



Reflections

Newsletter of the Popular Astronomy Club



FEBRUARY 2019

President's Corner February 2019



Alan Sheidler

Once again it is time for me to write another highly-anticipated introduction to "Reflections". As I am writing this, it is January 30th and the weather forecasts had predicted potentially record cold. I've lost track of the precise snow accumulation this month, but I would not be surprised if we've had 30" of snow this winter so far. Despite these arctic conditions, PAC members braved the chill to enjoy the "blood moon" lunar eclipse on the evening of January 20th. Many of us actually were able to set up telescopes and cameras to capture the eclipse. Some of these images are featured in this newsletter. Terry Dufek uploaded some of his images of the eclipsed blood moon on Facebook. As of today, Terry's submission has been viewed 634 times, received 54 likes and 8 shares. For those of you not well informed about Facebook, this means that 634 people viewed Terry's images, 54 clicked "like" on them and 8 people shared (linked) his images to other Facebook pages (for example, other astronomy clubs). In any event, these are amazing statistics and a record for PAC. This proves there is a high level of public interest in astronomical events.

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Roy Gustafson, Mike Gacioch and Dino Milani took some really nice telescopic views of the eclipse which you can enjoy here in this newsletter. These pictures are really nice quality. I admire what you guys accomplished despite the frigid conditions. Not to be outdone though, below is an image I took this morning from my front yard in Moline. You can clearly see the planets Venus, Jupiter, the Moon and the bright star Antares (on the right of the image). This was at 6:37AM this morning. The ambient temperature was -24degF! I would like to submit this as proof that some of us will stop at nothing to make observations—except maybe clouds! Keep looking up!

Alan Sheidler.



(above) Camera settings: Nikon D7500 camera, 62mm FL, F4.5, ISO 6400, 1/10 sec exposure time.

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Murugesh S ► Astronomy & Science

12 hrs ·

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**Satellite photos
are the
Earth's selfies.**



DAN METH /BUZZFEED

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ANNOUNCEMENTS / INFO



NCRAL 2019



Astronomical Voyages of Discovery: Past, Present & Future!

Event date:

Fri May 3, 2019 thru Sun May 5, 2019

Location of event:

Stoney Creek Hotel & Conference Center
101 18th St, Moline, IL 61265

North Central Region of the Astronomical Leagues annual convention being presented by the Popular Astronomy Club, Moline Illinois

[CLICK HERE for link to NCRAL 2019](#)

LOOKING FOR OLDER ISSUES OF REFLECTIONS NEWSLETTER?

[Click HERE](#)

HISTORY OF PAC?

[Click HERE](#)

Popular Astronomy Club on Facebook?

[Click HERE](#)

**READY FOR
MEMBERSHIP
OR TO RENEW?**

[Click Here](#)

For PAC Documents and use "**Enrollment Form**" OR use last page in



YES! We have openings for.....
Newspaper Articles , Programs and Constellation reports



See page 32-33 for list of openings
Please contact **Dino Milani** if Interested

March 11th meeting will be a smorgasbord of mini presentations. Any member having something of interest, please contact Dino Milani so you be added to the schedule.

Thank You!

Dr. Lee Carkner has invited PAC members to visit the John Deere Planetarium on **February 5th at 7:00 pm**. As you may know, the planetarium has been updated and modernized.
See you there!

SUBMISSIONS

If you have an article or photos to submit or items of interest, we encourage you to send them in by the 25th of the month. Links to stories are welcome also.

Thank you!

CONTRIBUTIONS

My visit to the Museo Galileo (Galileo Museum)

By Paul Levesque

In the fall of 2018, my wife, Dawn, and I took a trip to Europe. The first stop on the trip was Florence, Italy, where our son, Andrew, was spending the first semester of his senior year at the University of Northern Iowa studying abroad.

Though its population is roughly that of the Quad Cities metropolitan area, Florence is one of the most fascinating cities in the world, a center of art, culture and learning with a rich history and with something interesting to see around every corner. If you've never been to Florence, I'd recommend putting it on your bucket list, and I'd further recommend that you visit the **Museo Galileo** (Galileo Museum) while in the capital of Tuscany.

Galileo Galilei spent most of his life in and around Florence, and it was there that he discovered the moons of Jupiter, proving that Earth was not the center of the universe. Proclaiming such a heresy ultimately resulted in Galileo living his final years under house arrest in an estate near Florence; prior to his trial by the Inquisition, though, Galileo served under the patronage of the Medici family, which ruled the prosperous city-state throughout the 17th century.

The Medici and their successors as Florentine rulers established and maintained various academies of science, and these academies accumulated a vast collection of scientific instruments over the decades. Today, selected items collected by those academies are on display at the *Museo Galileo*.

At the museum, you'll find a variety of early telescopes, including two telescopes that were used by Galileo. In honor of its namesake, the museum also displays a bust of Galileo, along with relics from his body preserved behind glass – a tooth, a thumb, and middle and index fingers.

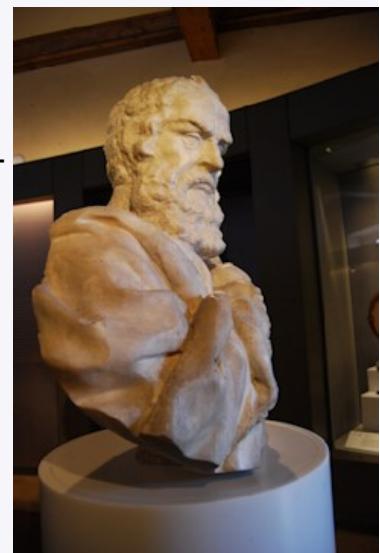
The other items you'll find in the museum include globes, maps, clocks, microscopes, thermome-

ters, barometers, navigation instruments, medical devices, an early chemistry cabinet, and more. Models used to teach and demonstrate scientific concepts are also on display.

Items in the collection range from the 17th to the 19th centuries, and – as typical of most large museums – much of the collection is stored out of sight of museum visitors, but available for examination by researchers.

The museum has two main floors divided into 18 rooms, each devoted to a different set of items. Wandering through these rooms for a few hours will give you a lesson in the history of science. You'll also come away amazed by the craftsmanship that went into the creation of the items you see, and by the ingenuity and determination of the scientists who used them to make discoveries that continue to benefit us today.

Photography is allowed at the museum, so here are some select photos which I took at the museum during our stop there on September 30:



Above: A bust of Galileo looking rather stern,



Left: The boney remains of his middle and index fingers, relics of the great man preserved under glass.

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Left: These two telescopes were used by Galileo in his examination of the night sky .



Right: Replicas of the telescopes used by Galileo, "exploded" to show their internal



Left: Telescopes from the 18th century, seemingly designed as objects of art as well as instruments of science.

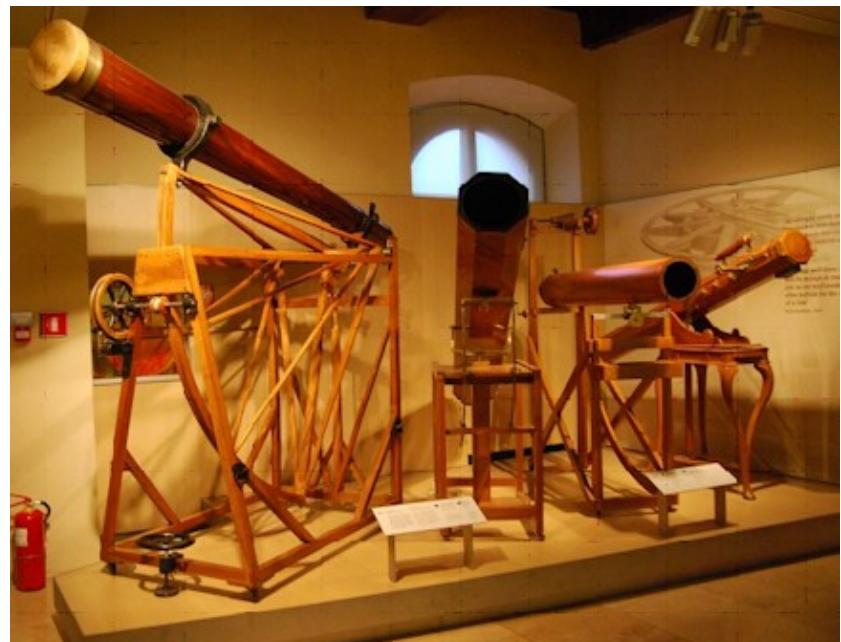


Right: A display case filled with telescopes used by astronomers who came after Galileo.

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Right: These large wooden telescopes were used by astronomers in the 19th century.



Left: Two of the many globes on display at the museum; the top globe shows geographical features, while the bottom illustrates the constellations with artistic renderings.

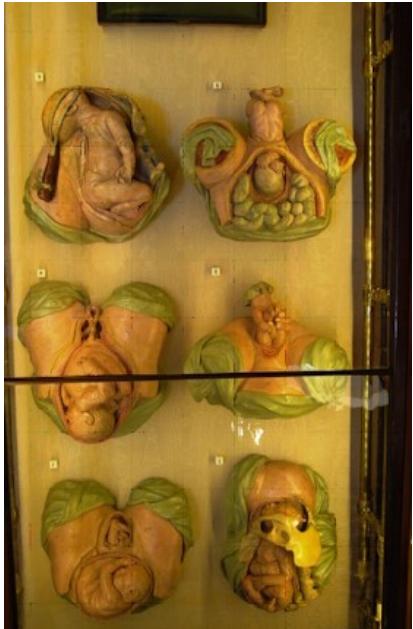


Left: Thermometers, barometers and other devices used to measure weather conditions.

