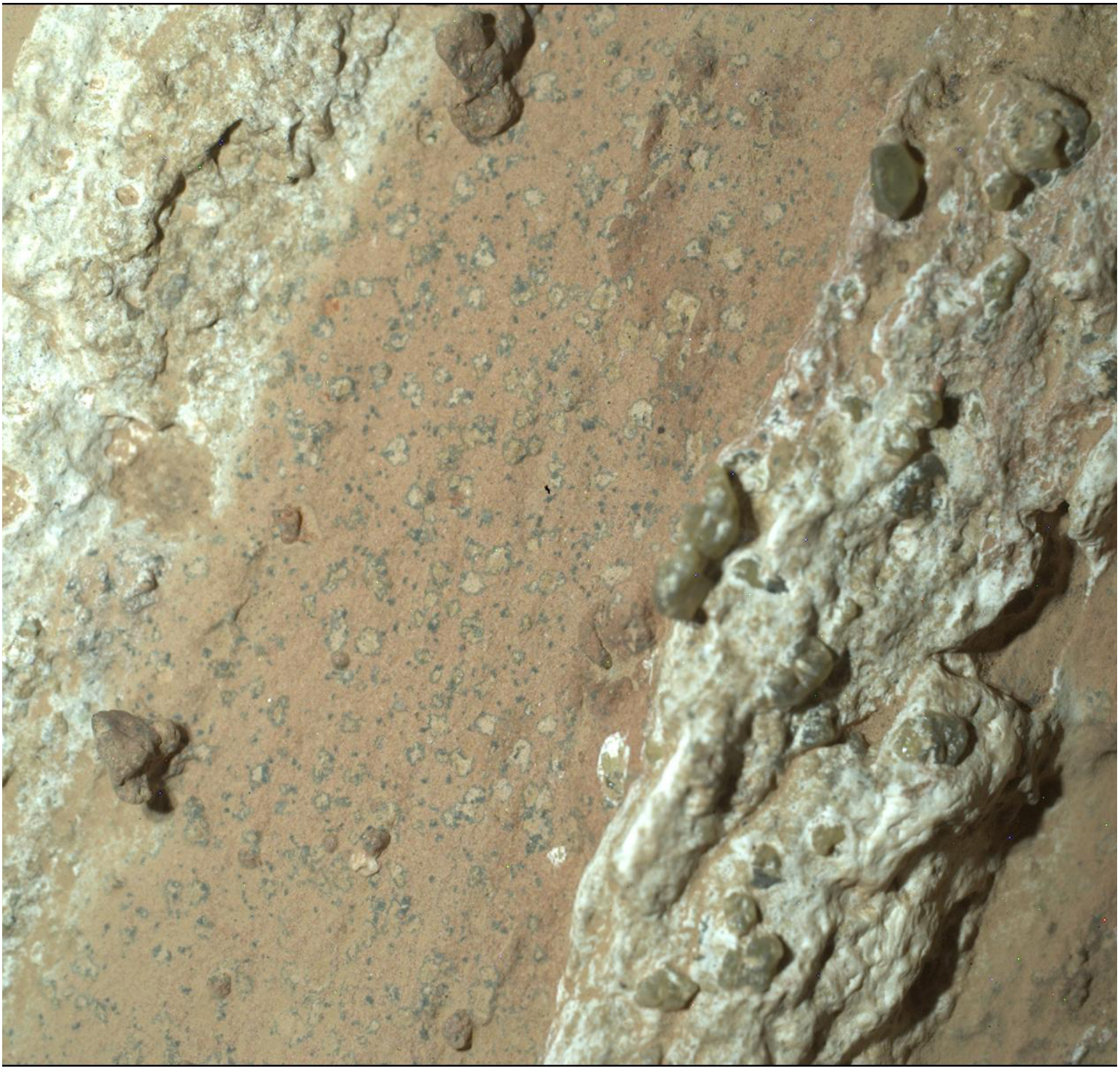
The ECLIPSE

The Newsletter of the Barnard-Seyfert Astronomical Society



August 2024

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Barnard-Seyfert Astronomical Society

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To celebrate the 25th anniversary of its launch, NASA's Chandra X-ray Observatory is releasing 25 never-before-seen views of a wide range of cosmic objects.

These images, which all include data from Chandra, demonstrate how X-ray astronomy explores all corners of the universe. By combining X-rays from Chandra with other space-based observatories and telescopes on the ground, as many of these images do, astronomers can tackle the biggest questions and investigate long-standing mysteries across the cosmos.

