ASTROFILES

Auburn Astronomical Society Newsletter

December 2022 *Newsletter Editor — John Wingard — jwin1048@gmail.com*

Moon Phases

December 16 — Last Quarter

December 23 — New Moon

December 29 — First Quarter

January 6 — Full Moon

January 14 — Last Quarter

January 21 — New Moon

January 28 — First Quarter

February 5 — Full Moon

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News and events

Well, another year is just about over and we hope that everyone has successfully navigated all of the challenges that have come your way. For me personally, this year has been a busy one, especially the last few months. Hopefully 2023 will be a little less stressful and more enjoyable. Apologies for missing a newsletter last month and I wasn't sure that I would make it this month but it looks like I just made it!

There hasn't much club activity recently but we do have a star gaze tentatively scheduled for February of 2023. We have been asked to assist a group in Prattville, AL on **Saturday February 25th, 2023.** This will be at a Camporee for the Frontier District of the Boy Scouts. It will be at Cooter's Pond in Prattville. Activities should begin around 8:00 PM CT after the campfire program. This is just a heads up for all AAS members in the Prattville/Montgomery area to mark it on your calendar. Of course, as we get closer to the actual date I will put out an email reminder along with directions to the location. There will be a 30% waxing crescent Moon to view as well as quite a few winter sky targets. Here's hoping that the weather will cooperate!

The Winter Sky

The Winter sky in January contains many interesting targets to observe. The planets Jupiter and Mars are both well placed for evening viewing as are many prominent deep-sky targets. Of course, Orion is rising in the East in the evenings and that entire area contains many interesting objects to see not the least of which is the Orion Nebula (M42). Then there's the Pleiades (M45) and the Andromeda Galaxy (M31). Also fairly high in the Northern sky is the constellation of Perseus with the famous Double Cluster. So take advantage of the longer nights and generally clearer skies and do some observing!

 **This article is distributed by NASA's Night Sky Network (NSN).** The NSN program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.gov to find local clubs, events, and more!

Spot the Messenger: Observe Mercury

David Prosper

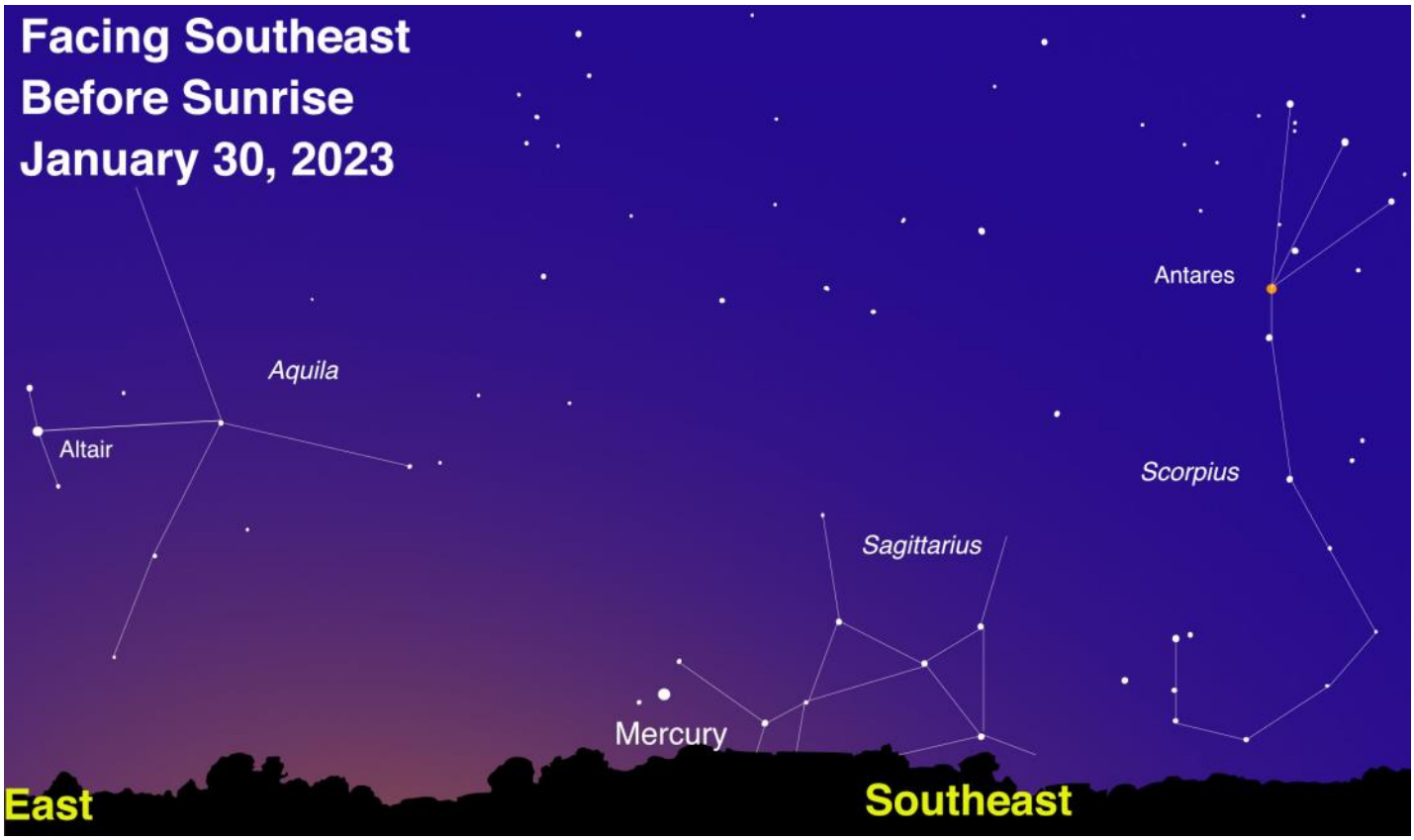
Most planets are easy to spot in the night sky, but have you spotted Mercury? Nicknamed *the Messenger* for its speed across the sky, Mercury is also the closest planet to the Sun. Its swift movements close to our Sun accorded it special importance to ancient observers, while also making detailed study difficult. However, recent missions to Mercury have resulted in amazing discoveries, with more to come.

