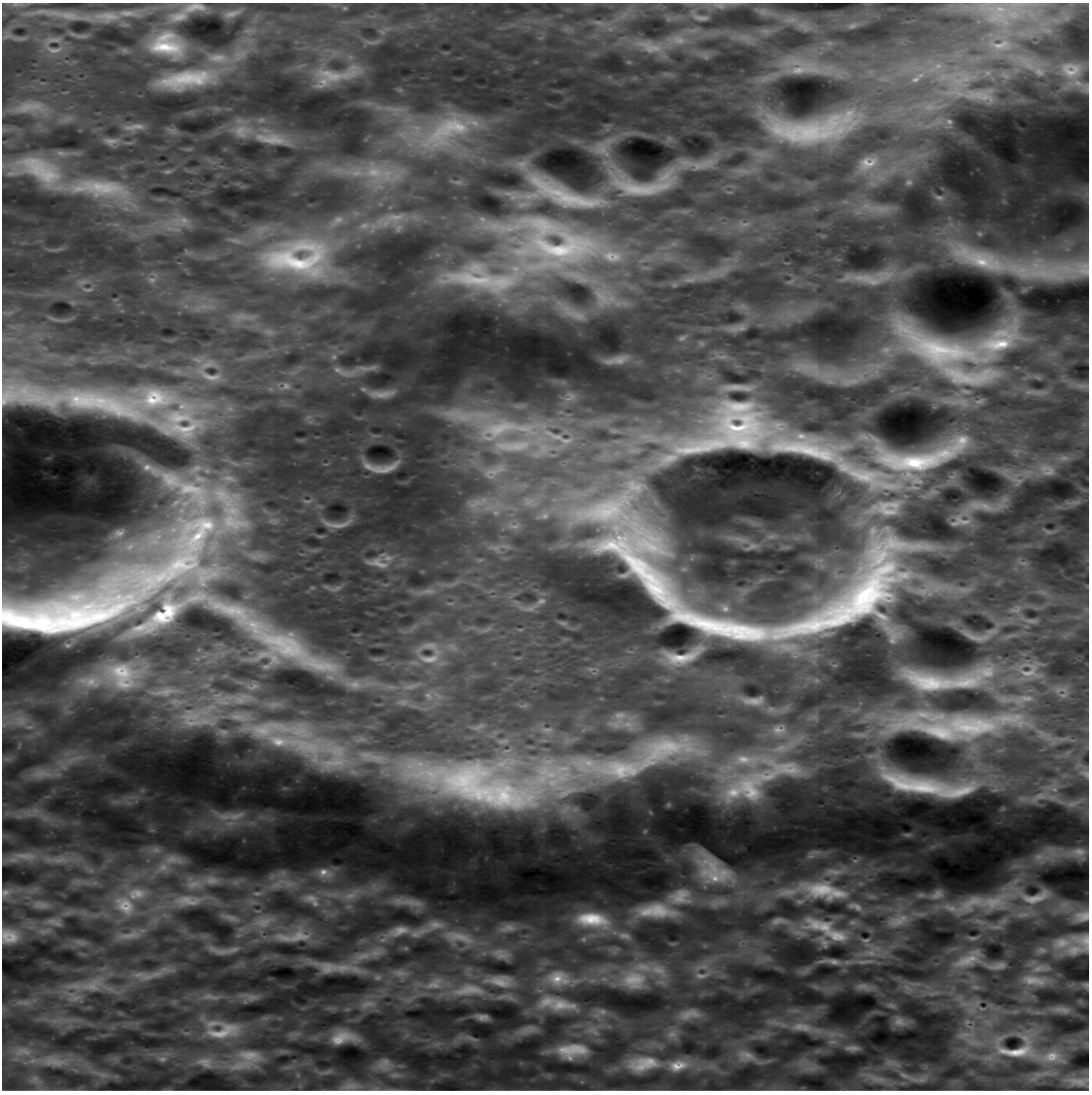
The ECLIPSE

The Newsletter of the Barnard-Seyfert Astronomical Society



September 2024

BSAS
Barnard-Seyfert Astronomical Society

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Contact BSAS officers at
bsasnashville.com/contact
Or email info@bsasnashville.com