On the cover: A vein-filled rock is catching the eye of the science team of NASA's Perseverance rover. Nicknamed "Cheyava Falls" by the team, the arrowhead-shaped rock contains fascinating traits that may bear on the question of whether Mars was home to microscopic life in the distant past.

The rock exhibits chemical signatures and structures that could possibly have been formed by life billions of years ago when the area being explored by the rover contained running water. Other explanations for the observed features are being considered by the science team, and future research steps will be required to determine whether ancient life is a valid explanation. NASA/JPL/MSSS

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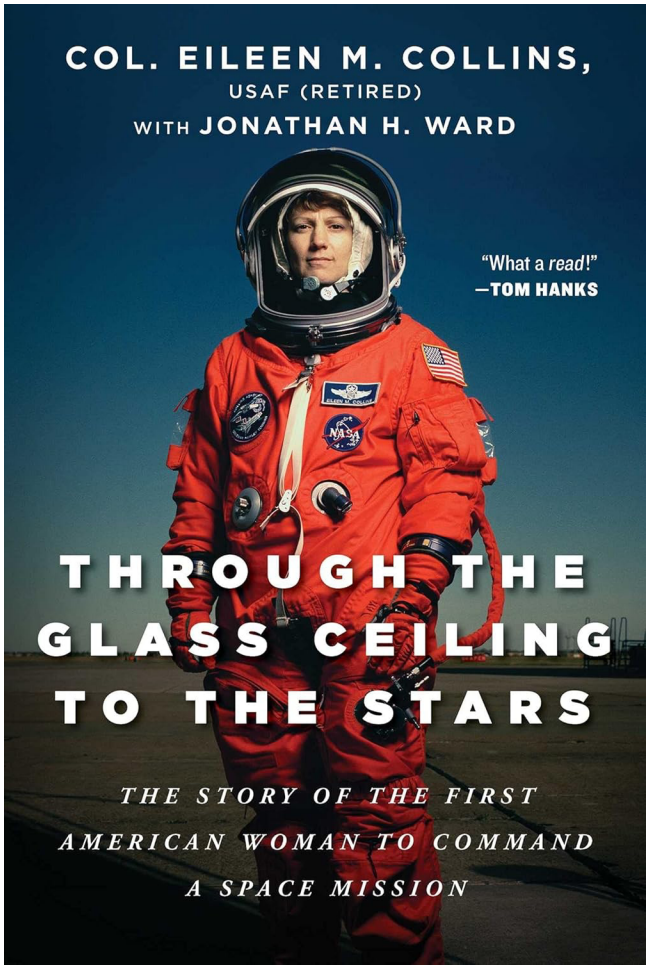
Book Review: Through The Glass Ceiling To The Stars reviewed by Robin Byrne



This last year, I bought several books for myself that were accumulating in my Amazon wish list. Included in that list was Through The Glass Ceiling To The Stars: The Story Of The First American Woman To Command A Space Mission by Col. Eileen M. Collins (Ret.) with Jonathan H. Ward. Being a sucker for astronaut biographies and woman trailblazers, I knew this would be right up my alley. I wasn't wrong.

The book largely emphasizes three main eras in Collins' life: her childhood, her military career, and, of course, her years at NASA.

Collins' childhood began fairly normally, but several challenges arose over the years. Both of Collins' parents dealt with personal demons. Her father was an alcoholic whose drinking and drunken behavior became so bad, her mother kicked him out of the house for good, though they never divorced. Collins' mother struggled to raise the family on her own, having to move into public assistance housing because money was so tight. When Collins' older brother left home for college, the last vestige of stability was gone, and her mother attempted suicide. Collins, a high school senior, was left to care for her two younger siblings on her own while her mother was temporarily institutionalized.

When Collins graduated high school, she was determined to leave home, join the Air Force, and become a pilot. Lucky for her, the recruiter didn't show up for their meeting. It turns out that to be a pilot in the Air Force, you need a college degree. So, on to plan B: Collins enrolled in a nearby community college, but she still had an interest in being a pilot in the Air Force. She researched schools that had an Air Force ROTC program, and the nearest to her was Cornell. After graduating with her Associate's Degree, Collins enrolled in the Air Force ROTC and reported for basic training the summer before entering Cornell. She found the discipline and challenge of the military to be a perfect fit for her personality.