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Right: A chemistry cabinet from the late 18th century .



Left: Obstetrical models from the late 18th century, used for training in childbirth.



Right: This medical model demonstrates the human arm as a third-order lever



Above: .A model of the Ptolemaic universe, with Earth at the center and other objects

Right: This beautiful, ornate clock was used to show the relative times and positions of the sun, moon and visible planets against the backdrop of the constellations of the zodiac.



Below: A sundial that keep remarkably accurate time stands outside the Museo Galileo





January 2019

For those of us who were alive back then, where were you on Christmas Eve, in the year 1968? I remember exactly where I was. Sitting in front of my family's television, we were watching a surreal scene on TV. There was a camera peering through a triangular-shaped window on a spacecraft called Apollo 8, out of which was a view of mountains, plains, and craters. And at the bottom of the screen were the words, "Live from the Moon". I have a feeling that most of you, if you were living then, were watching too. The Apollo 8 Christmas eve broadcast was the most watched television program in the world up to that time. The announcer on our station, Walter Cronkite, was not saying much. Occasionally he would update us as to what part of the Moon the spacecraft was looking at, but most of the time, the view on the screen said it all. And it was magical. The year 1968 was a terrible year for the most part. In April, Martin Luther King was murdered outside his hotel room in Memphis, and just two months later in Los Angeles, Senator Robert Kennedy was assassinated. And two months after that, the Democratic National Convention disintegrated into a riot on the streets of Chicago, with "The whole world watching." That November, Richard Nixon won a close national election. Then came Christmas Eve.

Apollo 8 was not intended to head for the Moon. The Saturn 5 rocket, as tall as a 36-floor building, had never been flown with humans aboard.

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The NASA picture that accompanies this article, in fact, shows Wernher Von Braun, the man who designed the Saturn 5, utterly dwarfed by five engines so large that one could set up housekeeping in each of them. (The other picture is astronaut Bill Anders' epochal "Earthrise".)



The Saturn 5's unmanned test flights had been beset by several minor problems, and the Lunar Module, which was intended to land two astronauts on

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Skyward

David H. Levy

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the Moon and return them to the command vehicle, was not yet ready for flight testing. But in August, 1968, George Low, Manager of the Apollo Spacecraft Program office, came up with an ingenious idea: NASA could fly a manned Saturn 5 with only the Command module. If the launch was successful, it could then proceed to orbit the Moon.

After some debate and a lot of tense moments, Apollo 8 launched on the winter solstice, December 21, 1968. About two hours later, a simple message was radioed: "Apollo 8: You are go for TLI." After the trans-lunar injection, Apollo 8, with Frank Borman, Jim Lovell, and Bill Anders, was on its way to a Christmas eve rendezvous with the Moon, there was nothing left to do but travel and wait.

For me, by far the most memorable part was the astronauts' Christmas eve message:

"We are now approaching lunar sunrise, and for all the people back on Earth, the crew of Apollo 8 has a message that we would like to send to you." Then each astronaut read from the book of Genesis. Our family was spellbound as we listened to these words. But it was the ending that really turned the year 1968 from one of tragedy to one of promise and hope:

"And from the crew of Apollo 8, we close with good night, good luck, a Merry Christmas—and God bless all of you, all of you on the good Earth."

BBC's
The Sky At Night
The Sky at Night Gaia:
A Galactic Revolution

**CLICK HERE FOR
LINK TO YOUTUBE**



"Just look at those stars tonight. ... Makes you feel sort of small and insignificant."

You and 12 others

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ASTRONOMY IN PRINT

Quad City Sky-Watch January 2019 article

By Sara Sheidler

The New Year opens with an unusual month for observers of the Sun, Moon, and planets. The highlight of not only January but the entire year comes up on January 20 but more about that later. The first few days of the month begin with a crescent Moon and bright Venus visible before sunrise. Looking Southeast 30 minutes before sunrise, Mercury is low to the horizon and Jupiter and Venus are shining brightly along with the star Antares. Jupiter starts the year rising after 5am. An interesting sight to watch on clear early mornings is Venus sinking down closer and closer to Jupiter until on the 19th it will be just to the left of Jupiter with Antares to the right. On the 26th the three objects almost make a horizontal line and they are all close together. Saturn doesn't emerge into the morning twilight until the third week of the month. Mars continues to be an evening planet in the southwestern sky throughout the month and continues to fade in brightness. Did you see it last Summer looming large and red in the Southern sky? Mars is the sole bright planet in the evening sky this month. The distant ice giants Neptune and Uranus are much more elusive to spot and will require telescopes.

The highlight for January and also the entire year will be the Lunar Eclipse which begins at approximately 9:34 pm on the evening of January 20 with the partial phase. This will be the last total lunar eclipse anywhere in the world until 2021 so if the sky is clear you won't want to miss this event. By 10:41pm the total eclipse begins which means the shadow of the Earth will be completely covering the Moon's surface. Totality will last just over one hour. The sky will darken and with binoculars you should be able to view some more objects in the Winter Milky Way. Gemini's "twins" Pollux and Castor will be just above the darkened Moon. The fa-

mous Beehive Cluster (M44) is to the left. The partial phase will end at approximately 12:51 am on January 21. If the skies are clear bundle up and watch the eclipse as it progresses. What does the Moon look like during totality? Is it orange, red, or rust colored? Some reports of other eclipses reported the Moon resembled a bright copper penny! Other lunar eclipses seemed to have a white ring around the edge of the Moon. Share your observations with us on [Facebook](#). There is a link to it from the Popular Astronomy Club website.

<http://www.popularastronomyclub.org/>

Good luck and clear skies!

Editors note: Appeared as the Quad-Cities Sky Watch article in the January 6th, 2019 Dispatch/Argus newspaper.



This is the lunar eclipse and blood moon visible the evening of April 15th, 2014. Photo by Alan Sheidler, Popular Astronomy Club.

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UPCOMING EVENTS



PAC Meeting February 11th, 2019

7:00PM

Location is at the Butterworth Center

Regular Meeting

Constellation Report: Wayland Bauer

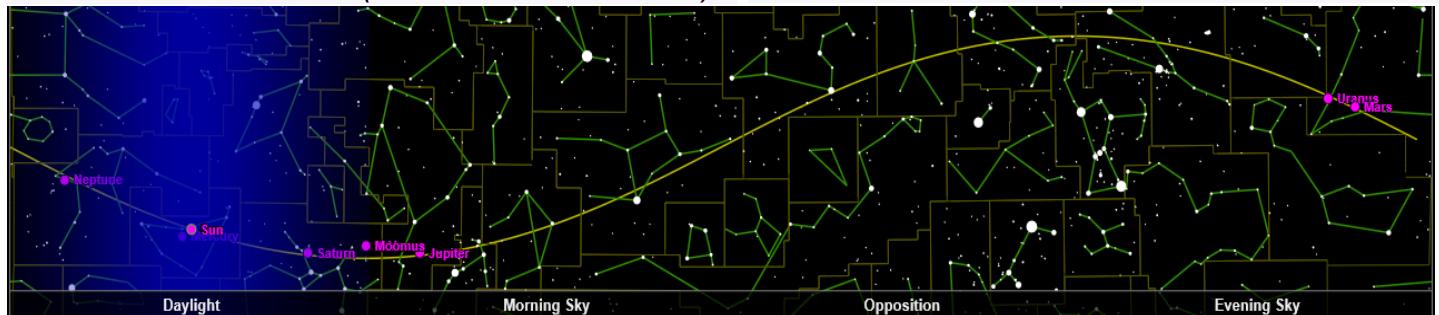
Presentation: Jeff Struve— Detecting Exo-planets



- **February 5th, 2019** John Deere Planetarium Showing for PAC members at 7 p.m. (hosted by Lee Carkner)
- **March 11th, 2019** PAC business meeting at Butterworth center at 7:00 p.m. Program: Smorgasbord; Constellation Report: Dino Milani
- **March 16th, 2019** WQPT Imagination Station [WIU-QC Campus](#) Daytime Event
- **March 16th, 2019** Niabi Observing Night: 1st quarter moon, high overhead; winter constellations
- **March 23rd, 2019** [Rock Island 30/31](#) Outreach 7:30–9 p.m. (Rain Date: March 30th)
- **April 8th, 2019** PAC regular meeting at the Butterworth Center at 7:00 p.m. Program: Gerry Pearson— International Dark Sky Association; Constellation report: Dale Hachtel
- **April 20th, 2019** Niabi Observing Night; deep sky objects; moon rising at 9:30 p.m.
- **May 3rd-5th, 2019** [NCRAL](#) conference – Moline Illinois
- **May 13th, 2019** PAC regular meeting at Butterworth Center at 7:00 p.m. Constellation Report Terry Dufek
- **May 18th, 2019** Niabi Observing Night.
- **June 10th, 2019** PAC business meeting at Butterworth center at 7:00 p.m. Constellation Report: Alex Holt
- **June 15th, 2019** Niabi Observing Night.
- **July 8th, 2019** PAC regular meeting at Butterworth Center at 7:00 p.m. Constellation Report: Frank Stonestreet— Hercules
- **July 20th, 2019** Niabi Observing Night.
- **August 3rd** ‘Astronomy in the Campground’ [Illiniwek Forest Preserve](#) Makeup date is 8/24/2019
- **August 10th, 2019** PAC Annual Picnic at Paul Castle Observatory
- **August 17th 2019** Niabi Observing Night.
- **September 21st, 2019** Niabi Observing Night.
- **Sept 27th-29th, 2019** Eastern Iowa Star Party
- **October 12th, 2019** PAC Annual Banquet— Butterworth Center
- **October 19th, 2019** Niabi Observing Night.
- **November 11th, , 2019** PAC regular meeting at Butterworth Center at 7:00 p.m.
- **November 16th. 2019** Niabi Observing Night.
- **December 9th, 2019** PAC Business meeting and election of Officers— Year in Review by Roy Gustafson

Mark your calendars and watch upcoming e-mails for more information!

