

The ECLIPSE

The Newsletter of the Barnard-Seyfert Astronomical Society



January 2024



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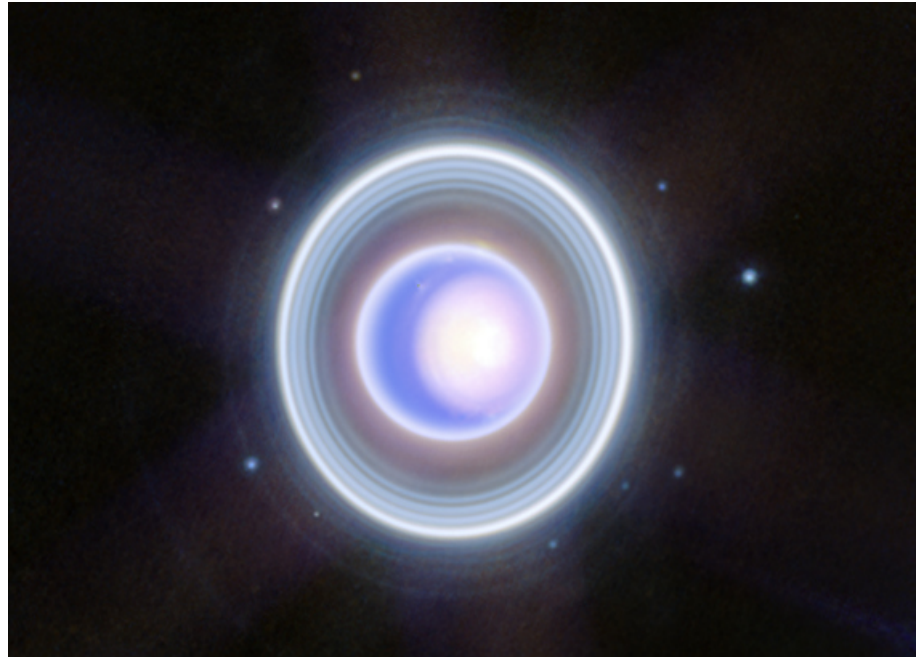
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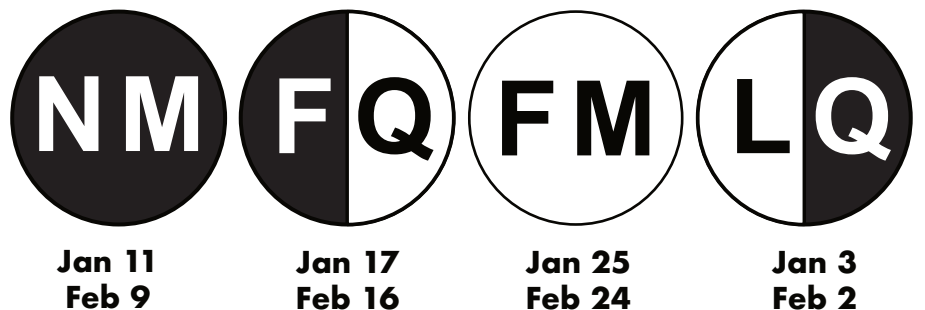
Kathy Underwood

Contact BSAS officers at
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This image of Uranus from NIRCam (Near-Infrared Camera) on NASA's James Webb Space Telescope shows the planet and its rings in new clarity. The Webb image exquisitely captures Uranus's seasonal north polar cap, including the bright, white, inner cap and the dark lane in the bottom of the polar cap. Uranus' dim inner and outer rings are also visible in this image, including the elusive Zeta ring—the extremely faint and diffuse ring closest to the planet. Image credits: [NASA](#), [ESA](#), [CSA](#), [STScI](#)

On the Cover: This image revealing the north polar region of the Jovian moon Io was taken on October 15, 2023, by the JunoCam imager aboard NASA's Juno spacecraft. Since the high latitudes were not well covered in imagery gathered by NASA's Voyager and Galileo missions, three of the peaks captured here were observed for the first time. Those mountains are seen at the upper part of the image, near the terminator (the line dividing day and night). At the time the image was taken, the Juno spacecraft was about 7,270 miles (11,700 kilometers) above Io's surface. Citizen scientist Ted Stryk made this image using raw data from the JunoCam instrument, processing the data to enhance details. Image data: [NASA/JPL-Caltech/SwRI/MSSS](#) Image processing by Ted Stryk



Happy Birthday Isaac Roberts by Robin Byrne

This month we celebrate the life of a man who took astrophotography to a new level. Isaac Roberts was born into a family of farmers on January 27, 1829 in North Wales, in the town of Groes. When Isaac was six years old, his family moved to Liverpool, England. Despite moving to England at such a young age, Isaac remained fluent in Welsh for the rest of his life.