After graduating from Cornell, Collins entered the Air Force and began training as a military pilot. During college, Collins had already taken private flying lessons, but now she got her hands on military aircraft. Although, as part of the policy barring women from serving in war, she was not allowed to fly any aircraft that was used in combat. This created some critical limitations in what Collins could do. Her military training was an interesting read, especially the component that involved survival exercises in case of a crash, immediately followed by being "captured" and taken to a "POW camp." The whole ordeal sounded harrowing.

Since childhood, Collins had an interest in science, and especially space. The dream of becoming an astronaut was always in the back of her head. In particular, Collins dreamt of flying a Space Shuttle. To achieve that dream, NASA required completion of Test Pilot School (TPS). But, to enter TPS, she had to fly a minimum of hours on a particular list of aircraft. Of course, all but one of the

aircraft on the list were combat aircraft, which she wasn't allowed to fly. So Collins made sure she flew on the one remaining aircraft as often as possible to accumulate the required hours. She also needed to log time flying an operational aircraft in actual missions. This ultimately led to her flying a support aircraft, and rescuing medical students, during the operations in Grenada.

But she still wasn't competitive enough to be accepted to TPS, so Collins entered graduate school, earning a Masters Degree from Stanford in Operations Research (a combination of engineering and computer modeling). This then gave her the qualifications to teach math at the Air Force Academy in Colorado. It was during this time that Collins married fellow Air Force pilot Pat Youngs, whom she had started dating before entering graduate school. Thinking about their future together and the logistics of their careers, Pat chose to become an airline pilot, making it easier for them to move around as Collins' Air Force career stationed them in different places.

Collins finally made it into Test Pilot School at Edwards Air Force Base in California. Because her path to this goal took longer than normal, she outranked her fellow classmates, which automatically made her the "class leader" for her group. She was the first woman to hold this position at the school, addeding another layer of responsibilities on top of training to be a test pilot. Collins rose to the occasion. Because of the intensity of the program, it's no surprise that this hard-working group of pilots also played hard. Collins describes several episodes of increasingly outrageous practical jokes that were executed by the pilots.

While she was in TPS, NASA announced that they were recruiting a new class of astronauts and taking applications. Collins knew it was now or never. She applied, despite not yet being an official test pilot. The timing actually worked well. A month after graduating from TPS, Collins started working at NASA as one of the first three women who were recruited to be astronaut pilots. Prior to this, all the women astronauts were recruited for Mission Specialist positions only.

Collins' astronaut career included all of the dues-paying that every astronaut candidate goes through: learning about every aspect of the Space Shuttle, as well as the various assigned duties. Meanwhile, Collins was getting anxious to fly. While every Shuttle flight had multiple Mission Specialist positions, there was only one pilot and one commander (and you had to fly at least twice as a pilot before flying as a commander). So, while Collins' fellow astronaut recruits were flying as mission specialists, she was still waiting. Her supervisor told her that when she got her assignment, he would make sure it was a good mission. He lived up to that promise. Collins would not only be the first woman to pilot a Shuttle, but, also, she would fly the first mission that executed a rendezvous with the Mir Space Station. While not a docking mission, it was still a major milestone that led to subsequent missions of the Shuttle docking with Mir.

Collins' second flight as a pilot did dock with Mir, and she had the opportunity to enter the space station, which she described as being a mess. This mission brought U.S. astronaut Jerry Linenger back to Earth from his stint on the space station. Linenger had one of the most harrowing experiences on Mir, including an automated cargo ship crashing into the station, as well as a fire breaking out in one of the modules. Collins was left with less than a favorable impression of the Russian space station.

When Collins was assigned as Commander for her next flight, she once again achieved a first - this time as the first woman to command a Shuttle mission. Her flight would deliver the Chandra X-Ray Telescope to space. Collins' interest in astronomy made her especially excited to be a part of this mission.

When Collins got her assignment for her next command, she never dreamed it would be years before she would actually fly it. The mission scheduled just prior to hers was a mission on the Columbia spacecraft. This would be Columbia's last flight, tragically breaking up during its reentry in Earth's atmosphere. Collins had to navigate not only her own family's reactions to the tragedy,

including her young daughter, but also help her fellow crew members and their families, while simultaneously assisting in the process of understanding what went wrong and figuring out how to avoid this kind of tragedy in the future.