SUNRISE FROM THE ISS, AUGUST 2024 The very beginning of orbital sunrise, captured from the ISS by astronaut Matthew Dominick. NASA / Matthew Dominick

On the cover: The JANUS camera onboard ESA's Jupiter Icy Moons Explorer (Juice) is designed to take detailed, high-resolution photos of Jupiter and its icy moons.

JANUS will study global, regional and local features and processes on the moons, as well as map the clouds of Jupiter. It will have a resolution up to 2.4 m per pixel on Ganymede and about 10 km per pixel at Jupiter.

This image of our own Moon was taken during Juice's lunar-Earth flyby on 19 August 2024. The main aim of JANUS's observations during the lunar-Earth flyby was to evaluate how well the instrument is performing, not to make scientific measurements.

ESA/JUICE/JANUS

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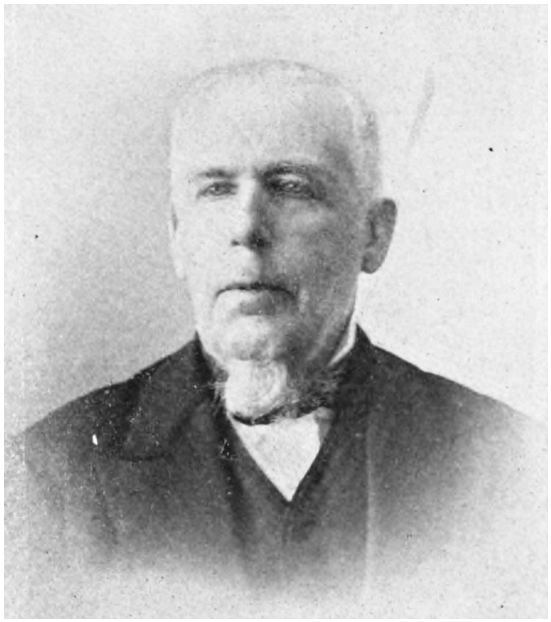
Happy Birthday Daniel Kirkwood
by Robin Byrne



This month we celebrate the life of a man whose name is associated with parts of the solar system, but which I associate with my alma mater.

Daniel Kirkwood was born September 27, 1814 on a farm in Hartford County, Maryland. Despite being raised on a farm, Kirkwood had no interest in pursuing farming as a career. In fact, he was much more interested in mathematics. So, in 1834, he enrolled at the York County Academy in York, Pennsylvania to study mathematics. Upon his graduation in 1838, Kirkwood was hired by the same Academy as a First Assistant and Mathematical Instructor.

In 1843, Kirkwood moved on to Lancaster High School, in Lancaster, Pennsylvania, to be the school's Principal. The following year, he married Sarah McNair. Kirkwood moved to Pottsville, Pennsylvania in 1848 to take the position of Principal for the Pottsville Academy.

Despite a career in public education, Kirkwood still found time to pursue his interest in mathematics, especially applying it to astronomy. In 1849, Kirkwood used the published values of the rotation rates of the known planets, and their distances from the Sun, to look for a pattern. He wanted to see if there was a connection between how long it takes a planet to spin on its axis and its distance from the Sun. The relationship he found stated that the number of rotations per orbit, when squared, was proportional to the distance from the Sun cubed. This became known as Kirkwood's Law and led to astronomers first taking note of Kirkwood. However, modern observations of planetary rotation rates show that this law doesn't actually apply.

In 1851, Kirkwood took the position of Professor of Mathematics at Delaware College. Four years later, he was named President of the same school. He apparently did not enjoy the responsibilities of being president, referring to his time in that post, Kirkwood said, "Concerning that, the less said the better." He did not like being the center of attention or being in the public eye, leaving the job after just one year.