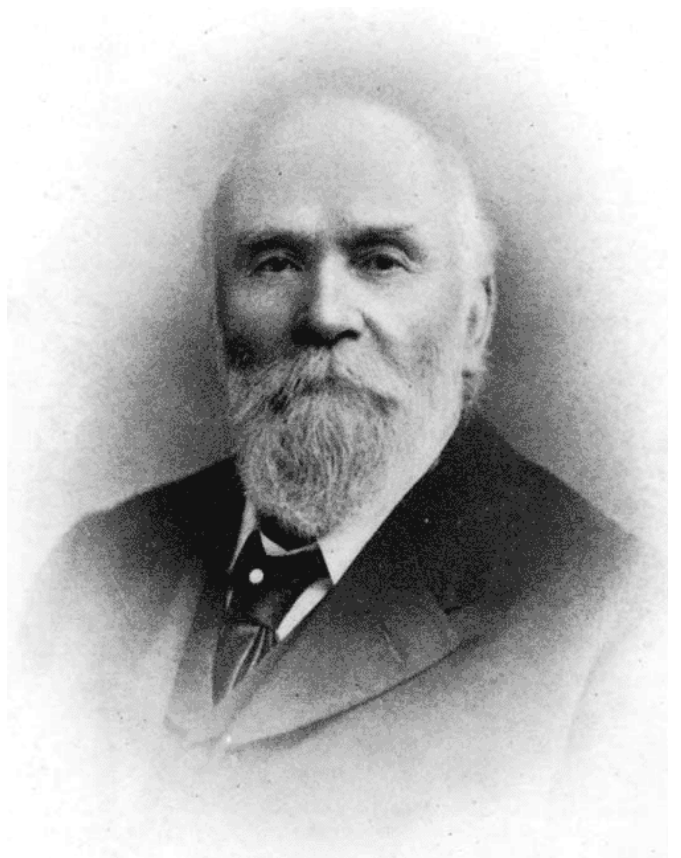
Most of Isaac's early education came from his father. But when he was 15 years old, Isaac started a 7-year apprenticeship with the mechanical engineering firm John Johnson & Son. Even with 13-hour workdays, Isaac managed to pursue his education by taking night classes at the Mechanic's Institute, as well as other schools.

In 1852, Roberts met the woman who would become his first wife, Ellen Anne Cartmel. Three years later, Isaac was promoted to manager at the engineering firm, which he eventually left in 1859 to open his own business as a builder. Isaac was quite successful in this field, as evidenced by his being named President of the Master Builders Association.

With the growing success of his business came the means to pursue his other interests. Isaac always had a scientific aptitude, and now he could explore some of the ideas that intrigued him. In 1869, he made a scientific study of the wells and water in Liverpool, publishing a paper on his results. As a member of the Liverpool Biological Society, he provided equipment used to measure water temperatures at large oceanic depths. He even was a member of the Geological Society and wrote a paper about the ability of sandstone to filter sea water.

In 1878, Isaac's interests turned to astronomy. With a 7-inch Cooke refractor, Roberts began making astronomical observations. By 1882, Roberts had set aside enough money to retire, which allowed him to devote his full attention to his scientific interests. That year, he was elected a Fellow of the Royal Astronomical Society. But he also continued his other studies, such as monitoring the motion of underground water to see if it was affected by the Sun and Moon. He even built special devices for measuring the vertical and lateral pressure produced by grains stored in tall hoppers, publishing his findings in the Proceedings of the Royal Society in 1884.

It was in 1883 that Roberts began to pursue astrophotography. He started with a camera equipped with a variety of lenses, up to 5-inches in diameter. It was around this time that he built an observatory and purchased an 18-inch reflector, in the hopes of getting better photographic results. Roberts constructed a mount for the 18-inch that replaced the counterbalance with his 7-inch refractor, which he then used as a tracking scope. Knowing that the secondary mirror of the reflector would degrade his images, Roberts mounted the photographic plates at the prime focus to optimize his results.



In 1886, Roberts formally shared with the Royal Astronomical Society at Liverpool some of his 200 images taken the previous year. This included the first photograph to show extensive nebulosity around the Pleiades, the result of a 3-hour exposure.

In December of 1888, Roberts created his most famous image. His careful tracking and long exposure showed that the Andromeda “Nebula” (now known as the Andromeda Galaxy) had a spiral structure. At this time, all nebulae were thought to be star-forming regions, so the observed structure was completely unexpected. Coupled with the incredibly detailed images he took of the Orion nebula, Roberts’ photographs sparked a transition in our understanding of the heavens.

