The Bays Mountain Astronomy Club Newsletter

January 2025

Kingsport, TN

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Cosmic Reflections

Greg Penner - BMAC Chair

reetings BMACers!

I hope everyone had a great time over the holidays and ringing in the New Year! 2024 was quite a notable year for astronomy with the solar eclipse, auroras and comets. Perhaps 2025 will bring some surprises in the sky as well.

We finished 2024 with a cold evening in December with our club stargazing night. Six of our club members braved the weather and brought telescopes, binoculars and even some red LED "mood lighting." The group had some nice views of the Andromeda Galaxy, the Pleiades, Venus, Moon, Saturn, Jupiter, Albireo and more! The cold weather did have a limiting effect on how long the observing lasted, but a couple of hours of stargazing fun was had by all. We will plan on doing more club stargazing nights at our Friday meetings, but during warmer weather in the spring or fall. One of our goals with this type of event is to give people who don't have telescopes (or thinking about getting one) a chance to look through various types of

instruments and compare pros and cons. We can also learn observing strategies or techniques from each other.

In January we will be having our annual club dinner. This is an event for club members and their families only, so members should be receiving a separate email with information about the dinner.

For our first club meeting of 2025, on February 7th, our own Robin Byrne will present to us "You Are Here: Finding Our Place in the Universe," which covers historical ideas of where we are located in space, up through to our modern understanding of the structure of the Universe.

As we move into the new year, please let me know if there is some topic in astronomy that you would like to see more info about in our club meetings or in the newsletter. This club exists for you, the members, so your feedback is very important to help the club support your pursuit of astronomy. Future club meeting programs are still "to be determined." One program we

are exploring is something about how smartphones are helping us get more out of astronomy. The quality of photographs taken with smartphone cameras through the telescope keeps improving, and there are other ways these little "pocket computers" are able to help us during a night of stargazing.

I'm looking forward to our club meetings and activities coming up in 2025. We will likely plan another field trip to the dark sky observatory. And as always, if you have interest in helping at StarWatch on Saturday nights, please go through the easy volunteer program application and join us as we show the public the many wonders of the night sky!

Clear Skies!

BMAC Notes

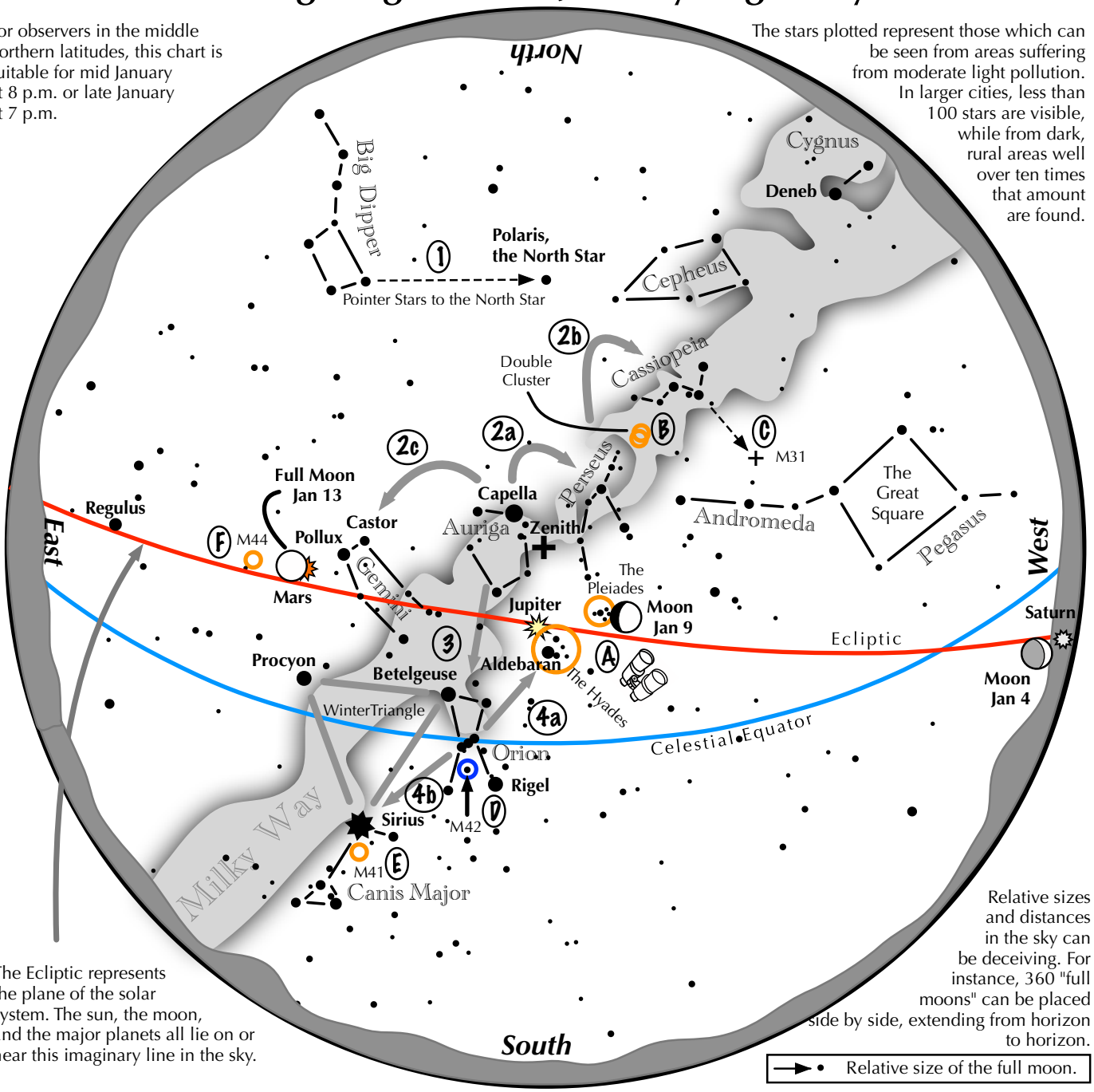
Sky News from the Astronomical League

The Astronomical League has a plethora of educational content to help you learn and enjoy the night sky more. The following inserts are just a tiny bit of what they provide.

Navigating the mid January Night Sky

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

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



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

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 winter 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 Castor and Pollux of 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 to the red star Aldebaran, then to the Hyades, and the Pleiades star clusters. Travel southeast from the Belt stars to the brightest star in the night sky, Sirius.

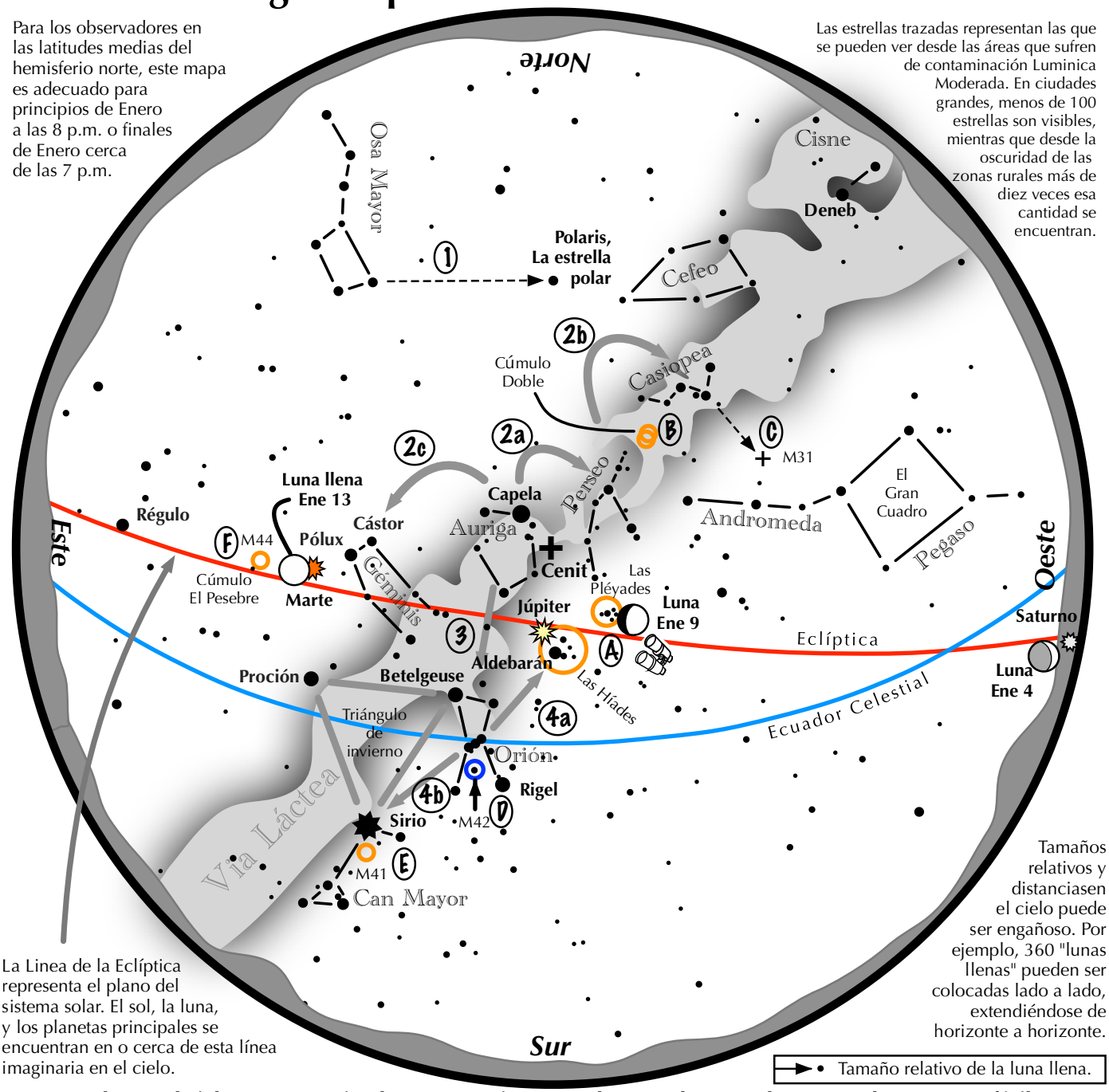
Binocular Highlights

A: Examine the stars of the Pleiades and Hyades, two naked eye star clusters. **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 to the southeast of Pollux.

Navegando por el cielo nocturno de Enero

Para los observadores en las latitudes medias del hemisferio norte, este mapa es adecuado para principios de Enero a las 8 p.m. o finales de Enero cerca de las 7 p.m.

Las estrellas trazadas representan las que se pueden ver desde las áreas que sufren de contaminación Luminica Moderada. En ciudades grandes, menos de 100 estrellas son visibles, mientras que desde la oscuridad de las zonas rurales más de diez veces esa cantidad se encuentran.



La Linea de la Eclíptica representa el plano del sistema solar. El sol, la luna, y los planetas principales se encuentran en o cerca de esta línea imaginaria en el cielo.