Kirkwood left Delaware to become Professor of Mathematics at Indiana University, in Bloomington, Indiana. Kirkwood finally found a place where he felt he belonged, staying at Indiana until his retirement 30 years later.

At Indiana, Kirkwood applied his mathematical skills to the study of asteroids. At a time when only about 50 asteroids were known, Kirkwood proposed that the gravity from Jupiter would create gaps in the asteroid belt. He reasoned that asteroids that had orbits in resonance with Jupiter's orbit (that is, orbits that would line up every so many times around the Sun), would be gravitationally affected by Jupiter, effectively removing them from the resonant orbits, thus creating gaps. As more asteroids were discovered (up to about 450), the proposed gaps were confirmed observationally. Those gaps are now known as Kirkwood Gaps.

In 1883, Kirkwood proposed that a similar phenomenon should occur in Saturn's rings for ring particles in resonant orbits with some of Saturn's moons. He suggested that this would explain the existence of the Cassini Division in the rings. Kirkwood was also one of the first people to associate

meteor showers with comets. Kirkwood's string of contributions to astronomy made him the first Indiana University faculty member to achieve national recognition.

In 1886, Kirkwood retired from IU and moved to California, but he wasn't quite done with teaching. In 1891, at the age of 77, Kirkwood was hired as a Lecturer in Astronomy at Stanford University. He truly loved teaching throughout his career, so it's no surprise that he never wanted to permanently leave the classroom or the camaraderie with his students.

In addition to teaching, Kirkwood was also a prolific writer. He published 126 articles, plus three books, covering topics related to meteors, comets, and asteroids.

On June 11, 1895, at the age of 81, Daniel Kirkwood passed away in Riverside, California. Although he died in California, he was buried in Bloomington, Indiana, the place he considered his true home.

Daniel Kirkwood's name lives on in many ways. On the far side of the Moon lies crater Kirkwood. In the asteroid belt is asteroid 1578 Kirkwood. And in Bloomington, Indiana you will find many homages to Kirkwood: On the IU campus are both Kirkwood Hall and Kirkwood Observatory, and the main street leading to campus is Kirkwood Avenue.

As a graduate of the Indiana University Astrophysics program, the name Kirkwood is very much a part of my fond memories of IU. Kirkwood Observatory was the first observatory I ever made observations from. My physics classes were taught in Kirkwood Hall. And Kirkwood Avenue was the destination for restaurants and entertainment in town. But even if you aren't fortunate enough to be an IU graduate, you can still think kindly of Daniel Kirkwood. Whether observing an asteroid, watching a meteor shower, or noting gaps in Saturn's rings, take a moment to remember the man who helped us understand these objects, and so much more - Daniel Kirkwood.

References:

Department of Astronomy, Indiana University - Daniel Kirkwood History

Wikipedia - Daniel Kirkwood

Daniel Kirkwood by Joseph Swain, Publications of the Astronomical Society of the Pacific, Vol.13, No. 80, p.140

Next Membership Meeting:

Wednesday, September 18 at 7:30 pm

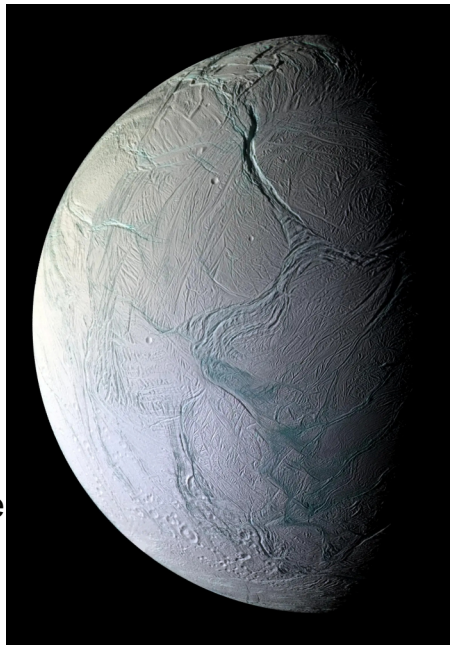
Dyer Observatory
1000 Oman Drive
Brentwood TN 37027