In search of a location that would be better for his bronchitis, and for his astronomical observing, Roberts moved to the town of Crowborough in Sussex. He bought four acres from Neeson Prince, who already had his own observatory on his portion of the property. Overseeing all aspects of its construction, Roberts built an observatory and house on his newly acquired land, dubbed “Starfields,” which he moved into in 1890. Sitting atop a hill 800 feet above sea level, the observatory had an excellent view in all directions. In addition to the observatory, the property also boasted a fruit orchard, kitchen garden, a grass tennis court, and a meteorological station.

Joining Roberts at his observatory was William Franks, who was placed in charge of taking the photographs. The two men produced a wealth of images through their collaboration. With this vast collection of photographs, Roberts published the first of two volumes of his images in 1893, in a collection titled “Selections of Photographs of Stars, Star Clusters and Nebulae.” The second volume was published six years later.

In 1896, Isaac joined a group of people on a steamship to observe a total solar eclipse. The eclipse was clouded out, but Isaac met someone who would later become an important part of his life, Dorothea Klumpke, who was head of the Carte du Ciel Office at the Paris Observatory. This led to a collaboration of measuring images of nebulae using both Isaac’s and the observatory’s collection of photographic plates. Isaac became widowed in 1901, while his friendship with Dorothea grew, culminating with their marriage in 1902.

On July 17, 1904, Isaac had spent the morning walking in his garden, but later began to feel ill. Dorothea sent for medical help, but Isaac had died before the doctor’s arrival. For four years, Dorothea kept Isaac’s ashes, but in 1908, a granite pillar was erected in the cemetery at Flaybrick Hill, which includes engravings of Isaac’s images of the Andromeda Galaxy and the California Nebula. The epitaph reads in part: “In memory of Isaac Roberts ... one of England's pioneers in the domain of Celestial Photography..., who spent his whole life in the search after Truth, and the endeavour to add to the happiness of others.”

The work that Isaac and Dorothea had begun years earlier was completed by Dorothea. In 1929, she published “Isaac Roberts’ Atlas of 52 Regions, a Guide to William Herschel’s Fields of Nebulosity.” Dorothea also used some of her inheritance to donate a substantial sum to the French Astronomical Society. The money was used to create the Prix Dorothea Klumpke - Isaac Roberts “for the encouragement of the study of the wide and diffuse nebulae of William Herschel, the obscure objects of Barnard, or the cosmic clouds of R.P. Hagen.”

Isaac Roberts pioneered the notion that exceptional astronomical photographs could be used to advance our knowledge of those objects. His attention to detail and painstaking endeavors helped

to demonstrate that the process could be done successfully. In recognition of his work, he has been immortalized by having a crater on the far side of the Moon named for him.

Whether you are out observing the Andromeda Galaxy, gazing at the Pleiades, or practicing your own astrophotography skills, take a moment to remember this month's honoree - Isaac Roberts.

References:

Isaac Roberts - Wikipedia

Scientist of the Day - Isaac Roberts, Jan. 27 2021 by Dr. William B. Ashworth, Jr.

Dr Isaac Roberts (1829-1904) and his observatories by Stephen H. G. James, Journal of the British Astronomical Association, vol.103, no.3, p.120-122

Next Membership Meeting:

Wednesday, January 17 at 7:30 pm

Dyer Observatory
1000 Oman Drive
Brentwood TN 37027

Connecting the 'Dots' with Asterisms By Kat Troche

In our [December Night Sky Notes](#), we mentioned that the Orion constellation has a distinct hourglass shape that makes it easy to spot in the night sky. But what if we told you that this is not the complete constellation, but rather, an [asterism](#)?

An asterism is a pattern of stars in the night sky, forming shapes that make picking out constellations easy. Cultures throughout history have created these patterns as part of storytelling, honoring ancestors, and timekeeping. Orion's hourglass is just one of many examples of this, but did you know Orion's brightest knee is part of another asterism that spans six constellations, weaving together the Winter night sky? Many asterisms feature bright stars that are easily visible to the naked eye. Identify these key stars, and then connect the dots to reveal the shape.

