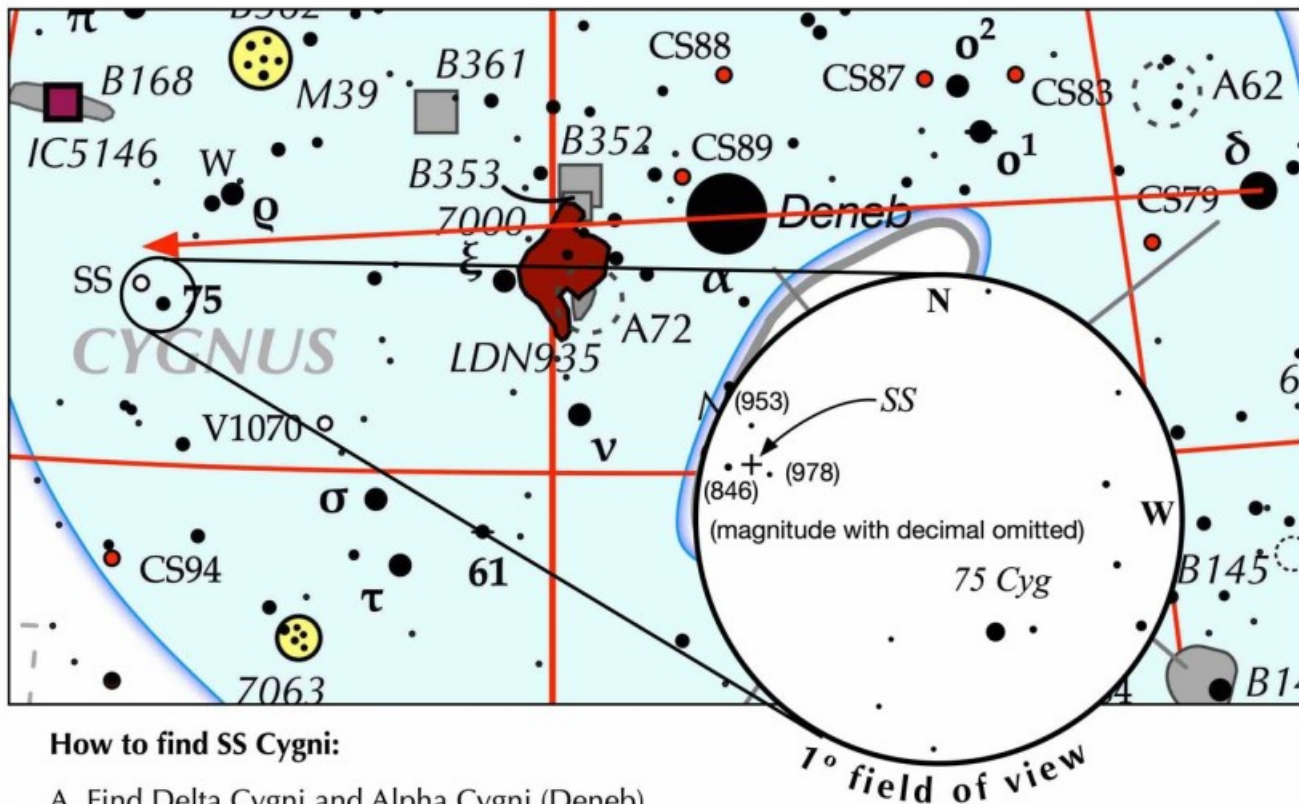
Meet the dwarf nova and cataclysmic variable

SS Cygni

also known as HD 206697 & TYC 3196-723-1



When it is near its peak brightness, it is a binocular variable star



How to find SS Cygni:

- Find Delta Cygni and Alpha Cygni (Deneb).
- Draw a line from Delta through Deneb and continue it for the same length. It ends about 1° north of fifth magnitude 75 Cygni.
- Place 75 Cygni in a wide field eyepiece.
- SS Cygni lies 31 minutes to the northeast of 75 Cyg.
- The star immediately east of SS is of nearly the same magnitude as SS at its max brightness.

Physical mechanism for variability:

- A white dwarf star pulls hydrogen plasma from a closely orbiting red dwarf.
- Once enough material reaches the white dwarf's surface, it ignites in a fusion event. The star brightens significantly.