When Collins' mission finally did launch, it was dubbed a "back to flight" mission, which meant that, in addition to the already planned flight goals, they would also be testing out new systems and procedures. The flight brought equipment and supplies to the International Space Station (ISS). One of the new procedures was for the Shuttle to perform a roll as it approached ISS, allowing the astronauts on the station to photograph the underside of the Shuttle to inspect for damage. They also used the Canadarm to carry astronauts around the spacecraft to look for anything amiss. Fortunately, no damage was found. Meanwhile, they got to experience life on ISS, which Collins enjoyed much more than Mir.

Collins had already decided to retire from NASA after this flight, wanting to make room for the newer astronaut pilots to have a chance to fly before the Shuttle fleet was retired. This decision ended up being delayed due to both of Collins' parents tragically dying within a few months of each other. Once both estates were settled, Collins retired from the Air Force and NASA, moving into roles on various boards and making appearances, but largely living a private life and raising her family.

Eileen Collins' story is inspirational and fascinating. Her strong will and drive are evident throughout her life's path, and those qualities played a large role in the fact that Collins achieved so many firsts in her career. If you enjoy reading about what it takes to be an astronaut and to blaze a trail, then Through The Glass Ceiling To The Stars is a book you should add to your own wish list.

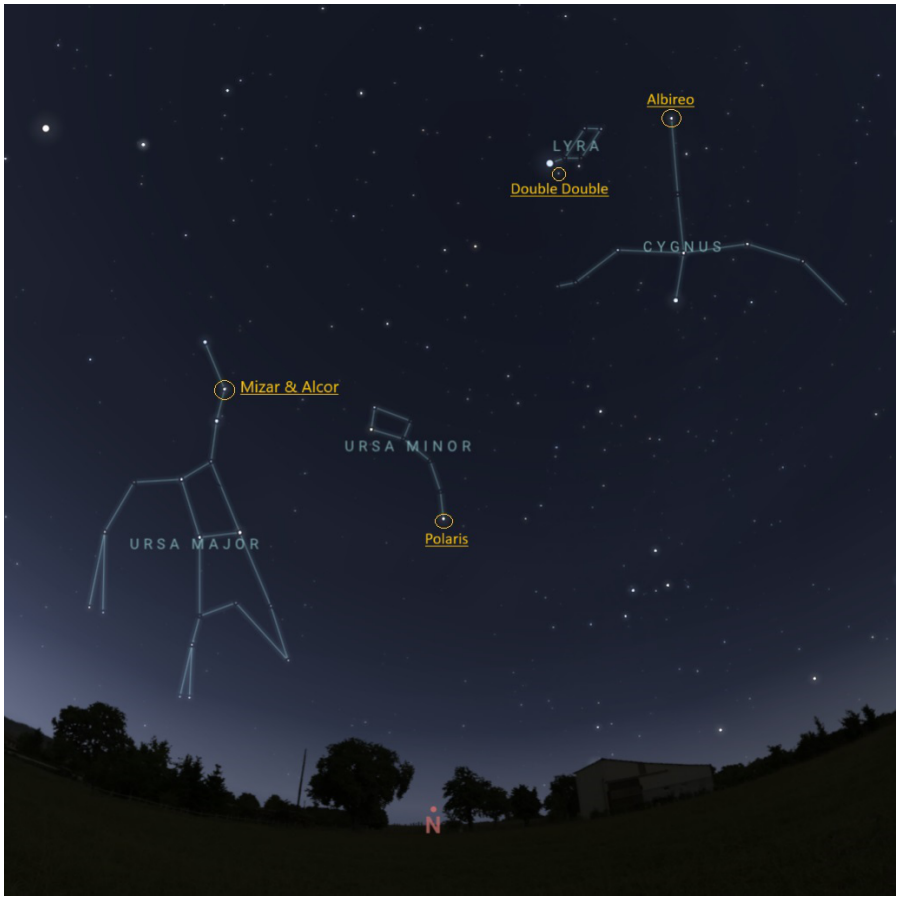
References: *Through The Glass Ceiling To The Stars: The Story Of The First American Woman To Command A Space Mission* by Col. Eileen M. Collins (Ret.) with Jonathan H. Ward; Arcade Publishing, 2021

xkcd

THE FIRST FEW TIMES EINSTEIN IMAGINED FLYING ALONGSIDE A BEAM OF LIGHT, HE DIDN'T HAVE ANY PARTICULAR INSIGHTS.