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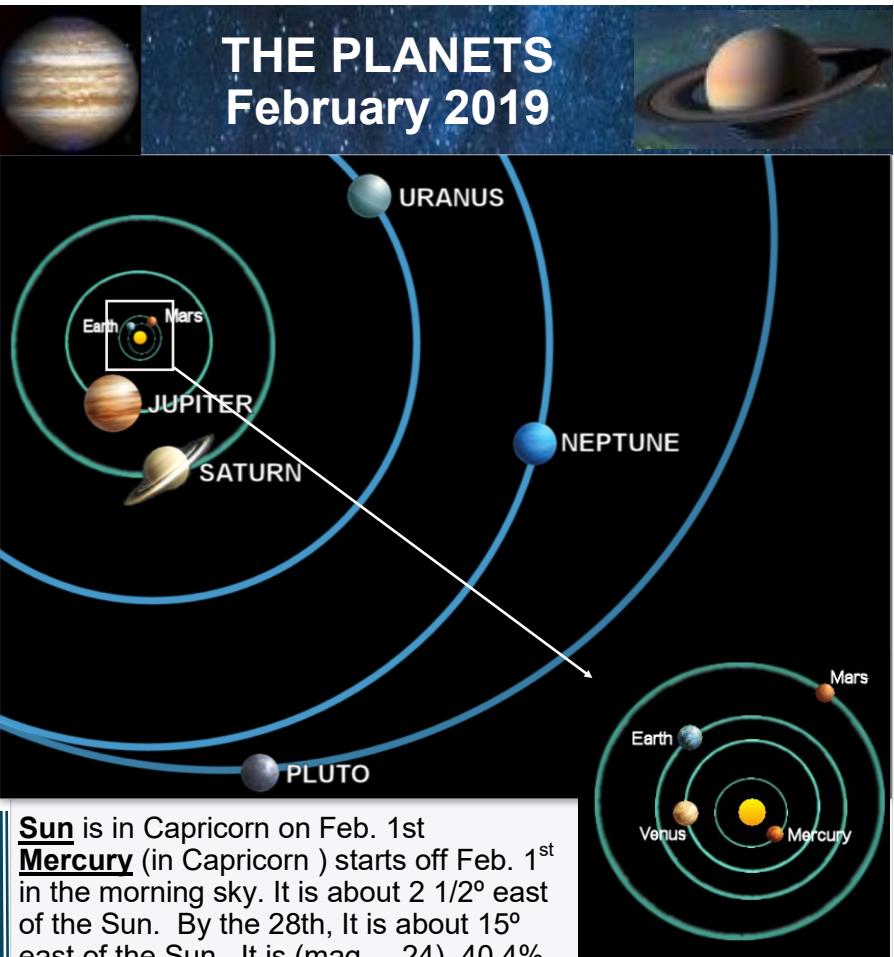
ASTRONOMICAL CALENDAR OF EVENTS

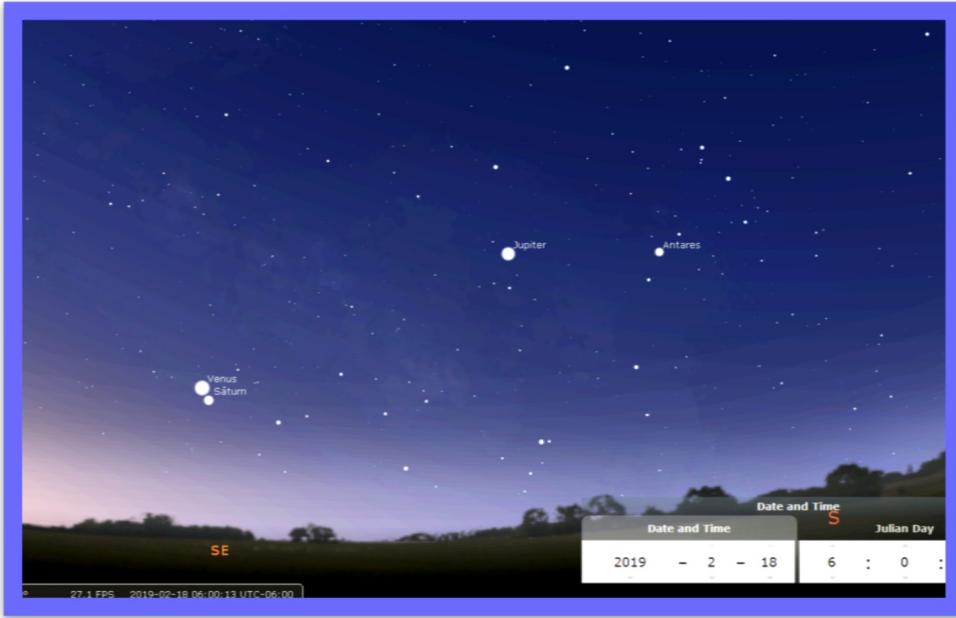
adjusted for Daylight Savings Time
when applicable

Date Time Event

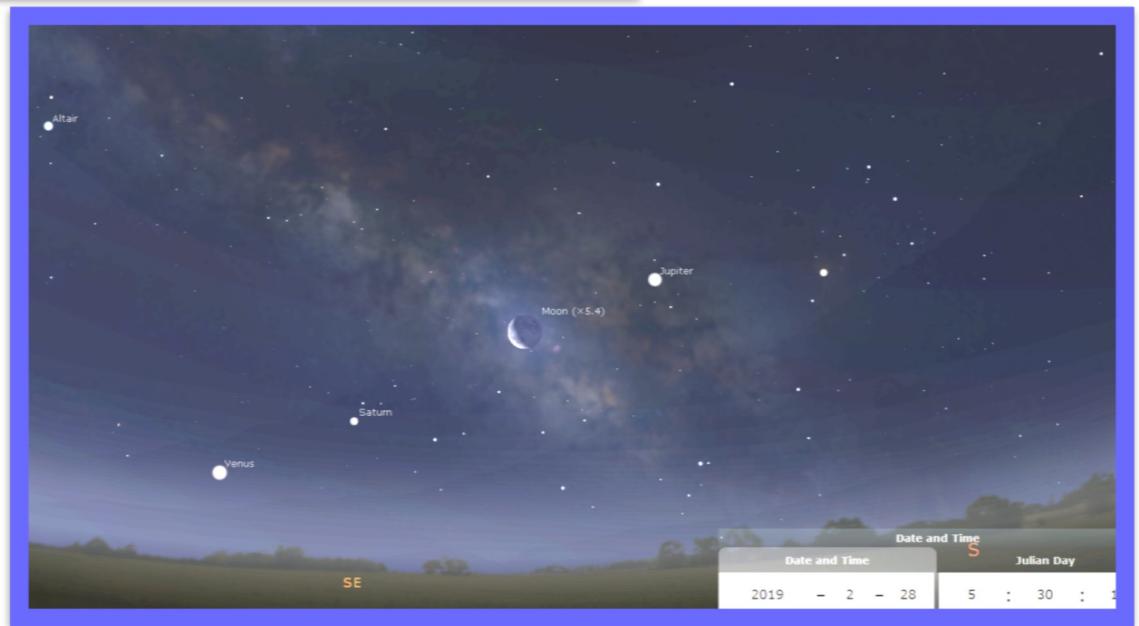
- Feb 02 01:18 **Saturn 0.6°S of Moon: Occultation (N.V.)**
- Feb 03 00:35 Moon at Descending Node
- Feb 04 15:04 **NEW MOON**
- Feb 05 03:26 Moon at Apogee: 406556 km
- Feb 12 16:26 **FIRST QUARTER MOON**
- Feb 13 21:29 Aldebaran 1.7°S of Moon
- Feb 17 03:42 Moon at Ascending Node
- Feb 17 21:05 **Beehive 0.6°N of Moon**
- Feb 19 03:06 Moon at Perigee: 356762 km
- Feb 19 07:08 Regulus 2.5°S of Moon
- Feb 19 09:53 **FULL MOON**
- Feb 25 02 Mercury at Perihelion
- Feb 26 05:28 **LAST QUARTER MOON**
- Feb 26 19 Mercury at Greatest Elong: 18.1°E
- Feb 27 08:17 Jupiter 2.3°S of Moon
- Mar 01 12:40 **Saturn 0.3°S of Moon: Occultation**
- Mar 02 05:03 Moon at Descending Node
- Mar 02 15:28 Venus 1.2°N of Moon
- Mar 04 05:25 Moon at Apogee: 406391 km
- Mar 06 10:04 **NEW MOON**
- Mar 06 19:00 Neptune in Conjunction with Sun
- Mar 10 03 00 **Daylight Savings Time Starts**
- Mar 11 07:09 Mars 5.8°N of Moon
- Mar 13 05:13 Aldebaran 1.9°S of Moon
- Mar 14 05:27 **FIRST QUARTER MOON**
- Mar 14 21:00 Mercury at Inferior Conjunction
- Mar 16 11:22 Moon at Ascending Node
- Mar 17 08:01 **Beehive 0.5°N of Moon**
- Mar 18 18:59 Regulus 2.6°S of Moon
- Mar 19 14:47 Moon at Perigee: 359381 km
- Mar 20 16:58 **Vernal Equinox**
- Mar 20 20:43 **FULL MOON**
- Mar 26 21:28 Jupiter 1.9°S of Moon
- Mar 27 23:10 **LAST QUARTER MOON**

