



# Reflections

The Newsletter of the Popular Astronomy Club

ESTABLISHED 1936



March 2023

## REFLECTIONS from the President



Dale Hachtel

The winter observing season has been difficult with cloudy weather whenever we wanted to do some observing.

Members were able to make a few observations between the clouds, but our attempts so far at public observing have resulted only in two indoor programs showing video of previous observations.

As I am writing this, I see that March may be off to a better start, with mostly sunny skies predicted for the conjunction of Venus and Jupiter on March 1.

Later in the month, on March 18, we open our season of public observing at Niabi Zoo, followed by observing programs at the Moline Public Library and John Deere Middle School.

This month will also be a good time to come out to the observatory when we have a good observing night. After the equinox, take a look at the spring Messier marathon objects. Watch your email for announcements of observing nights when we see good weather a day or two ahead of time.

We have also been invited to meet with the Quad City Engineering & Science Council (QCESC) to learn more from each other about what we do, and possibly to work with them in promoting STEM activities.

Positive feedback has been received from visitors who have enjoyed some of our talks about specific astronomy topics at some of the public sessions, particularly when observing was clouded out. We may want to include a specific short topic at many of our public sessions, such as those at Niabi Zoo, as a supplement to our observing sessions.

PAC members, you have a big opportunity to share your favorite topic, or communicate interesting facts about what you learned about astronomy with other club members and guests and nearby astronomy clubs, by providing a short talk as part of our smorgasbord of presentations at the next meeting on March 13 at Butterworth Center in Moline. Contact Dino Milani by email ([dinomilani@qconguard.com](mailto:dinomilani@qconguard.com)) to let him know what you may have for the meeting.

We hope to see you there, and until then, keep looking up.

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## Scope bundle is for sale

PAC member Rolando Gamino has a nice bundle of astronomy gear, including a telescope and related items, for sale. He's asking \$700 for the bundle, which includes the following items:

- Astro Tech 80mm f/6 triplet telescope
- SolarLite filter
- Finder scope
- Diagonal
- JMI motor focuser
- Hard case

The photo accompanying this item shows some what you'll get for that price. If you are interested or have questions, send an email to [rolandogamino@sbcglobal.net](mailto:rolandogamino@sbcglobal.net).



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?



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If you have questions or request,  
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[popularastronomy-club@gmail.com](mailto:popularastronomy-club@gmail.com)

# SUMMARY OF FEBRUARY PAC MEETING

The Popular Astronomy Club held a general membership meeting at the Butterworth Center in Moline on February 13 at 7 p.m.

Fourteen PAC members were present for the membership meeting, with another 20 joining the meeting via Zoom, including guests and members of other astronomy clubs in the region.

PAC President Dale Hachtel began the meeting by welcoming new member Sharon Kendall-Dunn to the club. He noted that the "Skywatch" column on the origins of Groundhog Day had recently appeared in the Times-Argus, albeit a few days after February 2.

The meeting then proceeded with a feature presentation titled "How to Design a Martian Civilization of One Million People." Jim Plaxco, president of the Chicago Society for Space Studies, made the presentation.

The presentation centered on an entry made in the 2020 Mars City-State Design Competition. Jim was a member of team that used online tools to come up with a way to establish and sustain a colony of up to 1 million people on Mars.

To complete the entry, the team was divided into the Technical Team; the Economic Team; the Social-Political Team; the Aesthetic Team; and a final Report Writing Team. Jim stated that the overall team was "not unified in its perspective" on all aspects, especially concerning political and economic issues.

In thinking about the overall system design, Jim said that the team first had to consider the restraints within which the project needed to operate; the major system elements that formed the building blocks of the system; the primary details that define connections and interdependencies among all systems; and the low-level details that may be too granular to make it into the final submission but still should be considered.

The contest set out key design features that needed to be addressed, such as creating a self-supporting "city-state" that could produce enough food, clothing, shelter, and basic consumer products to sustain a population of 1 million. Contest entries needed to address technical design issues; making the colony economically successful; how society and government should be structured; and, ultimately, how to make Mars an attractive and enjoyable place to live.