Seeing Double
By Kat Troche

During the summer months, we tend to miss the views of Saturn, Jupiter and other heavenly bodies. But it can be a great time to look for other items, like globular star clusters such as Messier 13, open star clusters such as the Coma Star Cluster (Melotte 111), but also double stars!



What Are Double Stars?

If you have seen any movies or read any books that refer to having two suns in the sky, that would be a double star system. These star systems typically come in two types – binary and optical doubles. Binary stars are two stars that are gravitationally bound and orbit each other, and optical double stars only appear to be close together when viewed from Earth, but in reality, are extremely far apart from another, and are not affected by each other's gravity. With a small telescope, in moderately light polluted skies, summer offers great views of these stellar groupings from the Northern Hemisphere:

Double Double: also known by its technical name, Epsilon Lyrae, this multiple star system appears as one star with naked eye observing. But with a small telescope, it can be split into 'two' stars. A large telescope reveals Epsilon Lyrae's secret – what looks like a single star is actually a quadruple star system!

Albireo: a gorgeous double star set – one blue, one yellow – in the constellation Cygnus.

Polaris: while technically a multiple star system, our North Star can easily be separated from one star to two with a modest telescope.

Mizar and **Alcor**: located in the handle of the Big Dipper, this pair can be seen with the naked eye.

Aside from looking incredible in a telescope or binoculars, double stars help astronomers learn about measuring the mass of stars, and about stellar evolution. Some stars orbit each other a little too closely, and things can become disastrous, but overall, these celestial bodies make for excellent targets and are simple crowd pleasers.

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, July 10, 2024

The regular meeting of the Board of Directors of the Barnard-Seyfert Astronomical Society was held July 10, 2024, online, Dr. Tom Beckermann presiding. Logged in were Tom Beckerman, Chip Crossman, Tony Drinkwine, Bud Hamblen, Keith Rainey, Theo Wellington, comprising a quorum.

The minutes of the board meeting of June 5, 2024, as printed in the July 2024, edition of the Eclipse, were adopted without discussion.

Membership report: Keith reported 194 members.

Chip circulated the updated club brochure.

Star parties and outreach: Public nights are planned at Cornelia Fort Airpark on July 13, Montgomery Bell State Park on July 20, and the Edwin Warner Park Special events field on August 10.

Upcoming meetings: Presenters have been scheduled for July 24, August 21, September 18 and November 20. Tom will be out of town on July 24. Theo will be presiding. Dr. Amber Straughn will be presenting.

Eclipse glasses: Tom is collecting eclipse glasses for astronomers without borders.

Telescope lending: It was proposed to refurbish the Celestron 114 goto telescope by purchasing a dust cap, a power supply, and a red dot finder. The motion was carried unanimously. Tom will be ordering the parts.

There being no further business, the meeting adjourned at 9 PM.

Respectfully submitted,

Bud Hamblen
Secretary

Next Membership Meeting:

Wednesday, August 21 at 7:30 pm

Dyer Observatory
1000 Oman Drive
Brentwood TN 37027

Barnard-Seyfert Astronomical Society
Minutes of the Monthly Membership Meeting
Held on Wednesday, July 24, 2024

The Barnard-Seyfert Astronomical Society met at Vanderbilt's Dyer Observatory and on-line by Zoom on Wednesday, July 24, 2023, Theo Wellington presiding. Seventeen persons signed in at Dyer and about 8 zoomed in.

Dr. Amber Straughn, NASA Goddard Space Flight Center, presented "Unfolding the Universe: Two Years of Incredible Discoveries with the James Webb Space Telescope," and took questions. She noted that the JWST is not designed to be serviced (including refueling), but has an estimated 26 year fuel supply. The Nancy Grace Roman space telescope, planned to be launched in 2027, is a Hubble-size infrared capable telescope, and will be used to investigate dark energy and dark matter as well as other lines of research. The Habitable Worlds Observatory is planned to investigate signs of life on exoplanets, beginning in the 2040s.

Treasurer's report: Truist bank balance is $8,089.38 ($4,574.87 in the equipment fund and $3,514.41 in the general fund). The PayPal balance is $426.59. Expenses were $17.47 for the Zoom account and $1.168.00 for the Astronomical Leagure dues. Updated brochures from Vistaprint would be $237.99 for 500 or $313.99 for 1000. The quantity is to be decided.

Social media report: The Facebook page had 2.3K "likes" and 2.5K followers. "X" has 336 followers.