THE PLANETS February 2019





(left) On February 18th, Saturn and Venus will pass about 1° from each other in the early morning sky. The scene represented is at about 6:00 am after which the sky brightens rapidly brightens rapidly after that.

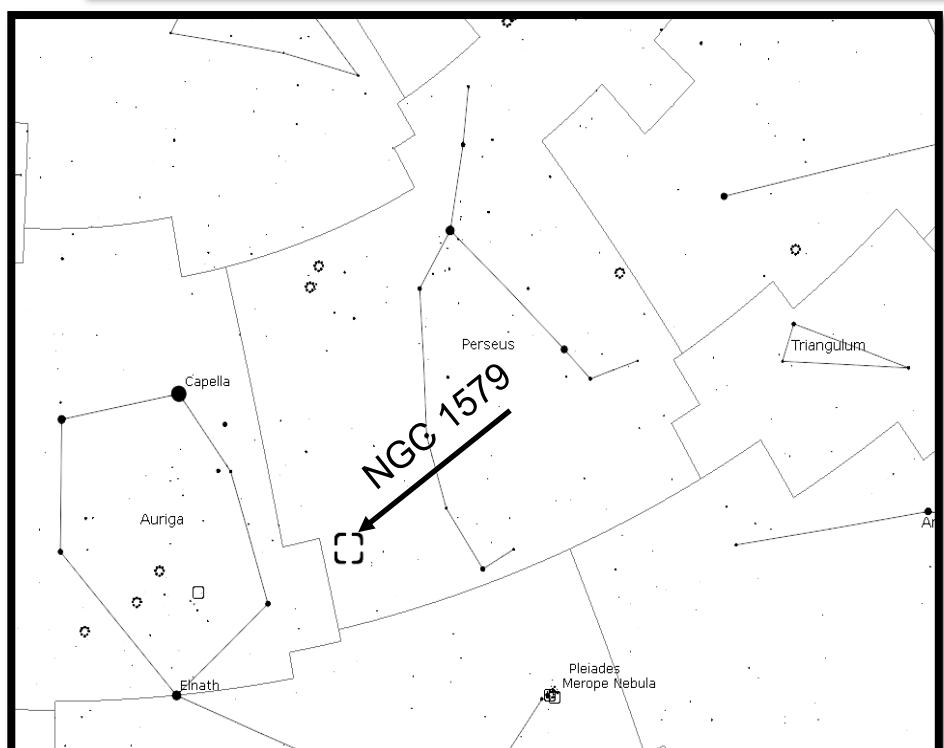


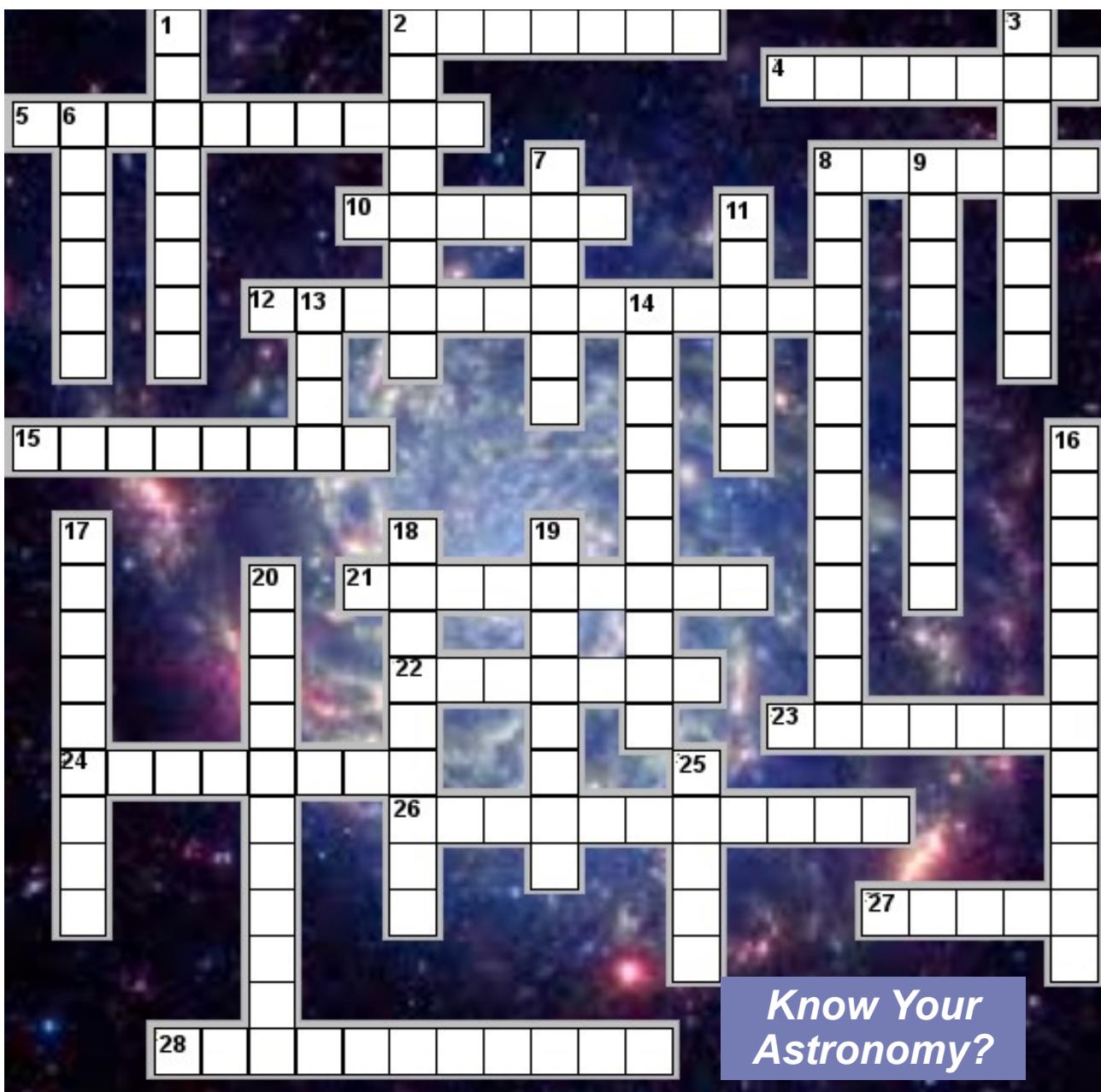
(left) On February 12th, Uranus and Mars will be about 1° apart in the evening sky. (see inset below)



Spotlight: NCG 1579 Northern Trifid Nebula

- NGC 1579 is also known as the “Trifid of the North” (because of its similar appearance to the Trifid Nebula, which is located in the southern celestial hemisphere)
- Located in the constellation of Perseus
- About 8 1/2 magnitude in brightness
- The star cluster contains the emission-line star LkHα 101, which provides much of the ionizing radiation in the nebula
- A reflection nebula and dust cloud contains a cluster of about 5 bright B class stars and 35 other stars.
- Like the Trifid, a study in contrasting blue and red colors, with dark dust lanes prominent in the nebula's central regions. In both, dust reflects starlight to produce beautiful blue reflection nebulae.
- But unlike the Trifid, in NGC 1579 the reddish glow is not emission from clouds of glowing hydrogen gas excited by ultraviolet light from a nearby hot star. Instead, the dust in NGC 1579 drastically diminishes, reddens, and scatters the light from an embedded, extremely young, massive star, itself a strong emitter of the characteristic red hydrogen alpha light.
- NGC 1579 lies within a giant molecular cloud known as the California Molecular Cloud
- About 2,100 light-years away and 3 light-years across





Know Your Astronomy?

