



# Reflections

The Newsletter of the Popular Astronomy Club

ESTABLISHED 1936



February 2022

## REFLECTIONS from the President



**Dale Hachtel**

This year is starting as an interesting one with a variety of programs. In January, we had the opportunity to drive around Mars on

the Curiosity Rover with Dr. Rebecca Williams. Coming this month is our opportunity to learn "How Birds Navigate the Night Sky," presented by Jen Owen of the Corey Marsh Ecological Research Center.

The March meeting will include a brief business meeting and a smorgasbord of members' short talks. Please be willing to share your favorite topic, a publication you have read, an observatory or museum you have visited, or some statistics or data of interest to astronomy.

Contact Dino Milani to get on the schedule. He is coordinating the smorgasbord topics for the March meeting. Smorgasbord talks are informal and typically last less than 10 minutes.

Programs later in the year include: Theories of Solar System Formation, Plane Wave Technology, Scaling the Stars at the U.S. Naval Observatory, and the OSIRIS-Rex Mission, and will provide interesting and informative astronomy education.

This year we anticipate a bigger audience on Zoom, as we continue online with our programs and invite nearby astronomy clubs to participate online. We are also forwarding online invitations from other clubs to our members when those clubs have provided a Zoom link to their programs. This results in a wider variety of topics being available to us and I encourage our members to participate when possible.

A big astronomy event this year is expected to be the first astronomy pictures and data from the James Webb Space Telescope. We eagerly await some of that information, expected to arrive this summer.

This will be an exciting year for amateur astronomy and for sharing our capabilities with the public at observing sessions at the Niabi Zoo March through November, with the first session on March 19.

Keep looking up! DALE



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## REST IN PEACE

Donald Gurnett, a professor emeritus at the University of Iowa who made major contributions to space exploration, died in Iowa City on January 31 at the age of 81.



**Donald Gurnett is shown in 1962 with a model of the Injun 3 spacecraft.**

Gurnett enrolled at Iowa in 1957, the same year Sputnik was launched, and soon began working for James Van Allen, noted for his discovery of the radiation belts that envelop Earth. He joined the faculty in 1965 after earning his doctorate in physics.

The Fairfax, Iowa, native was part of more than 30 space missions, including Voyager 1, the first spacecraft to visit the outer planets and leave the Solar System. He became known for recording and interpreting "space sounds" received from Voyager and other spacecraft.

Instruments designed by Gurnett also flew aboard the Galileo mission to Jupiter and the Cassini mission to Saturn.

At the time of his retirement in May 2019, Gurnett had taught a total of 111 undergraduate and graduate classes.

Condolences are also sent to the family and friends of John Weber, a member of the Popular Astronomy Club who died on December 31 at the age of 75.

## 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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# Overcoming astronomy's disadvantages

Every hobby seems to have disadvantages that impact how much enjoyment one can receive from it, and amateur astronomy is no exception.

One disadvantage is the weather. For some reason, it seems that almost every special astronomical event brings cloudy, rainy or snowy weather with it.

Another disadvantage deals with light. This may seem odd, since astronomy's focus is on light. But the problem arises from too much light.

Generally, astronomers are observing light from the sun, moon, stars, galaxies, and other celestial objects. The telescopes used to observe these objects are often referred to as "light buckets." The larger the front of the scope, the bigger the bucket, and the more light that can be collected. Collecting more light means smaller and more distant objects may be viewed.

Unfortunately, the presence of light at the wrong time, in the wrong place, or in the wrong quantities often makes observations impossible. Light from the moon can be either good or bad, depending on what is to be observed.

If the goal is observing the moon, light from the moon can be good. However, light from a full moon can be so bright that a filter may be needed to safely view it.

If the goal is to observe stars, star clusters, and galaxies, the bright light from the full moon makes viewing difficult. Fortunately, astronomers can decide what can be successfully observed according to what phase the Moon is in.

However, human-caused light pollution can't be handled so easily. Astronomers often have to drive many miles to reach darker skies. Individuals and public officials could help solve this problem by making more



***This satellite photo of the Midwest at night shows bright artificial lighting in metropolitan areas, including the Quad Cities. This lighting interferes with astronomical observing.***

effective and less expensive use of lighting. The International Dark Sky Association offers many ways to solve this problem. The simple solution is: "Light the ground, not the sky!"

