

The ECLIPSE

The Newsletter of the Barnard-Seyfert Astronomical Society



September 2023



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The NASA/ESA/CSA James Webb Space Telescope has captured a high-resolution image of a tightly bound pair of actively forming stars, known as Herbig-Haro 46/47, in near-infrared light. Look for them at the centre of the red diffraction spikes. The stars are buried deeply, appearing as an orange-white splotch. They are surrounded by a disc of gas and dust that continues to add to their mass.

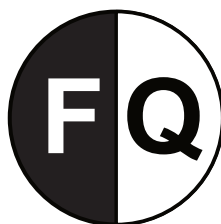
Herbig-Haro 46/47 is an important object to study because it is relatively young — only a few thousand years old. Stars take millions of years to form. Targets like this also give researchers insight into how stars gather mass over time, potentially allowing them to model how our own Sun, a low-mass star, formed.

Credit: NASA, ESA, CSA, J. DePasquale (STScI)

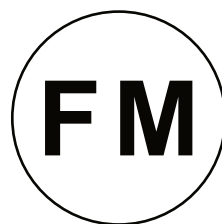
On the Cover: Webb’s NIRCam (Near-Infrared Camera) captured this detailed image of SN 1987A (Supernova 1987A). At the center, material ejected from the supernova forms a keyhole shape. Just to its left and right are faint crescents newly discovered by Webb. Beyond them an equatorial ring, formed from material ejected tens of thousands of years before the supernova explosion, contains bright hot spots. Exterior to that is diffuse emission and two faint outer rings. **Credits:** Science NASA, ESA, CSA, Mikako Matsuura (Cardiff University), Richard Arendt (NASA-GSFC, UMBC), Claes Fransson (Stockholm University), Josefin Larsson (KTH), Image Processing Alyssa Pagan (STScI) webbtelescope.org/contents/news-releases/2023/news-2023-136



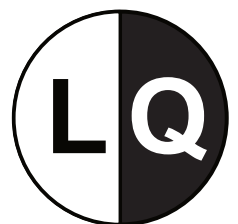
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Oct 14



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Oct 21



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Book Review: Beyond reviewed by Robin Byrne

In my never-ending quest to read every book about the early space program era, I recently purchased *Beyond: The Astonishing Story of the First Human to Leave Our Planet and Journey into Space* by Stephen Walker. Wordy title? Yes. Worth reading the book? Also, yes.

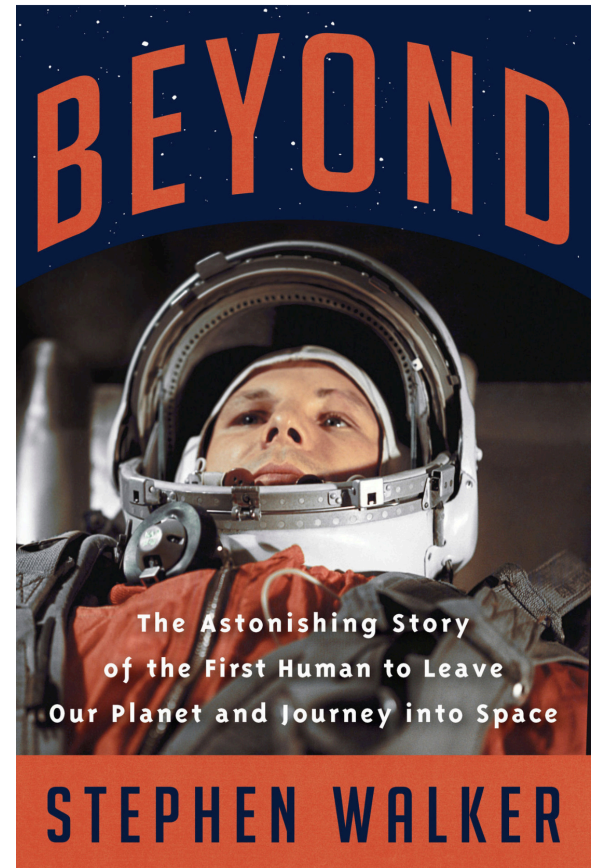
Unlike some authors I've read recently, Stephen Walker has a degree in the History of Science, and you can tell he understands what he's writing about. And unlike some other authors I've read recently, Walker writes clearly and at a level allowing the reader to also understand.

While the focus of the book is Yuri Gagarin, we are given his story in a much bigger context. We begin with some of the test flights, both Soviet and U.S., that occurred between the first few Sputniks and Gagarin's flight. There were several dog flights that I had never heard about, and many more problems with the Vostok spacecraft that are not usually mentioned. We also meet several people involved with the Soviet space program, from engineers to those who handled the dogs, as well as the medical staff. Walker interviewed many of the individuals involved to get their firsthand story, and that greatly enhances the narrative.