Tamaños relativos y distanciasen el cielo puede ser engañoso. Por ejemplo, 360 "lunas llenas" pueden ser colocadas lado a lado, extendiéndose de horizonte a horizonte.

Tamaño relativo de la luna llena.

Navegando por el cielo nocturno: simplemente comience con lo que sabe o con lo que puede encontrar fácilmente.

1. Sobre el horizonte noreste se alza la Osa Mayor. Dibuja una línea desde sus dos estrellas finales hasta la estrella polar.
2. Desde Capela, salte hacia el noroeste a lo largo de la Vía Láctea hacia Perseo, luego hacia la "W" de Casiopea. Siguiente salto hacia el sureste desde Capela a las estrellas gemelas de Cástor y Pólux en Géminis.
3. Directamente al sur de Capela se encuentra la constelación de Orión con sus tres estellas del Cinturón de Orión, su brillante estrella roja Betelgeuse y su brillante estrella azul-blanca Rigel.
4. Usa las tres estrellas del Cinturón de Orión para apuntar al noroeste hacia la estrella roja Aldebarán y el cúmulo estelar Hiades, y luego hacia el cúmulo estelar de las Pléyades. Viaja hacia el sudeste desde las estrellas del cinturón hasta la estrella más brillante en el cielo nocturno, Sirio.

Puntos destacados con binoculares

A: Examina las estrellas de las Pléyades y las Híades. **B:** Entre la "W" de Casiopea y Perseo se encuentra el Doble Cúmulo. **C:** Las tres estrellas más occidentales de la "W" de Casiopea apuntan hacia el sur hasta M31, la Galaxia de Andrómeda, un óvalo "borroso." **D:** M42 en Orión es una nebulosa formadora de estrellas. **E:** Mire al sur de Sirio para el cúmulo estelar M41.**F:** M44, un cúmulo de estrellas apenas perceptible a simple vista, se encuentra al sureste de Pollux

If you can see only one celestial event this January, see this one.

Lunar occultation of Mars across the contiguous United States: Jan. 13. Extreme southern US sees Mars move behind the southern portion of the moon, and the northern US sees the planet move behind the northern portion of the moon.

Be sure to use binoculars!

Occultations demonstrate the moon's eastward orbital motion as Earth's rotation causes it to move in a westward arc across the night night sky.

Full Moon occults Bright Mars

In the evening hours of **January 13**, the brilliant full moon passes in front of bright Mars, which is near opposition. It may not be easy to spot because of the moon's bright glare!, but give it a try!

Approximate local times of disappearance and reappearance.
Begin viewing ten minutes before your estimated time. Mars' time and position of reappearance is difficult to judge since the planet lies concealed behind the moon beforehand.

City	Disappearance	Reappearance
Albuquerque	**6:51 pm**	**7:52**
Augusta	**9:29**	**10:44**
Atlanta	**9:06**	**10:13**
Boise	**7:06**	**7:49**
Boston	9:26	10:42
Chicago	**8:08**	**9:16**
Dallas	**7:54**	**8:57**
Denver	**6:57**	**7:57**
Kansas City	**8:00**	**9:06**
Memphis	**8:00**	**9:07**
Minneapolis	**8:08**	**9:10**
Los Angeles	5:51	6:45
Miami	**9:30**	**9:53**
New Orleans	**8:00**	**8:59**
New York	9:21	10:37
Phoenix	**6:49**	**7:48**
Salt Lake City	**6:59**	**7:52**
San Antonio	**7:52**	**8:50**
San Diego	**5:49**	**6:45**
San Francisco	**5:58**	**6:45**
Seattle	**6:23**	**6:39**
Washington DC	**9:16**	**10:31**

Stellar Observations

Greg Penner

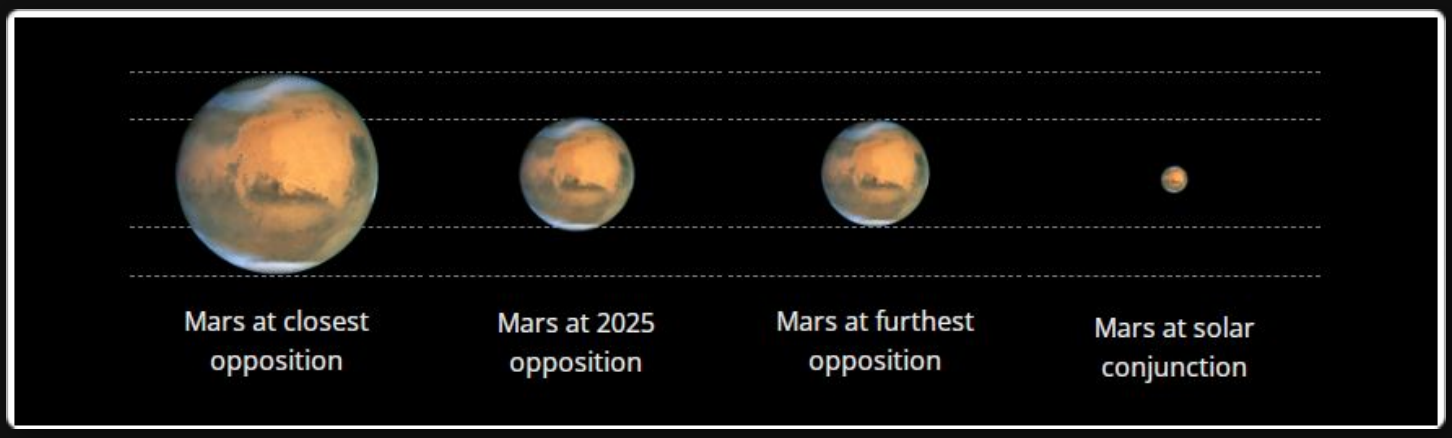
Looking Forward to 2025

2024 was an exciting year in astronomy as we were awed by a total solar eclipse, aurora borealis visible in East Tennessee on two occasions and then Comet Tsuchinshan-ATLAS in the October sky. All in all, that was quite a memorable year! One astronomical event we did NOT see in 2024 (despite much anticipation) was the star T Coronae Borealis going nova. Perhaps T CrB will fulfill its promise to amaze us in 2025, in the meantime, what else do we have to look forward to in the new year? Let's take a look at some of the highlights to watch for in 2025.

The first notable sky event will be throughout the month of January. The apparent size and brightness of the red planet Mars varies quite a lot over roughly two year periods due to the relationship between Earth's and Mars' orbits. Throughout most of 2023 and 2024, Mars was quite small and not very bright as it was more distant from Earth. In the second half of 2024, Earth started catching up to Mars, and by the end of the year the red

planet was living up to its name, shining bright orangey/red in the eastern sky in the late evenings. In January, Mars will arrive at perigee (nearest to Earth) on the 12th and opposition (the point in its orbit where it is opposite the Sun) on the 15th. For purposes of observing Mars, these exact dates aren't important. All of January Mars will be around 14" in diameter (its largest during the current apparition), so this will be your best chance to look for surface details through a telescope. Even though the current close approach of Mars is not very favorable, on a night of good seeing conditions it pays to use your higher magnification eyepieces to look for some surface details such as the polar ice caps or the dark feature Syrtis Major Planum. On the night of the 13th, we will get a special treat, as the full Moon will occult (pass in front of) Mars! At approximately 9:08p, the leading edge of the Moon will cover Mars until about 10:18p when Mars reappears on the other side. Through the rest of this decade Mars' apparent size will remain on the smaller end of the scale. By 2033 it will be 50% larger at 22" in

diameter, so that is something to look forward to in the long run.