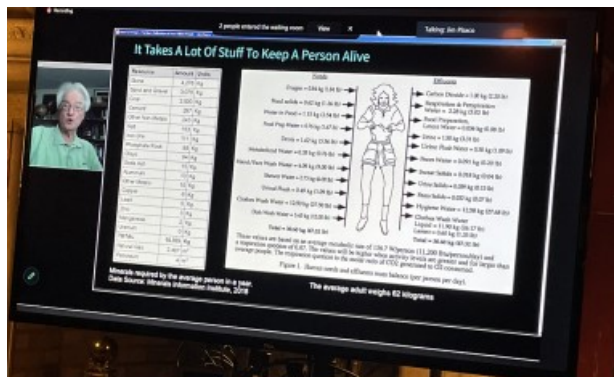
A chart was shown projecting that a population of 1 million could be reached by 2127, based on migration from Earth and birth and death rates on Mars. The model assumed no emigration from Mars.

The main initial challenges faced in colonizing Mars is getting people, and the resources needed to sustain them, to the planet. Jim noted that the cost of shipping items to Mars is currently estimated at \$500 per kilogram, meaning that a \$4 gallon of milk would cost about \$2,000 on Mars when shipping costs are considered.

While it is cheaper to ship back to Earth from Mars, the cost is still too high to make exports economically viable.

When sending humans to Mars, the

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# February meeting

*Continued from Page 3*

weight of the person and all the resources needed to sustain that person on the journey would all need to be considered, Jim said. The journey takes a minimum of six months during the best launch window and often longer.

While there is water on Mars, it is mostly frozen and underground, making it difficult to access. The water is mainly found near polar regions, but the best site for a colony would probably be closed to the Martian equator, which makes it necessary to build a rail system to transport the water.

Agriculture would largely need to be done in enclosed spaces, given the cold temperatures on Mars, and the weaker sunlight received. Because of the more distant Sun, Jim stated that solar power would be insufficient to meet energy needs, so nuclear energy would probably need to be employed as well.

In response to a question, Jim said that it would be impractical to ship and raise livestock on Mars, so residents would have to subsist on a vegetarian diet.

The issue of whether or not to allow private property on Mars was a sticking point for the design team, with Jim stating that he believed that banning property ownership would hinder economic development.

A Martian colony would likely employ plenty of robotic labor, Jim said, although all residents would be expected to do work of some kind. Tourism from Earth to Mars was not considered, Jim said, due to the high expense and long travel times. Colonizers would be expected to remain on Mars for the rest of their natural lives.

In looking at the overall picture of settling on other planets and extracting resources from planets and asteroids, Jim stated, "Space law is now a thing." Issues related to how space can be used for economic gain are



***During the meeting, Roy Gustafson presented Eva Davison with the Astronomical League's Basic Outreach Award. Rolando Gamino, who was not present, also received the award.***

still being worked out, with international treaties playing a major role in resolving these issues.