Asterisms Through the Seasons

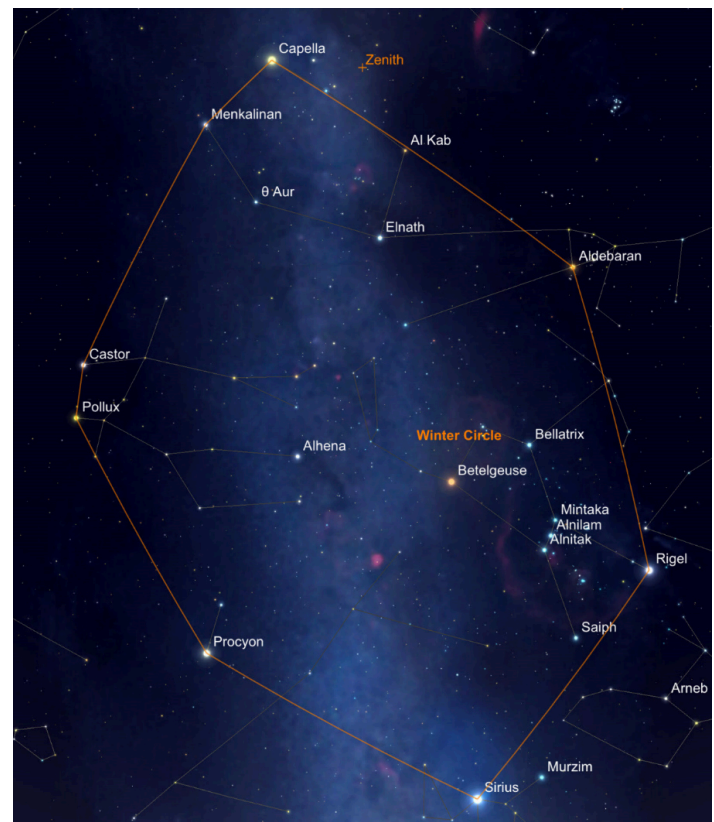
Try looking for these asterisms this season and beyond:

Winter Circle – this asterism, also known as the Winter Hexagon, makes up a large portion of the Winter sky using stars Rigel, Aldebaran, Capella, Pollux, Procyon, and Sirius as its points. Similarly, the Winter Triangle can be found using Procyon, Sirius, and Betelgeuse as points. Orion's Belt is also considered an asterism.

Diamond of Virgo – this springtime asterism consists of the following stars: Arcturus, in the constellation Boötes; Cor Caroli, in Canes Venatici; Denebola in Leo, and Spica in Virgo. Sparkling at the center of this diamond is the bright cluster Coma Berenices, or Bernice's Hair – an ancient asterism turned constellation!

Summer Triangle – as the nights warm up, the Summer Triangle dominates the heavens. Comprising the bright stars Vega in Lyra, Deneb in Cygnus, and Altair in Aquila, this prominent asterism is the inspiration behind the cultural festival [Tanabata](#). Also found is Cygnus the Swan, which makes up the Northern Cross asterism.

Great Square of Pegasus – by Autumn, the Pegasus can be seen. This square-shaped asterism takes up a large portion of the sky, and consists of the stars: Scheat, Alpheratz, Markab and Algenib.



Winter Triangle. Credit: Sky Safari Great Square of Pegasus

Tracing these outlines can guide you to objects like galaxies and star clusters. The Hyades, for example, is an open star cluster in the Taurus constellation with [evidence of rocky planetary debris](#). In 2013, Hubble Space Telescope's [Cosmic Origins Spectrograph](#) was

responsible for breaking down light into individual components. This observation detected low levels of carbon and silicon – a major chemical for planetary bodies. The Hyades can be found just outside the Winter Circle and is a favorite of both amateur and professional astronomers alike.