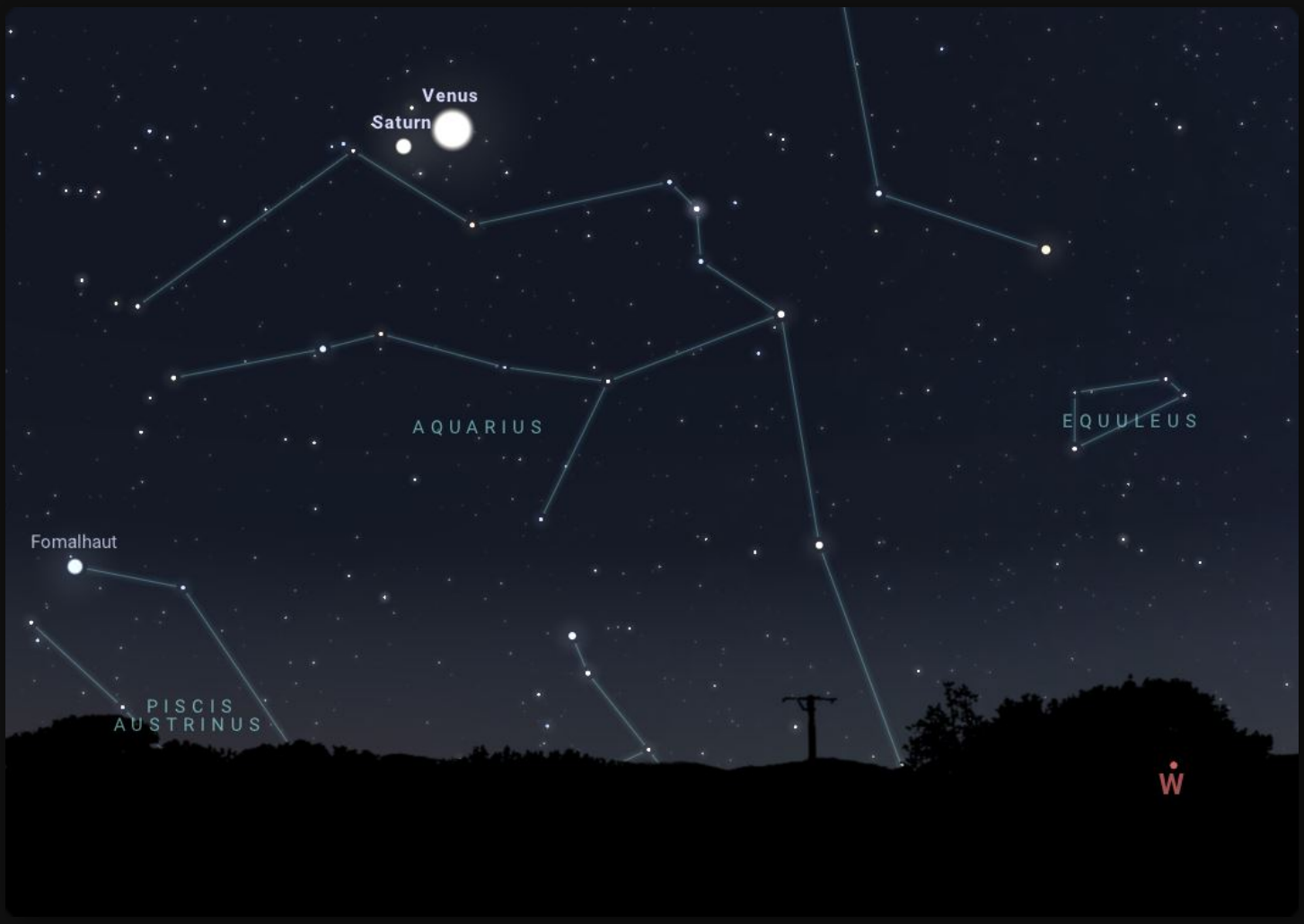


*Variation in Mars size - image by **Dominic Ford***

Mars and Jupiter among winter constellations - Stellarium

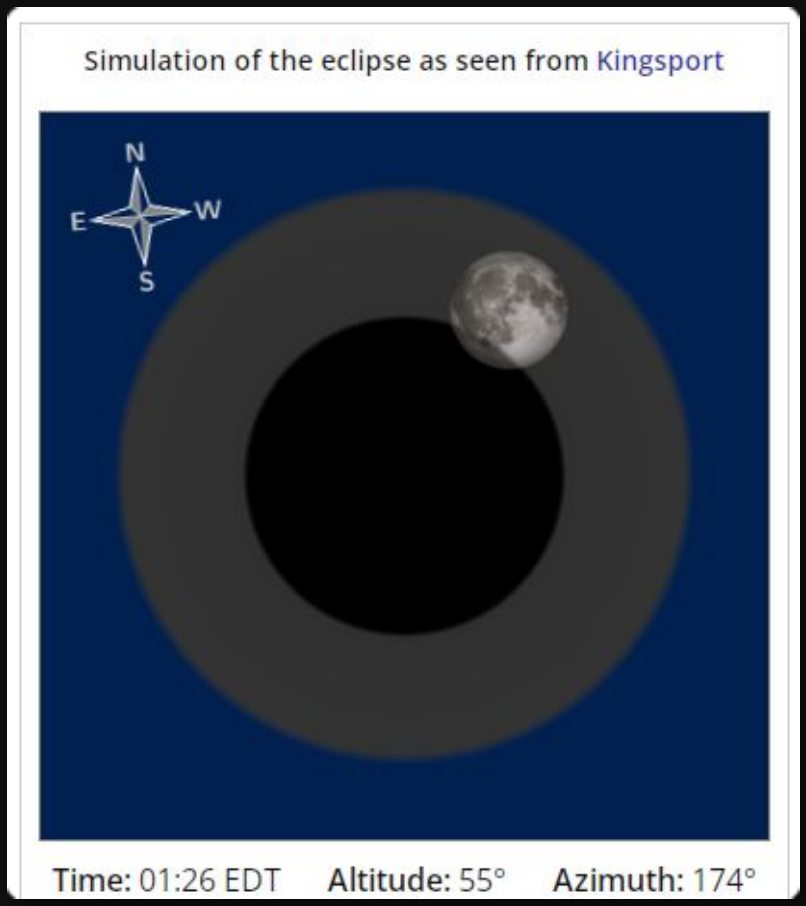
The first few months of the year will feature some beautiful planet viewing opportunities. A very interesting sight in January will occur the night of the 18th. Saturn and Venus will be together in the western sky only about 2 degrees apart. Venus will be brilliant at magnitude -4.38 and Saturn at magnitude +1.13. The view through a telescope will show Venus in a "half-moon" phase and Saturn's rings very nearly edge-on. Venus will be an interesting telescopic target to follow during the first couple of months of 2025. Starting the year as a half-moon with an apparent diameter around 24" [Ed: due to the thick atmosphere of Venus, it is difficult to precisely determine when Venus is half-lit by the Sun. This uncertainty of phase with Venus is called dichotomy.], as Venus gets nearer to Earth it will become a thinner and thinner crescent with a larger and larger diameter. By the first week of March it will be 55" in diameter, but a very thin crescent. See how long you can keep making observations as it sinks in the western horizon toward the Sun and becomes razor thin. Saturn won't be visible much longer as it will be getting close to conjunction with the Sun. Jupiter and

its four Galilean Moons will also be favorably placed during the first few months of the year, so January through March will be prime time for planet observations!



Venus and Saturn on 1-18-25 - Stellarium

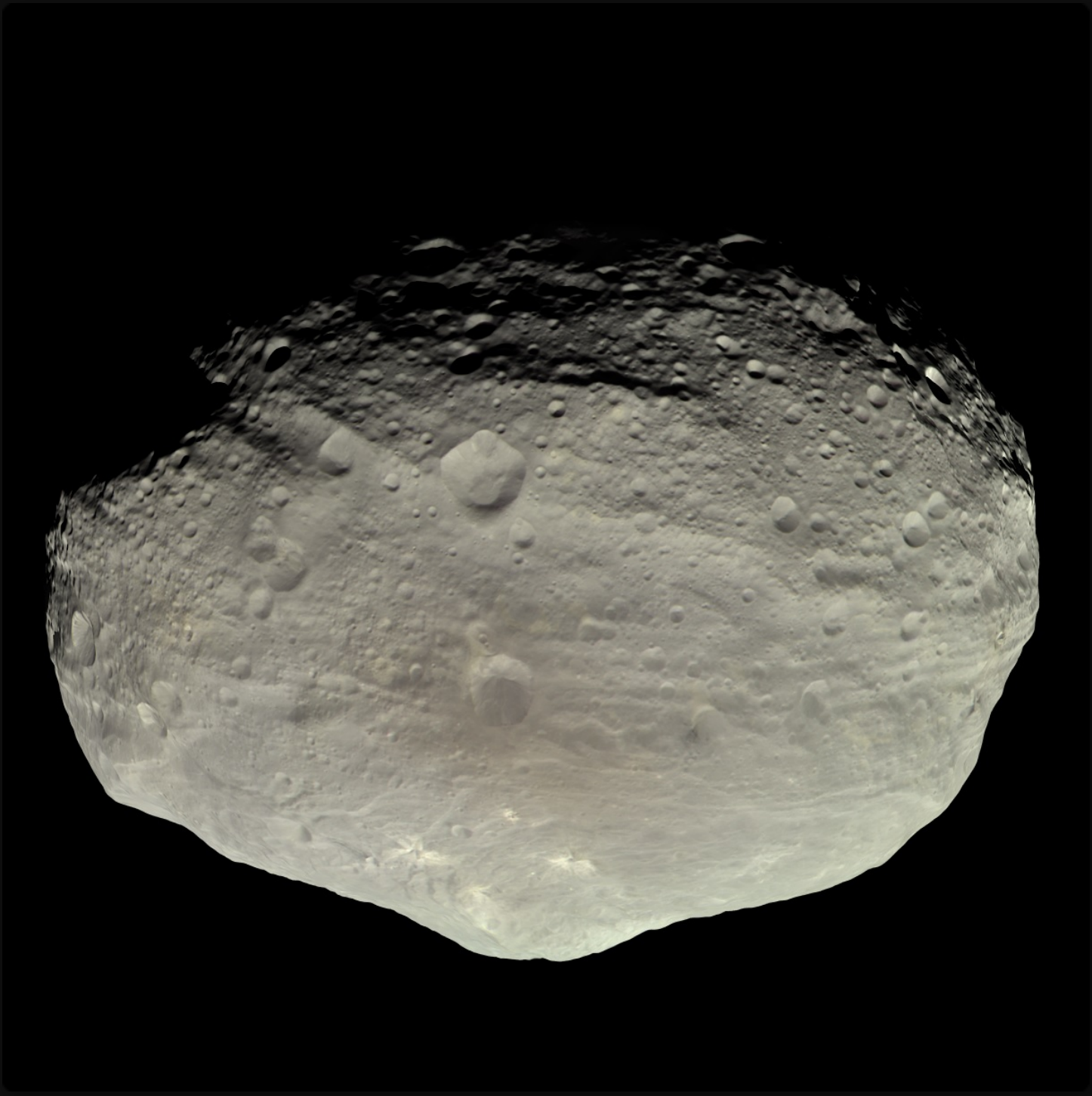
The early morning hours of March 14th will bring the first eclipse opportunity of the year. A total lunar eclipse will occur, with the partial eclipse beginning at 1:10a, total eclipse beginning at 2:26a, total eclipse ending at 3:31a, and partial eclipse ending at 4:48a. When the Moon's disk lies entirely in shadow, it often takes on a spectacular reddish-brown color, as some of the Sun's filtered red light is bent around the edge of the Earth's globe by its atmosphere.



*Total lunar eclipse begins as moon enters the umbra - image from **Dominic Ford***

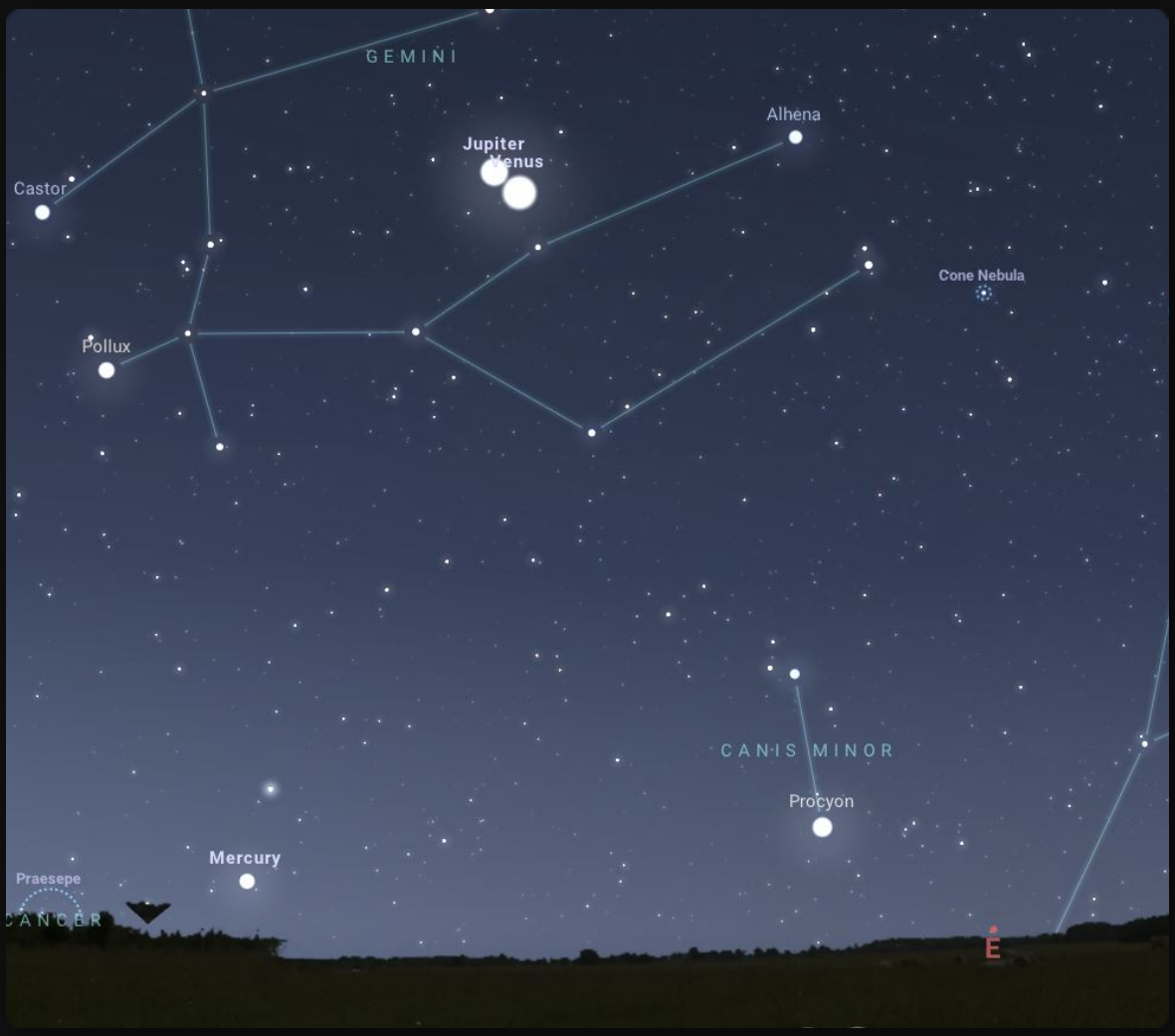
On May 2nd, the asteroid Vesta will reach opposition and also perigee. Vesta is the second largest asteroid in the main belt (mean diameter of 326 miles) and the brightest of all the asteroids. During the first week of May, Vesta will be around magnitude 5.6, making it potentially visible to the naked eye from a dark sky location. From May 1st through May 8th, Vesta will be conveniently traversing through a triangle of 4th and 5th magnitude stars in the constellation Virgo (see chart). The asteroid will be easy to identify using binoculars as you observe it moving relative to these stars night by night.