Light Curve Characteristics:

Maximum mag.: 8.3
Minimum mag.: 12.2
Irregular cycle: 8-10 weeks
Time at max: 1-2 days
Time at min: 6-7 weeks

Physical Characteristics:

Distance: 371 light-years
White Dwarf mass: 0.8 solar mass
Red Dwarf mass: 0.5 solar mass

Reference: Colosimo, F, Lamperti, A; "Dwarf Novae,"
ASTRONOMICAL LEAGUE, Reflector, p20-21, Sep 2023

Find out more about SS Cygni: www.aavso.org

Popular Astronomy Club
Income & Expense Detail
June through August 2023

Date	Name	Memo	Paid Amount
Ordinary Income/Expense			
Income			
Donation			
Member			
8/23/2023	Terry Dufek Trust	Final Distribution from Trust	6,012.09
	Total Member		6,012.09
Program			
6/19/2023		Niabi Zoo 5/20/23	22.00
6/19/2023	Giant Goose Conservat...	Giant Goose 6/3/23	200.00
6/19/2023	City of Moline	Moline Library 5/16/23	250.00
7/17/2023	Friends of Eldridge Libr...	Eldridge Library 6/26/23	100.00
7/17/2023	Michael Wright	Silver Bell Alpaca Farm 7/7/23	100.00
7/17/2023		Pacmo Donations	141.50
8/31/2023	John Deere Middle Sch...	Popular Astronomy Club Observing	200.00
	Total Program		1,013.50
	Total Donation		7,025.59
Interest Income			
6/30/2023		Deposit	3.74
6/30/2023		Deposit	0.04
7/31/2023		Deposit	3.35
7/31/2023		Deposit	0.05
8/31/2023		Deposit	3.55
8/31/2023		Deposit	0.05
	Total Interest Income		10.78
Membership			
Regular			
7/17/2023	Michael Donatsch	2023	10.00
7/17/2023	Michael Donatsch	2024	30.00
	Total Regular		40.00
	Total Membership		40.00
	Total Income		7,076.37
Expense			
Bank Service Charges			
6/16/2023	HarlandClarke	Checks	37.59
	Total Bank Service Charges		37.59
Dues and Subscriptions			
6/10/2023	Astronomical League		180.00
8/4/2023	Roy Gustafson	Illinois Annual Report	10.00
	Total Dues and Subscriptions		190.00
PACMO			
Operation			
6/7/2023	Secretary of State	License Renewal	158.00
8/16/2023	Auto-Owners Insurance	Insurance	842.00
	Total Operation		1,000.00
Repairs and Maintenance			
7/29/2023	Alan Sheidler	Bag Repair	60.00
	Total Repairs and Maintenance		60.00
	Total PACMO		1,060.00
Reimbursement			
8/18/2023	Alan Sheidler	Carl Wenning Room	86.55
	Total Reimbursement		86.55
Supplies			
6/2/2023	Alan Sheidler	T-Shirts	663.96
7/29/2023	Alan Sheidler	Eclipse Viewing Glasses (1,000)	346.00
	Total Supplies		1,009.96
	Total Expense		2,384.10
	Net Ordinary Income		4,692.27
	Net Income		4,692.27



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 1st 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 # _____

THANK YOU!! Welcome to the Popular Astronomy Club!!

Make your check payable to the **Popular Astronomy Club, Inc.** Mail or present at a PAC meeting to:

Michael Haney (treasurer)
564 36th Ave.
East Moline, Illinois 61244
cell # 309-781-4150

UPCOMING EVENTS



Date: October 14, 2023

Event: PAC Annual Banquet
Location: Riverfront Grille, Rock Island
Program: "The Connection between the Periodic Table and Astronomy" by Larry Bartoszek

*No regular monthly meeting in October
RSVPs due by October 2;*

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

UPCOMING EVENTS

- **October 4:** Moline Public Library; 'Project Next Generation' talk and observing session
- **October 14:** Annual PAC Banquet, Riverfront Grille, Rock Island
- **October 14:** QCAS public night, Menke Observatory
- **October 21:** Public observing at Niabi Zoo (*October 28 rain date*)
- **October 30:** Public observing at Runners Park, East Moline (*November 3 rain date*)
- **November 13:** PAC meeting, Butterworth Center; Oregon / Santa Fe trail astronomy
- **November 18:** Public observing at Niabi Zoo (*no rain date; last of season*)
- **November 20:** QCAS annual dinner / election of officers, Dynasty Buffet, Davenport
- **December 11:** PAC meeting, Butterworth Center; Year in Review by Roy Gustafson

PAC ANNUAL BANQUET

October 14, 2023 @ 5:30 p.m.

Riverfront Grille - 4619 34th Street, Rock Island

Please RSVP by October 2

Cost per adult: \$28 Children: \$18 (age 12 and under)

Full Buffet Dinner and Cash Bar

Include payment with RSVP; checks made out to Popular Astronomy Club

Mail to Dale Hachtel, 1617 Elm Shore Drive, Port Byron, IL, 61275; Phone: (614) 935-5748

NOTE: If you haven't sent in your RSVP yet, please contact Dale to let him know it's coming

	Name
1	
2	
3	
4	
5	