Marvelous Moons
By Kat Troche

September brings the gas giants Jupiter and Saturn back into view, along with their satellites. And while we organize celebrations to observe our own Moon this month, be sure to grab a telescope or binoculars to see other moons within our Solar System! We recommend observing these moons (and planets!) when they are at their highest in the night sky, to get the best possible unobstructed views.

The More the Merrier

As of September 2024, the ringed planet Saturn has 146 identified moons in its orbit. These celestial bodies range in size; the smallest being a few hundred feet across, to Titan, the second largest moon in our solar system.



Even at nearly 900 million miles away, Titan can be easily spotted next to Saturn with a 4-inch telescope, under urban and suburban skies, due to its sheer size. With an atmosphere of mostly nitrogen with traces of hydrogen and methane, Titan was briefly explored in 2005 with the Huygens probe as part of the Cassini-Huygens mission, providing more information about the surface of Titan. NASA's mission Dragonfly is set to explore the surface of Titan in the 2030s.

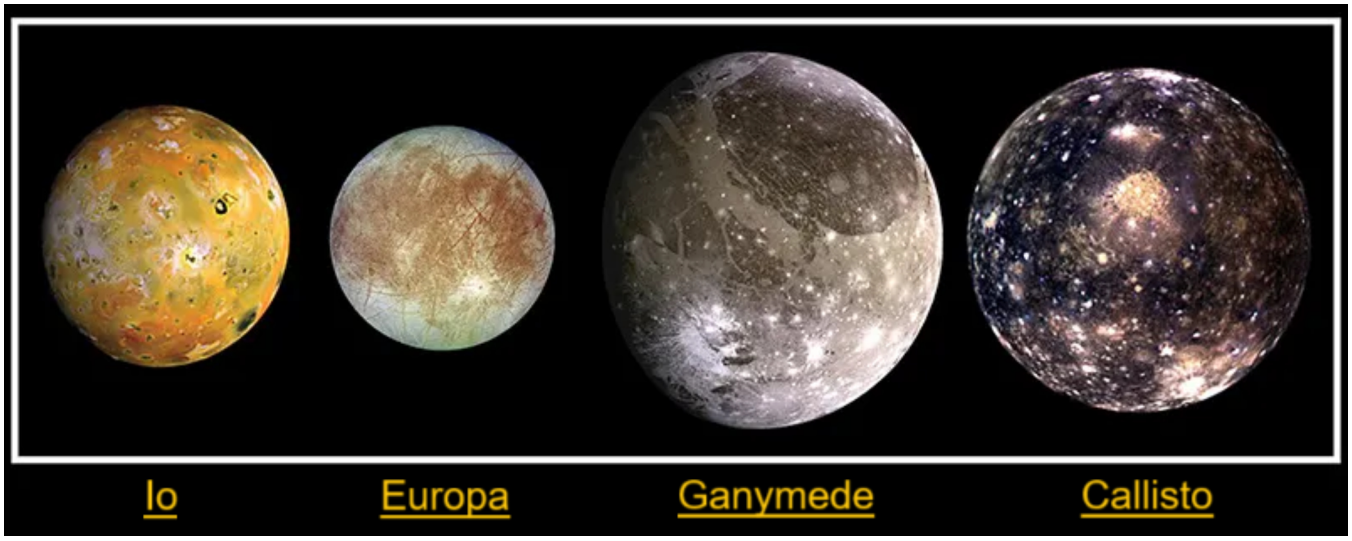
Saturn's moon Enceladus was also explored by the Cassini mission, revealing plumes of ice that erupt from below the surface, adding to the brilliance of Saturn's rings. Much like our own Moon, Enceladus remains tidally locked with Saturn, presenting the same side towards its host planet at all times.