Vesta in May 2025 - Stellarium



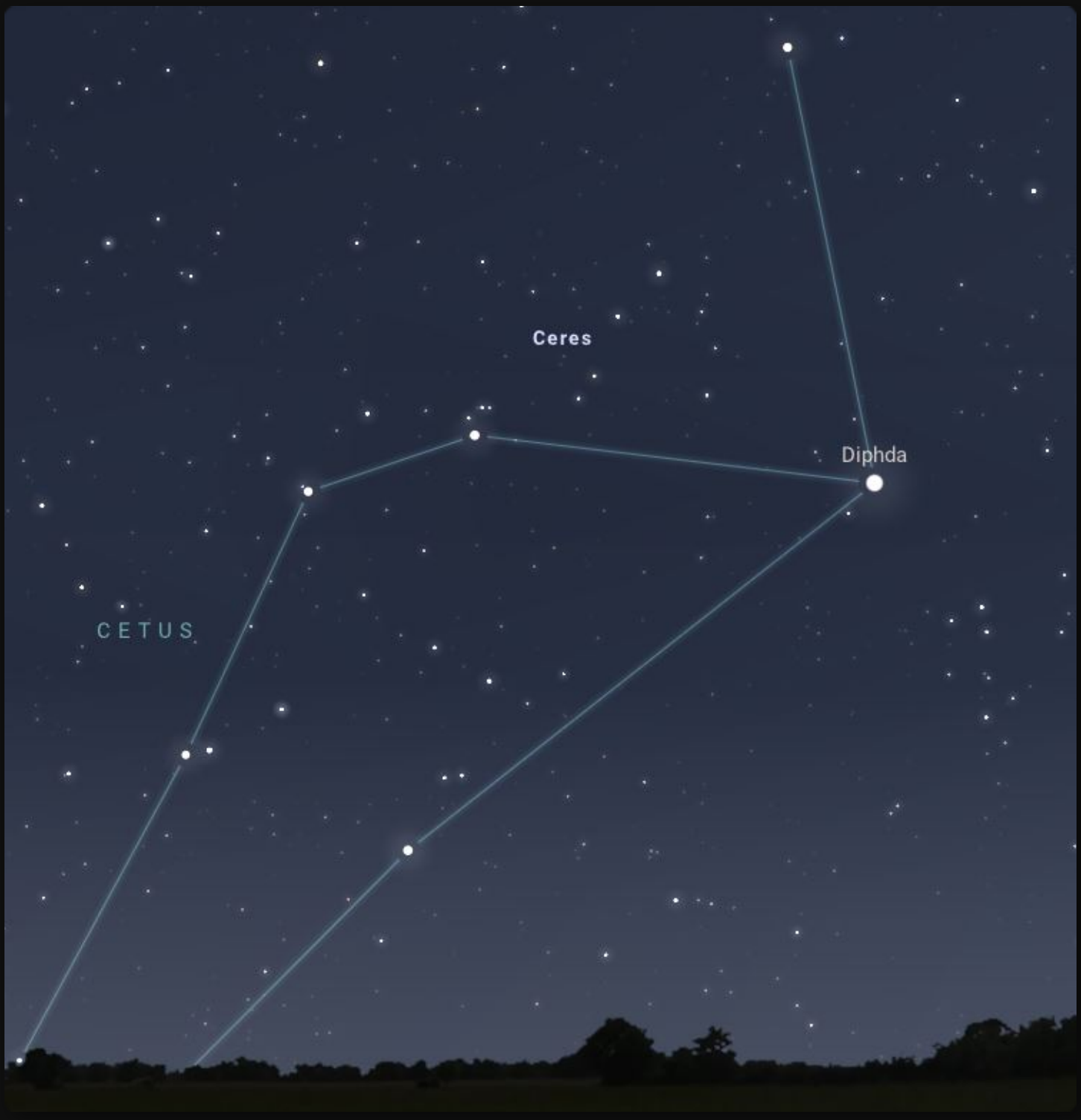
Vesta in natural color - NASA Dawn Spacecraft

On the morning of August 12th, Venus will again be paired up with a giant gas planet, but this time it will be Jupiter. These two bright planets will be less than 1 degree apart before dawn in the eastern sky. Depending on the type of telescope and eyepiece combination, you might be able to see both planets in the eyepiece. Can you capture a photo using a smart phone camera?

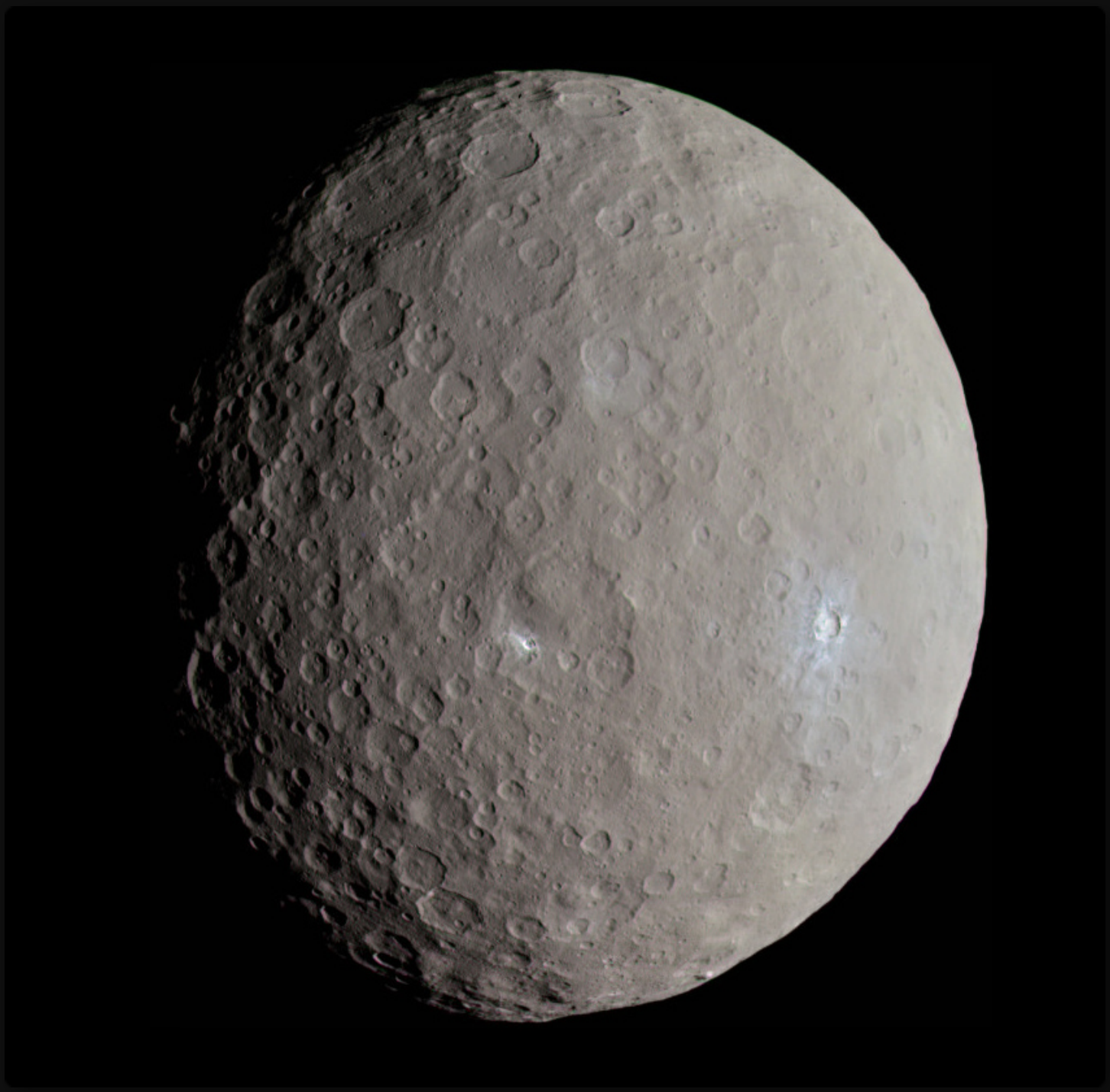


Jupiter and Venus on 8-12-25

October 2nd brings the largest asteroid in our Solar System, Ceres, to opposition and perigee. Ceres was the first asteroid to be discovered in 1801. More recently, Ceres has been reclassified as a dwarf planet because of its spherical shape (583 miles in diameter) and geological activity, so now it is in the same class of Solar System bodies as Pluto. Even though Ceres is the largest body in the asteroid belt, Vesta is brighter because its surface is whiter. At about magnitude 7.5, Ceres will be visible through binoculars as it traverses the sky through the tail of Cetus the whale in the first half of October. Consulting Stellarium and viewing this area each night will allow you to find and follow Ceres as it passes by several 5th magnitude stars.