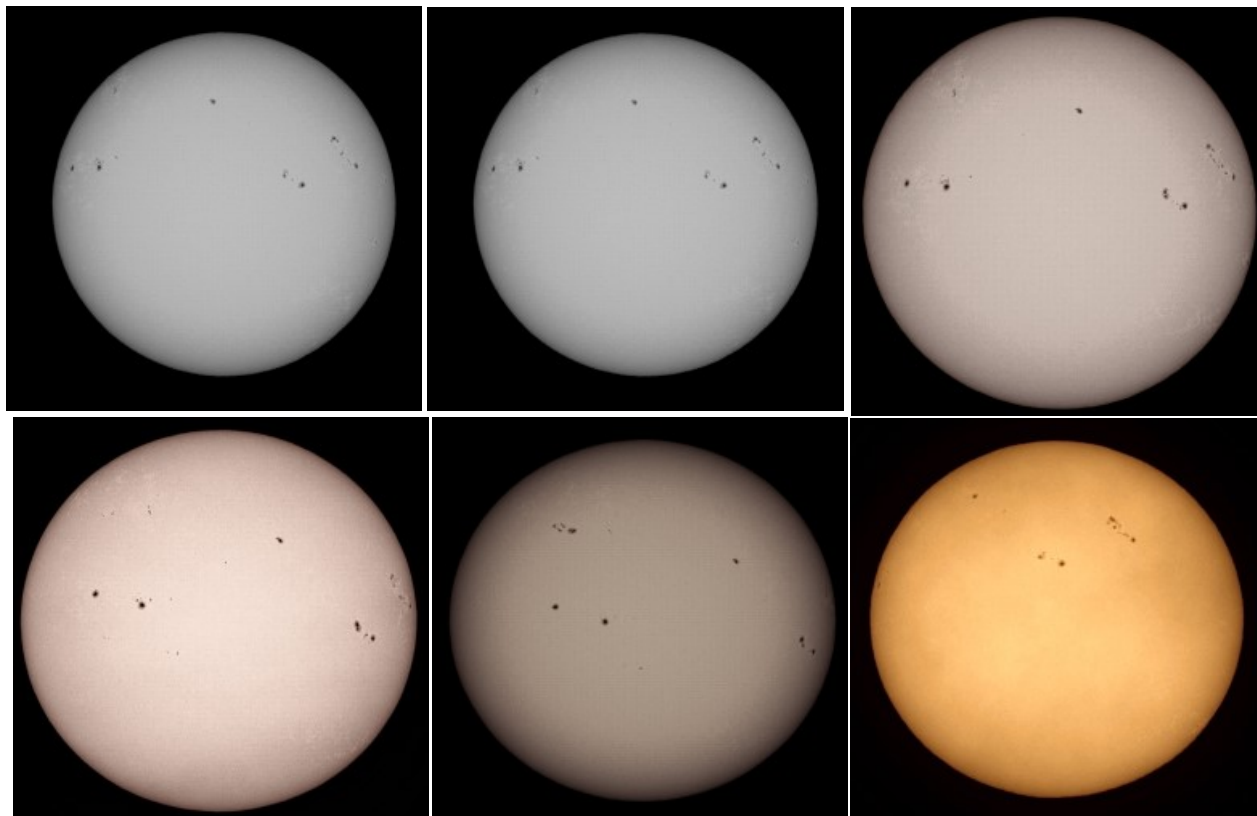
Following the presentation, a number of member observations were displayed. Dale reviewed a list of upcoming events and noted that more requests were coming in.

Roy Gustafson, Astronomical League Correspondent, then presented the league's Basic Outreach award to PAC members Eva Davison and Rolando Gamino. The award recognizes members who help promote and advance amateur astronomy in the community through involvement in public events.

The next membership meeting will feature a smorgasbord of member presentations. Dino Milani said that two presentations were scheduled and that there is room for more.

A recording of the meeting is available on YouTube via the following link: <https://youtu.be/ncQSC05xL-0>.

# MEMBER OBSERVATIONS & CLUB ACTIVITIES



*Here's a half-dozen photos of the Sun taken by Roy Gustafson on a few different days during February using Stellina. Note the varying sunspot activity captured in the photos.*

