The ECLIPSE

The Newsletter of the Barnard-Seyfert Astronomical Society

February 2024

BSAS
Barnard-Seyfert Astronomical Society

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The Artemis II crew is pictured during training January 23 in the Neutral Buoyancy Lab at the agency's Johnson Space Center in Houston. As part of training for their mission around the Moon next year, the first crewed flight under NASA's Artemis campaign, the crew practiced the recovery procedures they will use when the splash down in the Pacific Ocean.

Photographer: Josh Valcarcel – NASA

On the Cover: Face-on spiral galaxy NGC 628, as seen by the James Webb Space Telescope. Visit the JWST web site for a comparison with the Hubble Space Telescope view of this same galaxy.

NM	FQ	FM	LQ
Feb 9	Feb 16	Feb 24	Feb 2
Mar 19	Mar 16	Mar 25	Mar 3

Happy Birthday Scott and Mark Kelly
by Robin Byrne

This month we celebrate twin brothers who have both contributed to the space program, and so much more. Mark and Scott Kelly were born in Orange, New Jersey on February 21, 1964. Both of their parents were police officers. The brothers attended public school together, graduating from Mountain High School in 1982.

Mark (L) and Scott Kelly

After high school, Mark went to the United States Merchant Marine Academy, where he graduated in 1986 with his Bachelor's Degree in Marine Engineering and Nautical Science. He later went on to earn a Master of Science Degree in Aeronautical Engineering from the U.S. Naval Postgraduate School.

Meanwhile, Scott first attended the University of Maryland, but reading "The Right Stuff" inspired him to pursue naval aviation. He transferred to the State University of New York Maritime College to study electrical engineering, with a Navy ROTC scholarship paying his way. Scott spent his summers aboard the training ship, Empire State V, traveling to such places as Hamburg, Mallorca, and London. Scott graduated in 1987, and later earned a Master of Science Degree in Aviation Systems.

After college, Mark joined the Navy, becoming a naval aviator. During his time in service, he flew 39 combat missions as part of Operation Desert Storm. In 1989, Mark married Amelia Babis, with whom he had two daughters. They would eventually divorce in 2004. In 1993, Mark entered the U.S. Naval Test Pilot School, graduating the following year.

When Scott left college, he also joined the Navy, beginning at the NAS Pensacola flight school. By 1989 he was an official naval aviator. After training on a myriad of aircraft, Scott was deployed to the Persian Gulf in 1990. In 1992, Scott married Leslie Yandell. They had two children, but eventually divorced in 2010. In 1993, Scott joined his brother in the U.S.Naval Test Pilot School.

With their two paths repeatedly crossing, it shouldn't be too surprising that the brothers both applied to become NASA astronauts in 1995, and both were accepted into the program the following year. This was the first time NASA had astronaut candidates who were related. Training began in July of 1996, and both brothers began their individual journeys to space.

Mark's first trip to space would begin on December 5, 2001 as the pilot aboard the Space Shuttle Endeavor. This mission delivered supplies and crew members to the International Space Station, and

brought home returning ISS crew members. Mark returned to space in 2006 as the pilot of Discovery. In the wake of the Columbia disaster, the primary mission was to test various safety and repair procedures, as well as delivering supplies to the ISS. Meanwhile, in 2007, Mark began a different type of journey when he married U.S. Representative Gabby Giffords. But Mark's space adventures weren't over yet. His first mission as a shuttle commander was in 2008 aboard Discovery. This mission delivered parts of the Japanese Kibo module to ISS. In 2011, Giffords was shot in an attempted assassination. Mark was scheduled to fly another mission, but NASA wasn't sure if he should go because of Gifford's condition. Thankfully, she was showing tremendous improvements, so Mark ultimately did fly as commander aboard Endeavor, launching in May of 2011, with Giffords present to watch the launch. Once again, they delivered equipment to ISS. The following month, Mark announced his retirement from NASA and the Navy to be able to help his wife in her recovery. Over the next five years, Mark co-authored several books about space, about Gabby's injury and recovery, and about the issue of gun violence in America. Mark and Gabby became strong advocates for gun control, establishing a political action committee in 2013 called Americans for Responsible Solutions.

