



# Reflections

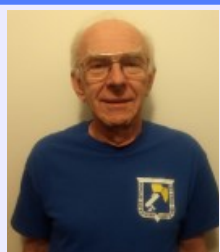
The Newsletter of the Popular Astronomy Club

ESTABLISHED 1936



February 2023

## REFLECTIONS from the President



**Dale Hachtel**

Mars has been an object of many of our observations, including the recent occultation and conjunctions, in the Popular Astronomy

Club.

Last year, we had a presentation titled "Wheeltracks on Mars: Exploring Mars' Habitable Past with the Curiosity Rover." This might be a good time to think about ideas for the future of Mars.

The speaker at our February meeting will be Jim Plaxco, president of the Chicago Society for Space Studies. He's also a National Space Society Space Ambassador, and a NASA Jet Propulsion Lab Solar System Ambassador.

His presentation, titled "How to Design a Martian Civilization of One

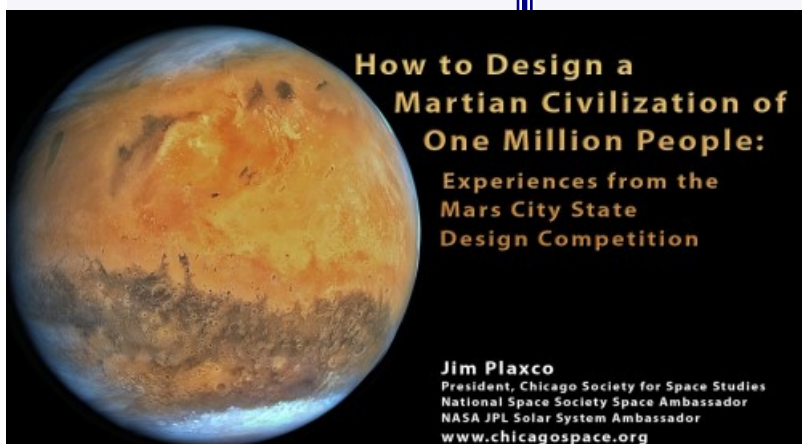
Million People", explores the design issues and challenges of an entry in the Mars Society's 2020 Mars City-State Design Competition. Come to the Butterworth Center on Monday, February 13, at 7 p.m. and see the presentation on the big screen, or view it on Zoom.

January was a rather poor month for observing, with too many cloudy nights. In February, Mars, Venus and Jupiter are still visible in the night sky.

A report on Comet ZTF indicates it will be near Mars on February 10 and 11, and should be visible with binoculars from a dark area. Just after sunset on each of those nights, Venus will appear to be approaching Jupiter, getting ready for a conjunction on March 1.

In March, we will have smorgasbord talks at our monthly meeting, where members have the opportunity to share insights into amateur

astronomy. We'd like to hear from you, so get ready to share what you know by making a presentation. Meanwhile, keep looking up!



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Registration is now open for the 43rd annual Texas Star Party, which takes place May 14-21 at historic Prude Ranch near Fort Davis, Texas.

The current registration period ends on Friday, February 17. Those who register by that date will be entered in a lottery for housing assignments at the ranch.

A late registration period for the star party will run from March 8 through April 28; April 28 is also the last day that registrants can cancel and receive a refund. Late registrants will be charged an additional fee and cannot be guaranteed housing assignments.

Prude Ranch is located in a dark sky location at over 5,000 feet in elevation, near Davis Mountains State Park. Along with excellent opportunities for observing, those attending will hear from guest speakers and enjoy other on-site activities.

As an added attraction, the McDonald Observatory - located 12 miles west of Prude Ranch - will hold evening public observing events during the Texas Star Party.

To register, and for more information, go to this link: [texasstarparty.org](http://texasstarparty.org).

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

**meteoblue**  
weather ☀ close to you



**CLEAR OUTSIDE**

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# SUMMARY OF JANUARY PAC MEETING

The Popular Astronomy Club held a general membership meeting at the Butterworth Center in Moline on January 9 at 7 p.m.

Twelve PAC members were present for the membership meeting, with another 10 joining the meeting via Zoom, including guests and members of other astronomy clubs in the region.

PAC President Dale Hachtel began the meeting by noting that the monthly "Skywatch" article had appeared that day in both the Quad City Times and Dispatch-Argus. He said that he had received positive feedback on the article and encouraged PAC members to submit future articles; editing assistance is available.

Dale thanked Rusty Case for repairing the telescope used by the Scott County Library in Eldridge. Rusty's work on the telescope means that it is once again available for check-out by library patrons.