The natural environment also contributes to the light problem. Depending on the latitude and season of the year, the amount of darkness can vary from zero to twenty-four hours in a day. For the Quad Cities, on the winter solstice – the shortest day of the year, which occurs on or near Dec. 21 – there are about fifteen hours of darkness. Around this time, you can observe from 5:30 p.m. for four hours and be home in time to watch the late news.

At the summer solstice, which occurs on or around June 21, there are only about nine hours of darkness. You're then lucky start observing by 9:30 pm and need to stay out well past midnight to get four hours in.

While it appears that winter would be the ideal time to observe, it is also the coldest time of the year. Why? The length of daylight begins increasing from the winter solstice until the summer solstice. Longer periods of daylight should bring warmer temperatures. Not necessarily: From the winter solstice until the spring (vernal) equinox, nights are still longer than the hours of daylight. Our coldest

***Continued on Page 4***



# Astronomy's disadvantages

*Continued from Page 3*

temperatures seem to occur in January and February.

The Earth is actually closest to the sun on or around January 4 (91.5 million miles away), and farthest from the Sun around the Fourth of July (94.5 million miles). Therefore, shouldn't winter temperatures be warmer, and how can the distance between the Sun and Earth change?

The distance changes because Earth's orbit is an ellipse (a slightly flattened circle) and is not perfectly round, and the Earth itself is tilted on its axis.

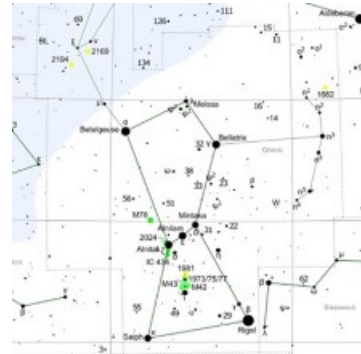
In the Northern Hemisphere's winter, the North Pole is tilted away from the sun and the sun's rays are spread over larger area. During the Northern Hemisphere's summer, the North Pole is tilted toward the sun and the sun's rays are more concentrated into a smaller area.

Johannes Kepler's 2nd Law of Planetary Motion can be summarized as, "Planets move fastest when they are closest to the Sun and slowest when they are farthest away." Therefore, Earth's elliptical orbit makes the length of the seasons uneven.

In the Quad Cities, winter is about 89 days long and summer is about 93 days long. One should not complain about long winters!

Meteorologists classify seasons differently than astronomers. Meteorologists classify seasons by months. Spring is March through May; summer is June through August; fall is September through November; and winter is December through February. The advantage of the meteorological system is the starting and ending dates are consistent.

The astronomical system is based on the relation of the Earth to the sun, with small changes in times and dates. Spring arrives



*This diagram of Orion (facing south, with east to the left), shows how it will appear on February 15 at about 8 p.m.*

with the vernal equinox, summer starts with the summer solstice, fall starts with the autumnal equinox, and winter begins with the winter solstice.

I suggest you brave a clear, cold and relatively long night of darkness in February and study Orion the Hunter, a key constellation in the winter sky.

Orion can be used as a signpost to find other objects nearby. Orion's line of three stars make his belt, which can be used to locate key stars in other constellations.

Draw a line from the lower (eastern side) of the belt up to the west and find Aldebaran, a bright star that is the "eye" of the constellation Taurus the bull. Continue the line on to the west and you come to the Pleiades, a beautiful star cluster visible to the naked eye.

Follow the belt downward from the eastern end and you arrive at Sirius in Canis Major. Sirius is the brightest star in the sky, and Canis Major is Orion's hunting dog. You've just experienced an important observing techniques known as "star hopping."

To learn more about Orion, go to the article "Hunting the Hunter: Observing Orion" in the January issue of "Reflections," found at our website: [popularastronomyclub.org](http://popularastronomyclub.org)

Weather permitting, PAC will hold its first free observing session at Niabi Zoo on March 19, the first Saturday after daylight saving time begins. We hope to see you there!

**Wayland Bauer**

# SUMMARY OF PAC JANUARY MEETING

The Popular Astronomy Club held its regular monthly meeting on January 10 at the Butterworth Center in Moline. Six PAC members attended the meeting “live,” with another 24 joining via Zoom, including members of other astronomy clubs in the region.

The meeting was called to order by Dale Hachtel; it was the first meeting he led since being elected as president of PAC at the previous monthly meeting.

After brief introductions, meeting attendees enjoyed a virtual presentation by Dr. Rebecca M.E. “Becky” Williams, a senior scientist Planetary Science Institute and participating scientist in experiments being conducted by the Curiosity rover currently exploring Mars. Her presentation was titled “Wheeltracks on Mars: Exploring Mars’ Habitable Past with the Curiosity Rover.”