Mercury can be one of the brightest planets in the sky – but also easy to miss! Why is that? Since it orbits so close to the Sun, observing Mercury is trickier than the rest of the "bright planets" in our solar system: Venus, Mars, Jupiter, and Saturn. Mercury always appears near our Sun from our Earth-bound point of view, making it easy to miss in the glare of the Sun or behind small obstructions along the horizon. That's why prime Mercury viewing happens either right before sunrise or right after sunset; when the Sun is blocked by the horizon, Mercury's shine can then briefly pierce the glow of twilight. Mercury often appears similar to a "tiny Moon" in a telescope since, like fellow inner planet Venus, it shows distinct phases when viewed from Earth! Mercury's small size means a telescope is needed to observe its phases since they can't be discerned with your unaided eye. Safety warning: If you want to observe Mercury with your telescope during daytime or before sunrise, **be extremely careful**: you don't want the Sun to accidentally enter your telescope's field of view. As you may already well understand, this is extremely dangerous and can not only destroy your equipment, but permanently blind you as well! That risk is why NASA does not allow space telescopes like Hubble or the JWST to view Mercury or other objects close to the Sun, since even the tiniest error could destroy billions of dollars of irreplaceable equipment.

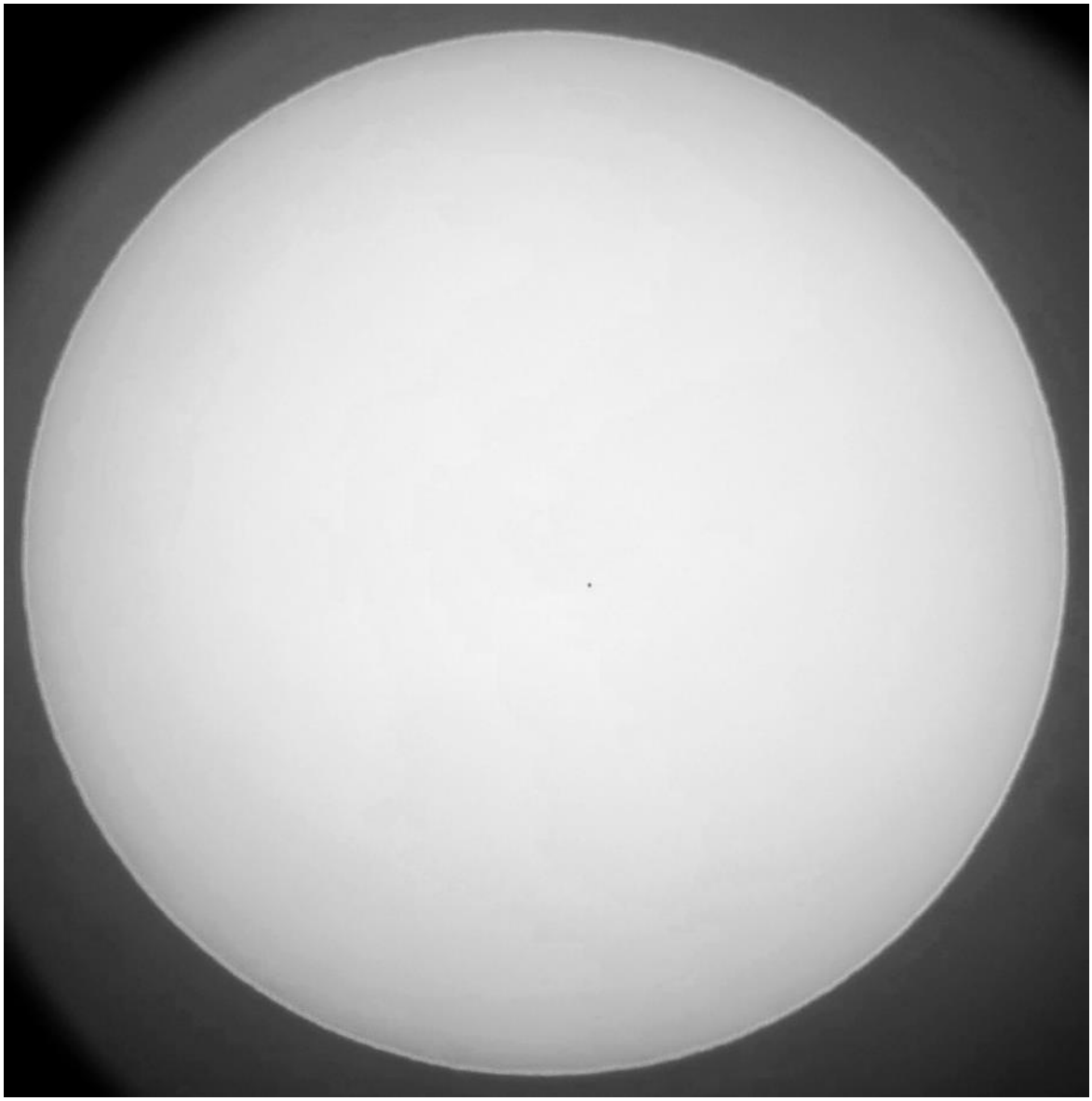