The Galilean Gang

The King of the Planets might not have the most moons, but four of Jupiter's 95 moons are definitely the easiest to see with a small pair of binoculars or a small telescope because they form a clear line. The Galilean Moons – Ganymede, Callisto, Io, and Europa – were first discovered in 1610 and they continue to amaze stargazers across the globe.

- Ganymede: largest moon in our solar system, and larger than the planet Mercury, Ganymede has its own magnetic field and a possible saltwater ocean beneath the surface.
- Callisto: this heavily cratered moon is the third largest in our solar system. Although Callisto is the furthest away of the Galilean moons, it only takes 17 days to complete an orbit around Jupiter.
- Io: the closest moon and third largest in this system, Io is an extremely active world, due to the push and pull of Jupiter's gravity. The volcanic activity of this rocky world is so intense that it can be seen from some of the largest telescopes here on Earth.
- Europa: Jupiter's smallest moon also happens to be the strongest candidate for a liquid ocean beneath the surface. NASA's Europa Clipper is set to launch October 2024 and will determine if this moon has conditions suitable to support life. Want to learn more? Rewatch the July 2023 Night Sky Network webinar about Europa Clipper here.

Be sure to celebrate International Observe the Moon Night here on Earth September 14, 2024, leading up to the super full moon on September 17th!



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, August 7, 2024

The regular meeting of the Board of Directors of the Barnard-Seyfert Astronomical Society was held August 7, 2024, online, Dr. Tom Beckermann presiding. Logged in were Tom Beckerman, Chip Crossman, Bud Hamblen, Keith Rainey, Andy Reeves, Theo Wellington, comprising a quorum.

The minutes of the board meeting of July 10, 2024, as printed in the August 2024, edition of the Eclipse, were adopted without discussion.

Membership report: Keith reported 198 members.

Treasurer's Report: The Truist bank balance was $8011.91. The PayPal balance was $452. Cash balance was $60. Expenses for the month included the monthly Zoom account.

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. A presentation on space law may be available for December 18.

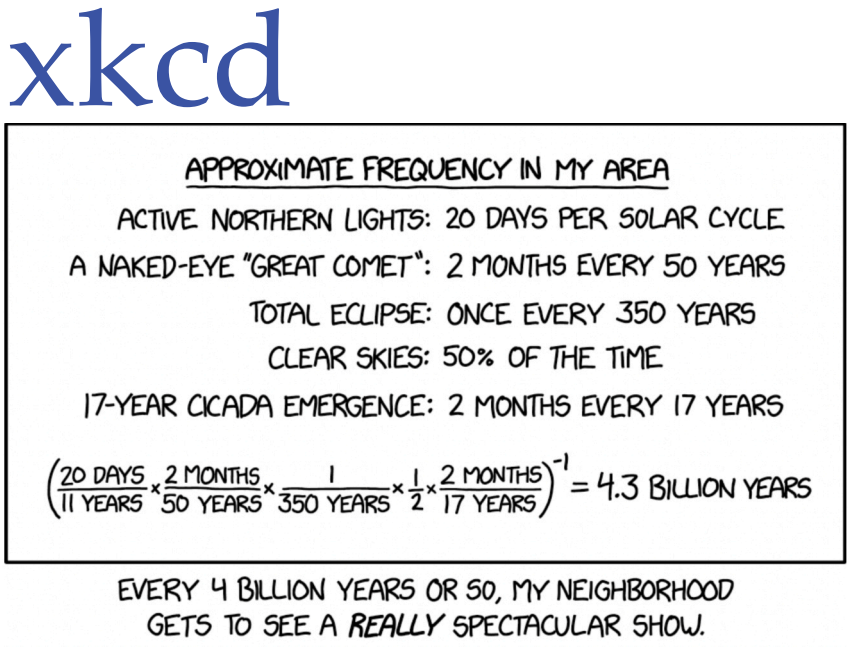
Telescope lending: Tom has ordered the parts to refurbish the loaner Celestron 114 telescope.