Dr. Williams gave a summary of the Curiosity mission, which began when the rover landed on Mars in August 2012. She showed multiple photos taken by Curiosity and explained how these photos showed evidence of lakes, rivers and other relatively large bodies of water on Mars. Water is a basic component of life on Earth, and Dr. Williams said that the presence of water indicates that some forms of life may have been present on Mars in the past and may still be present today.

Dr. Williams said that her research has focused on understanding the role that water may have played in shaping the surface of Mars through comparison with similar landforms on Earth, and how water helps create habitable environments. She said that, while water is present in frozen icecaps in Mars’



**Dr. Rebecca M.E. “Becky” Williams, a senior scientist Planetary Science Institute, appeared via Zoom at the meeting and summarized her work with the Curiosity rover on Mars.**

polar region, the planet is now dry and cold with a very thin atmosphere.

Dr. Williams also touched on experiments currently being carried out by the Perseverance rover, which landed on Mars in February 2021 and features a mini-helicopter currently performing experimental flights. Several satellites are also in orbit around Mars collecting data, meaning that we are living in what Dr. Williams described as “the golden age of Martian exploration.”

The presentation led to several questions and very positive feedback from attendees.

Following the presentation, Dale provided a summary of upcoming events and some astrophotos recently taken by club members were displayed. A recording of the meeting can be viewed on YouTube via this link: <https://youtu.be/bhNOMXrl-To>.

The next monthly PAC meeting is scheduled for February 14 at 7 p.m. at the Butterworth Center and live via Zoom. Look below for more information.

***A presentation titled “Seeing Stars: How Birds Use the Night Sky During Migration” will highlight the February meeting of the Popular Astronomy Club. Dr. Jennifer C. Owen, associate professor and coordinator of the Corey Marsh Ecological Research Center, Michigan State University, will make the presentation. Dr. Owen is an expert in the ecology of zoonotic diseases, the behavioral ecology of migratory birds, avian ecoimmunology, and virology.***



# PAC member donates telescope to PV High

Popular Astronomy Club member Terry Dufek has donated his telescope to the astronomy club at Pleasant Valley High School, where it will be used by students who belong to the club.

In response, Terry received the following thank-you from Ian Spangenberg, a science teacher at the high school who leads the astronomy club. A number of hand-written notes from students involved in the astronomy club were also sent (see below).

*Terry: Thank you so much for donating your telescope to the Pleasant Valley Astronomy Club. As you know, I love bringing my students out to observing nights, and your telescope will help me bring my students so much closer to the stars.*

*It is a wonderful piece of technology and equipment, and I can tell how much care and love you have given it. I promise to continue that level of care, and to continue your commitment to astronomy.*

*PV will start offering a dual credit astronomy course next school year, which means that students enrolling in the course will receive college credit for their studies. And graded*



**Members of the Pleasant Valley Astronomy Club are shown with the telescope donated by PAC member Terry Dufek.**

*nighttime observing events have been approved by the administration. This means that every student taking the course will be out at observing nights, learning the night sky and learning how to operate the telescope.*

*Your scope will quite literally take many students to places they've never been before. I also plan on getting a plaque to attach to the telescope so that your name will always be pointed toward the stars.*

*Terry, thank you. This donation means so much to me and the club. I'll never stop looking up.*

Dear Terry Dufek,  
Thank you for donating your telescope to the PVHS Astronomy Club!  
Don't worry, your telescope will be put to good use in our club. Personally, looking at the stars and the planets has been a pastime. I look forward to whenever the club has an Observing Night. I don't have a telescope at home, so using this telescope that you've donated will be so exciting!  
Again, thank you so much for this donation.  
Happy Holidays!!  
-Mukul Kulkarni

Hi Terry, Thank you so much for donating your telescope to the PVHS Astronomy Club. I really enjoyed observing to orbit Jupiter in the March 2020. I also really enjoyed observing Messier objects and can't wait to do so with your telescope. Again, thank you so much!  
-Nigam Kulkarni  
A member of the PVHS Astronomy Club