We also see what's happening simultaneously in America, with Kennedy just recently elected president and more focused on Cuba and Castro than on NASA and astronauts. We also learn about some of the politics behind America's slow progress, with excessive caution being recommended, ultimately leading to a long enough delay in Alan Shepard's flight that he would not be the first man in space.

Meanwhile, on the Soviet side, if anything, we see a total lack of caution. While the spacecraft repeatedly had serious issues that could have resulted in the death of the cosmonaut, Khrushchev and Korolev set a very definite time frame for their first manned flight, no matter what. Having the advantage of secrecy surrounding every flight, if something did go wrong, they would simply not make that information public. NASA, meanwhile, was very aware that if Shepard's flight had a problem, it would be broadcast live on television for all to see, effectively killing the U.S. space program.

We also explore the parallels and differences between the American and Soviet men chosen to go into space, how they were treated, and how they were trained. America's Mercury 7 astronauts were experienced test pilots, treated like celebrities, showered with luxuries, while undergoing extremely rigorous training to make sure they knew every detail of their spacecraft and were prepared for every possible problem. In contrast, the original group of cosmonauts were much younger and less experienced pilots. Their identities were kept a secret - even their wives were not supposed to know what they were training for. And how they were trained was very different, too. They were not



expected to fly their spacecraft, just to be passengers of the totally automated system, no different from the dogs that flew into space. So their training was almost exclusively focused on being physically fit, with very minimal information about the spacecraft - what few instruments were even available for the cosmonaut to use. Even the training for what to do in case of a system failure was literally done last minute. The day before Gagarin's flight, he and his two backups got 1 hour of training on the procedure.

Once launch day arrives, we follow not only Gagarin throughout the day, but also various members of his family (who knew nothing about what was going to happen) and the people on the ground who were involved in the flight. This section of the book went into more details about his flight than I had seen before, making for interesting reading. Once Gagarin lands, we see, thanks to more interviews by the author, the reactions of the people who were near where his spacecraft landed and the field where he parachuted down separately. We also experience the rapid shift in Gagarin's status. At first, he is this unknown, strangely-dressed person trudging through a field, asking for a horse and cart to take him to the nearest telephone to notify the authorities of his location. In a matter of a few hours, he finds himself surrounded by adoring crowds, as the news of his success and identity became public.

Then the American reaction is explored, especially that of President Kennedy. Between being beaten again by the Soviets, plus the Bay of Pigs fiasco, Kennedy was desperate for something positive and a way to get ahead of the Soviets. It was at this point that he became a supporter of the plan to send a man to the Moon.

The book closes with brief summaries of the lives of the key players in the story over the years after Gagarin's flight. Sadly, many of them ended too soon.

If you enjoy reading about the exploits of the people involved in the early stages of sending men into space, then you will want to read *Beyond: The Astonishing Story of the First Human to Leave Our Planet and Journey into Space* by Stephen Walker. You won't regret it.

References:

Beyond: The Astonishing Story of the First Human to Leave Our Planet and Journey into Space by Stephen Walker; HarperCollins Publishers, 2021

Next Membership Meeting:

Wednesday, September 20, 7:30 pm

Cumberland Valley
Girl Scout Council Building
4522 Granny White Pike

Looking Beyond the Stars By Brian Kruse

Looking up in awe at the night sky, the stars and planets pop out as bright points against a dark background. All of the stars that we see are nearby, within our own Milky Way Galaxy. And while the amount of stars visible from a dark sky location seems immense, the actual number is measurable only in the thousands. But what lies between the stars and why can't we see it? Both the Hubble telescope and the James Webb Space Telescope (Webb) have revealed that what appears as a dark background, even in our backyard telescopes, is populated with as many galaxies as there are stars in the Milky Way.

So, why is the night sky dark and not blazing with the light of all those distant galaxies? Much like looking into a dense forest where every line of sight has a tree, every direction we look in the sky has billions of stars with no vacant spots. Many philosophers and astronomers have considered this paradox. However, it has taken the name of Heinrich Wilhelm Olbers, an early 19th century German astronomer. Basically, Olbers Paradox asks why the night sky

is dark if the Universe is infinitely old and static – there should be stars everywhere. The observable phenomenon of a dark sky leads us directly into the debate about the very nature of the Universe – is it eternal and static, or is it dynamic and evolving?