Ceres on 10-2-25



Ceres in natural color - NASA Dawn Spacecraft

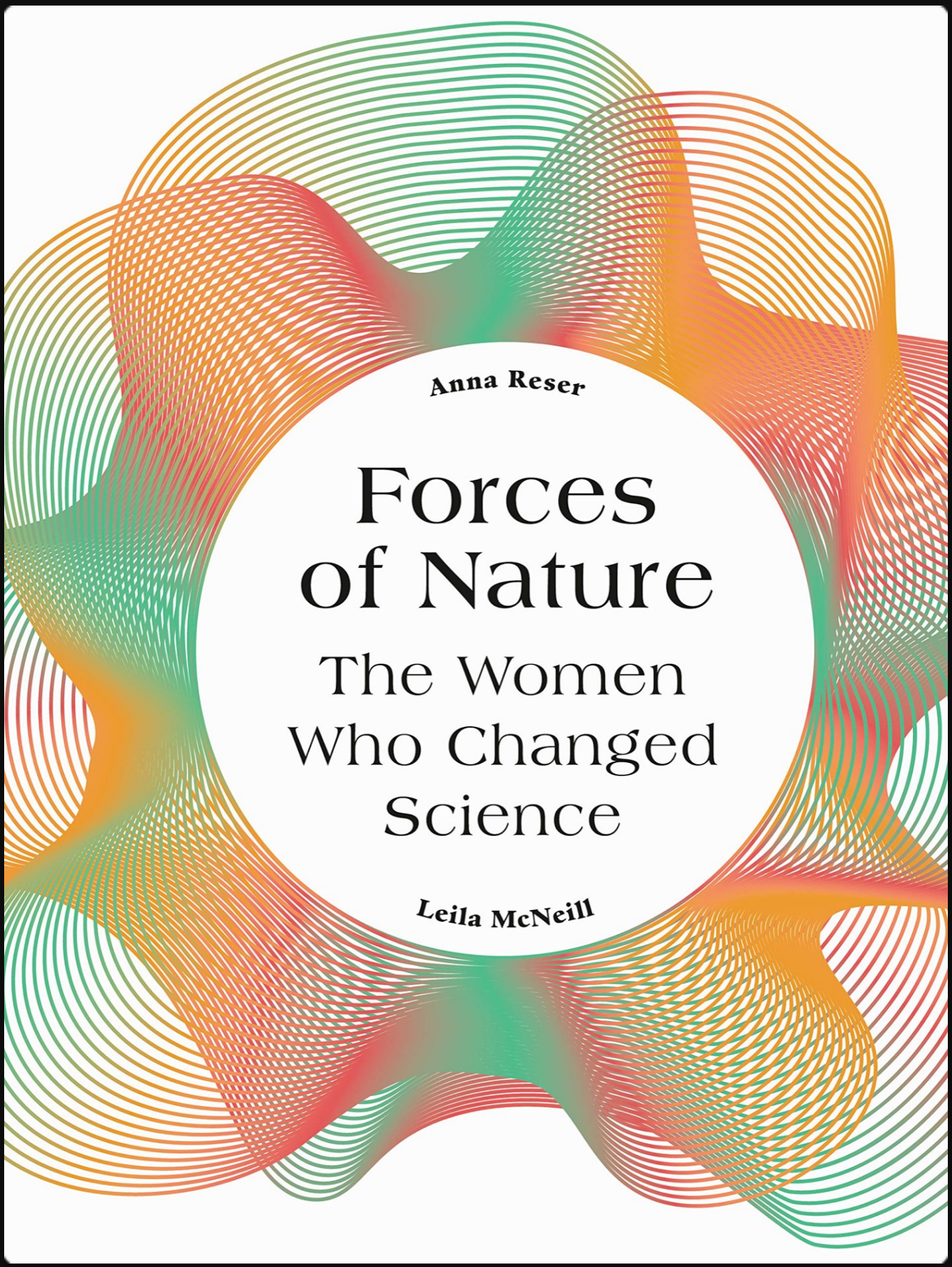
These are just some of the astronomical highlights that will be visible in 2025. As we saw last year, we may not yet be aware of even greater sights we will see. Could we be in store for another fantastic aurora display? Will we be surprised by a new comet? Hopefully, T Coronae Borealis will quit teasing us and put on a nova show in the new year. And would it be too much to hope for a supernova in our own galaxy? Maybe, but hoping to see such dramatic sights in the sky is what makes astronomy fun. Whatever the new year brings, we know there is always plenty to look up and get excited about. Even our closest celestial neighbor, the Moon, can be a delight as we observe craters and mountains through a telescope. In the coming year we will continue to see commercial missions attempt to land on the Moon, and the Artemis program will get closer to sending people to lunar orbit (currently scheduled for 2026). Looking forward to many nights of clear skies in 2025!

The Queen Speaks

Robin Byrne

Book Review: Forces of Nature

As a lover of the history of science, and of the contributions made by women, I couldn't resist a book titled Forces of Nature: The Women Who Changed Science. The authors, Anna Reser and Leila McNeill, are both professors of the history of science, so the book does have an academic feel to the writing style, but it is still very much an easy, enjoyable read.



The book cover to Forces of Nature: The Women Who Changed Science

I went into this book expecting to read stories of most of the women in science that we are familiar with, so I was surprised to encounter a number of individuals, and groups of women, who are far less known. The book is arranged, roughly, in a chronological order, beginning with women in antiquity through the Middle Ages. This section largely focused on the contributions women made out of necessity, such as assisting in childbirth as midwives, and administering home remedies to the sick. The authors made a point of including women whose names are not known, because of the fact that men were the ones writing the histories, so the contributions of women were not given the same respect as those made by men. This will be a recurring theme throughout the book.

As we move into the Renaissance, we meet lesser known women who made contributions to mathematics and astronomy, such as Maria Gaetana Agnesi, who wrote the first calculus book in Italian, and Nicole-Reine Lepaute, who helped calculate the orbit of Halley's Comet in order to predict its return in 1757. It was in this era that we encounter several women who were

either the wife or sister of a scientist, and who worked as an assistant. While officially mere helpers, many of these women made their own contributions to science, as well. In astronomy, the most famous example would be Caroline Herschel, who assisted both her brother, William, and then his son, John, but who also discovered comets on her own.

An interesting section of the book was devoted to women who contributed to science through their art. The science of studying human anatomy was largely pursued by male doctors, but women contributed by illustrating texts with detailed diagrams of the human body, the organs, and bones. One woman, Anna Morandi, sculpted human bodies out of wax, to be used by medical students. Similarly, the field of botany was advanced by women who pursued the "accepted" pastime of gardening. Tending to flowers and plants was something refined women could do without raising eyebrows, but, at the same time, some of the women took this "hobby" farther by making detailed drawings of the parts of plants, and noting the behavior of insects.

By the nineteenth century, women were contributing to science by writing articles for magazines that popularized science, becoming some of the first to share scientific discoveries with the masses through popular media.

During World War I, with the majority of the male population engaged in the war, women were recruited to assist in medical care. This ultimately led to the development of formal training to become nurses, which had not existed prior to this time. Women were at the forefront of both creating the nursing school curricula, as well as teaching the classes. This even led to women becoming doctors, though they had to attend women-only schools.

The early twentieth century also saw women gaining employment as "computers" - literally, women who made mathematical calculations. In astronomy, we are most familiar with the women computers at Harvard Observatory, such as Annie Cannon, Henrietta Leavitt, and Williamina Fleming. But other observatories, including Greenwich, had their own cadre

of women making calculations, as well. This role of women computers would continue into the 1960s, up to the point when mechanical computers would replace them.

A subject area that I would not have thought of as a scientific field is home economics. However, the development of ways to efficiently run a home, lay out a kitchen to minimize the number of steps taken, and a focus on cooking nutritious meals all had to be studied and tested to see what worked best. And since this dealt with raising children, cleaning the house, and cooking, it was women who made the most significant advances in this subject area.

World War II saw women moving into many roles previously reserved for men, but the book primarily focused on women who contributed to the development of the atomic bomb. Women worked in a wide variety of capacities in this endeavor, from technicians running equipment to chemists and physicists designing and analyzing the experiments.

Post World War II saw a push to return women to the role of homemaker, but one area that was still accepted was related to gardening - caring for the environment. Women conservationists made the analogy between caring for their own home and the need to care for the entire planet. While Rachel Carson is best known among the early female conservationists, she was not alone.

As we near the end of the book, we see the first women to go to space, and some notable female astronomers, such as Vera Rubin and Jocelyn Bell. An interesting point made is that the women who were "first" to do something are the ones we hear about, while the women who continue to make significant contributions in their fields are often overlooked. The last few pages of the book highlight a wide variety of women who are lesser known, but who are equally deserving to be recognized for the work they have done.

Forces of Nature: The Women Who Changed Science by Anna Reser and Leila McNeill was a very interesting and thought-

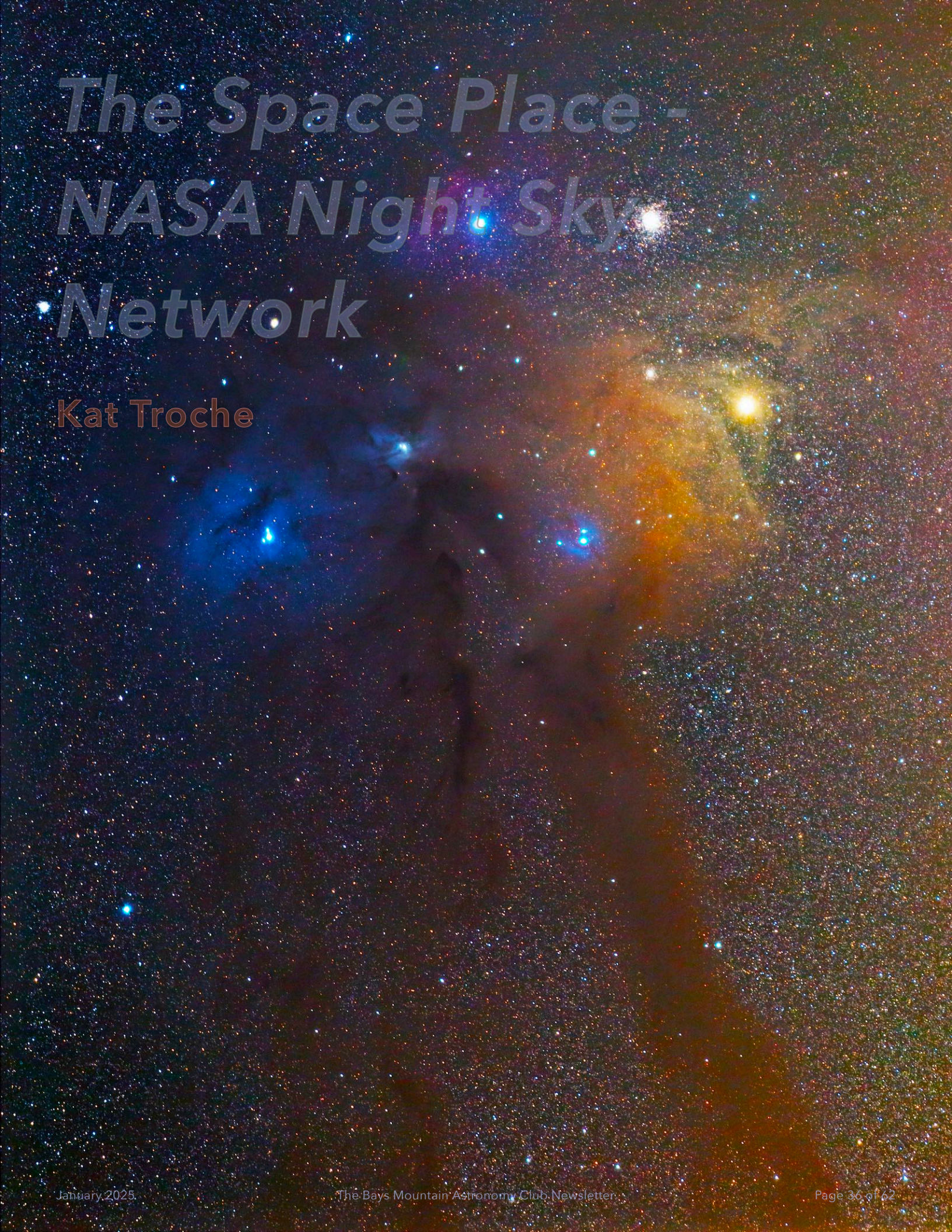
provoking book. It expanded my thinking in regard to what constitutes science and what can be considered a contribution to the scientific world. If those ideas interest you, then I would highly recommend reading this book.