While Roy Gustafson – who serves as PAC's Astronomical League Correspondent (ALCOR) – was not present at the meeting, he had informed Dale and other PAC board members about revisions to the league's by-laws. After reviewing the revisions, Roy does not believe that they should lead to any changes in PAC's constitution or bylaws. How-

ever, PAC must vote on the revisions.

Treasurer Michael Haney reported that PAC now has a healthy balance of \$36,579 in its accounts, and a net income of \$26,957. This is largely due to the recent donation made to PAC from Terry Dufek's memorial fund.

Dale said that PAC had already received a number of public outreach requests for 2023. The first will be an upcoming event at the Moline Public Library on January 18, beginning at 6 p.m. This is planned as an indoor event, though some outside observing may be done if the weather allows. Two more events will take place at the library later this year.

Three observing and information sessions are scheduled for John Deere Middle School in Moline during 2013. Requests have also been received from Kewanee Central School, the Riverdale school system, Illiniwek Campground, and the libraries in Silvis, Port Byron and Cordova.

Nine Niabi Zoo outreach sessions are scheduled for the second Saturday of each month, beginning in March. Dale said that the zoo may allow PAC to postpone the sessions by one week in the event of inclement weather.

August 12 has been set as the likely date of the annual PAC picnic, and Dale noted this also happens to be the date when the Perseid meteor shower is expected to peak. October 14 has tentatively been set as the date for PAC's annual banquet, pending the availability of a facility

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***Al Sheidler's presentation, titled "Revitalizing Astronomy Clubs," will be presented at the annual banquet of the Twin Cities Amateur Astronomers on February 18.***



# January meeting

**Continued from Page 3**

to host the banquet.

The meeting then continued with a presentation by Al Sheidler titled "Revitalizing Astronomy Clubs." He said that the presentation was still in draft form and invited members to offer suggestions for improvement. Al plans to make an updated presentation at the annual banquet of the Twin Cities Amateur Astronomers (TCAA) on February 18.

Al began by stated that the Popular Astronomy Club was one of the most active and successful clubs in the Astronomical League. The goal of his presentation was to share some of the reasons that PAC was so successful with other clubs, and to get their ideas on how to make PAC even better.

QUAD-CITIES POPULAR ASTRONOMY CLUB

## 'Moonikin' honors pioneer

Arturo Campos played a key role in returning Apollo 13 to Earth.

PAUL LEVINSKY

Popular Astronomy Club

When the three-delayed Artemis 1 moon rocket finally does get off the ground, it will carry a "moonikin" honoring a Hispanic engineer who helped bring the Apollo 13 astronauts home safely.

NASA is launching Artemis 1 to test the rocket's ability to carry astronauts on future moon missions. Riding about the rocket will be three mannequins — clearly dubbed as moonikin — wearing space suits equipped with sensors that will collect data showing how well the suits shield radiation and otherwise protect the astronauts who will someday wear them.

Earlier this year, NASA held a contest to select a name for the moonikin sitting in the middle seat, a spot reserved for the mission commander. When the contest ended, NASA announced that the moonikin would be named for Arturo Campos, an engineer who was working at Mission Control in Houston at the time of the Apollo 13 launch in 1970.

Campos was born in 1934 into a Mexican-American family living in the border city of Laredo, Texas. His father was an auto mechanic, and young Arturo was considering the same careers until out of his high school teachers recognized his potential and urged him to go to college.

While working part-time in his father's engine shop, Campos took classes at Laredo Junior College. He then went on to the University of Texas, graduating in 1956 with a degree in electrical engineering.

Campos was hired by NASA in the early 1960s, a time when the first American astronauts were headed into space. He was assigned to research, develop and design the electrical systems that would be used in manned spacecraft, and he played a key role in creating the electrical system for the lunar module used in Moon landings.

When an oxygen tank on Apollo 13 burst, Campos was among the NASA employees who were called in to help get the spacecraft home and save



The 'moonikin' named for Arturo Campos will fly on the Artemis mission to the moon.

the three-member crew. He led the effort to find a way to provide electrical power to Apollo 13's command module, in order to enable the crew to survive and find their way back to Earth.

Fortunately for the astronauts aboard Apollo 13, Campos had earlier written a plan outlining procedure for such

an eventuality. After arriving at Mission Control, Campos immediately began reviewing that plan to fit the particular circumstances faced by Apollo 13 and worked with his fellow engineers to implement the procedures and communicate them to the astronauts.

You know the rest of the story: As famously depicted in

the 2001 movie 'Apollo 13' the astronauts returned to Earth safe and sound, and received a hero's welcome. But there were many unsung heroes who made their rescue possible, including Campos, who isn't mentioned in the movie.