Previous star parties: The event at Montgomery Bell State Park had about 25 visitors. The weather cooperated for this one, too. Clouds parted at the last minute and Chuck Schlemm was able to show several objects to visitors.

Upcoming star parties: August 10 at Edwin Warner Park.

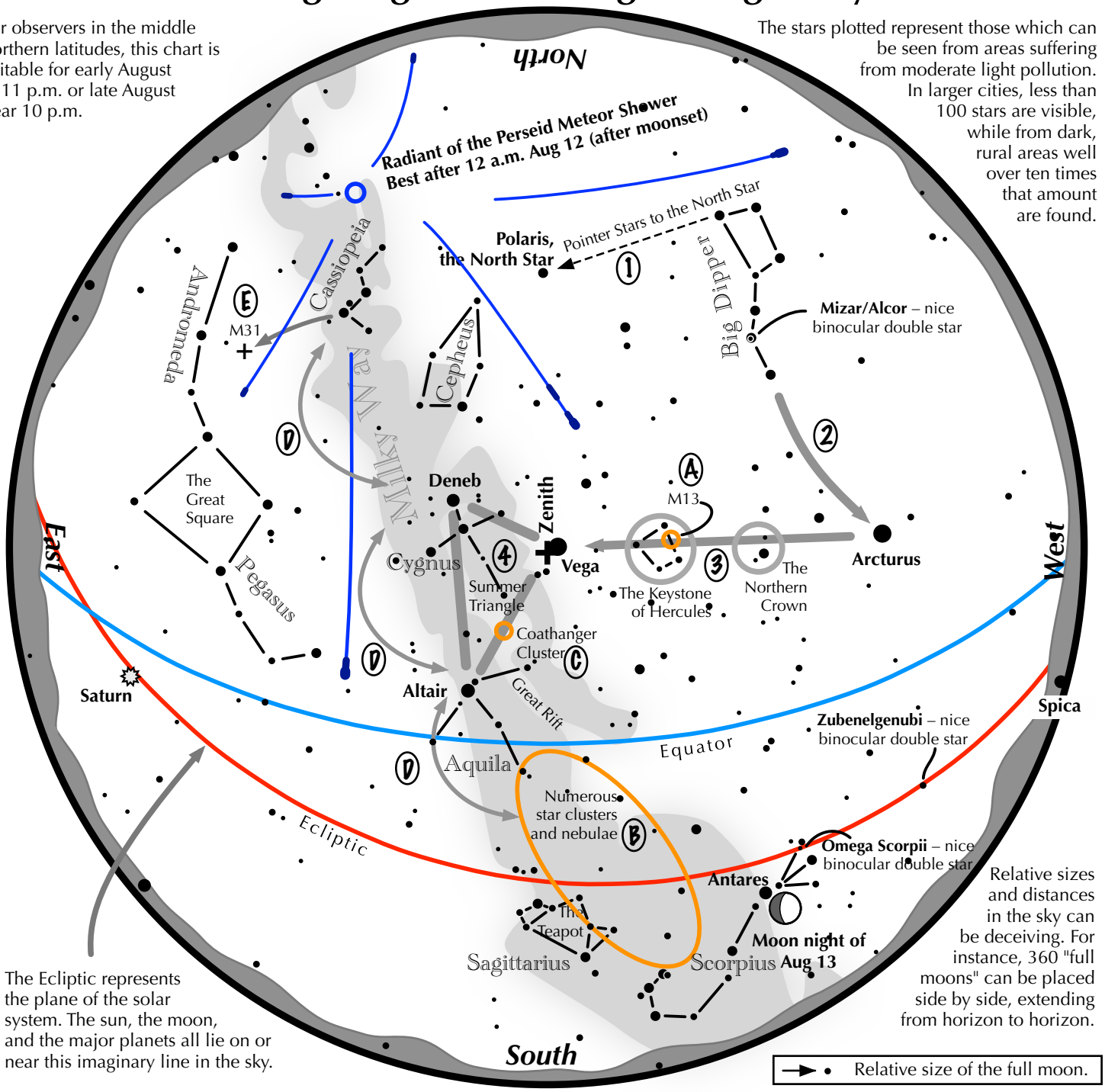
Respectfully submitted,

Bud Hamblen
Secretary

Navigating the mid August Night Sky

For observers in the middle northern latitudes, this chart is suitable for early August at 11 p.m. or late August near 10 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 mid August night sky: Simply start with what you know or with what you can easily find.