References:

Forces of Nature: The Women Who Changed Science by Anna Reser and Leila McNeill, 2021, Frances Lincoln Publishing

The Space Place - NASA Night Sky Network

Kat Troche

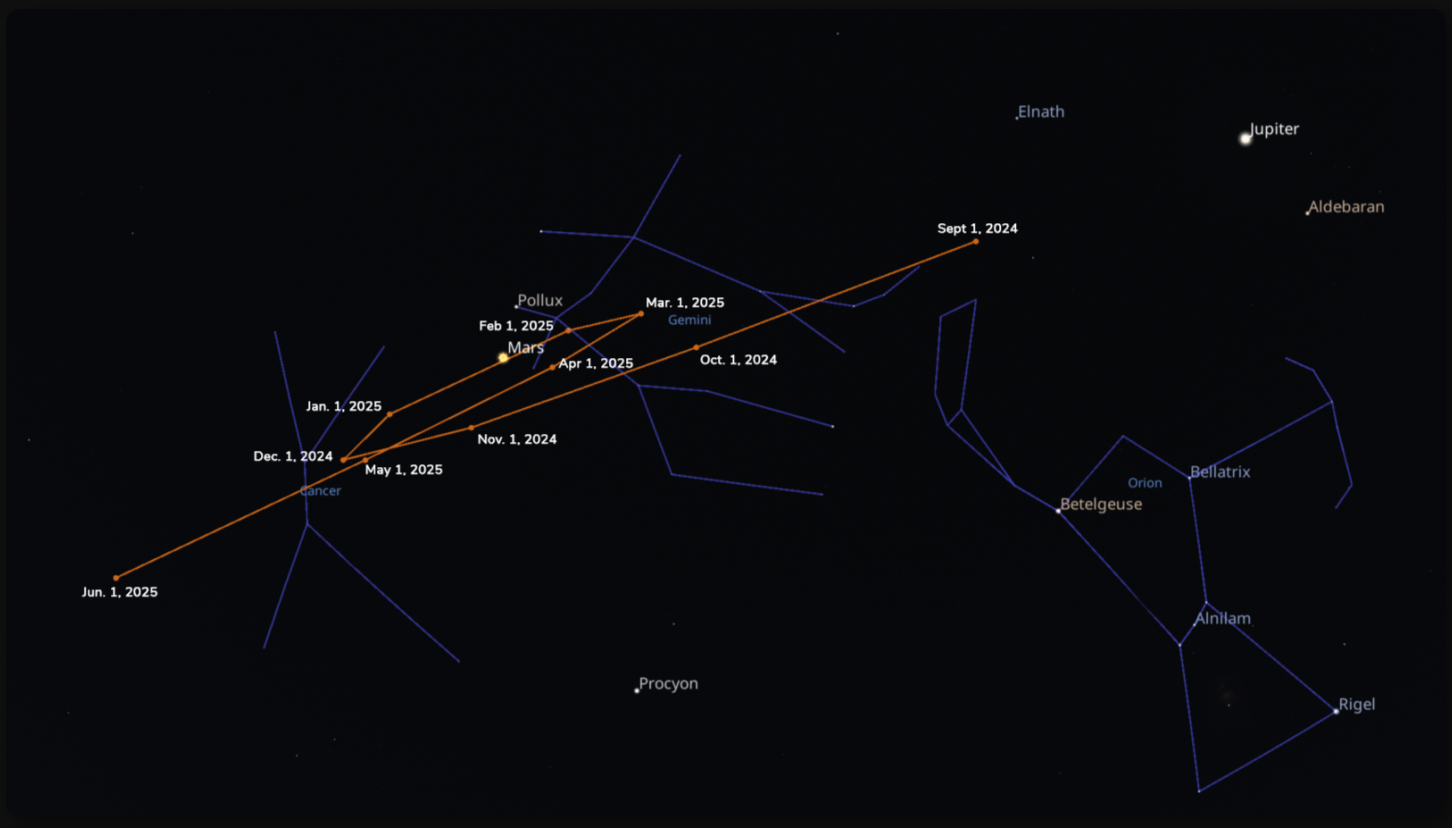


The Red Planet

Have you looked up at the night sky this season and noticed a bright object sporting a reddish hue to the left of Orion? This is none other than the planet Mars! January will be an excellent opportunity to spot this planet and some of its details with a medium-sized telescope. Be sure to catch these three events this month.

Martian Retrograde

Mars entered retrograde (or backward movement relative to its usual direction) on December 7, 2024, and will continue throughout January into February 23, 2025. You can track the planet's progress by sketching or photographing Mars' position relative to nearby stars. Be consistent with your observations, taking them every few nights or so as the weather permits. You can use free software like **Stellarium** or Stellarium Web (the browser version) to help you navigate the night as Mars treks around the sky. You can find Mars above the eastern horizon after 8p local time.



This mid-January chart shows the path of Mars from September 2024 to June 2025 as it enters and then exits in retrograde motion. Mars appears to change its direction of motion in the sky because Earth is passing the slower-moving Mars in its orbit. ***Credit****: Stellarium*

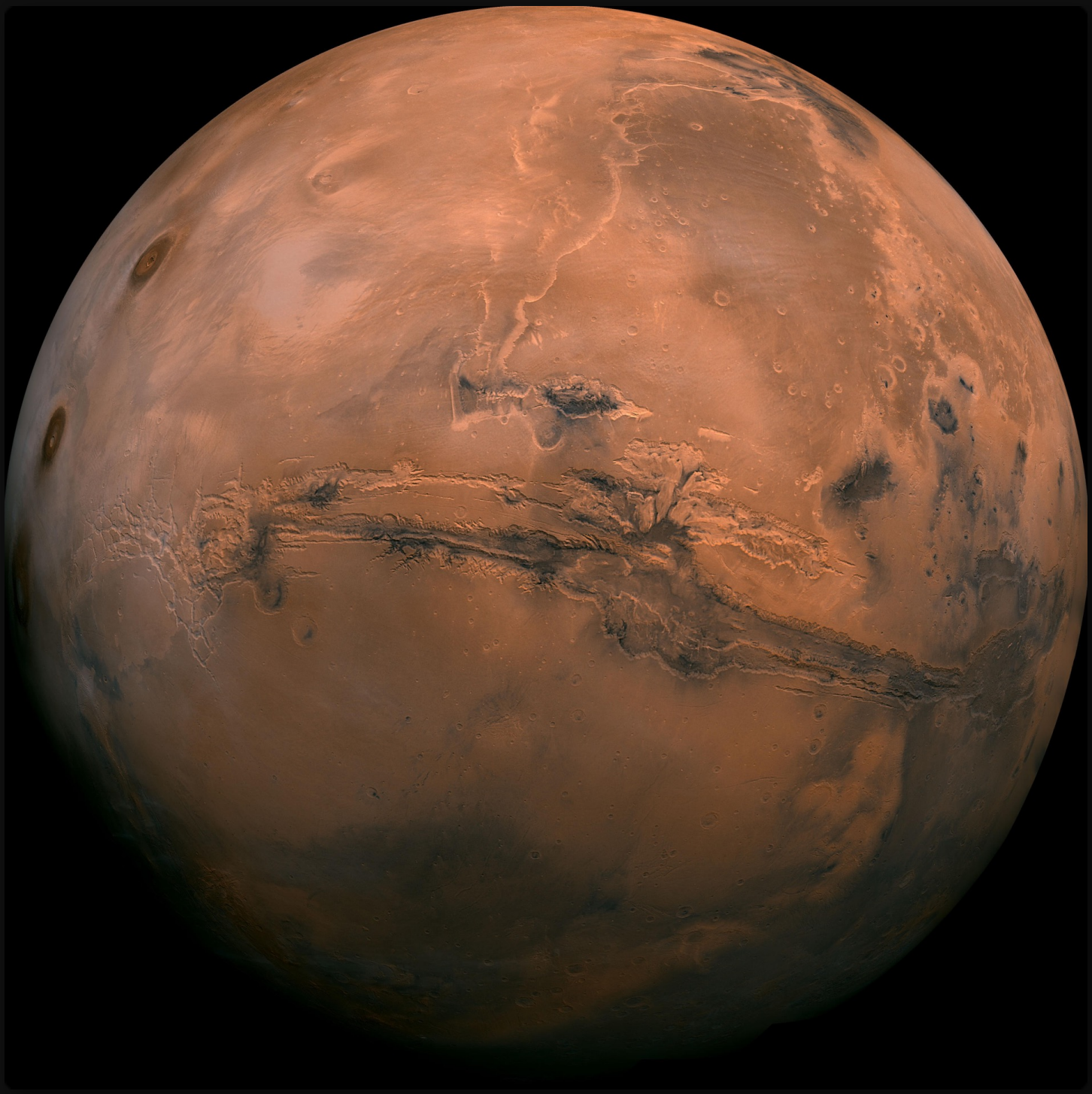
Hide and Seek

On the night of January 13th, you can watch Mars ‘disappear’ behind the Moon during an occultation. An occultation is when one celestial object passes directly in front of another, hiding the background object from view. This can happen with planets and stars in our night sky, depending on the orbit of an object and where you are on Earth, similar to eclipses. Depending on where you are within the contiguous United States, you can watch this event with the naked eye, binoculars or a small telescope. The occultation will happen for over an hour in some parts of the US. You can use websites like **Stellarium Web** or the Astronomical League’s **‘Moon Occults Mars’ chart** to calculate the best time to see this event.