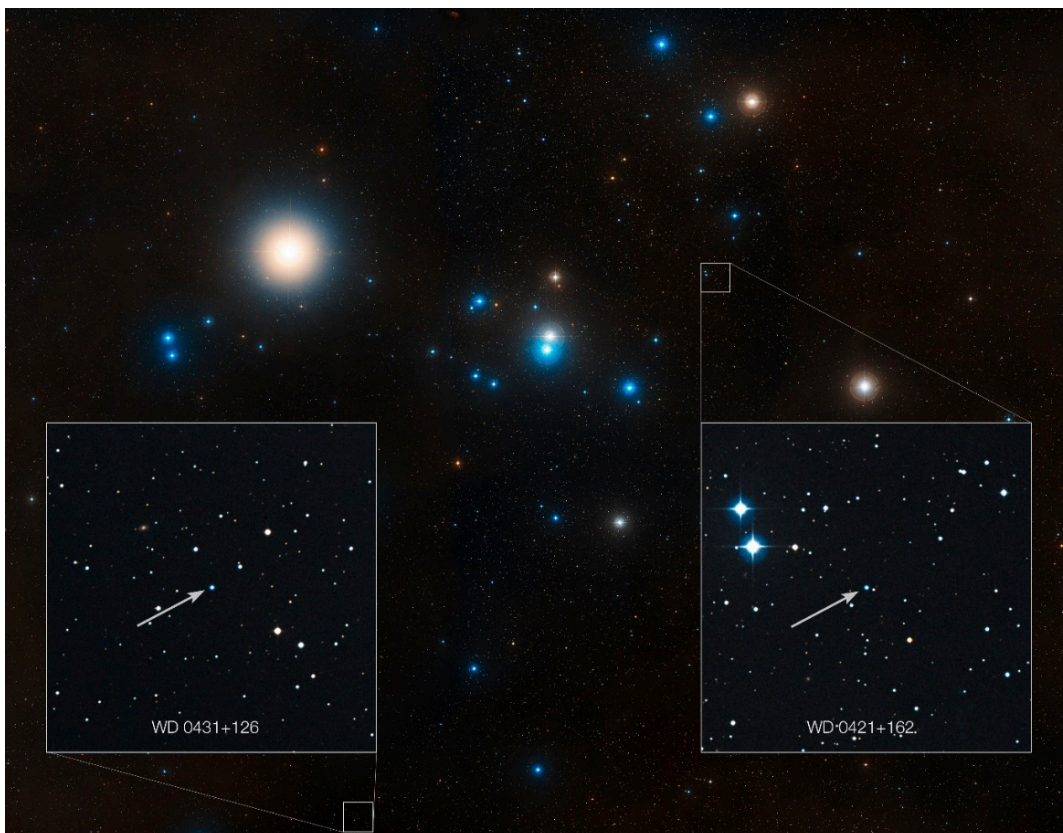
How to Spot Asterisms

Use Star Maps and Star Apps – Using star maps or stargazing apps can help familiarize yourself with the constellations and asterisms of the night sky.

Get Familiar with Constellations – Learning the major constellations and their broader shapes visible each season will make spotting asterisms easier.

Use Celestial Landmarks – Orient yourself by using bright stars, or recognizable constellations. This will help you navigate the night sky and pinpoint specific asterisms. Vega in the Lyra constellation is a great example of this.

Learn more about how to stay warm while observing this Winter with our upcoming mid-month article on the [Night Sky Network](#) page through NASA's website!



This image shows the region around the Hyades star cluster, the nearest open cluster to us. The Hyades cluster is very well-studied due to its location, but previous searches for planets have produced only one. A new study led by Jay Farihi of the University of Cambridge, UK, has now found the atmospheres of two burnt-out stars in this cluster — known as white dwarfs — to be “polluted” by rocky debris circling the star. Inset, the locations of these white dwarf stars are indicated — stars known as WD 0421+162, and WD 0431+126. NASA, ESA, STScI, and Z. Levay (STScI)

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!

**Barnard-Seyfert Astronomical Society
Minutes of a Regular Meeting of the Board of Directors
Held on Wednesday, December 6, 2023**

The regular meeting of the Board of Directors of the Barnard-Seyfert Astronomical Society was held on December 6, 2023, online, Dr. Tom Beckermann presiding. Logged in on Zoom were Tom Beckermann, Chip Crossman, Tony Drinkwine, Bud Hamblen, Andy Reeves, and Theo Wellington.

The 11/1/23 minutes were adopted without discussion.

Membership report: the current membership count is 165.

Treasurer's report: the Truist bank balance was \$5,839 and the PayPal balance was \$85. Zoom fees are now paid by direct debit from the bank account.

Future events: A private star party is scheduled for 12/9/23 at Natchez Trace Mile Marker 435.3. A public star party is scheduled for 12/16/2023 at Shelby Bottoms Nature Center. Vanderbilt's NANOGrav project will be presented at the 12/20/23 meeting and potluck dinner. The Warner Parks Nature Center will present a Winter Solstice event on 12/21/23. The permit for the Natchez Trace is still in the works.

Resolution 2013-12-06 to accept the contract for meetings at Vanderbilt's Dyer Observatory was adopted unanimously.

Respectfully submitted,

Bud Hamblen
Secretary

Barnard-Seyfert Astronomical Society Minutes of the Monthly Membership Meeting Held on Wednesday, December 20, 2023

The Barnard-Seyfert Astronomical Society met at the Girl Scouts Center on Wednesday, December 20, 2023, at 6:30 PM for the monthly meeting, and the annual pot-luck dinner and silent auction.

The minutes for the November meeting were adopted without discussion.

Treasurer's Report: The Truist bank balance was approximately \$6,000.

Star Parties and Outreach: A members-only event is scheduled for January 13 at the Natchez Trace Water Valley Overlook. A public star gazing event is scheduled for January 20 at the Edwin Warner Park Special Events Field.