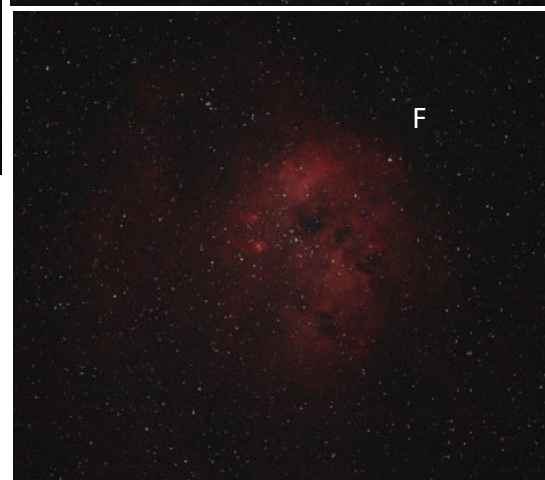
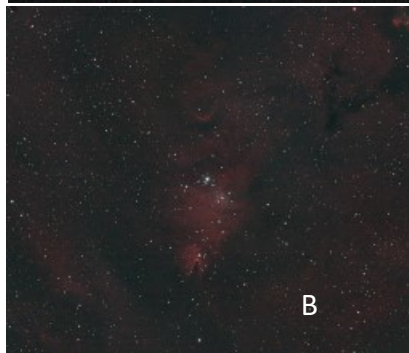
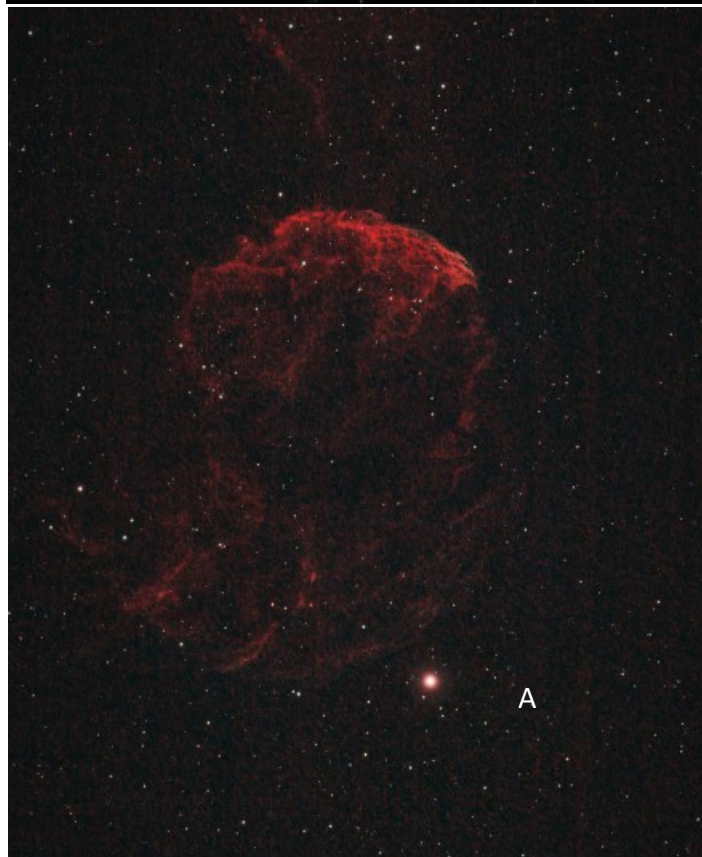


*Chad Potter and Al Sheidler braved single-digit temperatures on the evening of January 30 to try out some new equipment recently acquired by John Deere Middle School and to capture some images of Comet ZTF, which are shown at right. We admire your determination!*





# MEMBER OBSERVATIONS & CLUB ACTIVITIES



*Here are more outstanding astrophotos taken during February by Byron Davies; note that some of these were taken during a full moon in light-polluted areas, a tribute to the Triad Ultra Filter he used. Shown are (A) Jellyfish Nebula; (B) Cone Nebula; (C) Eskimo Nebula; (D) Orion Nebula; (E) Monkey Head Nebula; (F) Tadpole Nebula*

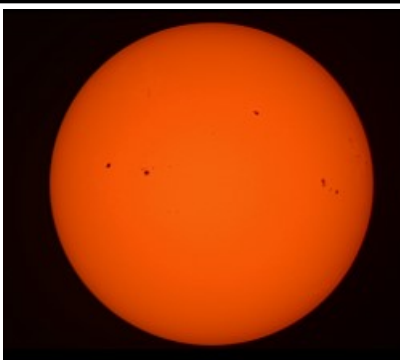
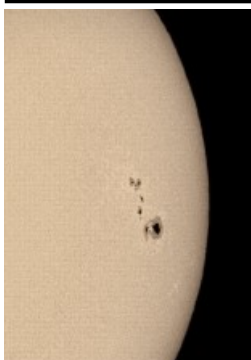
# MEMBER OBSERVATIONS & CLUB ACTIVITIES



*Roy Gustafson captured these images using Stellina on February 11. Shown above is the Flame Nebula, by the star Alnitak; below is Comet ZTF.*



*Paul Saeger (above) and John Baker set up their gear during the Winter Star Party on Scout Key in Florida. Bill Myers, a past PAC member now living in Fort Myers, also attend-*



*Here are some more photos of the Sun; the color photo was taken by Al Sheidler on February 11 using PAC's 10-inch LX200 telescope. Roy Gustafson went out on March 1 with Stellina and got a nice closeup of some sunspots.*



*Al Sheidler and Dale Hachtel went to John Deere Middle School in Moline on February 24 to assist Chad Potter with an observing session using school telescopes. But the weather was uncooperative, so Al treated the 18 students and visitors who attended to a slide show.*