Across

2. any of a class of variable stars with regular cycles of variations in luminosity (most ranging from three to fifty days)
4. Viewing an object by looking slightly to its side is known as using _____ vision
5. a mark on the earth's surface, usually circular, formed by a large ancient meteorite impact
8. A brief streak of light caused by a small piece of solid matter entering Earth's atmosphere
10. set of constellations situated along the ecliptic in the sky
12. the twinkling of stars or radio sources, caused

by rapid changes in the density of the earth's atmosphere, the interplanetary medium, or the interstellar medium, producing uneven refraction of starlight

15. The imaginary north-south line that passes directly overhead (through the zenith)
21. A telescope that gathers light with a lens
22. The two times each year, near March 20th and September 22nd, when the Sun is directly overhead at noon as seen from Earth's equator
23. The apparent size of an object in the sky in seconds, minutes or degrees is know as its _____ size
24. The time after sunset or before sunrise

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when the sky is not fully dark

26. The angle between the plane of an orbit and a reference plane
27. The device that supports your telescope
28. A small telescope used to aim your main scope at an object in the sky

Down

1. The apparent offset of a foreground object against the background when your perspective changes.
2. A telescope with a mirror in the back and a lens in the front is called a _____ telescope
3. a stony meteorite consisting of silicate minerals
6. A measure of the atmosphere's stability
7. A lens that's placed into the focusing tube to effectively double or triple a telescope's focal length
8. The amount that a telescope enlarges its subject
9. The line on the Moon or a planet that divides the bright, sunlit part from the part in shadow
11. a fast-spinning star or celestial mass
13. the luminous cloud surrounding the frozen solid nucleus in the head of a comet
14. The eyes' transition to night vision, in order to see faint object is called dark
16. The measure of how much an orbit deviates from being circular.
17. A telescope's main light-gathering lens or mirror
18. A grid system for locating things in the sky is called _____ coordinates
19. A star whose brightness changes over the course of days, weeks, months, or years is called?
20. The moment when a celestial object crosses the meridian and is thus at its highest above the horizon.
25. The Moon **waxes**, growing more illuminated, between its new and full phases, and _____, becoming less illuminated, between its full and new phases.

Answers on last page of this issue



Variable Earthshine?

As you know Earthshine is the reflected light from the Earth to the unlit portion of the Moon just before or after new. It is quite noticeable then but is harder to see later because of the brightening of the Moon as it gets towards first quarter.

Earthshine can vary in brightness due to the moon being close to sunset or lost in the twilight or even because of atmospheric conditions but it can also vary due to the position of the Earth itself.

The Earth's albedo (reflectivity) varies based on the surface being looked at. It is between 10% to 40% (low) when looking at land and sea while clouds, ice and snow can be between 70% to 90% (high). So, if the sunlit part of the Earth that is pointed towards the darkened portion of the Moon contains large areas of say the northern hemisphere during mid winter and even some clouds, it will tend to brighten the Moon more than if the part of the Earth facing the Moon was Africa and the surrounding oceans.

Detecting differences in brightness in the Earthshine may be the hard part however as there are quite a few variables involved as mentioned above. The individual observer must make the determination if the Earth-shine is brighter when seen as opposed to previous observations.



This article is distributed by NASA Night Sky Network

The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.org to find local clubs, events, and more!

Hexagon at Night, Quartet in the Morning

David Prosper

The stars that make up the **Winter Hexagon** asterism are some of the brightest in the night sky and February evenings are a great time to enjoy their sparkly splendor. The Winter Hexagon is so large in size that the six stars that make up its



*Caption: The stars of the Winter Hexagon
Image created with help from Stellarium*

points are also the brightest members of six different constellations, making the Hexagon a great starting point for learning the winter sky. Find the Hexagon by looking southeast after sunset and finding the bright red star that forms the “left shoul-

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der” of the constellation Orion: **Betelgeuse**.

You can think of Betelgeuse as the center of a large irregular clock, with the Winter Hexagon stars as the clock’s hour numbers. Move diagonally across Orion to spot its “right foot,” the bright star **Rigel**. Now move clockwise from Rigel to the brightest star in the night sky: **Sirius** in Canis Major. Continue ticking along clockwise to **Procyon** in Canis Minor and then towards **Pollux**, the brighter of the Gemini twins. Keep moving around the circuit to find **Capella** in Auriga, and finish at orange **Aldebaran**, the “eye” of the V-shaped face of Taurus the Bull.

Two naked-eye planets are visible in the evening sky this month. As red **Mars** moves across Pisces, NASA’s InSight Mission is readying its suite of geological instruments designed to study the Martian interior. InSight and the rest of humanity’s robotic Martian emissaries will soon be joined by the Mars 2020 rover. The SUV-sized robot is slated to launch next year on a mission to study the possibility of past life on the red planet. A conjunction between Mars and **Uranus** on February 13 will be a treat for

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telescopic observers. Mars will pass a little over a degree away from Uranus and larger magnifications will allow comparisons between the small red disc of dusty Mars with the smaller and much more distant blue-green disc of ice giant Uranus.

Speedy Mercury has a good showing this month and makes its highest appearance in the evening on February 27; spot it above the western horizon at sunset. An unobstructed western view and binoculars will greatly help in catching Mercury against the glow of evening twilight.

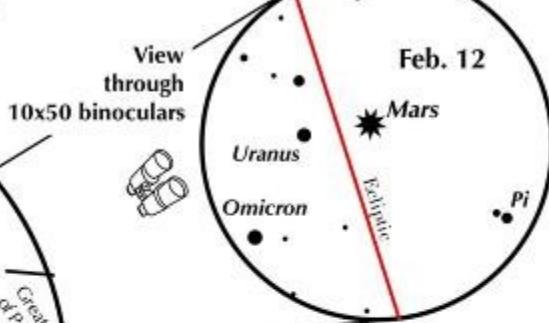
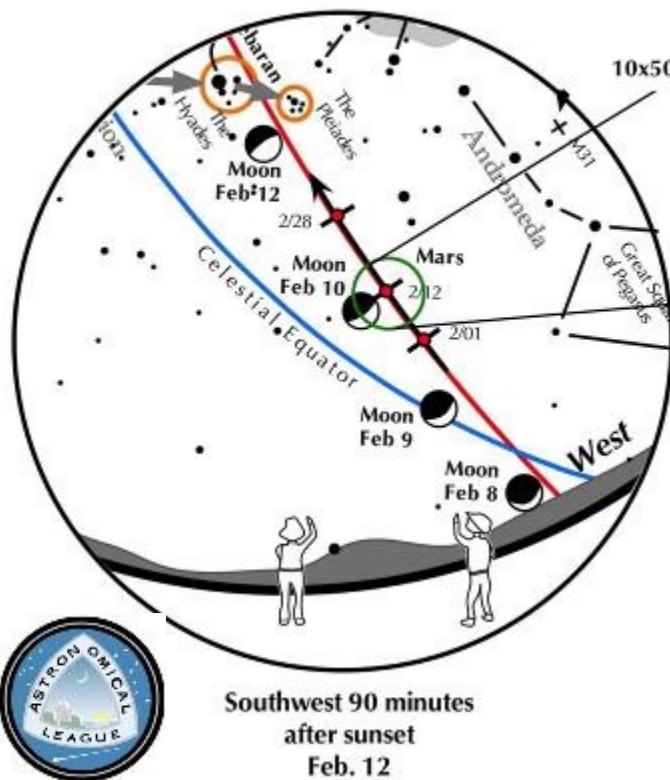
The morning planets put on quite a show in February. Look for the bright planets **Venus**, **Jupiter**, and **Saturn** above the eastern horizon all month, at times forming a neat lineup. A crescent **Moon**

(Continued in next column)

makes a stunning addition on the mornings of February 1-2, and again on the 28th. Watch over the course of the month as Venus travels from its position above Jupiter to below dimmer Saturn. Venus and Saturn will be in close conjunction on the 18th; see if you can fit both planets into the same telescopic field of view. A telescope reveals the brilliant thin crescent phase of Venus waxing into a wide gibbous phase as the planet passes around the other side of our Sun. The Night Sky Network has a simple activity that helps explain the nature of both Venus and Mercury's phases at bit.ly/venusphases

You can catch up on all of NASA's current and future missions at nasa.gov

If you can observe only one celestial event this month, consider this one:



Look to the southwest 90 minutes after sunset.