Scott was actually the first of the two to go to space, aboard the Space Shuttle Discovery as the mission pilot, launching December 19, 1999. This was a Hubble Space Telescope repair and upgrade mission. It was also the only shuttle mission to celebrate Christmas from orbit. After this flight, Scott was sent to Star City, Russia to serve as NASA's director of operations. In 2002, Scott ventured in a different direction, spending 5 days as commander of the NEEMO 4 underwater laboratory, analyzing similarities between working in the extreme environment in the ocean to working in space. In 2005, he participated in a similar assignment for 3 days as part of the NEEMO 8 mission. Scott returned to space in 2007 aboard the Space Shuttle Endeavor, delivering parts to construct more components of the ISS. Scott once again flew to ISS in 2010, but this time his mission was to stay there. After his first two months on ISS, he moved into the position of Commander. During his five months in space, Scott participated in various scientific experiments. While in orbit, Scott received the horrible new that his sister-in-law, Gabby Giffords, had been shot. After returning to Earth, his first stop was to the hospital where she was still being treated. In 2012, Scott officially retired from the Navy. That same year, he was chosen for a landmark NASA mission - to spend one year in space aboard ISS. Riding a Soyuz spacecraft, Scott launched in March of 2015, and returned to Earth aboard another Soyuz spacecraft in March of 2016. During his year in space, Scott performed a variety of scientific experiments, as well as being a scientific test study himself. About halfway through his mission, the role of Commander was passed on to him, so Scott also performed command duties. Shortly after his return, Scott announced that he would be retiring from NASA. A month later, he was named by the United Nations Office for Outer Space Affairs (UNOOSA) to be the United Nations Champion for Space. His role was to raise awareness of UNOOSA activities and outreach. Scott also followed in Mark's literary footsteps, writing his own book about the year he spent in space. In 2018, Scott married Amiko Kauderer, who worked for NASA as a public relations officer.

Scott's year in space, coupled with both of the identical twin brothers having been employed by NASA for several years, provided a unique opportunity to perform a scientific study of the effects of space on the human body. NASA had many years of medical records for both brothers to establish a baseline, and then could look at changes in Scott's body compared to Mark's. Overall, they found that the human body recovers from extended weightlessness very well. One study looked at the ends of DNA strands, which tend to get depleted as people age, with each round of replicating DNA showing more depletion. Surprisingly, Scott's DNA, after a year in space, not only had LESS degradation than his brother's, but the strand had actually increased in length. However, after returning to Earth, the strands first reduced back to where they were before the flight, but then

degraded at an even faster rate. That could be a point of concern if it is a regular occurrence. For now, they don't understand why the changes progressed in this way.

Another area of research was looking at gene expression, which is how the information in a gene is used to construct a protein molecule. Stress was already known to affect this process, so they wanted to see if spaceflight created a different situation. They found that Scott's gene expression varied the most during his last 6 months in space, which was not expected, thinking he would get more accustomed to the environment over time. Once back on Earth, Scott's gene expression returned to within 90% of Mark's, which is considered normal levels.

In a test of cognitive skills, they did find concerning decreases in Scott's cognition after his return to Earth, despite being stable while in space. The decrease lasted for roughly 6 months. That raises the question of whether this would affect the performance of astronauts on even longer missions, such as a flight to Mars. On a positive note, they found that the flu vaccine worked the same in weightlessness as it does on Earth. And, overall, Scott's condition returned to a level similar to Mark's in all areas measured after being on Earth for a few months. Obviously, this was a study of only two people, so it would be difficult to make any generalizations about how these results may apply to others.

After NASA, both brothers have remained active. In addition to public appearances, Scott has become active in a program called the UNITED24 project, which has been raising funds to help replace medical equipment in Ukraine.

Meanwhile, Mark has followed in his wife's political footsteps, becoming a U.S. Senator, representing Arizona. He first ran in the 2020 special election, after the death of John McCain opened a seat, and in 2022, he was reelected.

Scott's year in space study is not over, either. He will have tests done annually to monitor long term changes, with Mark always present for a comparison.