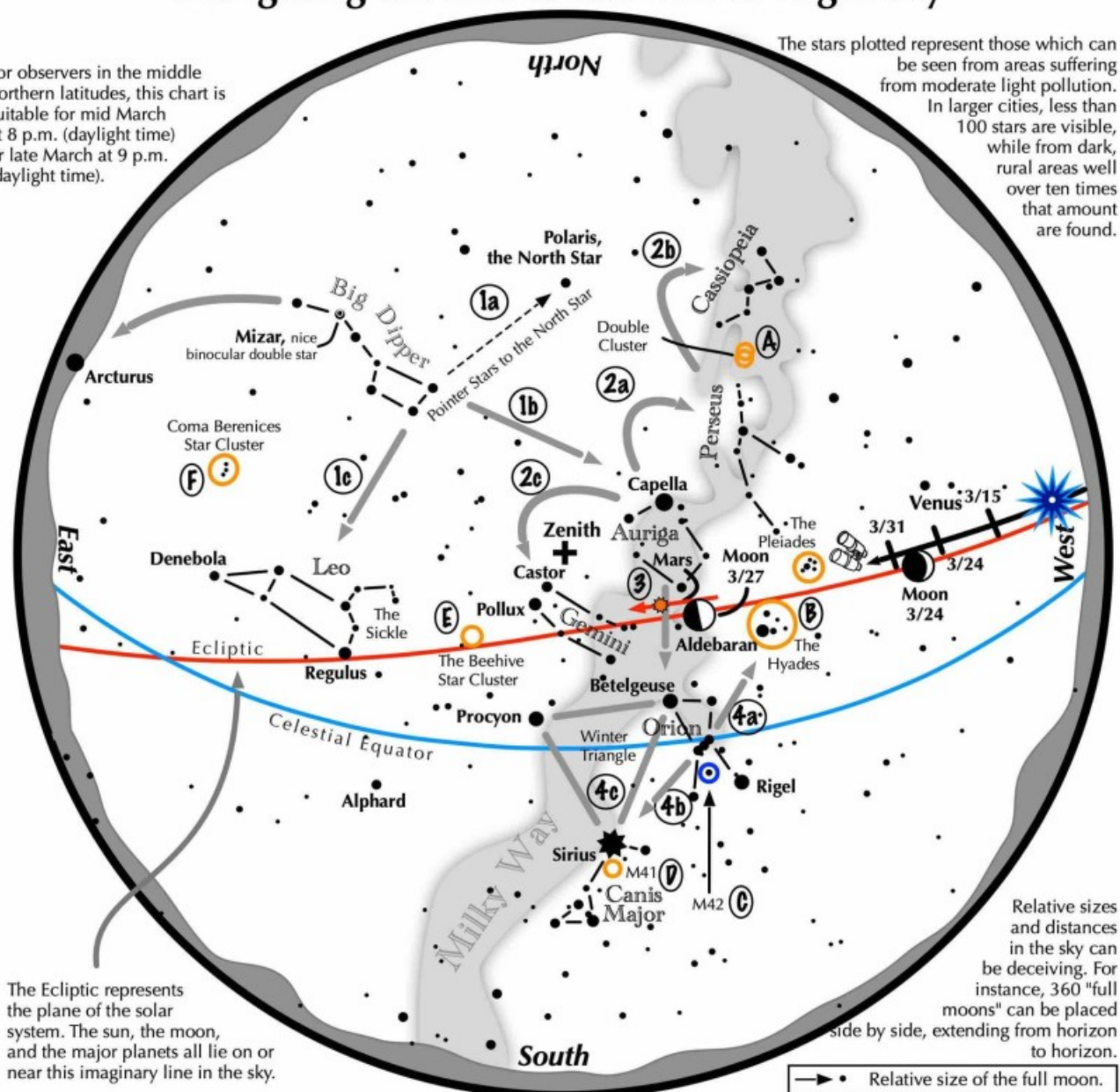




# Navigating the mid to late March Night Sky

For observers in the middle northern latitudes, this chart is suitable for mid March at 8 p.m. (daylight time) or late March at 9 p.m. (daylight time).

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



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

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

—•• Relative size of the full moon.