Instead, 'Apollo 13' sticks with the stereotypical image of a Mission Control engineer: A white guy wearing a white shirt and a dark tie. To be fair, nearly all NASA engineers at the time fit that description, with Campos being one of the few Hispanics employed by the space agency.

Campos continued to work at NASA until retiring in 1980. He took an active role in efforts to recruit more Hispanics for the space program and encourage them to pursue careers in science and technology. Campos died at his home in Texas in 2001.

Today, NASA is a much more diverse place than it was in 1970. About 17% of the current NASA workforce identifies as Hispanic, and more than one-third are women.

Hispanic Heritage Month, which continues through Oct. 15, is an appropriate time to recognize and remember pioneers like Campos. Stories like his remind us of the value of our nation's diversity, and the ongoing need to extend opportunities as widely as possible.

The Apollo 13 astronauts might never have made it home if Campos had not gotten the opportunity to pursue the path that led him to NASA. We can honor his memory by spotlighting and developing the potential in young people of all backgrounds and setting them on paths that could lead to great success.

The Popular Astronomy Club holds a public observing program at noon on the third Saturday of every month from March through November at the Nixie Zoo parking lot. The next one is scheduled for Oct. 15.

Check our website on Facebook page if cloudy weather threatens to cancel the event. Visit [popularastronomyclub.org](http://popularastronomyclub.org) for more information on public observing programs, monthly meetings and other events.

In his presentation, Al said that some of the key factors in PAC's success, and in making astronomy clubs successful in general, include the following:

- Be sure that all visitors and first-time members are acknowledged and greeted; Al praised Anne Bauer for her friendly outreach to those who attend PAC events.
- Take telescopes out to where the public is, which PAC does well with its PACMO and scopes brought to outreach events by club members.
- Because outreach events will often be held in populated areas with ambient light, don't be afraid of "light pollution." Al noted that, during a recent outreach event held in downtown East Moline, guests were able to observe planets and other objects, despite the high level of outdoor lighting in the area.
- Connect with schools, individual teachers, and youth groups, and tailor events to meet their specific needs. One way to do this is by offering scouting groups a chance to earn merit badges by participating in outreach events.
- Always go to outreach events with a list of objects to observe, especially those objects most likely to "wow" the public. Al noted that many people are amazed with the views of the Moon they get when looking through a telescope.
- Maintain regular channels of communication, such as a monthly newsletter and a column in the local newspaper. Al said that newspaper editors enjoy receiving science articles for free. He added that communication efforts must also include

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**PAC's monthly column in the local newspaper is one factor in the club's success.**

# January meeting

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Facebook and other social media.

- Don't rely just on mass e-mails or "appeals from the pulpit" to get participation from members in club events. Such solicitations are a good means of keeping members informed, but getting members involved usually requires one-on-one communication.
- Leverage the Astronomical League by encouraging members to apply for the numerous observing awards available through the league. Other awards, such as the Mabel Sterns award for best newsletter, are offered through the Astronomical League. Al noted that PAC was "an award-winning club," with many members receiving awards in the past and one member earning a college scholarship. Offer other forms of recognition to club members for their contributions
- Collaborate with other clubs in the region, and go on field trips to their facilities and observatories.
- Be aware that club members have different needs and goals when it comes to their participation; some members may simply wish to be "entertained." Make it clear that you don't need a telescope or any science background to be a member, and that club telescopes, with hands-on instruction on how to use them, are available for us.
- Have a well-organized club with officers

who have defined roles and duties. Offer members opportunities for growth and advancement.

- Above all, have fun! Astronomy is a hobby that can be enjoyed by all and should be done in an environment of friendship and camaraderie.

Al said that public participation in club events should be documented, and one of the best ways of doing this is through group photos. He displayed a chart showing that the number of members of the public attending outreach events peaked in 2016 and 2017 – perhaps in anticipation of the total solar eclipse – but fell virtually to zero in 2020 due to the coronavirus pandemic. However, Al believes the pandemic may have made the club stronger, as members got together for frequent observing sessions (held safely outdoors), and that interest in PAC post-pandemic seemed to increase.

Those present offered Al a few suggestions in improving the presentation, to include increasing the size of the typefaces used, but gave it high marks overall.

Dale concluded the meeting by reminding members of upcoming events and the need for volunteers at those events.

A recording of the meeting is available on YouTube via the following link: <https://youtu.be/4UuAg20TiSI>.

The meeting adjourned at 8:35 p.m. The next membership meeting is scheduled for February 13 at the Butterworth Center and via Zoom.