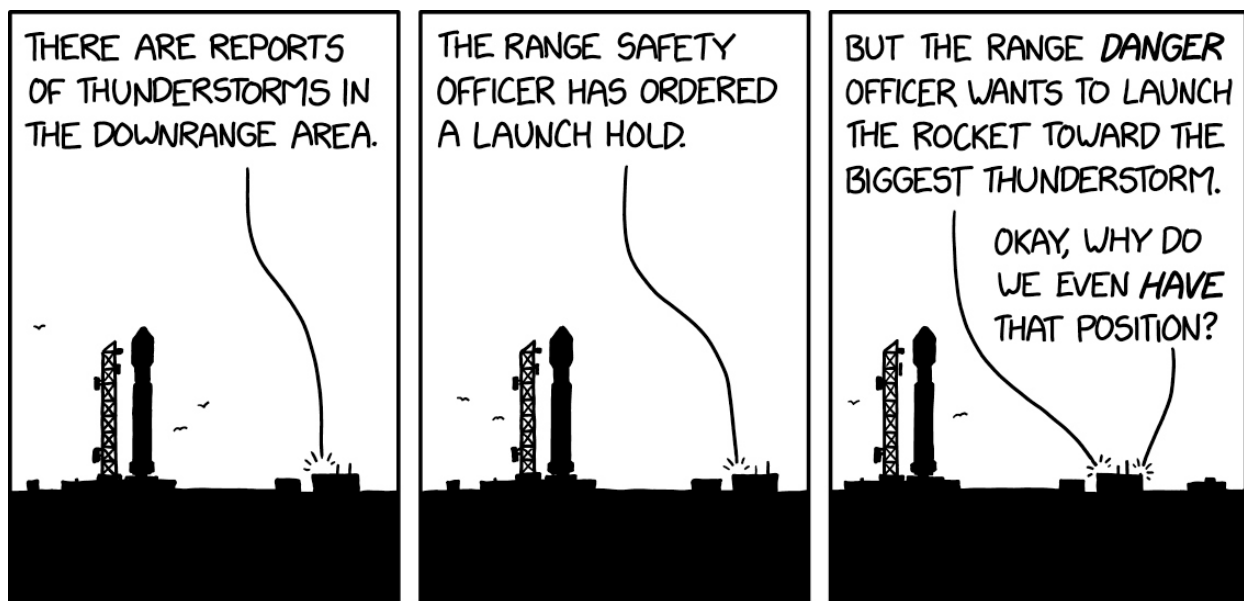
Following the dinner, William Lamb, Vanderbilt University PhD student, presented the NANOGrav Experiment. NANOGrav measures low frequency gravitational waves by the effect on timing of pulses from pulsars. The web site is at <https://nanograv.org/> Additional information can be found at <https://astrobites.org/>.

The silent auction concluded after Mr. Lamb's presentation.