1. Extend a line north from the two stars at the tip of the Big Dipper's bowl. It passes by Polaris, the North Star.
2. Follow the arc of the Dipper's handle. It intersects Arcturus, the brightest star in the June evening sky.
3. To the northeast of Arcturus shines another star of the same brightness, Vega. Draw a line from Arcturus to Vega. It first meets "The Northern Crown," then the "Keystone of Hercules." A dark sky is needed to see these two dim stellar configurations.
4. High in the East lies the summer triangle stars of Vega, Altair, and Deneb.

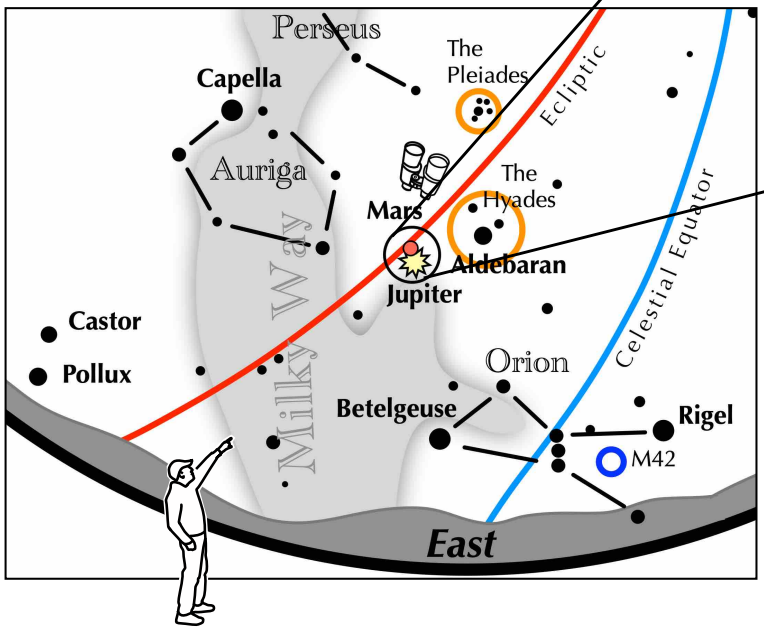
Binocular Highlights

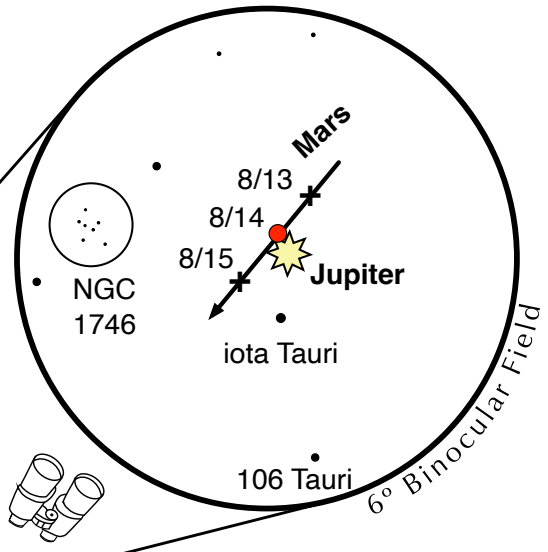
A: On the western side of the Keystone glows the Great Hercules Cluster.
B: Between the bright stars Antares and Altair, hides an area containing many star clusters and nebulae.
C: 40% of the way between Altair and Vega, twinkles the "Coathanger," a group of stars outlining a coathanger.
D: Sweep along the Milky Way for an astounding number of faint glows and dark bays, including the Great Rift.
E: The three westernmost stars of Cassiopeia's "W" point south to M31, the Andromeda Galaxy, a "fuzzy" oval.

If you can view only one celestial event this month, view this one.

A slowly brightening Mars passes immediately north of the much brighter Jupiter.

1. Look to the east 90 minutes before sunrise on August 13, 14, and 15.
2. Find Mars and Jupiter shining left of the red star Aldebaran. Mars' brightness will nearly match that of Aldebaran.





Binocular View

3. Aim binoculars at Mars and Jupiter.
4. On the morning of August 14, they will be only 20 minutes apart.
5. They will be just 1.5° southwest of the open cluster NGC 1746.
6. A telescope at > 100 power will reveal Mars' tiny red disk and Jupiter's larger disk along with its four Galilean moons.

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.