## Navigating the March 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. Its top bowl stars point west to Capella in Auriga, nearly overhead. Leo reclines below the Dipper's bowl.
- 2 From Capella jump northwestward along the Milky Way 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. It is a member of the Winter Triangle.

### Binocular Highlights

**A:** Between the "W" of Cassiopeia and Perseus lies the Double Cluster. **B:** Examine the stars of the Pleiades and Hyades, two naked eye star clusters. **C:** M42 in Orion is a star forming nebula. **D:** Look south of Sirius for the star cluster M41. **E:** M44, a star cluster barely visible to the naked eye, lies to the southeast of Pollux. **F:** Look high in the east for the loose star cluster of Coma Berenices.



Astronomical League [www.astroleague.org/outreach](http://www.astroleague.org/outreach); duplication is allowed and encouraged for all free distribution.





**March  
2023**

## **Of comets and Fritz Zwicky**

Since October 1965, when I spotted my first comet, Ikeya-Seki, I have seen 227 different comets. Near the dawn of my passion for the night sky, watching that mighty comet rise, apparently right out the St. Lawrence River, was a sight I shall never forget.

The two most recent comets I have seen share the same name; they are both called Comet ZTF for “Zwicky Transit Facility.” This is the name of a project using a new camera that offers a very wide field of view. The camera is attached to the large 48-inch Oschin Schmidt telescope at Palomar Observatory in southern California.

This project has a rich history. It is named for astronomer Fritz Zwicky, one of the founding astronomers at Palomar and one of the foremost scientists of the last century.

Zwicky developed the original 18-inch Schmidt camera, the very first telescope atop that mountain. Since this project is named after Zwicky, why are its comets called “ZTF” instead of just Zwicky? It is because the comets are named for the project, not the man.

The historical Zwicky actually had little interest in comets. His career leaned towards the big questions of cosmology, the study of the large-scale issues of the universe. But he was the first regular user of Palomar’s 18-inch Schmidt camera, the telescope Gene and Carolyn Shoemaker and I used to discover our comets, including the one that collided with Jupiter in 1994.

That in itself was a tribute to Zwicky, for it offered insights into how comet impacts contributed to the origin of life on different

worlds. Though Zwicky was not into comets, he was deeply concerned with the distant explosions of massive stars that he and colleague Walter Baade called supernovae.

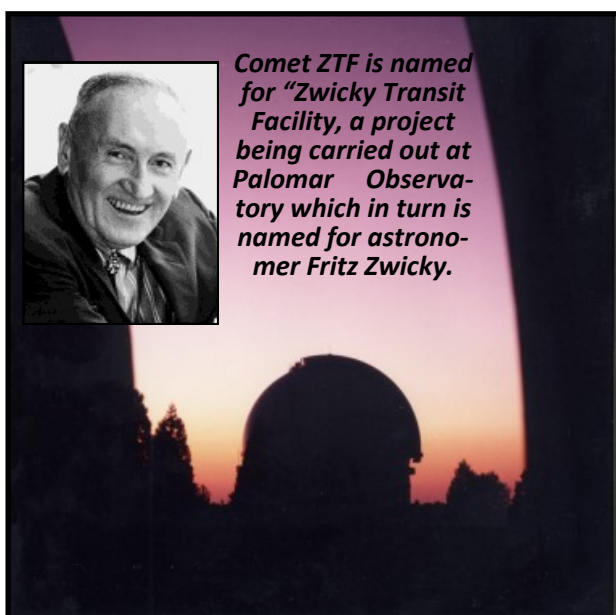
When Zwicky began using the 18-inch scope, there were 12 known supernovae. He ultimately discovered 121 supernovae, 120 by himself and one with Paul Wild.

Even though I never met Zwicky, who died in 1974, I can share three aspects of him, not including the most famous one in which he called anyone he did not like a “spherical bastard.” The expression was intended to mean that, no matter from which angle you looked, that person is (or was) a bastard.

One story I heard from Walter Hass, founder of the Association of Lunar and Planetary Observers, who said that, when Zwicky was having a quiet chat in a corridor at Caltech with another astronomer, one could hear him two blocks away.