Respectfully submitted,

Bud Hamblen
Secretary

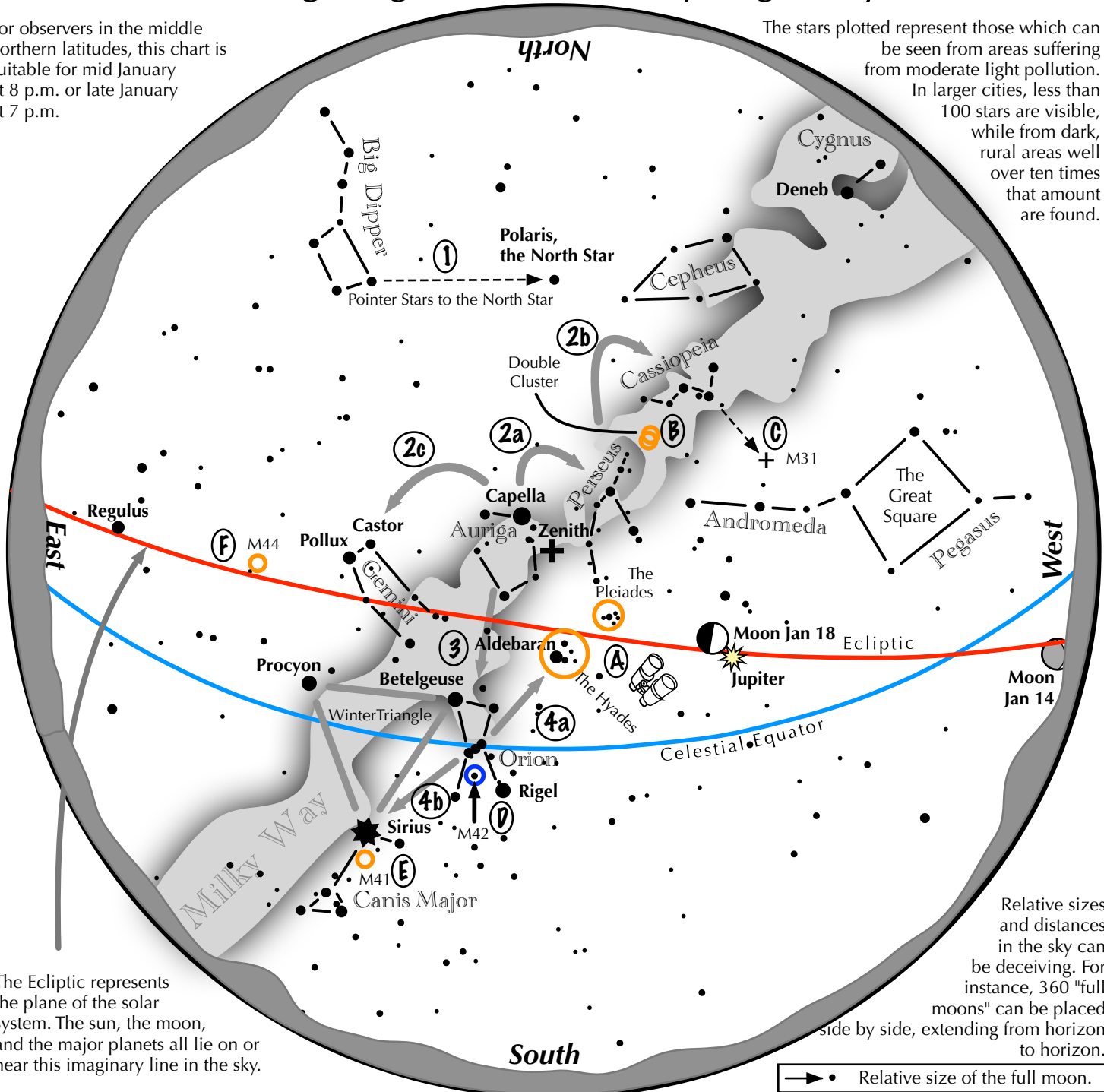
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Navigating the mid January Night Sky

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.



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.

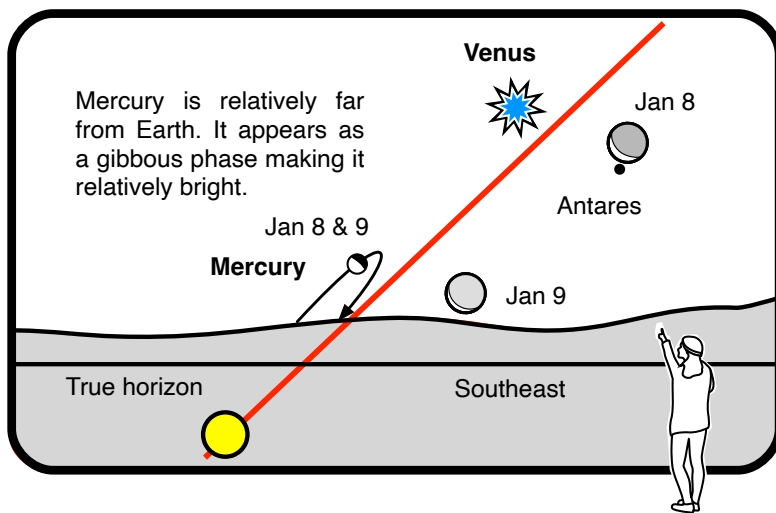
- 1 Above the northeast horizon rises the Big Dipper. Draw a line from its two end bowl stars upwards to the North Star.
- 2 Face south. Overhead twinkles the bright star Capella in Auriga. Jump northwestward along the Milky Way first to Perseus, then to the "W" of Cassiopeia. Next Jump southeastward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

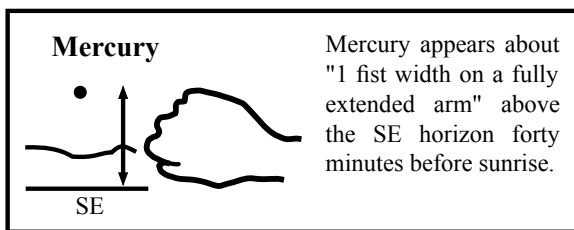
A: Examine the stars of the Pleiades and Hyades, two naked eye star clusters. **B:** Between the "W" of Cassiopeia and Perseus lies the Double Cluster. **C:** The three westernmost stars of Cassiopeia's "W" point south to M31, the Andromeda Galaxy, a "fuzzy" oval. **D:** M42 in Orion is a star forming 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.