The **Astronomical League** offers more than 70 different observing programs, ranging alphabetically from "Active Galactic Nuclei" to "Youth Astronomer." The programs are designed to provide goals and directions for observations and cover a full range of observable objects and skill and experience levels. You can earn certificates and pins for completing the programs. Click on this link - [Observing Programs](#) - to view the list.

# The origins of Groundhog Day

## *Silly 'holiday' traces its roots to ancient astronomy*

Groundhog Day will roll around again on February 2, and we will once again be subjected to “news” about the ability of ground-burrowing, garden-destroying rodents to predict the duration of winters.

We now mainly observe Groundhog Day as just another silly “holiday” on the calendar – coming just before Bubble Gum Day on February 3 – but its roots can be traced to ancient astronomers who carefully tracked the movement of celestial objects through the year.

Like some other unofficial holidays, Groundhog Day falls on a cross-quarter day, which is a day about halfway between the start and the end of a particular season of the year. On February 2, we’re about six weeks past the winter solstice, marking the start of winter, and six weeks away from the spring equinox, marking the end of winter and beginning of spring.

At this time of year, we often hear people commenting that the “days are getting longer,” meaning that they’ve noticed that it’s no longer pitch dark at 5 p.m. We say this in casual conversation because we live in a modern time of central heating and well-stocked grocery stores, but tracking the length of days was a much more serious

matter for our prehistoric forebears, whose stock of fuel and food was surely dwindling as they came to the month we now call February.

So the fact that the sun was once again visibly progressing ever higher in the sky, and the natural world was on its way to spring, was surely a cause for celebration for a hunter-gatherer.

Archeologists have unearthed plenty of evidence that ancient peoples around the world carefully tracked the movement of the Sun, planets and stars throughout the year, and knew when the seasons began, ended, and reached their halfway points. Stonehenge in England is just one example of a site that seems to have been used many centuries ago as an observatory, arranged in a manner that marks the passage of the Sun and other objects in the sky, serving as a sort of calendar.

The pre-Christian Celts who occupied the

British Isles a millennium after Stonehenge was built celebrated all four cross-quarter days, and named them Imbolc (February 1), Beltane (May 1), Lughnasadh (August 1), and Samhain (November 1). You’ll note that the latter ap-

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***Groundhog Day (February) 2 is a cross-quarter day, marking the midpoint of the winter season. Other cross-quarter days include May Day (May 1); Lammas (August 1), still observed in some parts of England and Scotland by blessing bread made from the first grain harvest of the year; and, of course, Halloween (October 31).***



## PAC Facebook page draws a large following

The Popular Astronomy Club Facebook page has been a great tool to publicize our club.

Adam Beals created the PAC Facebook page over five years ago. At that time, three of us were managing it: Adam, Terry Dufek, and me.

From that start, our following grew. Today, we have over 1,300 followers, and we continue to add more.

To keep the page fresh, I try to find posts every day from the astronomical world that I hope our followers find interesting and educational.

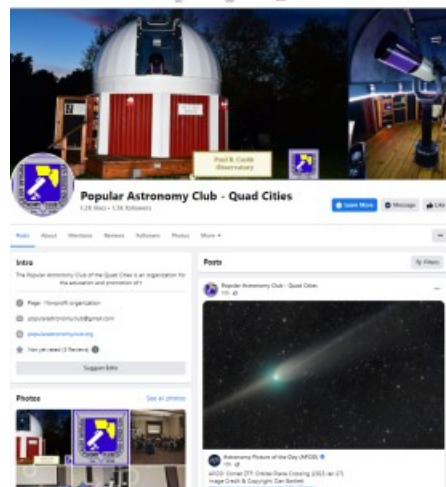
All the public libraries in the Quad Cities area are also on Facebook, and I will share their posts about our outreach events on the PAC page. I'll do the same for any other organization or club that hosts a PAC outreach event and uses their page to publicize it.

I also promote all our monthly Niabi Zoo observing sessions, and put out weather updates if we are forced to cancel or postpone. I also remind our followers about our monthly meetings; if we have a speaker planned, I include that information.

What I have found generates the most interest and "likes" are the pictures by our members and pictures from our events. The January 18 Moline Public Library program was a very popular post, seen by more than 375 people, with 10 "likes", one share, and two favorable comments from participants. So please keep the pictures coming!

Please check out the PAC Facebook page – at <https://www.facebook.com/QCPAC> – if you haven't already done so. I think we are all looking forward to warmer weather and fewer clouds so we can get back into this great hobby!

Submissions to the PAC Facebook page should be emailed to either of these addresses: [ssheidler@gmail.com](mailto:ssheidler@gmail.com) or [adsheidler@gmail.com](mailto:adsheidler@gmail.com).