Despite being a small and seemingly barren world, Mercury is full of interesting features. It's one of the four rocky (or terrestrial) planets in our solar system, along with Earth, Venus, and Mars. Mercury is the smallest planet in our solar system and also possesses the most eccentric, or non-circular, orbit of any planet as well: during a Mercurian year of 88 Earth days, the planet orbits between 29 million and 43 million miles from our Sun – a 14-million-mile difference! Surprisingly, Mercury is **not** the hottest planet in our solar system, despite being closest to the Sun; that honor goes to Venus, courtesy its thick greenhouse shroud of carbon dioxide. Since Mercury lacks a substantial atmosphere and the insulating properties a layer of thick air brings to a planet, its temperature swings wildly between a daytime temperature of 800 degrees Fahrenheit (427 degrees Celsius) and -290 degrees Fahrenheit (-179 degrees Celsius) at night. Similar to our Moon, evidence of water ice is present at Mercury's poles, possibly hiding in the frigid permanent shadows cast inside a few craters. Evidence for ice on Mercury was first detected by radar observations from Earth, and follow-up observations from NASA's MESSENGER mission added additional strong evidence for its presence. Mercury sports a comet-like tail made primarily of sodium which has been photographed by skilled astrophotographers. The tail results from neutral atoms in its thin atmosphere being pushed away from Mercury by pressure from the nearby Sun's radiation.

NASA's Mariner 10 was Mercury's first robotic explorer, flying by three times between 1974-1975. Decades later, NASA's MESSENGER first visited Mercury in 2008, flying by three times before settling into an orbit in 2011. MESSENGER thoroughly studied and mapped the planet before smashing into Mercury at mission's end in 2015. Since MESSENGER, Mercury was briefly visited by BepiColombo, a joint ESA/JAXA probe, which first flew by in 2021 and is ex-