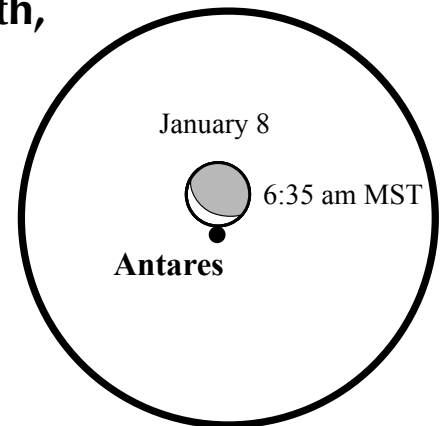
**If you can observe only one celestial event this month,
see this one:**



**January 8 and 9, 2024:
Mercury, Venus, and the moon
forty minutes before sunrise
in the southeast**



**View through
10x50 binoculars
on January 8**



The Scene:

The crescent moon, Antares, Venus, and Mercury in the morning twilight

On January 8, the crescent moon approaches Antares low in the southeast 90 minutes before sunrise.

- The moon occults Antares for viewers living in the southwestern portion of the US. (NM, UT, AZ, and So CA.)
- The event begins at 6:39AM MST, location dependent.
- Use common household binoculars to watch the occultation and begin viewing at 6:35 MST.
- * The very bright object to the moon's left is Venus.
- 40 minutes before sunrise, look for Mercury low in the southeast to the far lower left of Venus.

On January 9, an even thinner crescent moon lies right of Mercury and below brilliant Venus.



In honor of the club's 90th anniversary we partnered with Hatch Show Print to create a unique poster that would honor the achievement of the club. For those who don't know Hatch Show has been making posters for a variety of events and concerts for 140 years. In all that time we are their first astronomy club.

On the poster at the center is the moon. This was made from a wood grained stencil that the shop has used for over 50 years. To contrast that the telescope that the people are using is a brand new stencil made for our poster. The poster has three colors. First the pale yellow color of the moon was applied. Next the small stars, circles, and figures at the bottom were colored in metallic gold. The third color is

a blue for the night sky. Where it overlaps with the metallic gold it creates a darker blue leaving the figures at the bottom looking like silhouettes. This was a one time printing so the 100 that we have are all that will be printed.

The prints are approximately 13 3/4" x 22 1/4" and are available for \$20 at our membership meetings, or \$25 with shipping by ordering through bsasnashville.com. Frame not included.



Become a Member of BSAS!
Visit bsasnashville.com to join online.

All memberships have a vote in BSAS elections and other membership votes. Also included are subscriptions to the BSAS and Astronomical League newsletters.

Annual dues:

Regular: \$25
Family: \$35
Senior/Senior family: \$20
Student*: \$15

* To qualify as a student, you must be enrolled full time in an accredited institution or home schooled.

About BSAS

Organized in 1928, the Barnard-Seyfert Astronomical Society is an association of amateur and professional astronomers who have joined to share our knowledge and our love of the sky.

The BSAS meets on the third Wednesday of each month at the Dyer Observatory in Nashville. Experienced members or guest speakers talk about some aspect of astronomy or observing. Subjects range from how the universe first formed to how to build your own telescope. The meetings are informal and time is allotted for fellowship. You do not have to be a member to attend the meetings.

Membership entitles you to subscriptions to *Astronomy and Sky & Telescope* at reduced rates; the club's newsletter, the *Eclipse*, is sent to members monthly. BSAS members also receive membership in the Astronomical League, receiving their quarterly newsletter, the *Reflector*, discounts on all astronomical books, and many other benefits.

In addition to the meetings, BSAS also sponsors many public events, such as star parties and Astronomy Day; we go into the schools on occasion to hold star parties for the children and their parents. Often the public star parties are centered on a special astronomical event, such as a lunar eclipse or a planetary opposition.

Most information about BSAS and our activities may be found at bsasnashville.com. If you need more information, write to us at info@bsasnashville.com.

Free Telescope Offer

Did someone say free telescope? Yes, you did read that correctly. The BSAS Equipment & Facilities Committee has free telescopes ranging in size from 2.6" to 8" that current members can actually have to use for up to 60 days at a time. We also have some other items in the loaner program such as a photometer, H-alpha solar telescope, educational CDs, tapes, DVDs, and books. Some restrictions apply. A waiting list is applicable in some cases. The BSAS Equipment Committee will not be held responsible for lost sleep or other problems arising from use of this excellent astronomy gear. For information on what equipment is currently available, contact info@bsasnashville.com.