Resolved to order 500 new club brochures from Vistaprint. Tom made the motion, Andy seconded, and the motion carried by unanimous voice vote. Theo will order the brochures.

There being no further business, the meeting adjourned.

Respectfully submitted,

Bud Hamblen
Secretary



Barnard-Seyfert Astronomical Society
Minutes of the Monthly Membership Meeting
Held on Wednesday, August 21, 2024

The Barnard-Seyfert Astronomical Society met at Vanderbilt's Dyer Observatory and on-line by Zoom on Wednesday, August 21, 2024, Dr Tom Beckermann presiding. Twenty-two persons signed in at Dyer and about 7 zoomed in. The minutes from the July 24, 2024, general meeting were adopted without discussion.

Membership report: The club roster on Night Sky Network numbered 201.

Treasurer's report: Truist bank balance is $8,011.91. The PayPal balance is $452. The cash balance is $60. Expenses included payment for the Zoom account.

Equipment report: The 8-inch dob is available. The equipment list is on the Google Group bsasnashville.

Social media report: The Facebook page (https://www.facebook.com/bsasnashville/) has 2.3K likes and 2.5K followers. "X" (@BSASNashville) has 335 followers. Instagram (bsasnashville) has 262 followers. The members' discussion forum is hosted on Google Groups with 141 members and 712 posts. Contact info@bsasnashville.com for access.

Previous star parties: Members met at the Water Valley Overlook on August 3. Find the permit on Google Groups. The public star party at the Edwin Warner Parks Special Events Field on August 10 had about 10 scopes and more than 100 guests. Chuck Schlemm and Tony Proctor has telescopes at the Percy Warner Park Full Moon Picking Party on August 16.

Upcoming star parties and outreach: Members only at Natchez Trace Parkway Mile Marker 435.3 (permit required) on August 31. Public star party at Bowie Nature Park, Fairview, Tennessee on September 7, from 7:30 PM to 9:30 PM. Arrive at hour early if you are bringing a telescope. "International Observe the Moon Night" on September 14: https://moon.nasa.gov/observe-the-moon-night/. Astronomical League observing challenge: https://moon.nasa.gov/resources/459/astronomical-league-observing-challenge/. On-going citizen science project to discover new lunar craters and missing spacecraft hardware by comparing lunar orbital images: https://trek.nasa.gov/moondiff/. The next general meeting of the BSAS is at Vanderbilt's Dyer Observatory on September 18 at 7:30 PM.

Theo Wellington presented "Transit Tales: Venus and the Epic Search for the Size of the Solar System." The book mentioned in the presentation is Chasing Venus: The Race to Measure the Heavens by Andrea Wulf.

The URL for the YouTube video of this meeting is: https://www.youtube.com/live/LiRS3QERQi0