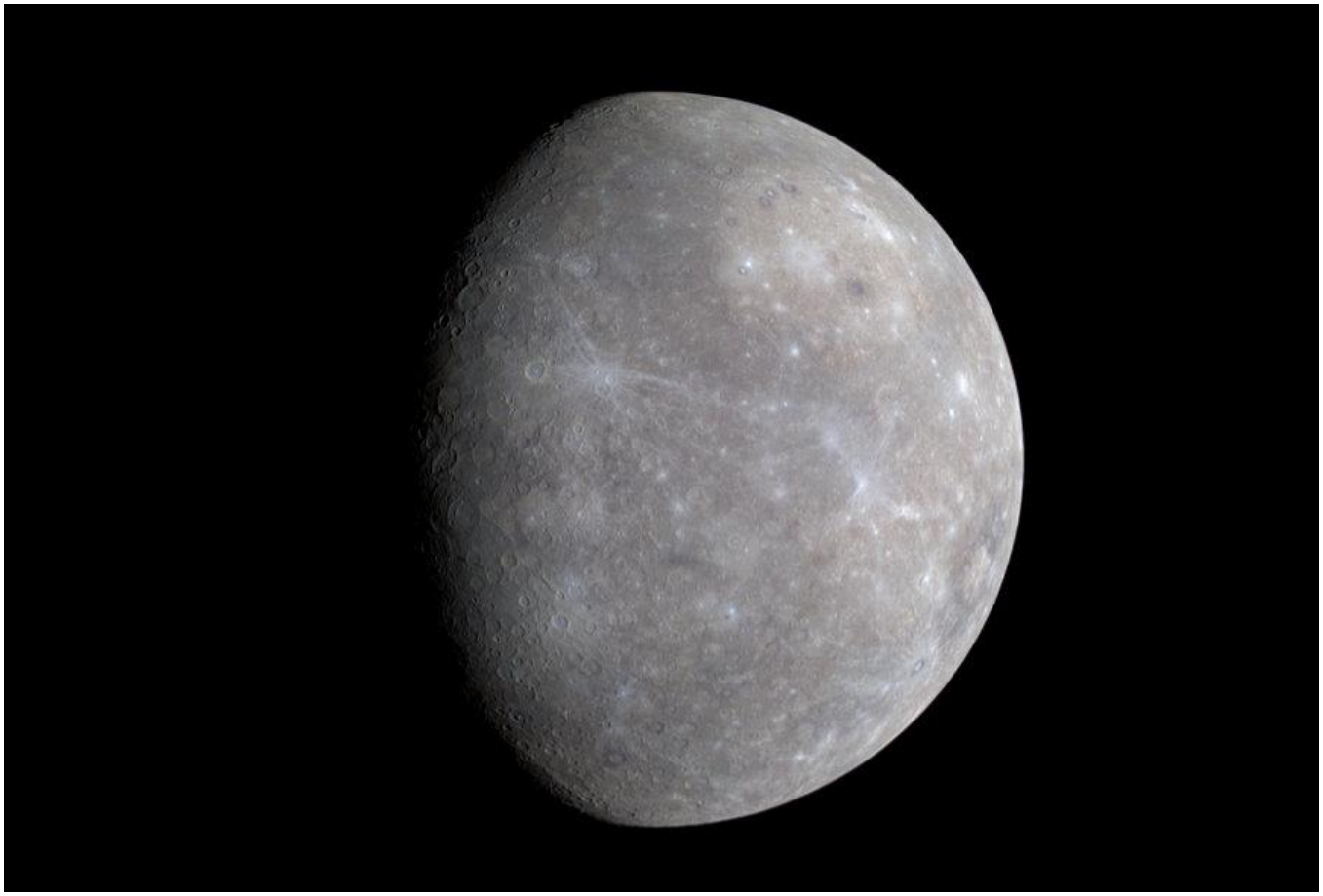
pected to enter orbit in 2025 - after completing six flybys. Need more Mercury in your life? Check out NASA's discoveries and science about Mercury at solarsystem.nasa.gov/mercury/, and visit the rest of the universe at nasa.gov.



Mercury reaches maximum western elongation on the morning of January 30, which means that your best chance to spot it is right before sunrise that day! Look for Mercury towards the southeast and find the clearest horizon you can. Observers located in more southern latitudes of the Northern Hemisphere have an advantage when observing Mercury as it will be a bit higher in the sky from their location, but it's worth a try no matter where you live. Binoculars will help pick out Mercury's elusive light from the pre-dawn glow of the Sun. Image created with assistance from Stellarium