The Kelly Brothers have led amazing lives, and continue to contribute to the betterment of mankind. From political and charitable activities, to increasing our understanding of how weightlessness affects the human body, Mark and Scott are two inspiring individuals who will, undoubtedly, add more remarkable achievements to their life stories before it is all said and done.

References:

Scott Kelly - Wikipedia

Mark Kelly - Wikipedia

Twins Study - NASA

NASA's Study of Astronaut Twins Creates a Portrait of What a Year in Space Does to the Human Body: Wide-ranging research compares astronaut Scott Kelly to his earthbound twin brother, Mark; Smithsonian Magazine; Maddie Burakoff; April 11, 2019

Constant Companions: Circumpolar Constellations, Part I
By Kat Troche

The counterclockwise circumpolar constellations Auriga, Cassiopeia, and Ursa Minor in the night sky, with four objects circled in yellow labeled: Pinwheel Cluster, Starfish Cluster, Owl Cluster, and Polaris.

Credit: Stellarium Web

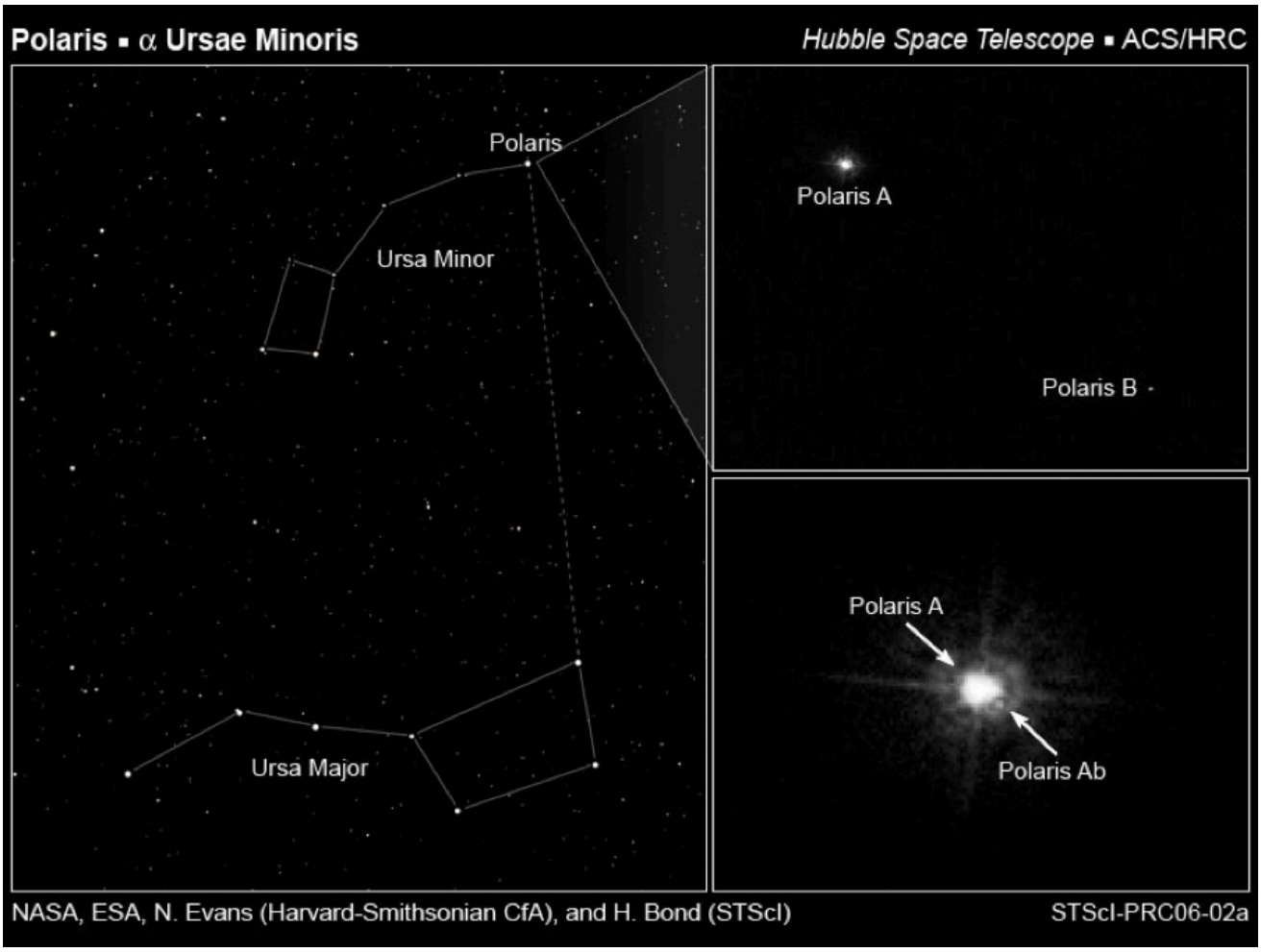
Winter in the northern hemisphere offers crisp, clear (and cold!) nights to stargazers, along with better views of several circumpolar constellations. What does circumpolar mean when referring to constellations? This word refers to constellations that surround the north and south celestial poles without ever falling below the horizon. Depending on your latitude, you will be able to see up to nine circumpolar constellations in the northern hemisphere. Today, we'll focus on three that have gems within: Auriga, Cassiopeia, and Ursa Minor. These objects can all be spotted with a pair of binoculars or a small to medium-sized telescope.