Hi Terry,  
I AM A SENIOR AT PLEASANT VALLEY HIGH SCHOOL, AND AM PRESIDENT OF ASTRONOMY CLUB. I'VE BEEN FASCINATED BY ASTRONOMY FOR MY ENTIRE LIFE, AND AM GRATEFUL FOR THE EDUCATIONAL OPPORTUNITIES TO SEE AND LEARN MORE ABOUT SPACE.  
IT'S REMARKABLE TO LOOK AT THINGS SO BIG AND SO FAR AWAY, AND TO REMEMBER HOW SMALL WE ARE IN COMPARISON, LOOKING THROUGH A TELESCOPE BRINGS A FEELING OF INSIGNIFICANCE, YET SOLIDARITY. WE WEAR ALL TURNED IN THE SAME WAY FROM THE SAME THINGS, AND WE WILL SHARER PART OF IT ALL FOREVER. WHEN I LOOK AT A STAR OR PLANET, I FEEL COMFORT IN KNOWING I WILL ONE DAY BE PART OF THAT— EVERY BIT OF MATTER AND ENERGY.  
WHAT AN INCREDIBLE PRIVILEGE TO BE THE UNIVERSE CONSCIOUS OF ITSELF!  
YOUR DONATION MEANS A LOT TO ME AND THE REST OF OUR CLUB. WE WILL PUT IT TO GREAT USE. I HOPE YOU'RE DOING WELL, AND HAVE A GREAT HOLIDAY!  
THANK YOU,  
LAUREN MCGOVERN

Hi Terry,  
Thank you for donating your telescope. I can't wait to use it to see the universe. I'll be sure to take good care of it, and I am very appreciative that you donated your telescope to help us learn the universe around us.  
Thanks a lot,  
Devon Kulkarni

Dear Mr. Dufek,  
Thank you so much for donating your telescope. This is a great gift to the PVHS Astronomy Club. I have been fascinated by astronomy since I was a child, and I am excited to have a telescope that I can use to observe the night sky. I will be sure to take good care of it and use it to observe the night sky as often as possible. I will be sure to take good care of it and use it to observe the night sky as often as possible. I will be sure to take good care of it and use it to observe the night sky as often as possible.  
-Ben Scott

Hey Terry,  
I wanted to say thank you for donating the telescope to the PVHS Astronomy Club. I joined Astronomy Club because I've always been fascinated with space and how the universe works. Because of Astronomy Club, I learned about why we know the Big Bang happened 14 billion years ago. I also think it's incredible how small we are compared to everything. I really enjoy being in Astronomy Club, so I feel very grateful that you contributed something that will help us enjoy it even more.  
With gratitude,  
Pashra Dahal

**Here are some of the letters written to Terry Dufek by members of the Pleasant Valley Astronomy Club, thanking him for donating his telescope to the club.**



# Bettendorf planetarium offers free shows

The Donald A. Schaefer Planetarium at Bettendorf High School will offer free public shows once a month for the remainder of the school year. All shows are scheduled for Tuesday evenings beginning at 7 p.m. The schedule is as follows:

- February 22: “Phantom of the Universe” – Learn about the fundamental particles that make up the universe and ponder answers to questions such as “Where did we come from?” and “What are we made out of?”
- March 29: “Oasis in Space” / “Renaissance” – The first professionally produced show will take viewers through the farthest reaches of space and shows how we live in an oasis in the vast cosmos. The second show, produced by Bettendorf High School students, takes us back to the time that saw the birth of modern science.
- April 19: “Sunstruck” / “Modeling the Solar System” – The first show explores the sun and its influence on life on Earth; the second show will feature audience participation as viewers create a model of the Solar System showing the positions and properties of the planets.



**Public shows at the Donald A. Schaefer Planetarium are free but reservations are required.**

- May 24: “From Earth to the Universe” / “The Works of Walt Whitman” – The first professionally produced show will look at recent breakthroughs in astronomy and cosmology and take viewers to the edge of the known universe. The second show, produced by Bettendorf High School students, showcases the works of noted American poet Walt Whitman.

While shows are free of charge, space in the planetarium is limited so reservations are required. To reserve a seat, contact Christopher Like at (563) 332-4516, email [clike@bettendorf.k12.ia.us](mailto:clike@bettendorf.k12.ia.us).