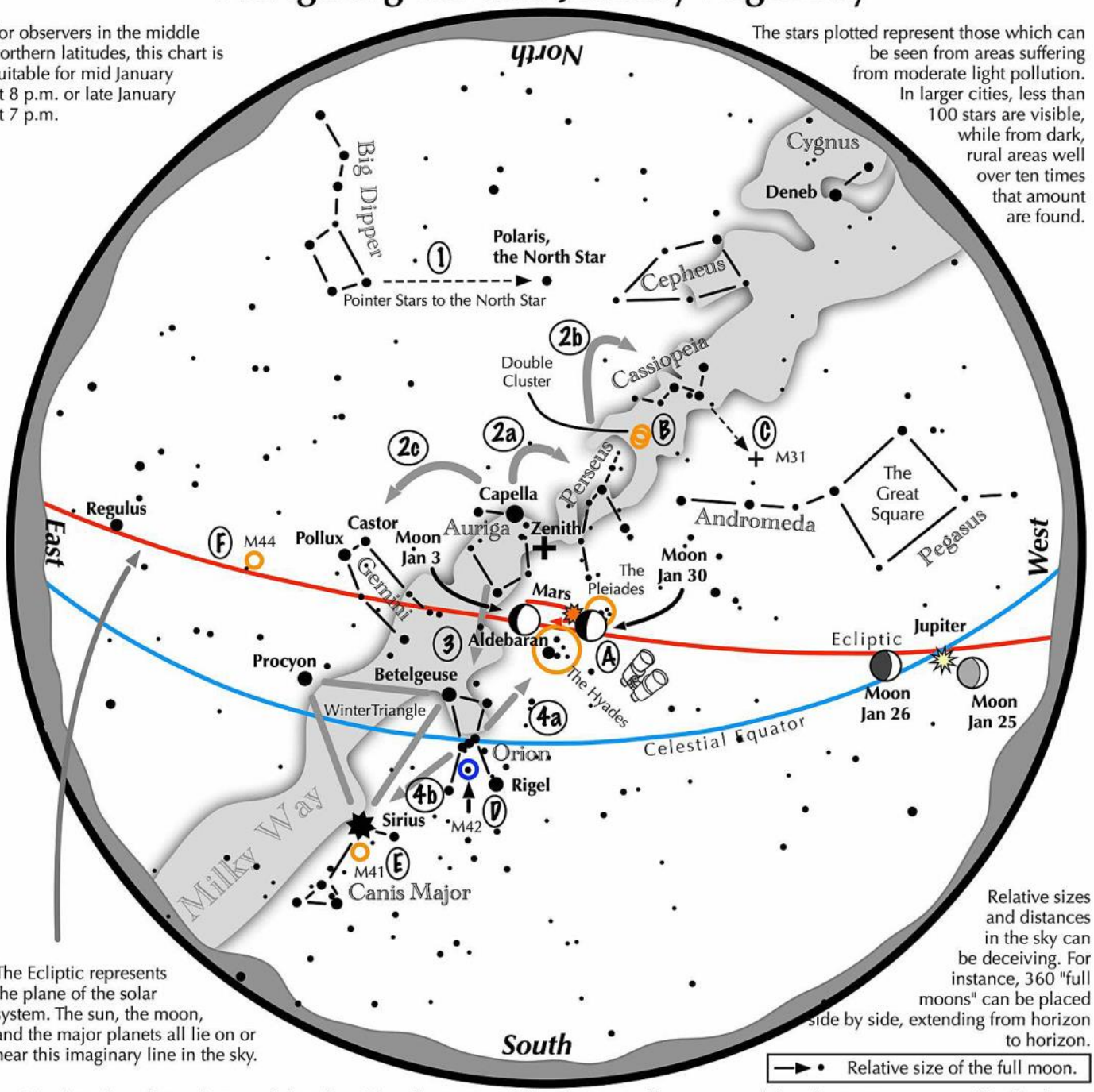
On rare occasion, Earthbound observers can observe Mercury, like Venus, transiting the Sun. Mercury frequently travels between Earth and the Sun, but only rarely does the geometry of all three bodies line up to allow observers from Earth to view Mercury's tiny shadow as it crosses our star's massive disc. You can see one such event in this photo taken by Laurie Ansorge of the Westminster Astronomical Society on November 11, 2019. If you missed it, set a reminder for Mercury's next transit: November 13, 2032.



Mercury is hot, small, and heavily cratered across its gray surface, as seen in this image from NASA MESSENGER. Mercury is the most heavily cratered planet in our solar system, since it lacks either a substantial atmosphere or geologic activity to erode surface features like craters - similar in certain aspects to the surface of our own Moon.