The Pinwheel Cluster: Located near the edge of Auriga, this open star cluster is easy to spot with a pair of binoculars or small telescope. At just 25 million years old, it contains no red giant stars and looks similar to the Pleiades. To find this, draw a line between the stars Elnath in Taurus and Menkalinan in Auriga. You will also find the Starfish Cluster nearby.

The Owl Cluster: Located in the 'W' or 'M' shaped constellation Cassiopeia, is the open star cluster known as the Owl Cluster. Sometimes referred to as the E.T. Cluster or Dragonfly Cluster, this group of stars never sets below the horizon and can be spotted with binoculars or a small telescope.

Polaris: Did you know that Polaris is a triple star system? Look for the North Star on the edge of Ursa Minor, and with a medium-sized telescope, you should be able to separate two of the three stars. This star is also known as a Cepheid variable star, meaning that it varies in brightness, temperature and diameter. It's the closest one of its kind to Earth, making it a great target for study and conceptual art.

Up next, catch the King of the Planets before its gone for the season with our upcoming mid-month article on the Night Sky Network page through NASA's website!



A black and white image from the Hubble Telescope of the Polaris star system, showing three stars: Polaris A, Ab, and Polaris B.

Credit: NASA, ESA, N. Evans (Harvard-Smithsonian CfA), and H. Bond (STScI)