## ***A delicious model of the phases of the Moon***

***Models are often used in astronomy to explain and illustrate celestial events, and Roy Gustafson came up with this unique—and delicious—model of the phases of the Moon, using Oreo cookies. It’s unknown whether Roy prefers dunking his Oreos or licking the filling first — or, maybe, both? — but, either way, we’re sure that this model didn’t last as long as it takes the Moon to complete a full cycle of its phases.***



## ASTRONOMY AND SPACE HISTORY – IT HAPPENED IN FEBRUARY

**February 4, 1984:** American astronaut Bruce McCandless departs from the Challenger space shuttle and embarks on the first untethered spacewalk ever attempted. McCandless and fellow astronaut Bob Stewart used a device known as the Manned Maneuvering Unit to venture more than 300 feet from the shuttle with no lifelines attached. The MMU, which was propelled by 24



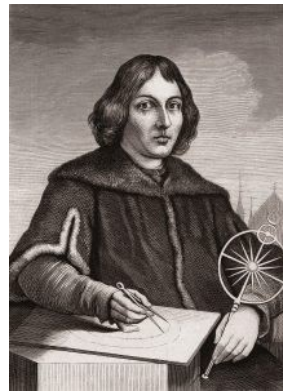
nitrogen-fueled thrusters and steered by hand controls at the ends of two arms, was employed on two subsequent missions in 1984 in attempts to retrieve satellites, but was later deemed too risky for further use.

**February 15, 1845:** First light is achieved at a telescope dubbed as the “Leviathan of Parsonstown,” a name derived from the fact that it was the largest telescope in the world at the time. The Newtonian reflecting telescope, with its 72-inch aperture, would hold that distinction until 1917. The telescope was built by William Parsons, the 3rd Earl of Rosse, on his estate in County Offaly, Ireland. Parsons used steam-powered grinding machines to fabricate a five-inch thick mirror weighing nearly three tons for the telescope. It was used to explore nebulae catalogued by Charles Messier and John Herschel, and Parsons saw that several had spiral structures, generating sketches of what we now know are galaxies. After falling into disuse in the early 20th century, the Leviathan of Parsonstown was rebuilt in the 1990s, this time with an aluminum mirror requiring less maintenance than the original mirror, which had been made from speculum metal. The

grounds of the estate also now house a radio telescope that is the westernmost station in the LOFAR network.



**February 18, 1930:** Clyde Tombaugh, an amateur astronomer who had celebrated his 26th birthday earlier that month, uses a blink comparator to analyze photographic plates he’d imaged on separate dates in late January and spots what is soon confirmed to be “Planet X,” an object now known as Pluto. Tombaugh was working at an observatory in Flagstaff, Arizona, founded in 1906 by Percival Lowell, who believed there was a planet beyond the orbit of Neptune and hunted for it until his death in 1916. In 2006, the International Astronomical Union made the still-controversial decision to redesignate Pluto as a dwarf planet; despite that, its discovery remains a defining moment in astronomical history.



**February 19, 1473:** Nicolaus Copernicus is born in a town in Poland that was then under Prussian rule. Shortly before his death in 1543, Copernicus published *De revolutionibus orbium coelestium* (On the Revolutions of the Celestial Spheres), a work which posited that the Earth rotated

around the sun. Copernicus’ heliocentric model revolutionized astronomy and is now what he’s most famous for, but he was also a true Renaissance man with a doctorate in canon law who served as a diplomat, spoke multiple languages, and was skilled in mathematics, physics and economics. In the latter field, Copernicus came up with an early version of “Gresham’s Law,” the economic theory that bad money tends to drive out good money.

**February 23, 1987:** The light from a supernova located in the Large Magellanic Cloud reaches Earth, making it the first supernova that modern astronomers were able to study in detail. The supernova, designated 1987A, resulted from a neutron star more than 168,000 light-years away that collapsed and exploded. SN1987A’s apparent magnitude peaked at about 3, meaning that it was visible to the naked eye under most conditions.



# QCAS COMPLETES MOVE OF DOME



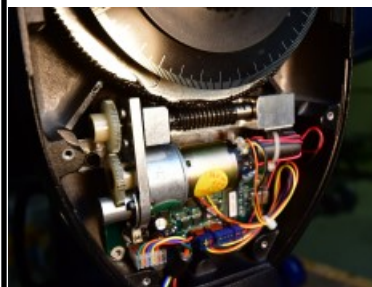
The Quad Cities Astronomical Society has completed the move the dome of its observatory from Sherman Park in Clinton County across the Wapsipinicon River to the Wapsi River Environmental Education Center in Scott County.

The photos show the movement of the dome on December 20, and its setup at the center. The relocated dome will be used to house a 12-inch Newtonian telescope.

Thanks to those who made the movement possible, including John Baker, Mike Dannenfeldt, Jim Rutenbeck and Steve VanHyfte.