Sara Sheidler

## Groundhog Day

*Continued from Page 6*

proximately marks what is now the most famous cross-quarter day of all, Halloween – a day of joyous candy collection by children which still retains themes of darkness and terror that hark back to a time when the inevitable march to winter was something truly to be feared.

May Day is another cross-quarter day, still widely celebrated in Europe with dances around a maypole decorated with spring flowers gathered from green pastures. The cross-quarter day falling in the middle of

summer has no well-known holiday associated with it, but is still known in some parts of England and Scotland as Lammass, a day when bread baked from the first grains harvested that year are brought to church for a blessing.

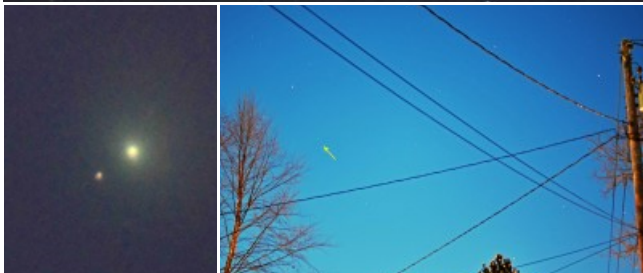
Given this history, the cross-quarter day we now call Groundhog Day should remind us of what we share in common with these humble rodents. Like all animals, groundhogs track the progress of the seasons. It's a matter of survival for them, just as it once was for us.

Paul Levesque

# MEMBER OBSERVATIONS & CLUB ACTIVITIES



*The Moline Public Library hosted a PAC outreach event on January 18 as part of its "Project Next Generation" initiative. During the presentation, Dale Hachtel and Dino Milani demonstrated how telescopes work, and Dino showed some meteorite fragments. The next "PNG Astronomy Night" at the library is scheduled for March 23.*



*The 'green comet' known as ZTF is now visible, and Al Sheidler obtained these images from his front yard in Moline. The photo at bottom right points to where the comet can be spotted despite the ambient light. ZTF is expected to peak in brightness in early February, so get out and take a look!*



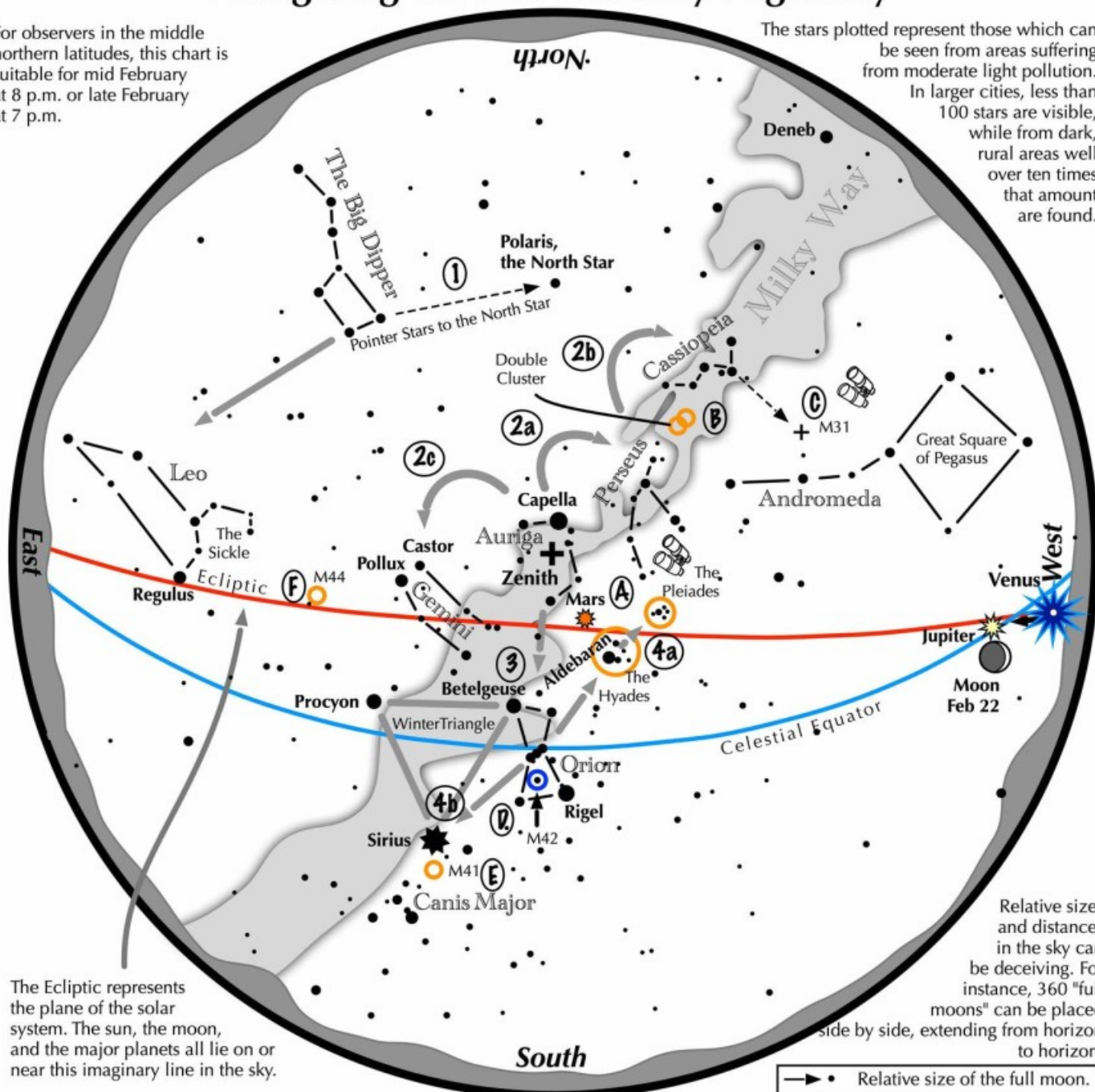
*This image of the Flaming Star Nebula was sent in by Byron Davies, who took it in his light-polluted backyard under a half-moon. Byron used a Radian Triad Ultra filter, which he describes as a 'game changer' when it comes to dealing with light pollution.*