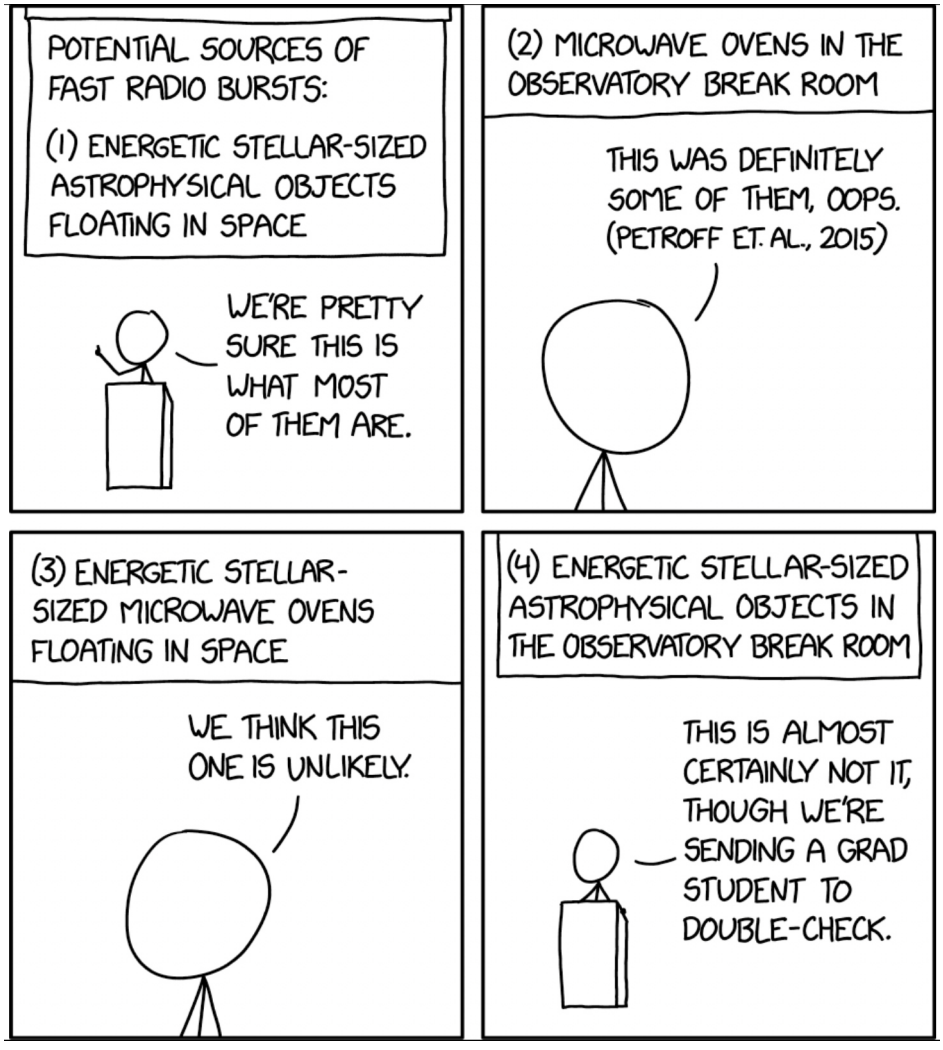
This article is distributed by NASA's Night Sky Network (NSN). The NSN program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.gov to find local clubs, events, and more!

Next Membership Meeting:

Wednesday, February 21 at 7:30 pm

Dyer Observatory
1000 Oman Drive
Brentwood TN 37027

xkcd


POTENTIAL SOURCES OF FAST RADIO BURSTS:
(1) ENERGETIC STELLAR-SIZED ASTROPHYSICAL OBJECTS FLOATING IN SPACE
WE'RE PRETTY SURE THIS IS WHAT MOST OF THEM ARE.
(2) MICROWAVE OVENS IN THE OBSERVATORY BREAK ROOM
THIS WAS DEFINITELY SOME OF THEM, OOPS. (PETROFF ET AL., 2015)
(3) ENERGETIC STELLAR-SIZED MICROWAVE OVENS FLOATING IN SPACE
WE THINK THIS ONE IS UNLIKELY.
(4) ENERGETIC STELLAR-SIZED ASTROPHYSICAL OBJECTS IN THE OBSERVATORY BREAK ROOM
THIS IS ALMOST CERTAINLY NOT IT, THOUGH WE'RE SENDING A GRAD STUDENT TO DOUBLE-CHECK.

Barnard-Seyfert Astronomical Society
Minutes of the Monthly Membership Meeting
Held on Wednesday, January 17, 2024

The Barnard-Seyfert Astronomical Society met on-line via Zoom on Wednesday, January 17, 2024, at 7:30 PM, Dr Tom Beckermann presiding. The in-person meeting had to be canceled because of inclement weather.

The minutes for the December 20, 2023, meeting were adopted without discussion. Theo Wellington reported that the Truist bank balance was $5787.16, and the PayPal balance was $256.00. The annual premium for the liability insurance policy has been paid (about $300). The 2024 RASC Observer's Handbooks have been sent out. One copy of the 2024 RASC Observers Handbook is still available. Eclipse glasses are available (members: 2 pairs free, additional pairs $1 each – non-members $2 each). Rainbow Symphony says they have stopped making glasses for individual orders – get yours from us. Commemorative Hatch Show Print posters are available ($25 shipped, $20 picked up at a meeting).

Member count on Night Sky Network is 172. Members can join or renew through the Night Sky Network. There are 2.2k likes and 2.3k followers on Facebook, and 324 followers on X.

Loaner telescopes are still available for members. The list is on the BSAS Google Group.

We are seeking newsletter editors. Contact info@bsasnashville.com. We are also seeking a vice president.