The second involved Zwicky’s observing coat, which he left in a closet at the 18-inch observatory building. One night, as I was about to observe alone there, as Gene Shoemaker left the building he said, “If you get too cold, you can wear Zwicky’s coat!” The

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# Venus: The Morning and Evening Star

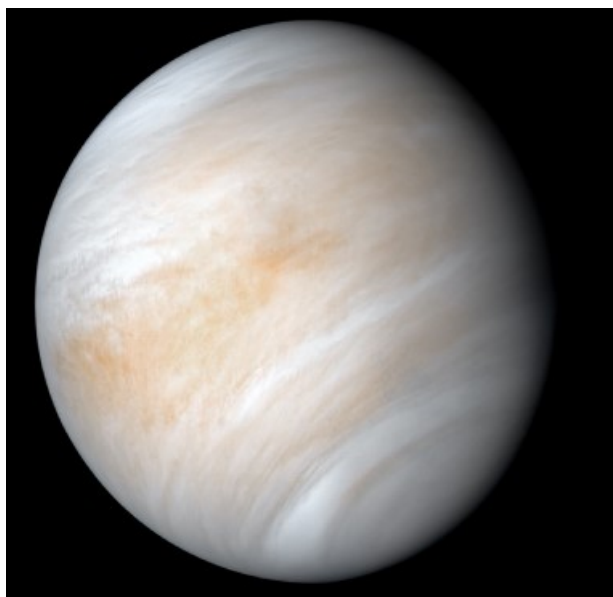
Venus is usually the brightest planet in our skies, and is called “Earth’s Twin” due to its similar size and rocky composition. However, Venus is a nightmare version of our planet, featuring a thick, crushing atmosphere of acidic clouds, greenhouse gases, howling winds, and intense heat at its surface.

This rocky inner world’s orbit brings it closer to Earth than any of the other planets, and makes it the second closest to the Sun after Mercury. Like Mercury, Venus orbits between our planet and the Sun, so Earth-based observers can observe Venus in the morning before sunrise, or in the evening after sunset – but never high in the sky in the middle of the night, unlike the outer planets.

Since Venus is so striking in its twilight appearances, the planet features heavily in sky mythologies worldwide. Venus’ bright morning and evening appearances are the origin for its dual nicknames: The Morning Star, and the Evening Star.

Some ancient astronomers never made the connection, and assumed the Evening Star and Morning Star were two unrelated objects. Observers can even spot Venus during the daytime, if the sky is very clear and the planet is bright enough.

Venus also has phases, similar to the Moon and Mercury. Galileo’s observations of



***Venus’ cloud tops pop in this enhanced image, reprocessed using data that was collected in 1974 during the Mariner 10 mission.***

Venus’ phases helped turn the astronomy world upside-down in the early 1600s, and you can see them yourself using a telescope or even a surprisingly low-power pair of binoculars.

**Warning:** Please be very careful when observing Venus with a telescope in the early morning or daytime. Never allow the Sun to enter your instrument’s field of view, as you could be permanently blinded.

Venus’s other moniker of “Earth’s Twin” is a bit misleading. In terms of their surface temperatures and atmospheres, Venus and Earth are extremely different!

The surface of Venus is warmer than that of Mercury, despite Mercury being many millions of miles closer to the Sun. While Mercury is still a scorching 800 degrees Fahrenheit (427 degrees Celsius), Venus is even hotter: 900 degrees Fahrenheit (482 degrees Celsius).

The vast amount of carbon dioxide in the thick Venusian atmosphere acts as an insulating blanket that retains much of the Sun’s

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# Venus

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## *Continued from Page 10*

heat, creating a runaway greenhouse effect that dominates its present-day climate. The Venusian surface is a crushing 90 Earth atmospheres on top of its absurd temperatures. These extreme conditions mean that the mission lives of any past Venusian robotic landers were measured in hours at best – and usually minutes!

However, conditions in Venus' upper atmosphere may be much more hospitable, with temperatures and pressures at 30 miles (50 kilometers) above the surface that are much more Earth-like.

Studies of the Venusian atmosphere, including the seasonal appearances of dark streaks and faint signals of suggestive chemistry, intrigue researchers with the possibility that some sort of life may persist in its clouds. But far more evidence is needed to confirm such a claim, since non-biological factors like volcanism and other processes could also be the source for these signals.