A simulated view of the Moon as Mars begins its occultation on January 13, 2025. ***Credit****: Stellarium*

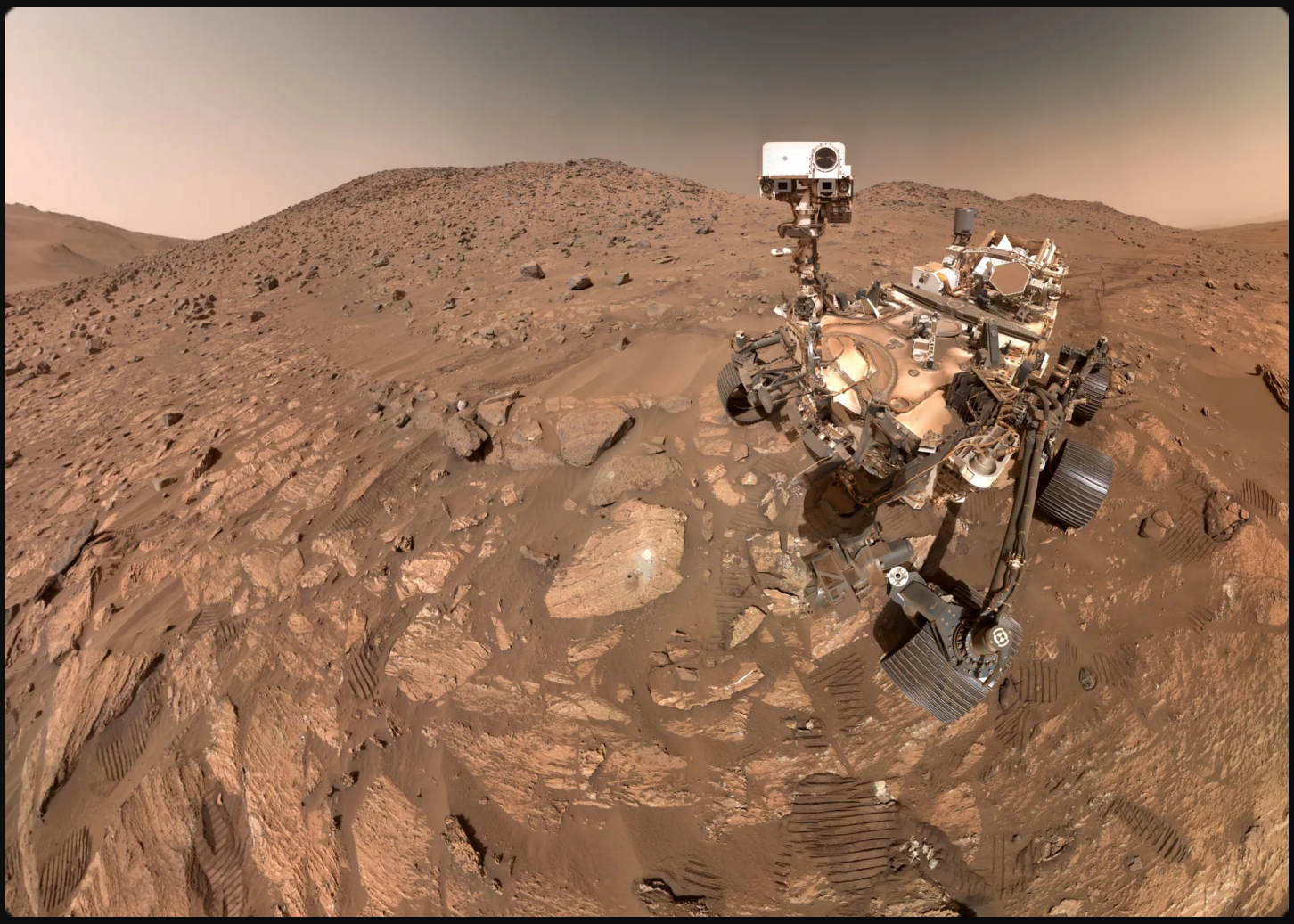
Closer and Closer

As you observe Mars this month to track its retrograde movement, you will notice that it will increase in brightness. This is because Mars will reach opposition by the evening of January 18th. Opposition happens when a planet is directly opposite the Sun, as seen from Earth. You don't need to be in any specific city to observe this event; you only need clear skies to observe that it gets brighter. It's also when Mars is closest to Earth, so you'll see more details in a telescope. Want a quick and easy way to illustrate what opposition is for Jupiter, Saturn, Mars or other outer worlds? Follow the instructions on our **Toolkit Hack: Illustrating Opposition with Exploring the Solar System** page using our **Exploring Our Solar System** activity!



A mosaic of the Valles Marineris hemisphere of Mars projected into point perspective, a view similar to that which one would see from a spacecraft. The mosaic is composed of 102 Viking Orbiter images of Mars. ***Credit****: NASA/JPL-Caltech*

Mars has fascinated humanity for centuries, with its earliest recorded observations dating back to the Bronze Age. By the 17th century, astronomers were able to identify features of the Martian surface, such as its **ice caps and darker regions**. Since the 1960s, exploration of the Red Planet has intensified with robotic missions from various space organizations. Currently, NASA has **five active missions**, including rovers and orbiters, with the future focused on human exploration and habitation. Mars will always fill us with a sense of wonder and adventure as we reach for its soil through initiatives such as the **Moon to Mars Architecture** and the **Mars Sample Return** campaign.



*BONUS **IMAGE** - Percy's Selfie*

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** to find local clubs, events, and more!

The Space Place - NASA Night Sky Network - Bonus Article

Vivian White and Kat Troche

Celebrating 20 Years: Night Sky Network

NASA's Night Sky Network is one of the most successful and longstanding grassroots initiatives for public engagement in astronomy education. Started in 2004 with the PlanetQuest program out of the Jet Propulsion Laboratory and currently supported by NASA's Science Activation, the Night Sky Network (NSN) is critical in fostering science literacy through astronomy. By connecting NASA science and missions to support amateur astronomy clubs, NSN leverages the expertise and enthusiasm of club members, who bring this knowledge to schools, museums, observatories, and other organizations, bridging the gap between NASA science and the public. Now in its 20th year, NSN supports over 400 astronomy clubs dedicated to bringing the wonder of the night sky to their communities across the U.S. and connecting with 7.4 million people across the United States and its territories since its inception.

International Observe the Moon Night, September 2024. ***Credit****: Oklahoma City Astronomy Club/Dave Huntz*

Humble Beginnings

It all started with an idea – astronomy clubs already do significant outreach, and club members know a lot about astronomy (shown definitively by founder Marni Berendsen's research), and they love to talk with the public. How could NASA support these astronomy clubs in sharing current research and ideas through informal activities designed for use in the places where amateur astronomers conduct outreach? Thanks to funding through NASA JPL's PlanetQuest public engagement program, the Night Sky Network was born in 2004, with more than 100 clubs joining in the first year.

Raynham Public Observing Night, February 2004. ***Credit****: Astronomical Society of Southern New England/Mark Gibson*

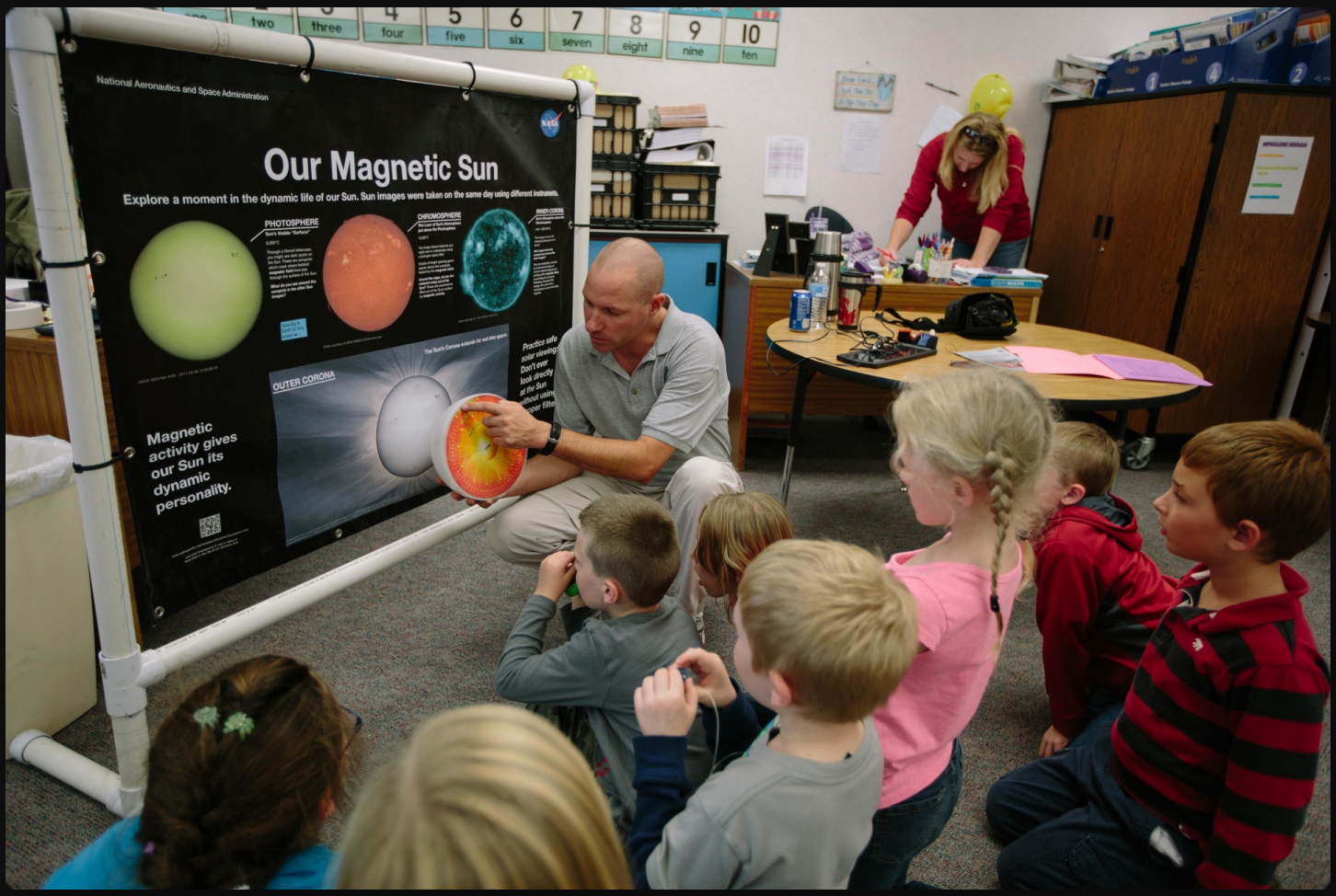
As quoted from the first NSN news article, "NASA is very excited to be working closely with the amateur astronomy community," said Michael Greene, current Director of Communications and Education and former head of public engagement for JPL's Navigator Program and PlanetQuest initiatives.