## TELESCOPE REPAIRS PEFORMED



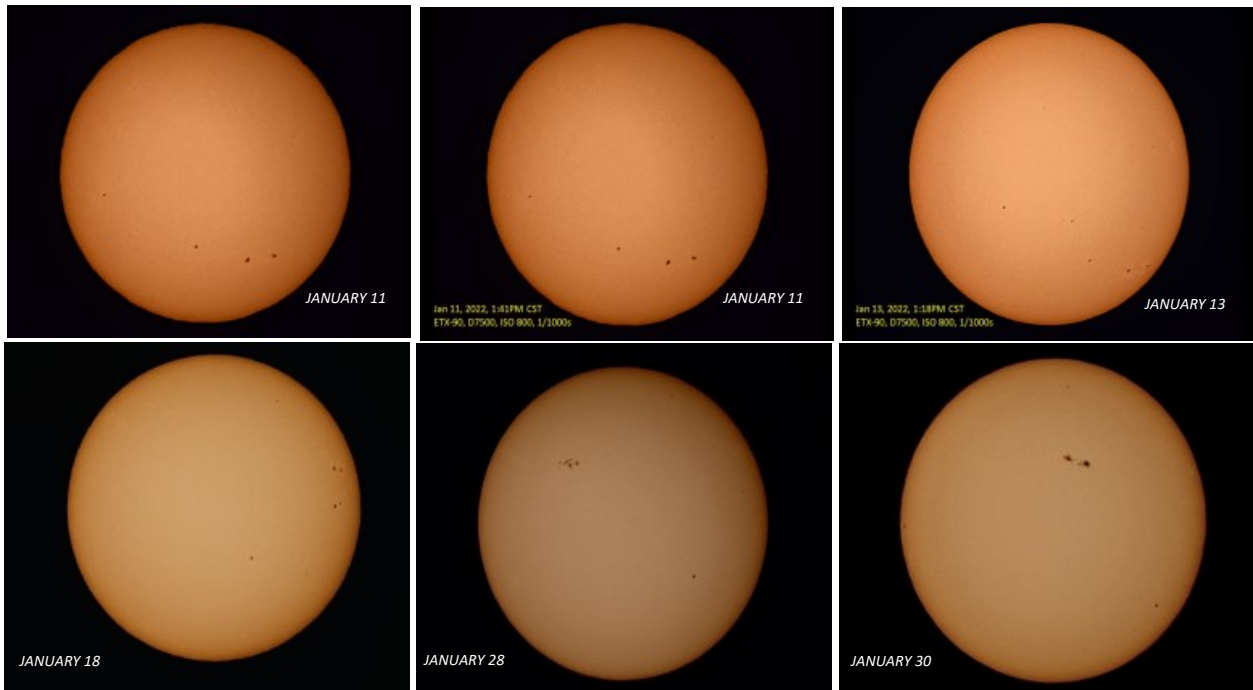
Alan Sheidler spent part of his time before the holidays performing repairs on a telescope used by the astronomy club at John Deere Middle School. The plastic gears on the declination drive, shown near the left center of the top photo, were badly damaged and stripped. They have been replaced by sturdier stainless steel gears.

Al also removed the motherboard, at lower left in the bottom photo, in order to have the software updated to correct a malfunctioning GPS unit. The same photo shows motherboard, power panel, right ascension drive and declination drives, hand controller and cables from Jim Rutenbeck's 12-inch LX200 scope, all of which have been sent for reprogramming and repair.



The motherboard on the JDMS scope has been successfully updated, and the work being done on the electronics for the Rutenbeck telescope should be completed soon. Once all components are received and reinstalled, both telescopes should be restored to full functionality.

# MEMBER OBSERVATIONS & CLUB ACTIVITIES



***It can be a bit too cold in January to do astronomy after dark, so Al Sheidler decided instead to go out during the day point his telescope at the sun and take these astrophotos showing sunspot activity throughout the month, with dates shown. The photos were taken using a Nikon D7500 DSLR , set at 1/1000 second shutter speed at ISO 800.***



***In the first public outreach event of the year, Roy Gustafson made a half-hour presentation on PAC to the Rock Island Rotary Club at the Botanical Center on January 18. Roy discussed upcoming PAC activities and astronomical events happening in 2022. About 45 people were in attendance, including those who looked in via Zoom. A nice thank-you was received from the Rotary Club, and the presentation was featured on the front page of their newsletter.***





**February  
2022**

### **Go Webb!**

We all got a special and thoroughly delightful present early on this past Christmas morning.