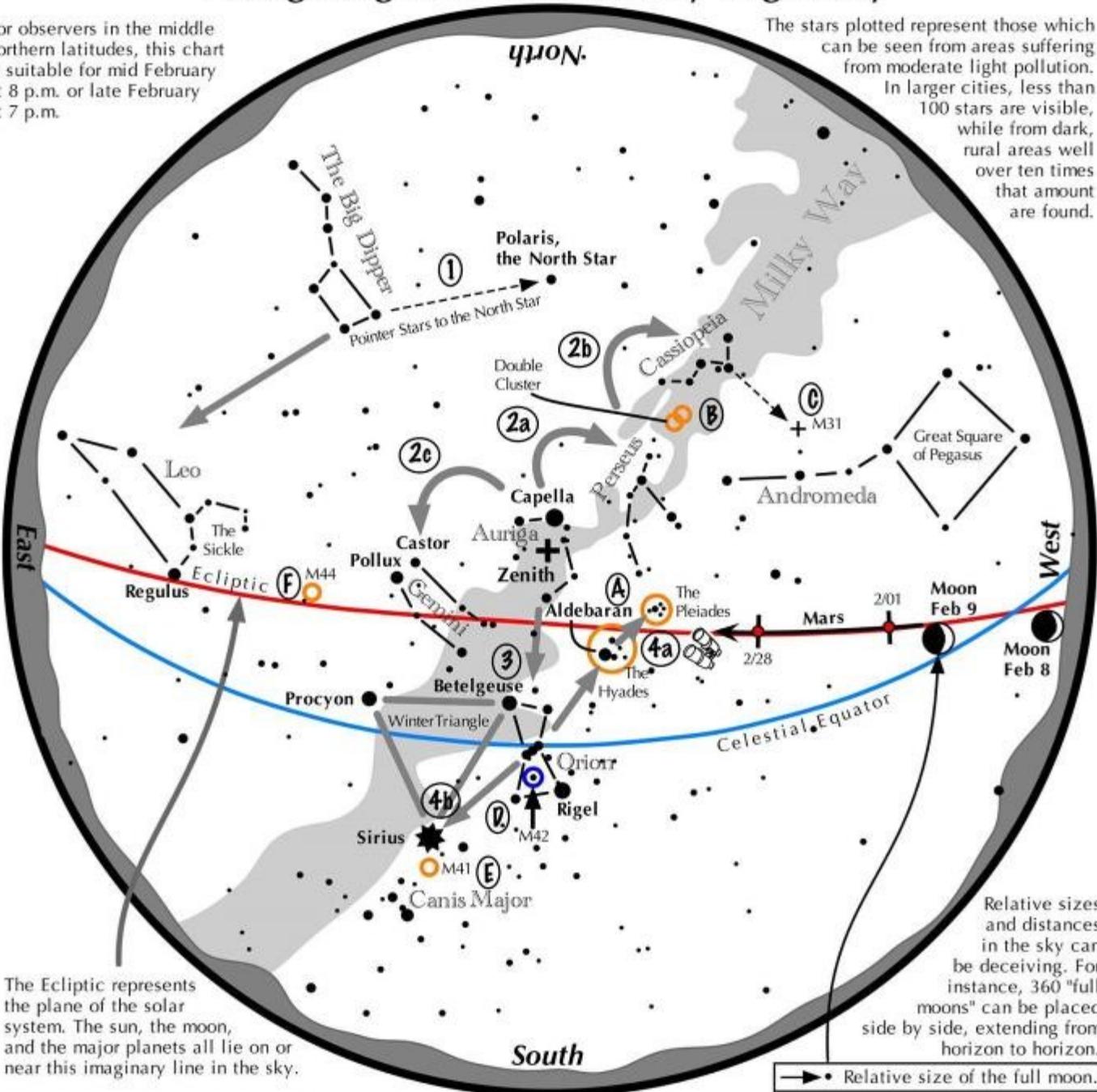
- Mars will be the brightest object in the area, other than the passing moon.
- Aim binoculars at the Red Planet. On the lower left edge of the field of view, shines Omicron Piscium and at the lower right twinkles Pi Piscium.
- The next brightest object in the field sits just to Mars' left, Uranus.
- A small telescope at high magnification will show Mars' small, ruddy disk, and Uranus' even smaller dot.
- Uranus spans 12 times the diameter of Mars, but it lies 7½ times farther away.

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.



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.



How do you find celestial objects?

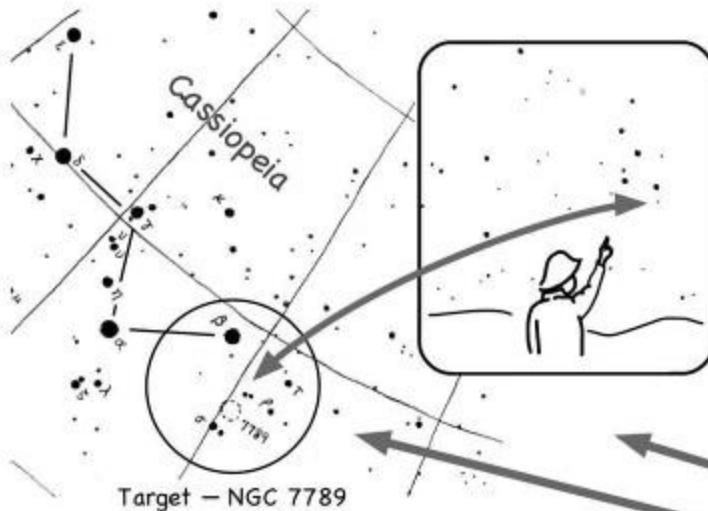
★ Finding celestial targets the modern way ★

Computerized "GoTo" telescopes ... the quick and easy method:

- 1 Level the telescope mount
- 2 Point the tube towards north
- 3 Indicate the date and time
- 4 Indicate observing location
- 5 Center on first guide star
- 6 Center on second guide star
- 7 Enter the target's designation
- 8 The scope automatically slews to it

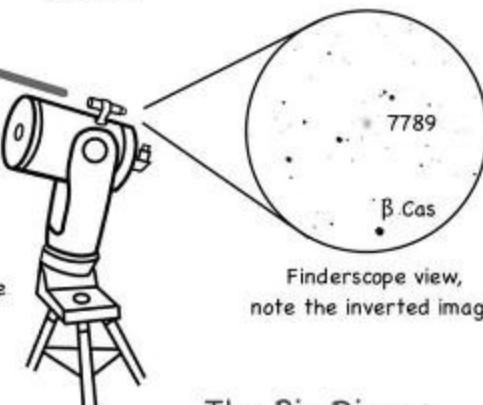


★ Finding celestial treasures the old fashioned way ★



1 Learn the stars and constellations

- ★ There is no substitute for sitting under the stars with a map and red flashlight.
- ★ Use a star map that plots all stars visible to the unaided eye.
- ★ Start by finding well-known star patterns such as the Big Dipper, or the constellation of Orion or Cassiopeia.
- ★ Continue by identifying neighboring star patterns.



2 Finderscope: little scope, big view

Why a finderscope?

- ★ Gives a wide field of view, about 5°,
- ★ Must be aligned with the main telescope,
- ★ Only the bright planets, brighter nebulae and star clusters are visible

Simply...

- ★ Point the finder at a suitable guide star, or
- ★ Triangulate to the object by using nearby recognizable stars.

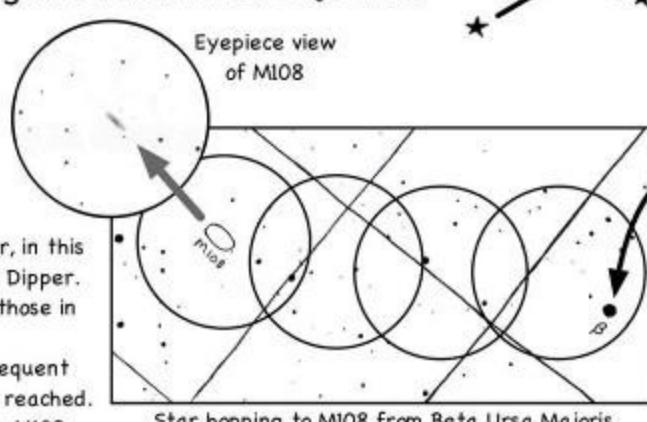
3 Star Hopping: finding the faintest of objects...

Before hopping begins:

- ★ Must have a detailed star map.
- ★ Must know the field of view of the eyepiece.

As an example, find galaxy M108:

- ★ Begin hopping at a reference star, in this case Beta (β) Ursa Majoris in the Big Dipper.
- ★ Match the stars on the map with those in the eyepiece.
- ★ Hop among the stars in each subsequent field of view until the correct field is reached.
- ★ Look closely to see the dim galaxy M108.



The Big Dipper



NEWSLINKS

How we found Jupiter's 79 (at least) moons

December 28th, 2018

CLICK HERE for
link to News Article



NASA's New Horizons mission reveals entirely new kind of world

January 2, 2019

CLICK HERE for
link to News Article



A guide to hunting zombie stars

January 2, 2019

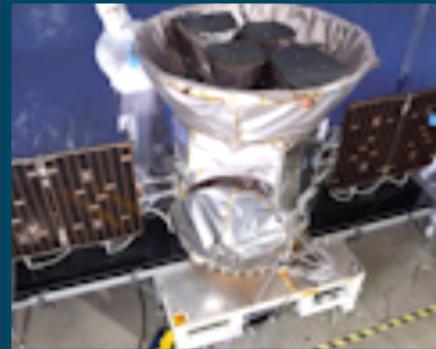
CLICK HERE for
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TESS on track to revolutionize exoplanet astronomy

January 8th, 2019

CLICK HERE for
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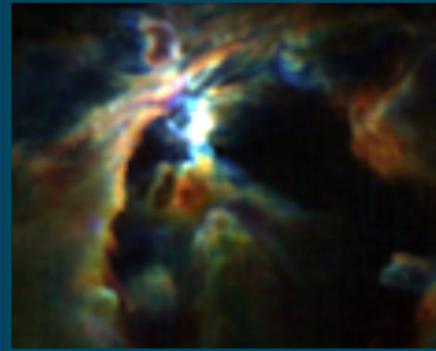