> Amateurs want more people to look at the sky and understand astronomy, and so do we. Connecting what we do with our missions to the sense of wonder that comes when you look up at the stars and the planets is one of our long-term objectives. We have a strong commitment to inspiring the next generation of explorers. Lending support to the energy that the amateur astronomy community brings to students and the public will allow NASA to reach many more people.

Taking off like a rocket, Night Sky Network had over 100 clubs registered on their website within the first year.

The Toolkits

Outreach Toolkits were developed to assist clubs with their endeavors. These kits include educational materials, hands-on activities, and guides for explaining topics in an accessible way. So far, 13 toolkits have been created on topics ranging from the scale of the Universe to how telescopes work. To qualify for these free Toolkits, clubs must be active in their communities, hosting two outreach events every three months or five outreach events within a calendar year. Supplemental toolkits were also created based on special events like the solar eclipses and the 50th anniversary of Apollo’s Moon landing. A new toolkit is being developed to teach audiences about solar science, and NSN is on track to support clubs well into the future.



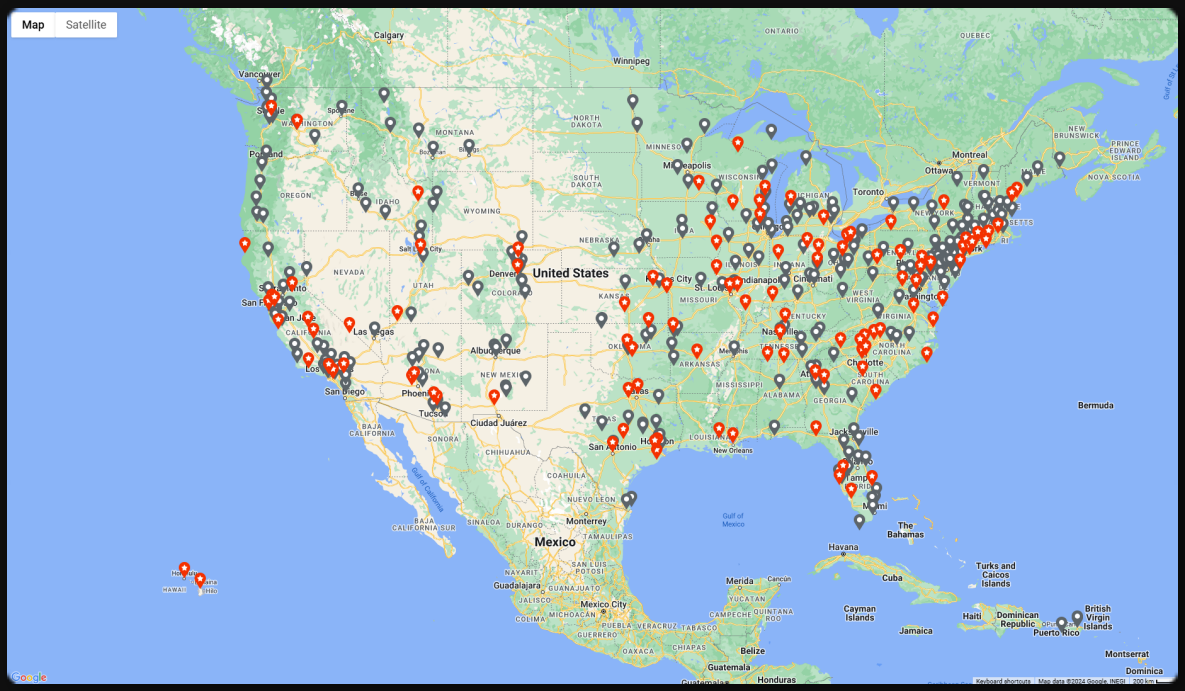
Rye Science Day, October 2014. ***Credit****: Southern Colorado Astronomical Society/Malissa Pacheco*

NSN also hosts archived video trainings on these toolkits and other topics via its YouTube channel and a **monthly webinar series** with scientists from various institutions worldwide. Lastly, a monthly segment called **Night Sky Notes** is produced for clubs to share with their audiences via newsletters and mailing lists.

Sharing the Universe

In 2007, a National Science Foundation grant funded further research into astronomy club needs. From that came three club resources: the **Growing Your Astronomy Club** and Getting Started with Outreach video series, an updated website with a national calendar, and club and event coordination. Now, you can find **hundreds of monthly events** nationwide, including virtual events you can join from anywhere.

Night Sky Network: Current and Future



Map of Night Sky Network clubs within the United States as of November 2024. ***Credit****.*

As of November 2024, NSN has over 400 clubs as far north as Washington State, west as Hawaii, and south as far as Puerto Rico. Astronomy clubs worldwide share the wonder of the day and night sky with their communities, and the Night Sky Network is happy to support US clubs with public engagement tools. Through their outreach efforts, member clubs have reached more than 7 million people to date, and the community is still going strong. Find an upcoming star party near you on our new public website.

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** to find local clubs, events, and more!

BMAC Calendar & More

Calendar:

BMAC Meetings:

- Friday, February 7, 2025 - 7p - BMACer and NSCC Associate Professor Robin Byrne will present "You Are Here: Finding Our Place in the Universe," which covers historical ideas of where we are located in space, up through to our modern understanding of the structure of the Universe.
- Friday, March 7, 2025 - 7p - Topic TBA.
- Friday, April 4, 2025 - 7p - Topic TBA.
- Friday, May 2, 2025 - 7p - Topic TBA.
- Friday, June 6, 2025 - 7p - Topic TBA.
- Friday, August 1, 2025 - 7p - Topic TBA.
- Friday, September 5, 2025 - 7p - Topic TBA.
- Friday, October 3, 2025 - 7p - Topic TBA.
- Friday, December 5, 2025 - 7p - Topic TBA.
- Friday, February 6, 2026 - 7p - Topic TBA.

SunWatch:

- Every clear Saturday & Sunday - 3p-3:30p - March-October - By the Dam
  - View the Sun safely with a white-light view if clear.; Free.
  - You must have completed the Park Volunteer Program in order to help with the public program. If you have, and have been trained, please show up at least 30 minutes prior to the official start time.

StarWatch:

- March 1 & 8, 2025 - 7p
- March 15, 22 & 29, 2025 - 8p
- April 5, 12, 19 & 26, 2025 - 8:30p
  - View the night sky with large telescopes at the observatories. If poor weather, an alternate live tour of the night sky will be held in the planetarium theater. Free.
  - You must have completed the Park Volunteer Program in order to help with the public program. If you have, and have been trained, please show up at least 30 minutes prior to the official start time.

Special Events:

- **BMAC Dinner - January 2025**
  - This event is for members and their families. Look for an e-mail in January with all the information.
- **Astronomy Day - ?, 2025 - 12p-3p; 8:30p-9:30p**
  - Come help share the fun of astronomy with the public. There will be tables with different themed topics plus solar and night viewing.
- **Annual Club Picnic - July 2025**
  - Date and site location will be sent directly to full BMAC members. BMACers and their families are welcome to enjoy an evening of astronomy-themed games and activities along with a potluck dinner and observing.
- **StarFest 2025 - November 7-9, 2025**
  - Our 40th annual astronomy convention / star gathering for the Southeast United States. Three days of astronomy fun, 5 meals, 4 keynote speakers, unique T-shirt and more!
  - **Pre-registration by Oct. 16, 2025 with full payment is mandatory for attendance. Sorry, no walk-ins nor "visits."**
  - **Link for all the StarFest info including registration and hotel reservation links.**

Regular Contributors:

Greg Penner

Robin Byrne

Adam Thanz

Greg Penner is a semi-retired architect living in the Tri-Cities area since 2018. He has enjoyed astronomy since childhood when he received a “department store telescope” and viewed Saturn for the first time. He has been a member since 2018.

Robin Byrne has been writing the science history column since 1992 and was chair in 1997. She is an Associate Professor of Astronomy & Physics at Northeast State Community College (NSCC).

Adam Thanz has been the BMAC Newsletter Editor for all but a small number of issues since 1992. He is the Planetarium Director at Bays Mountain Park and an astronomy adjunct instructor at NSCC since 2000.

Connection:

Bays Mountain Astronomy Club:

- 853 Bays Mountain Park Road; Kingsport, TN 37650
- (423) 229-9447 - **Park Site** - **Club Site**
- Newsletter edited by **Adam Thanz**

Dues:

- Dues are highly supplemented by the Bays Mountain Park Association and volunteerism by the club. As such, our dues are kept at an extremely low cost.
- $16 / person / year
- $6 / each additional family member
- Note: if you are a Park Member (which incurs a separate, additional fee), then a 50% reduction in BMAC dues are applied.
- Dues can be paid in many ways. The easiest way is to pay via the CivicRec online portal. If you are a current member, please log in with your e-mail address and reset your password if you have not already done so. You can then update your membership. Here's the direct **link**. If you want to add family members, then add them via the internal link. You can also pay at the gift shop, by mail or over the phone.

Chapter Background Image Credits:

- **Cover image of Southern Milky Way by Adam Thanz.**
  - *Sony A7ii with Zeiss Batis 2.8/18 lens, f/2.8, 8 sec., ISO 6,400, August 9, 2020.*
- **Table of Contents image of Comet NEOWISE (C/2020 F3) by Adam Thanz**
  - *Sony A7ii with Sony FE 2.8/90 Macro G OSS lens, f/2.8, 8 sec., ISO 4,000, July 15, 2020.*
- **Cosmic Reflections image of the Summer Triangle area of the Milky Way by William Troxel.**
  - *Image captured July 23, 2016.*
- **BMAC Notes painting of the Moon with moon glow by Christa Cartwright.**
  - *Painting based on a photograph of the Moon Christa captured July 2020.*
- **Stellar Observations image of Crescent Nebula by David Reagan.**
  - *This image was taken with a 140mm refractor in his suburban backyard using an AstroPhysics 900 mount, 8.7 hours of 5 minute Ha and OIII subexposures, combined in AstroPixelProcessor as an HOO image and processed in Lightroom and Photoshop. Image captured in 2022.*
- **The Queen Speaks image of a solar halo by Robin Byrne.**
  - *iPhone 7, June 8, 2020.*
- **The Space Place - NASA Night Sky Network image of the Rho Ophiuchi cloud complex by Brandon Stroupe.**
  - *Canon 6D with Canon 2.8/70-200mm lens, f/2.8 @200mm, 20 x 120 sec. exposures, ISO 1,000, stacked in Deepsky Stacker, processed in Adobe Photoshop CC, Skywatcher Star Adventure mount, September 19, 2015.*
- **BMAC Calendar & More image of the Moon by Greg Penner.**
  - *iPhone shooting through a 9mm eyepiece and 12.5" Truss Tube Dobsonian @212x.*
- **All background images used with permission by their authors.**