# Navigating the mid February Night Sky

For observers in the middle northern latitudes, this chart is suitable for mid February at 8 p.m. or late February at 7 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.



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.

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

- 1 Above the northeast horizon rises the Big Dipper. Draw a line from its two end bowl stars upwards to the North Star.
- 2 Face south. Overhead twinkles the bright star Capella in Auriga. Jump northwestward along the Milky Way first to Perseus, then to the "W" of Cassiopeia. Next jump southeastward from Capella to the twin stars of Castor and Pollux in Gemini.
- 3 Directly south of Capella stands the constellation of Orion with its three Belt stars, its bright red star Betelgeuse, and its bright blue-white star Rigel.
- 4 Use Orion's three Belt stars to point northwest to the red star Aldebaran and the Hyades star cluster, then to the Pleiades star cluster. Travel southeast from the Belt stars to the brightest star in the night sky, Sirius, a member of the Winter Triangle.

### Binocular Highlights

- A: Examine the stars of two naked eye star clusters, the Pleiades and the Hyades.  
 B: Between the "W" of Cassiopeia and Perseus lies the Double Cluster.  
 C: The three westernmost stars of Cassiopeia's "W" point south to M31, the Andromeda Galaxy, a "fuzzy" oval.  
 D: M42 in Orion is a star forming nebula. E: Look south of Sirius for the star cluster M41. F: M44, a star cluster barely visible to the naked eye, lies southeast of Pollux.





**February  
2023**

## **Back to the Moon**

I shouldn't have been surprised by the complete success of the Artemis mission last fall. NASA's "A Team" of engineers really knows what they are doing.

The mission was fun to watch, particularly the brilliant light when the main engines lit up, and provided some hope that we may actually return to the Moon, someday soon.

But somehow, it isn't the same. Something is missing.

For those of us who were alive and young in 1961, do you remember President Kennedy's poignant speech to Congress on May 25, 1961, when he asked the nation to commit itself to landing a person on the Moon? Coming only three days after my 13th birthday, this was a call I heard distinctly.

I did miss the fact that this was the second of three speeches. The first call was during his inaugural address: "Let both sides seek to invoke the wonders of science, instead of its terrors. Together let us explore the stars..." And at Rice University in September 1962, he gave his third: "We choose to go to the Moon."

On August 25, 1960, I observed a 99.2% partial eclipse of the Moon, during which the shadow of the Earth covered almost all of the Moon. I remember, a few years later, setting up my first telescope, Echo, across the street to time the Moon passing in front of star, and explaining to a priest who was passing by that what I was doing might actually assist the planning for the Moon mission. Or not.

I have already written about where I was on July 20, 1969, during that emotional moonwalk. I listened attentively as the astro-

nauts on Apollo 13 somehow managed to return safely home after that mission's near-disaster. And I watched the interminable countdown hold when, on December 6, 1972, the countdown was stopped just thirty seconds before launch.