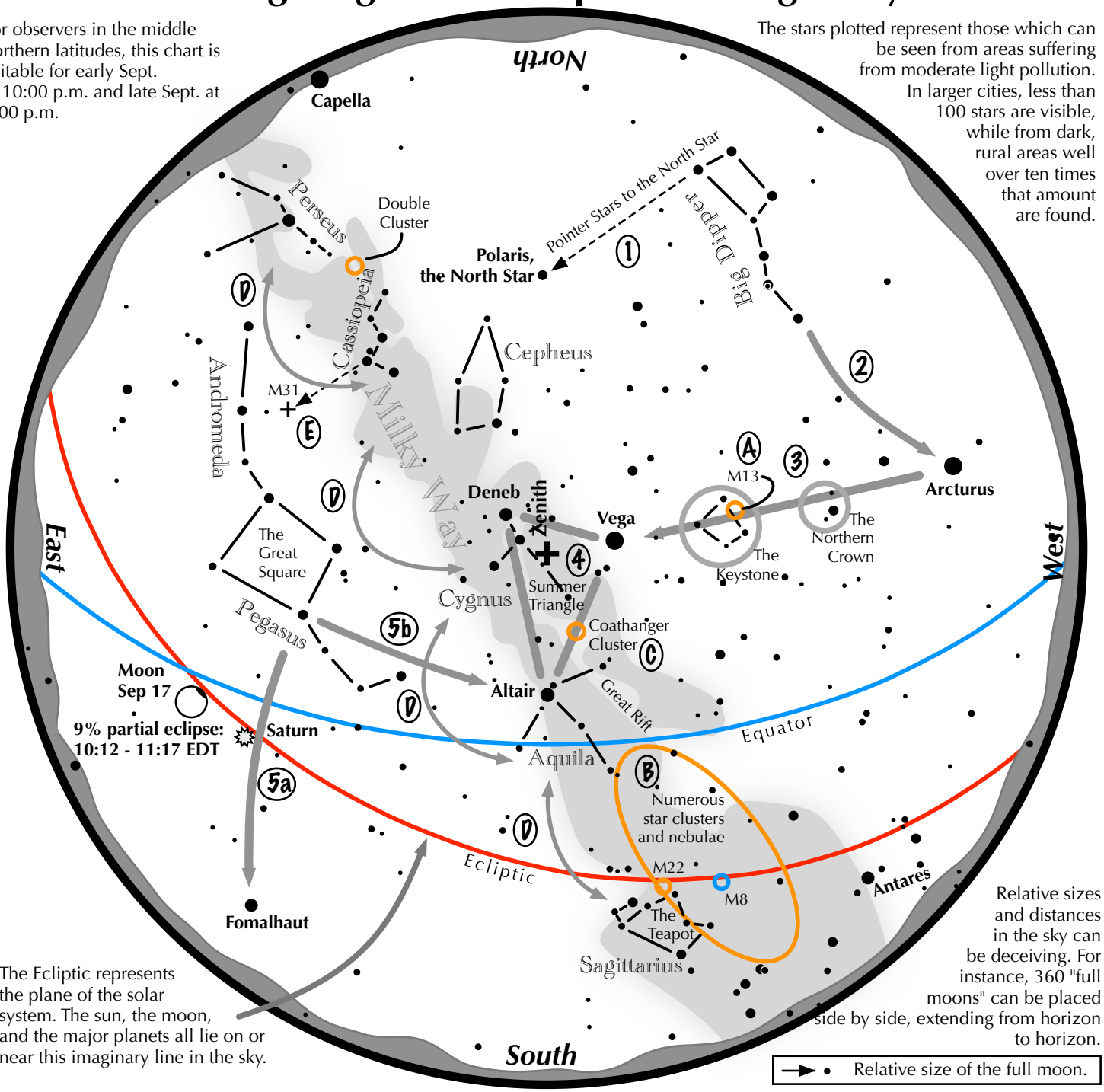
Respectfully submitted,

Bud Hamblen
Secretary

Navigating the mid September Night Sky

For observers in the middle northern latitudes, this chart is suitable for early Sept. at 10:00 p.m. and late Sept. at 9:00 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 September night sky: Simply start with what you know or with what you can easily find.