We have a new meeting venue at Vanderbilt's Dyer Observatory. Meetings will continue to be on the third Wednesday of every month, except for June and July, when they will be on the fourth Wednesday. June 19 is a holiday, and the observatory plans another event for July 17.

Star Parties and Outreach: A public star party is scheduled at Edwin Warner Park on January 20, 2024. A members-only star party is scheduled for February 10 at Natchez Trace Mile Marker 435.3 (the permit is still pending on this one). A public star party is scheduled for February 17 at the Shelby Bottoms Nature Center. The Middle Tennessee Science and Engineering Fair is scheduled for March 22. The BSAS traditionally offers awards for the best astronomy related projects.

Because the planned telescope workshop could not be held, there was an open forum where members talked about things of current interest. Some items of interest included: Organizing a Tennessee chapter of the International Dark-Sky Association. An introductory course on amateur astronomy by the Kalamazoo Astronomical Society. The Night Sky Network as an observing resource. The April 8 total eclipse of the Sun. Did the JWST find a biosignature signal in an exoplanet atmosphere? The Astronomical League Lunar observing program. The Japanese SLIM lander. Teresita recommended the book Future Stories by David Christian. History of the Barnard Seyfert Astronomical Society (since 1928).

Some URLs that were mentioned:

Astronomical League: https://www.astroleague.org/

International Dark-Sky Association: https://darksky.org/

Kalamazoo Astronomical Society: https://www.kasonline.org

Night Sky Network: https://nightsky.jpl.nasa.gov/

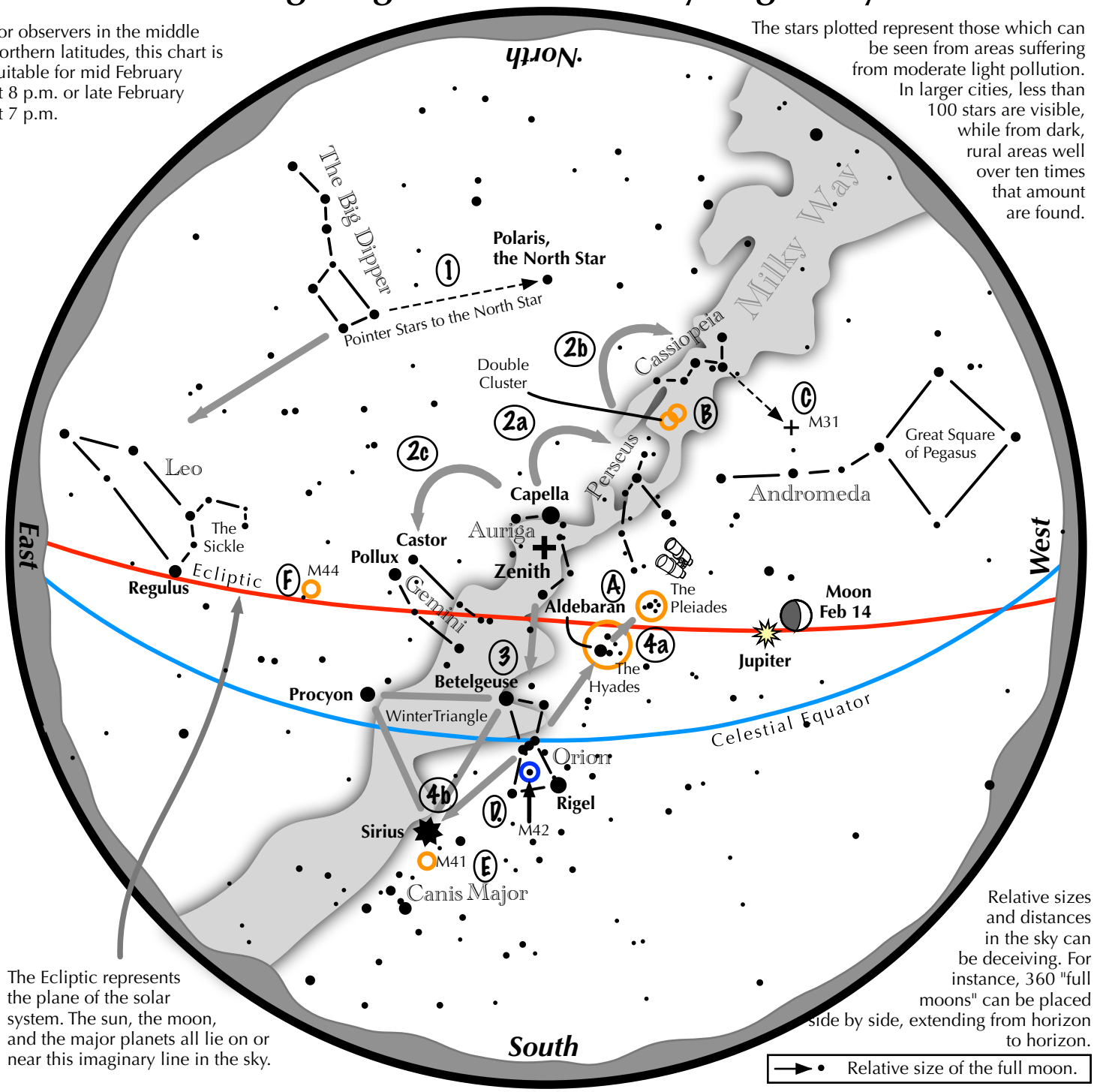
Respectfully submitted,

Bud Hamblen
Secretary

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.



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.

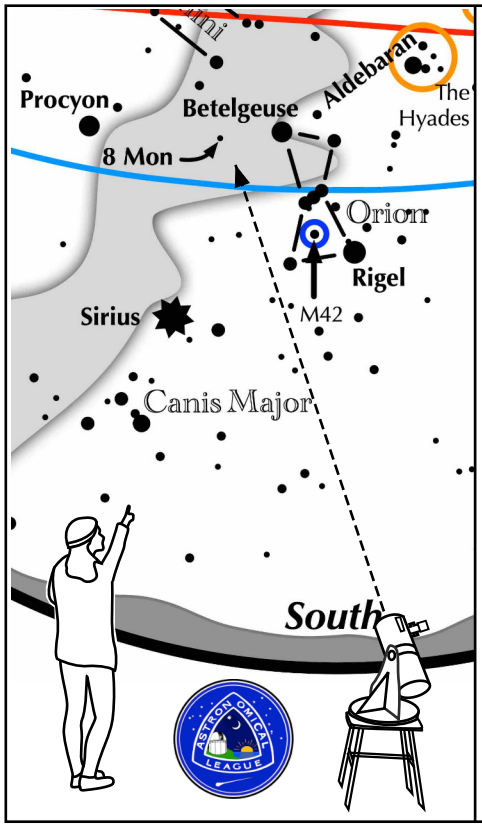
Navigating the February night sky: Simply start with what you know or with what you can easily find.

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.

ASTRONOMICAL LEAGUE Double Star Activity



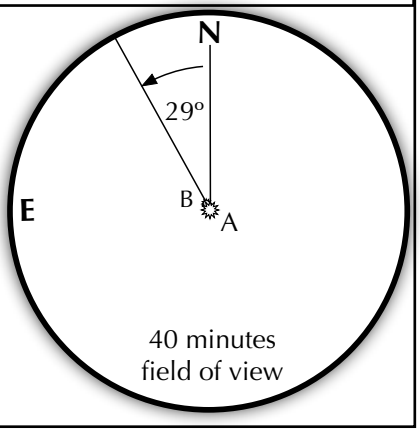
Other Suns: Epsilon (8) Monocerotis

How to find Epsilon Monocerotis on a February evening

Face south. Look for the Winter Triangle stars of Betelgeuse and Procyon. Epsilon Monocerotis is about 1/3 between Betelgeuse and Procyon. It is a 4.3 magnitude star so dark skies are needed to spot it.

Suggested magnification: >20x
Suggested aperture: >3 inches

Epsilon (8) Mon
A-B separation: 12 sec
A magnitude: 4.4
B magnitude: 6.6
Position Angle: 29º
Colors:
white
lilac



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.

Barnard-Seyfert Astronomical Society

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.