Credit: NASA/Johns Hopkins University Applied Physics Laboratory/Carnegie Source: https://solarsystem.nasa.gov/resources/439/mercurys-subtle-colors/

Navigating the mid January Night Sky



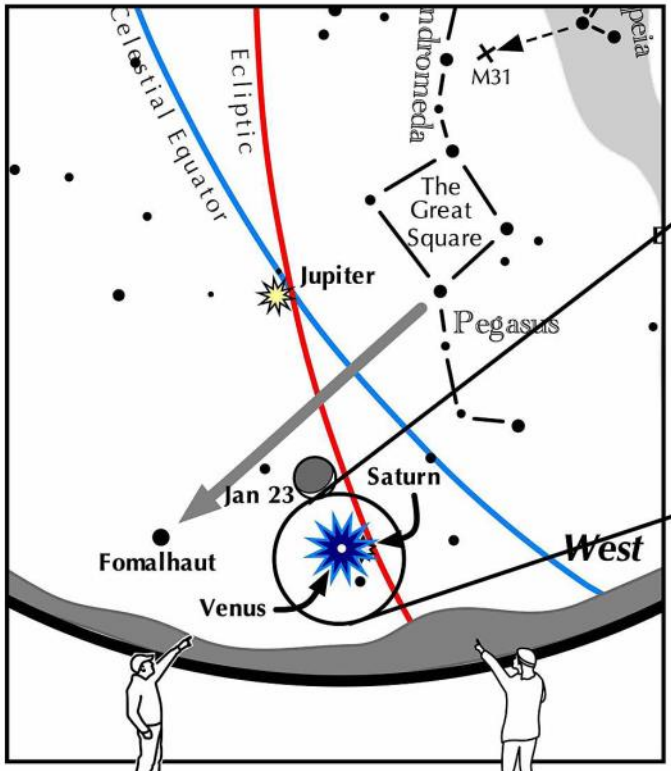
Navigating the winter night sky: Simply start with what you know or with what you can easily find.

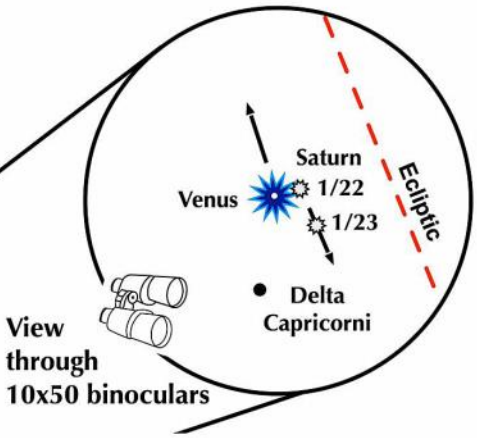
1. Above the northeast horizon rises the Big Dipper. Draw a line from its two end bowl stars upwards to the North Star.
2. Face south. Overhead twinkles the bright star Capella in Auriga. Jump northwestward along the Milky Way first to Perseus, then to the "W" of Cassiopeia. Next Jump southeastward from 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.

In the early evening of January 22, try this challenge:





View to the west-southwest on January 22 & 23 45 minutes after sunset

Venus meets Saturn

On January 1, Venus appears very low above the west-southwestern horizon. As the month proceeds, the bright planet climbs higher each evening. Saturn, on the otherhand, begins the month much higher than Venus, and drops closer to the horizon each evening.

On January 22, the two planets reach their closest to each other. Look to the west-southwest 45 minutes after sunset for the pair. Binoculars will help pick Saturn out in the twilight.

On the following evening, the thin crescent moon floats to their upper left, seemingly full with earthshine.

Auburn Astronomical Society

Membership Application Form

Name:
_____

Address:
_____

City: _____ **State:** _____ **Zip:** _____

Phone: _____ **Date of Application*** _____/_____/_____

E-mail:
_____

Telescope(s):
_____

_____

Area(s) of special interest:
_____

_____

Enclose: $20.00 for regular membership, payable in January. *Full-Time* student membership is half the Regular rate.

*** For *NEW* members joining after January, refer to the prorated Dues Table below:**

Jan $20.00	Feb $18.33	Mar $16.66	Apr $14.99	May $13.33	Jun $11.66
Jul $10.00	Aug $8.33	Sep $6.66	Oct $4.99	Nov $2.33	Dec $1.66

Make checks payable to: Auburn Astronomical Society and return this application to:

Auburn Astronomical Society
c/o John Wingard
5 Wexton Court
Columbus, GA 31907

For questions about your dues or membership status, contact: jwin1048@gmail.com

Thank you for supporting the Auburn Astronomical Society