Although I did not set my alarm, my wife, Wendee, did get up around 5 a.m. I turned on our television set, and what I saw 15 minutes later was the most thrilling space view since 1969, when Neil Armstrong and Buzz Aldrin walked on the Moon.

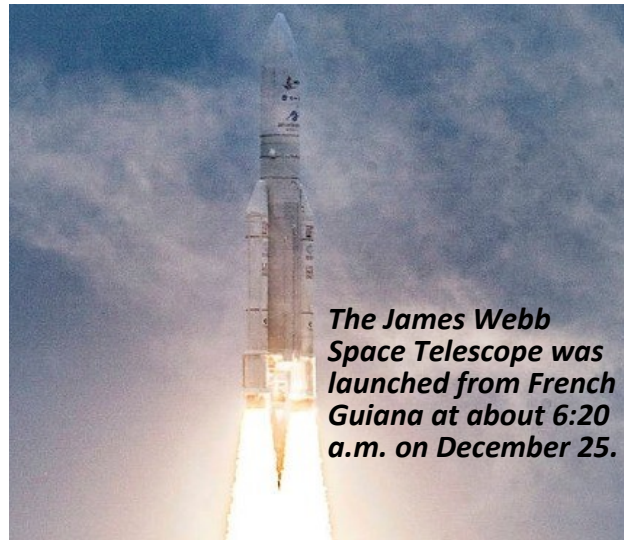
It was the spectacular, flawless launch of the James Webb Space Telescope, the start of a mission so perfect and smooth that, if the telescope could speak, it would have told us that it did not feel any motion whatsoever as it soared away.

Even the countdown was unique; it was in French: “Dix, neuf, huit...” I did notice a possible hiccup. About ten minutes after launch, the metal covers designed to protect the telescope fell away while the vehicle was still in powered flight.

But a second later, I understood that this was not a hiccup; it was supposed to fall away. The telescope was already out of Earth’s atmosphere, and with no air to bother it, the protective cover was no longer needed.

As lovely as this experience was for me, the launch was not the most memorable part. That came about an hour later, when NASA administrator Bill Nelson gave a speech in which he thanked the many people involved in getting the telescope into space.

At the end of his speech, Nelson mentioned a young shepherd boy, sitting out under the stars, looking toward the night sky, and writing a poem about it. That shepherd boy, the administrator went on, went on to



become David, King of Israel.

The poem to which he referred is undoubtedly the 19th Psalm, the opening four lines of which I quote here, plus an additional one added by nova discoverer Peter Collins, an old friend.

*The heavens declare the glory of God.  
And the firmament showeth his handiwork.  
Day unto day uttereth speech,  
And night unto night revealeth knowledge,  
So long as the sky is clear.*

The telescope has now been fully deployed and it is ready for its final adjustments. Unlike for the shepherd boy, and for all of us on Earth, the sky will always be clear and dark at the Lagrange point 2 in space where the telescope will live.

(NOTE: Lagrange point 2, named for Italian mathematician Joseph-Louis Lagrange, is an area in space about 930,000 miles from Earth where the gravity from Earth and the sun roughly balance out, enabling the telescope to remain in a fixed position with little energy needed for course correction.)

The James Webb Space Telescope is there to teach us about the universe of which we are a part, and I suspect that it will also inspire us to set aside the cares and the news of each day, head out into our backyards, and look up at the night sky.



# Hang Out with the Twins of Gemini

The night skies of February are filled with beautiful star patterns, and so this month we take a closer look at another famous constellation, now rising high in the east after sunset: Gemini, the Twins!

If you're observing Orion, as discussed in last month's article, then Gemini is easy to find: Just look above Orion's "head" to find Gemini's "feet." Or, make a line from brilliant blue-white Rigel in the foot of Orion, through its distinct "belt," and then on through orange Betelgeuse. Keep going, and you will end up in between the bright stars Castor and Pollux, the "heads" of the Gemini Twins.

While not actually related – these stars aren't bound to each other, and are almost a magnitude apart in brightness – they do pair up nicely when compared to their surrounding stars.

Take note: More than one stargazer has confused Gemini with its next-door neighbor constellation, Auriga. The stars of Auriga rise before Gemini's, and its brightest star, Capella, doesn't pair up as strikingly with its second most brilliant star as Castor and Pollux do. Star-hop to Gemini from Orion using the trick above if you aren't sure which constellation you're looking at.