About two hours later, the launch was completely successful. During the mission, the space program's only geologist, Jack Schmitt, conducted a field excursion 240,000 miles from Earth, in the Taurus-Littrow valley of the Moon's southern highlands.

"I was enormously pleased and proud of Jack," recalled his teacher, Gene Shoemaker, "but I was also wistful. There, but for a failed adrenal gland, went I."

Because of Addison's disease (which, ironically, President Kennedy also suffered from), Shoemaker never made it to the Moon, at least not in life. After he died in 1997, some of his ashes landed on the Moon aboard the Lunar Prospector probe.

In the 1960s, I used the Apollo project to intensify my own passion for observing the Moon through telescopes and binoculars. In 1961, Kennedy set the goal. Eight years later,

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***In a September 1962 speech delivered at Rice University, President John F. Kennedy stated, "We choose to go to the Moon." Six decades later, the successful Artemis mission has paved the way for astronauts to return to the Moon.***



# Spot the King of Planets: Observe Jupiter

Jupiter is our solar system's undisputed king of the planets!

Jupiter is bright and easy to spot from our vantage point on Earth, helped by its massive size and banded, reflective cloud tops. Jupiter even possesses moons the size of planets: Ganymede, its largest, is bigger than Mercury. What's more, you can easily observe Jupiter and its moons with a modest instrument, just like Galileo did over 400 years ago.

Jupiter's position as our solar system's largest planet is truly earned; you could fit 11 Earths along Jupiter's diameter, and in case you were looking to fill up Jupiter with some Earth-size marbles, you would need over 1,300.

Despite its awesome size, Jupiter's true rule over the outer solar system comes from its enormous mass. If you took all the planets in our solar system and put them together, they would still only be half as massive as Jupiter all by itself.

Jupiter's mighty mass has shaped the orbits of countless comets and asteroids. Its gravity can fling these tiny objects towards our inner solar system, and also draw them into Jupiter itself, as famously observed in 1994 when Comet Shoemaker-Levy 9, drawn towards Jupiter in previous orbits, smashed into the gas giant's atmosphere.



*This image of Jupiter's cloud tops was taken by NASA's Juno probe. To create images like this, visit [missionjuno.swri.edu/junocam](https://missionjuno.swri.edu/junocam).*

The comet's multiple fragments slammed into Jupiter's cloud tops with such violence that the fireballs and dark impact spots were not only seen by NASA's orbiting Galileo probe, but also observers back on Earth!

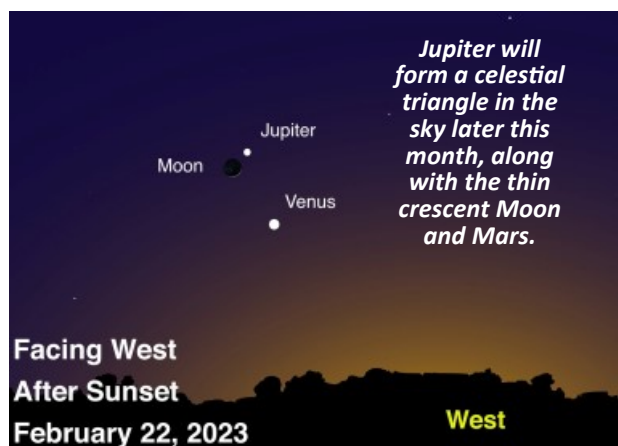
Jupiter is easy to observe at night with our unaided eyes, as well-documented by the ancient astronomers who carefully recorded its slow movements from night to night. It can be one of the brightest objects in our nighttime skies, bested only by the Moon, Venus, and occasionally Mars, when the red planet is at opposition.

That's impressive for a planet which, at its closest to Earth, is still over 365 million miles away. Jupiter remains very bright to earth-bound observers at its furthest distance: 600 million miles.

While the King of Planets has a coterie of around 75 known moons, only the four largest that Galileo originally observed in 1610 – Io, Europa, Ganymede, and Callisto – can be easily observed by Earth-based observers with very modest equipment. These four are called, appropriately enough, the Galilean moons.

Most telescopes will show the moons as faint, star-like objects neatly lined up close to bright Jupiter. Most binoculars will show at least one or two moons orbiting the planet. Small telescopes will show all four of the Galilean moons if they are all visible, but some-

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# Back to the Moon

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*Continued from Page 10*

human beings walked across the lunar surface in one of the high points of human civilization.

That passion I carry to this day. I still enjoy watching the Moon, looking at its well-known craters and mountain ranges.

The Moon is not just a thing in the sky. It is a place. Twelve people have walked across its surface, and with luck, more will someday do so again.