Venus' thick sulfuric acid clouds block direct visual observations of its surface from optical telescopes on Earth. Multiwavelength

observations from space probes show evidence of active volcanoes and possibly some plate tectonics, but follow-up missions will be needed to confirm the presence of active volcanism, plate tectonics, and any signs of life.

NASA is sending two new missions to Venus by the end of this decade: The orbiter VERITAS (for "Venus Emissivity, Radio Science, InSAR, Topography and Spectroscopy"), which will map the surface in high detail and study the chemistry of its rocks and volcanoes, and DAVINCI+ (for "Deep Atmosphere Venus Investigation of Noble gases, Chemistry and Imaging"), which will study its atmosphere and possible tectonic surface features via a "descent sphere" that will plunge into Venus's clouds.

Follow their development and discover more about Venus at [solarsystem.nasa.gov/venus](https://solarsystem.nasa.gov/venus), and continue your exploration of the universe 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 outreach. Visit [nightsky.jpl.nasa.gov](https://nightsky.jpl.nasa.gov) to learn more.*

# Zwicky

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## *Continued from Page 9*

thought of that coat haunted me all night.

Third, my friend David Rossetter named his large 25-inch diameter reflector "Fritz," after Zwicky's first name. It is a wonderful telescope named for a brilliant man.

In January, the ion or gas tail of Comet ZTF showed a sort of disconnection, in which the part of the tail closest to the comet appeared as a thin line which suddenly broadened to a larger fan further out. This "disconnection event" was closely tied to a sudden increase in sunspot activity, an observation which

teaches us more about how comets interact with the solar wind.

As this article goes to press, there is not one ZTF comet, but two. David Rossetter and I saw the other one at our club's dark observing site.

The second one is much fainter, visible as an amorphous smudge of small, slowly moving haze. As I looked at this second comet, I tried to understand and appreciate the seminal role that Zwicky played in his time. In our time, that role has expanded to explore in still greater detail the night sky that he loved.

# UPCOMING EVENTS



**Date: March 13, 2023**

**Event: Membership meeting @ 7 p.m.**  
**Location: Butterworth Center / Zoom**  
**Program: Smorgasbord of Member Presentations**

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

## UPCOMING EVENTS

- **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
- **April 10:** Monthly meeting at Butterworth Center; program TBD
- **April 15:** Public observing at Niabi Zoo
- **April 18:** Kewanee Central School, 'Steamer Success' astronomy night
- **April 21:** Observing session at John Deere Middle School, Moline
- **April 24:** Moline Public Library; 'Project Next Generation' talk and observing session
- **May 16:** Moline Public Library; 'Project Next Generation' talk and observing session
- **June 26:** Eldridge Public Library astronomy night
- **July 1:** Illiniwek Campground public observing session (*July 8 rain date*)
- **July 7:** Silver Bell Alpaca Farm public observing session
- **July 25:** DeWitt Public Library Summer Reading Program 'Stargazing'

## Amateur astronomers welcome at NCRAL convention



"Amateur Astronomy for Amateurs" is the theme for the 2023 convention of the North Central Region of the Astronomical League, which is scheduled for Friday and Saturday, May 6-7.

This year's convention is sponsored by Twin City Amateur Astronomers of Bloomington-Normal, Illinois. It will take place at Grand Bear Resort in North Utica, Illinois.

An "early bird" registration rate of \$140 is offered to those who register for the convention before March 15. That's also the last date you can order convention coffee mugs and regalia.

The rate increases to \$160 to those who register after March 15 but before April 6. After then, and up to the date of the convention, you can register for \$130; however, meals will not be included. Meals offered to early registrants include hors d'oeuvres at a Friday night reception; lunch and break snacks on Saturday; and a banquet on Saturday night.

The convention is expected to include an impressive lineup of experienced amateur astronomers who will share their expertise and practical advice on topics such as member education, public outreach, astronomical diagrams, newsletters, and astronomy club management.

At the Saturday night banquet, Dr. John Martin, a stellar astrophysicist from the University of Illinois – Springfield, will give the feature presentation titled "JWST: The Just Wonderful Space Telescope."

To register, and for more information, go to this link : <https://tcaa.club/ncral2023>.