Pollux is the brighter of Gemini's two "head" stars – imagine it has the head of the "left twin" – and is located about 34 light-years away from our Solar System. Pollux even possesses a planet, Pollux b, over twice the mass of Jupiter.

Castor, the head of the "right twin," lies about 51 light-years away and is slightly dimmer. While no planets have been detected around Castor yet, it still has plenty of company, as Castor is actually a six-star system!

There are several great deep-sky objects in Gemini to observe as well. You may be able to spot one with your unaided eyes, if you have dark skies and sharp eyes: M35, a large open cluster near the "right foot" of Gemini, about 3,870 light-years away.



***The stars Castor and Pollux form the "heads" of the distinctive constellation Gemini.***

M35 almost the size of a full Moon in our skies! Optical aids like binoculars or a telescope reveal the cluster's brilliant member stars.

Once you spot M35, look around to see if you can spot another open cluster, NGC 2158, much smaller and more distant than M35 at 9,000 light-years away. Another notable object is NGC 2392, a planetary nebula created from the remains of a dying star, located about 6,500 light-years distant. You'll want to use a telescope to find this intriguing faint fuzzy, located near the "left hip" star Wasat.

Gemini's stars are referenced quite often in cultures around the world, and even in the history of space exploration. NASA's famed Gemini manned space program took its name from these stars, as do the appropriately named twin Gemini North and South Observatories in Hawaii and Chile.

You can discover more about Gemini's namesakes, along with the latest observations of its stars and related celestial objects, at [nasa.gov](http://nasa.gov).

*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](http://nightsky.jpl.nasa.gov) to learn more.*

# UPCOMING EVENTS



**Date: February 14, 2022**

**Event: Regular Meeting @ 7 p.m.**

**Location: Zoom / Butterworth Center**  
**Program : Seeing Stars: How Birds Use the**  
**Night Sky During Migration**

**Presented by Dr. Jennifer C. Owen**  
**Corey Marsh Ecological Research Center,**  
**Michigan State University**

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

MONTH	NEWSPAPER ARTICLES	MEMBER PRESENTATION	MEETING / PROGRAM
MAR 2022	AVAILABLE	AVAILABLE	March 14 - Business Meeting; Smorgasbord of Member Presentations
APR 2022	AVAILABLE	AVAILABLE	April 11 - Presentation: "Fantastic Space Discoveries: Theories of Solar System Formation" by Jim Kovac, Chicago Society for Space Studies
MAY 2022	AVAILABLE	AVAILABLE	May 9 - Presentation: "Technology for the Astronomical Community & More" by Matt Dieterich, Technical Services Manager, PlaneWave Instruments, Inc., Adrian, Michigan
JUNE 2022	AVAILABLE	AVAILABLE	June 13 - Presentation: "Sky With Ocean Joined: Scaling the Stars at the U.S. Naval Observatory, 1830 to the Present" by Geoff Chester, Public Affairs Officer, U.S. Naval Observatory, Washington D.C.
JULY 2022	AVAILABLE	AVAILABLE	July 11 - Presentation: "OSIRIS-REx Mission Update" by Dolores Hill, Senior Research Specialist, Lunar & Planetary Laboratory, University of Arizona, Tucson, Arizona

## UPCOMING EVENTS

- **February 5:** QCAS public viewing, Menke Observatory, sunset
- **NIABI PUBLIC VIEWING:** Third Saturday of the month, beginning March 19
- **April 2:** Messier Marathon
- **May 7:** Astronomy Day: Bettendorf High School / Menke Observatory
- **May 13-14:** NCRAL Convention, Port Washington, Wisconsin
- **May 21:** Boy Scout STEM Event at Loud Thunder Forest Preserve; volunteers needed
- **June 25:** Public viewing at Illiniwek Forest Preserve, sunset
- **July 31:** Perseid meteor show public viewing, Pleasant Valley Middle School (QCAS event)
- **August 13:** Annual PAC Picnic (*no regular meeting*)
- **September 23-24:** Eastern Iowa Star Party
- **October 22:** Annual PAC Banquet (*no regular meeting*)

## SUBMISSIONS WELCOME!

This is YOUR newsletter, so we want to hear from you! If you have an article or photos to submit, or other

items that might be of interest, send them along to Reflections. Send to: [levesque5562@att.net](mailto:levesque5562@att.net). Thank you!