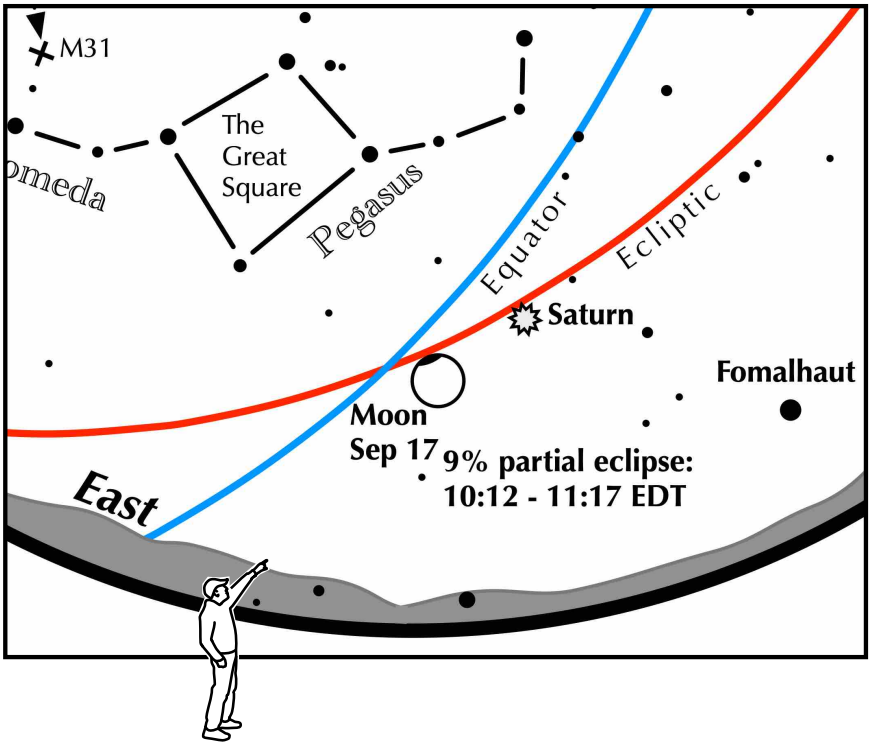
1. Extend a line north from the two stars at the tip of the Big Dipper's bowl. It passes by Polaris, the North Star.
2. Follow the arc of the Dipper's handle. It intersects Arcturus, the brightest star in the September evening sky.
3. Nearly overhead shines a star of similar brightness as Arcturus, Vega. 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. The stars of the summer triangle, Vega, Altair, and Deneb, shine overhead.
5. The westernmost two stars of the Great Square, which lies high in the east, point south to Fomalhaut. The southernmost two stars point west to Altair.

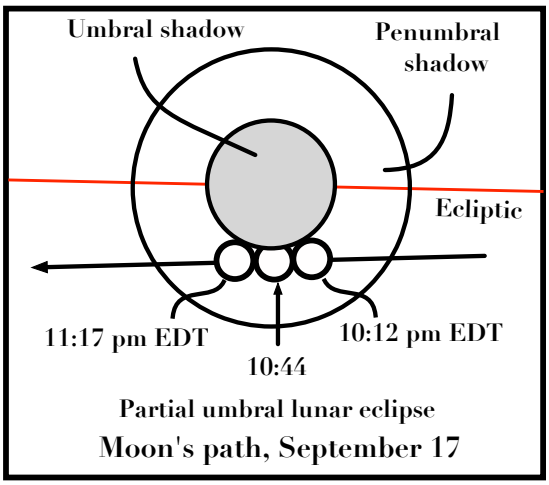
Binocular Highlights

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.

Astronomical League *www.astroleague.org/outreach; duplication is allowed and encouraged for all free distribution.*

A partial lunar eclipse that is a nibble, not a bite!





View to the southeast on September 17 from 10:12 through 11:17 pm EDT. Mid eclipse lands at 10:44 pm

The Moon slides through a partial umbral eclipse

A very partial umbral lunar eclipse occurs on the night of September 17. Bring out the binoculars for a better look at Earth's shadow taking a nibble out of the moon. Only about 9% of the surface will be in umbral shadow. The event will be slight enough that the casual observer might not notice it.

Mid eclipse and the best view occurs at 10:44 pm EDT. West Coast observers will find it low above the southeastern horizon.

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.