NEWSLINKS

Stellar Wind is Preventing More Stars From Forming in the Orion Nebula

January 7th, 2019

[CLICK HERE](#) for
link to News Article



NASA May Decide This Year to Land a Drone on Saturn's Moon Titan

January 16th, 2019

[CLICK HERE](#) for
link to News Article



Suspected meteor hit Moon during eclipse

January 20th, 2019

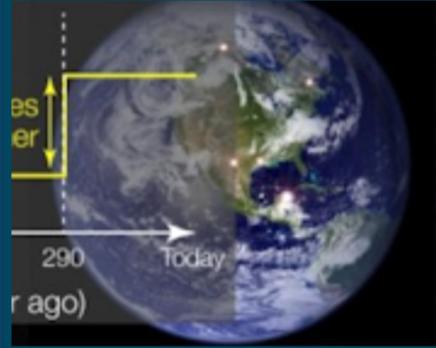
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Scientists find increase in asteroid impacts on ancient Earth by studying the Moon

January 17th, 2019

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link to News Article

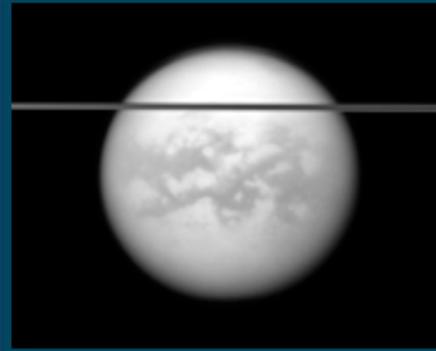


NEWSLINKS

Saturn's Biggest Moon Titan May Bake Its Own Atmosphere

January 26th, 2019

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link to News Article



As clouds fall apart, a new star is born

January 24th, 2019

CLICK HERE for
link to News Article



Opportunity rover logs 15 years on Mars

January 24th, 2019

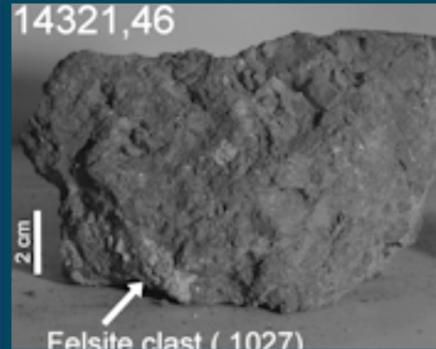
CLICK HERE for
link to News Article



Earth's oldest rock found on the Moon

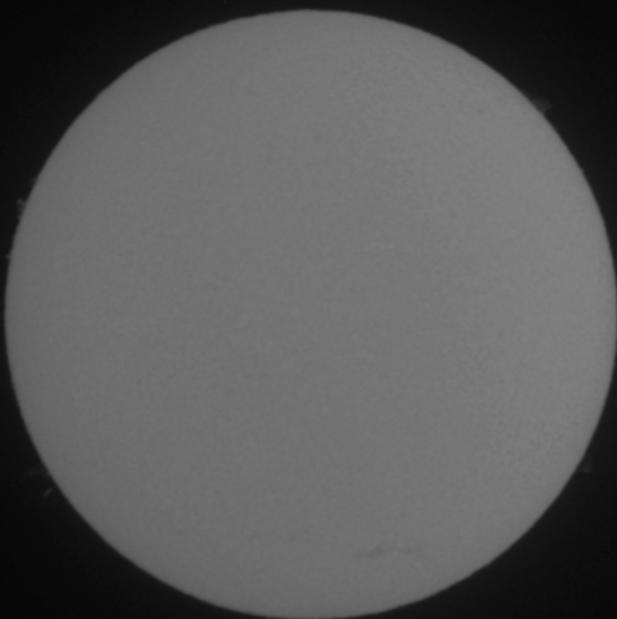
January 24th, 2019

CLICK HERE for
link to News Article



MEMBER OBSERVATIONS

(written, visual or photographic welcome)



Well, to paraphrase the immortal words of Scotty in the Star Trek film where they put a whale in a giant indoor pool on the Enterprise, I say “There be features on the Sun today!”. Not much, just a few proms and one faint filament just right of bottom center on the filament image, but still, better than the absolute nothing I’ve seen for the last few weeks. Granted, they aren’t very prominent, but, hey, there’s something there!

And some people think our Sun is not a variable star! I really miss the old days of a year or so ago when there were plenty of prominences and filaments that were easy to see.

Ken Boquist



Editors note: Photos were taken by Ken on December 30th, 2018

MEMBER OBSERVATIONS

(written, visual or photographic welcome)

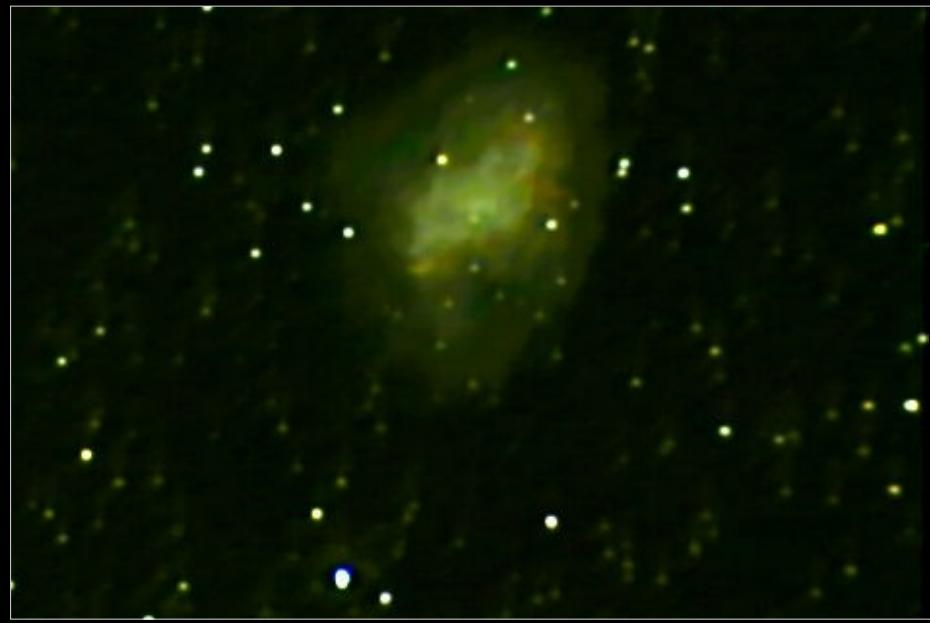


Editors note: I was seeing what Al saw at about 6:50. It was about this time I notice Mercury peeking over a roof top very low in the south east.

There was a beautiful alignment of the Moon, Jupiter and Venus this morning. Attached is a picture of the crescent Moon and Jupiter this morning (January 3rd) at 6:31 AM. This clearly shows the dark side of the moon illuminated by earth-shine and three of the four Galilean moons of Jupiter (Ganymede, Io, and Europa). Callisto is too close to Jupiter to be visible at this magnification.

Camera data: Nikon D7500 with telephoto lens at FL = 240mm, F6.3, 6400 ISO, 1/3 second exposure time.

This was a beautiful sight.
Thanks. Al Sheidler



M1 (left) taken on Jan. 4th. with the revolution imager from Menke observatory by Terry Dufek

MEMBER OBSERVATIONS

(written, visual or photographic welcome)



M33 (left) taken on Jan. 4th. with the revolution imager from Menke observatory . Amazingly, it looked pretty much the same but fainter in the eyepiece
Terry Dufek

Arrived out at Menke (Jan. 4th) to take advantage of the dark skies and mild weather with Ken, Paul, Al and Eric. Used the revolution imager to take some photos of The Crab Nebula, M33 galaxy in Triangulum and NCG 2024, the Flame Nebula. All other photos didn't turn out. Possibly because of wrong settings on sharp cap. I have created default settings in the program so hopefully that is that. The laptop shut down (because of the cold) after a couple hours so did some visual observing . Tip: on cold evenings 40 degrees or below, plug the charger in right away. The Orion Nebula was fantastic and the detail was great through the eyepiece. The trapezium stood out clearly. Looked at M15 globular cluster with a nice tight ball of stars. Visually looked the Crab Nebula overhead and it was much brighter than I have seen with its ghostly shape. Could visually see the Andromeda Galaxy directly overhead. Also looked at the Crystal Ball Nebula in Taurus, a fairly bright planetary.

Terry Dufek



NGC 2024, The Flame Nebula (right) taken on Jan. 4th. with the revolution imager from Menke observatory by Terry Dufek

MEMBER OBSERVATIONS

(written, visual or photographic welcome)

Last evening (*January 4th*) , Ken Boquist, Terry Dufek, Paul Levesque, Eric Sheidler and Al Sheidler met at Menke Observatory to take advantage of the beautifully clear weather and moonless sky to do a little observing. Terry and Ken were set up to do imaging, while Paul, Eric and I did primarily visual observing. We did snap a couple of pictures attached to this email which you might find pleasing:

1) M2 (*lower left*) is a nice globular cluster in Aquarius. D7500 Nikon camera attached to a 10" Meade LX200, F10, 30sec time exposure at ISO6400

2) M42, The Orion Nebula. (*upper right*) Same camera and telescope, F10, 20sec exposure time, ISO6400. I also used Photoshop to darken the highlights to improve the view of the Trapezium and tease out some of the structure of the clouds enveloping this amazing star forming region. It is amazing to observe this nebula in the eyepiece and we used 56mm, 40mm and 26mm eyepieces to provide both wide field and magnified views of this amazing sight. The one thing the camera does (which the eye cannot do) is show the colors of the clouds.