I will never walk on the Moon. But, through my telescope, I shall continue to view the Moon from southern Arizona. And, when my eye touches the eyepiece of my telescope, I will be as close to the Moon as I ever hope to get.



***The Apollo 17 lunar module blasted off from the lunar surface on December 14, 1972. No human has walked on the Moon since that date, though a return may soon happen.***

# Jupiter

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times they can pass behind or in front of Jupiter, or even each other.

Telescopes will also show details like Jupiter's cloud bands and large storms, like Jupiter's famous Great Red Spot. You may also see the shadows of the Galilean moons as they pass between the Sun and Jupiter.

NASA's Juno mission currently orbits Jupiter, one of just nine spacecraft to have visited

this awesome world. Juno entered Jupiter's orbit in 2016 to begin its initial mission to study this giant world's mysterious interior.

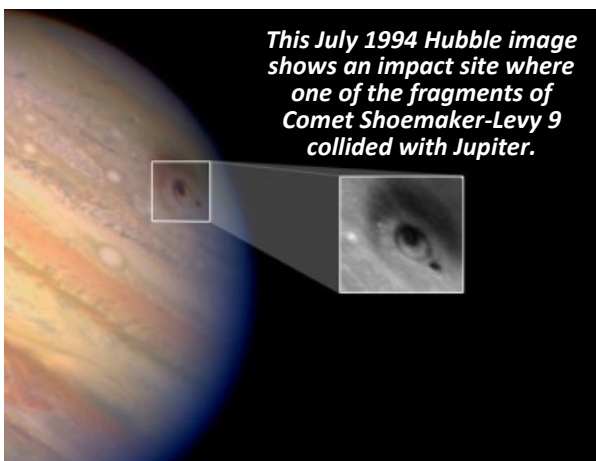
The years since have proven Juno's mission a success, with data from the probe revolutionizing our understanding of this gassy world's guts. Juno's mission has been extended to include the study of its large moons.

Since 2021, the plucky probe, battered by Jupiter's powerful radiation belts, has made flybys of the icy moons Ganymede and Europa, along with volcanic Io. In 2024, NASA will launch the Europa Clipper mission to study this Galilean moon and assess its potential to host life inside its deep subsurface oceans.

Find the latest discoveries from Juno and NASA's missions at [nasa.gov](https://nasa.gov)

**David Prosper**

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



# UPCOMING EVENTS



**Date: February 13, 2023**

**Event: Membership meeting @ 7 p.m.**  
**Location: Butterworth Center / Zoom**  
**Program: SEE BELOW**

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

## UPCOMING EVENTS

- **February 23:** Observing session at John Deere Middle School, Moline
- **March 13:** Monthly membership meeting, Butterworth Center / Zoom; smorgasbord of presentations by club members
- **March 18:** Public observing at Niabi Zoo; first of year
- **March 21:** Observing session at John Deere Middle School, Moline
- **March 23:** Moline Public Library; 'Project Next Generation' talk and observing session
- **March 25:** Observing session, homeschool group in Fulton / Morrison

*Volunteers are needed for these events; to make presentations at PAC 'smorgasbord' meetings; and to write articles and provide input for the monthly 'Skywatch' column and 'Reflections.' Please contact any club officer if you can help. Your active participation really makes a difference, both for PAC and for our community!*

## February meeting will feature presentation on Mars

A presentation titled "How to Design a Martian Civilization of One Million People" will highlight the next monthly membership meeting of the Popular Astronomy Club.

The meeting will be held on Monday, February 13, at the Butterworth Center in Moline and will also streamed live via Zoom.

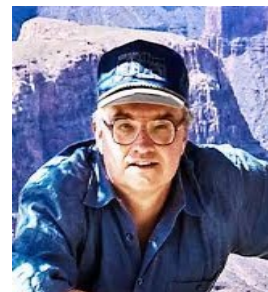
Leading the presentation will be Jim Plaxco, president of the Chicago Society for Space Studies. The presentation will explore the design issues and challenges of an entry in the Mars Society's 2020 Mars City-State Design Competition.

Jim Plaxco is a digital artist and computing professional who has been a space activist since the 1980s, when he became a member of the National Space Institute. He currently serves as the director of Information Systems for the National Space Society.

In the past, Jim served as director and vice president of both the National Space Society and the Planetary Studies Foundation. He has been a judge in a variety of space art contests, including some sponsored by NASA.

Jim established the speakers bureau for the Chicago Society for Space Studies and is one of its most active members. He presents on a wide variety of topics related to space exploration and astronomy to a wide range of audiences.

More information on Jim and the Chicago Society for Space Studies is available at their website: [www.chicagospace.org](http://www.chicagospace.org).



**JIM PLAXCO**