Other objects we observed included:

M15 a really nice globular cluster in Pegasus

M52 a rich, compressed open cluster in Cassiopeia

NGC40, the Bow Tie Nebula, a planetary nebula in Cepheus

Erakis, the Garnet Star, in Cepheus. This star's beautiful, deep orange color betrays the fact that it is a red supergiant star. It is so big that if it were substituted for the sun in our solar system, we would be inside it! (better them than us).

NGC6826, The Blinking Planetary, an interesting planetary nebula in Cygnus. The still visible central star appears to "blink" when viewed with averted vision.

NGC7008, The Fetus Nebula another planetary nebula also in Cygnus. It appears to be irregular in shape and larger, though not as bright as NGC6826

NGC6543, The Cat's Eye Nebula, another planetary nebula in Draco. Planetary nebulae are the remnants of stars which are dead or dying. In several billion years, this may be the ultimate fate of our sun.

Keep looking up and enjoy the view! Al.



Total Lunar Eclipse January 20th, 2019

(written, visual or photographic welcome)

I hope you all got a chance to observe the lunar eclipse last night. (Right) is a picture of the event from Moline, Illinois at about 10:41PM. I used a Meade ETX90 telescope, FL = 1250mm, f13.8; Nikon D7500 camera, 3 second exposure time at ISO 6400.
Keep looking up!

Al Sheidler.



My attempt (left) of the Moon at 11:14 pm last night. Canon 200D, 2x teleconverter, and a 70 - 300 mm telephoto lens at 300 mm. Too cold to stay out very long - the temperature was -5 degrees!!!!

Roy Gustafson



10:39 pm



10:54 pm



11:15 pm



11:46 pm

Above sequence was shot with a Kodak digital. Could not control exposure and focus was automatic (?) but still gave some decent results.

Terry Dufek

Total Lunar Eclipse

January 20th, 2019

(written, visual or photographic welcome)

Editors note: all photos on this page are from Mike Gacioch. They are sequenced from top to bottom, left to right



All taken with stationary tripod Canon 7D Mark II; 100 - 400 L lens at 400mm; Partials 1/1250, f/8, ISO800; Early Full 1/2 sec, f/8, ISO3200; Max Full 1 sec, f/8, ISO 1600. All cropped, sharpened and light adjusted, no color adjustment.

Mike Gacioch

Total Lunar Eclipse

January 20th, 2019

(written, visual or photographic welcome)



Here are my photos from Sunday night. It started out cold, 7 degrees above zero and dropped to 0 degrees when I quit. I used my Bresser 127mm refractor and attached a Canon 40D in manual mode, ISO-100, various exposure times (from 1/2500th of a second to 6 seconds) then cropped to smaller sizes for easier viewing. Since you have the full email list, please share them with everyone.
Thanks,

Dino Milani

Editors note: all photos on this page and the next are from Dino Milani. They are sequenced from left to right, top to bottom. Continued on next page

Total Lunar Eclipse

January 20th, 2019

(written, visual or photographic welcome)



*Editors note; photos
by Dino Milani*



PAC MONTHLY MEETING

President Alan Sheidler called the January meeting of the Popular Astronomy Club to order in the Deere-Wiman Butterworth Center at 7:00 p.m. local time, on January 14th, 2018. We had 25 members and 4 guests attending.

Guests were introduced. Paul Rewerts, Byron Davies and new member John Moessner.

Review of openings for Constellation Reports, Presentations and Newspaper Articles.

Observations or Photography presented:

- Ken Boquist's Solar Photos
- Ken Boquist's Comet Wirtanen Photos
- Terry Dufek's Sketch of Comet Wirtanen
- Al Sheidler's Movement of Comet Wirtanen Photos
- Al Sheidler's Moon with earthshine and Jupiter and moons.
- Roy Gustafson's photo of Comet Wirtanen among the Pleiades and the Hyades.
- Al Sheidler's photo of M42&M43
- Ken Boquist's photos M52 & NGC7635, the Bubble Nebula; NGC 147 &NGC185; NGC 672 & IC1727; NGC891 with assorted galaxies in the field.
- Alex Holt reported a couple of meteors around the 7th.
- Ann Bauer reported that couple had proposed during a meteor shower.

Request for Public Outreach

- A request to help locate a star for a family (Matt Francis) and fulfill a Make a Wish request was assisted by Al Sheidler and Terry Dufek on December 30th at the Genesco Public Library.
- The Genesco Chamber of Commerce asked the PAC to do another outreach at future date TBD.

Upcoming Events:

- The total lunar eclipse occurs on January 20th. Jeff Struve said that the QCAS will be

observing from Riverdale, conditions permitting.

- February 11th will be the next PAC meeting.
- March 11th meeting will be a smorgasbord of mini presentations. Any member having something of interest, please contact Dino Milani so you be added to the schedule.
- March 16th is the Imagination Station at WIU.
- March 16th is also the 1st Niabi outreach event of the year.
- March 23rd is the Rock Island 30/31 library outreach event.
- February 5th John Deere Planetarium Showing for PAC members at 7 p.m. (hosted by Lee Carkner)

NCRAL:

The NCRAL web site is up and active. More information for volunteers is coming.

Presentations:

Calisto by Ian Spangenberg

Planetary Photography by Terry Dufek

The meeting was adjourned.

Newspaper Articles 2019

Jan	Sara Sheidler
Feb	Dino Milani
Mar	Terry Dufek
Apr	Ellen Tsagaris
May	Dave Smith
June	open
July	open
Aug	open
Sept	open
Oct	open
Nov	open
Dec	open

(continued in next column)

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(Continued from previous page)

Constellation Reports 2019

Jan	Ian Spangenberg
Feb	Wayland Bauer
Mar	Dino Milani
Apr	Dale Hachtel
May	Terry Dufek
June	Alex Holt
July	Frank Stonestreet
Sept	Hugh Holt
Nov	Roberta Wright
Dec	open

Programs 2019

Jan	Terry Dufek (planetary photography)
Feb	Jeff Struve (detecting exo planets)
Mar	Smorgasbord of short presentations
Apr	Gerry Pearson (international Dark Sky)
May	Jeff Struve (binary star systems or spectroscopy)
June	Smorgasbord of short presentations
July	TBD
Sept	Smorgasbord of short presentations
Nov	Ian Spangenberg TBD
Dec	Election of Officers / Year in Review-Roy Gustafson

Editors Note: If you are interested in contributing/participating in the above programs, please let Dino Milani or myself know. Thank you

Answers to Crossword puzzle

Across

2. **CEPHID**—any of a class of variable stars with regular cycles of variations in luminosity (most ranging from three to fifty days)
4. **AVERTED**—Viewing an object by looking slightly to its side is known as using _____ vision
5. **ASTROBLEME**—a mark on the earth's surface, usually circular, formed by a large ancient meteorite impact
8. **METEOR**—A brief streak of light caused by a small piece of solid matter entering Earth's atmosphere
10. **ZODIAC**—set of constellations situated along the ecliptic in the sky
12. **SCINTILLATION**—the twinkling of stars or radio sources, caused by rapid changes in the density of the earth's atmosphere, the interplanetary medium, or the interstellar medium, producing uneven refraction of

- starlight
15. **MERIDIAN**—The imaginary north-south line that passes directly overhead (through the zenith)
21. **REFRACTOR**—A telescope that gathers light with a lens
22. **EQUINOX**—The two times each year, near March 20th and September 22nd, when the Sun is directly overhead at noon as seen from Earth's equator
23. **ANGULAR**—The apparent size of an object in the sky in seconds, minutes or degrees is known as its size
24. **TWILIGHT**—The time after sunset or before sunrise when the sky is not fully dark
26. **INCLINATION**—The angle between the plane of an orbit and a reference plane
27. **MOUNT**—The device that supports your telescope
28. **FINDERSCOPE**—A small telescope used to aim your main scope at an object in the sky

Down

1. **PARALLAX**—The apparent offset of a foreground object against the background when your perspective changes.
2. **COMPOUND**—A telescope with a mirror in the back and a lens in the front is called a telescope
3. **AEROLITE**—a stony meteorite consisting of silicate minerals
6. **SEEING**—A measure of the atmosphere's stability
7. **BARLOW**—A lens that's placed into the focusing tube to effectively double or triple a telescope's focal length
8. **MAGNIFICATION**—The amount that a telescope enlarges its subject
9. **TERMINATOR**—The line on the Moon or a planet that divides the bright, sunlit part from the part in shadow
11. **SPINAR**—a fast-spinning star or celestial mass
13. **COMA**—the luminous cloud surrounding the frozen solid nucleus in the head of a comet
14. **ADAPTATION**—The eyes' transition to night vision, in order to see faint objects is called dark
16. **ECCENTRICITY**—The measure of how much an orbit deviates from being circular.
17. **OBJECTIVE**—A telescope's main light-gathering lens or mirror
18. **CELESTIAL**—A grid system for locating things in the sky is called _____ coordinates
19. **VARIABLE**—A star whose brightness changes over the course of days, weeks, months, or years is called?
20. **CULMINATION**—The moment when a celestial object crosses the meridian and is thus at its highest above the horizon.
25. **WANES**—The Moon waxes, growing more illuminated, between its new and full phases, and _____, becoming less illuminated, between its full and new phases.

Continued in next column