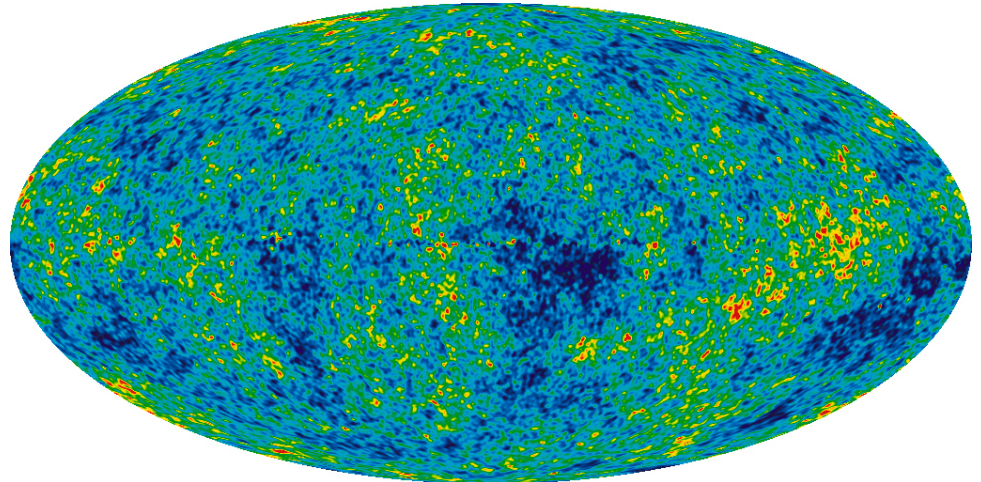
It was not until the 1960s with the discovery of the Cosmic Microwave Background that the debate was finally settled, though various lines of evidence for an evolving universe had built up over the previous half century. The equations of Einstein's General Theory of Relativity suggested a dynamic universe, not eternal and unchanging as previously thought. Edwin Hubble used the cosmic distance ladder discovered by Henrietta Swan Leavitt to show that distant galaxies are moving away from us – and the greater the distance, the faster they're moving away. Along with other evidence, this led to the recognition of an evolving Universe.

The paradox has since been resolved, now that we understand that the Universe has a finite age and size, with the speed of light having a definite value. Here's what's happening



NASA's James Webb Space Telescope has produced the deepest and sharpest infrared image of the distant universe to date. Known as Webb's First Deep Field, this image of galaxy cluster SMACS 0723 is overflowing with detail. This slice of the vast universe is approximately the size of a grain of sand held at arm's length by someone on the ground. (Image Credit: NASA, ESA, CSA, STScI) <https://bit.ly/webbdeep>

– due to the expansion of the Universe, the light from the oldest, most distant galaxies is shifted towards the longer wavelengths of the electromagnetic spectrum. So the farther an object is from us, the redder it appears. The Webb telescope is designed to detect light from distant objects in infrared light, beyond the visible spectrum. Other telescopes detect light at still longer wavelengths, where it is stretched into the radio and microwave portions of the spectrum. The farther back we look, the more things are shifted out of the visible, past the infrared, and all the way into the microwave wavelengths. If our eyes could see microwaves, we would behold a sky blazing with the light of the hot, young Universe – the Cosmic Microwave Background.

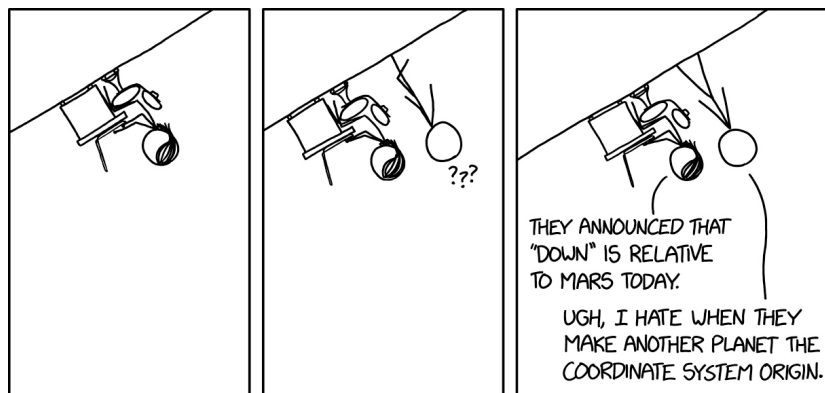


The oldest light in the universe, called the cosmic microwave background, as observed by the Planck space telescope is shown in the oval sky map. An artist's concept of Planck is next to the map. The cosmic microwave background was imprinted on the sky when the universe was just 380,000 years old. It shows tiny temperature fluctuations that correspond to regions of slightly different densities, representing the seeds of all future structure: the stars and galaxies of today. (Image credit: ESA and the Planck Collaboration - D. Ducros) <https://go.nasa.gov/3qC4G5q>

The next time you look up at the stars at night, turn your attention to the darkness between the stars, and ponder how you are seeing the result of a dynamic, evolving Universe.

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!

xkcd



Barnard-Seyfert Astronomical Society Minutes of the Monthly Membership Meeting Held on Wednesday, August 16, 2023

The Barnard-Seyfert Astronomical Society met at the Girl Scouts Center and on-line via Zoom on Wednesday, August 16, 2023, Theo Wellington presiding.

Paul Lowell presented an introduction to high altitude ballooning, "Your Own (near) Space Program." NC Near Space is based in the Raleigh area and launches relatively inexpensive payloads on weather balloons. NC Near Space has a web page at <https://sites.google.com/ncnearspace.org/home>. They also have a Facebook page at <https://www.facebook.com/NCNearSpace>. They can be followed on "X" (formerly known as Twitter) as "@ncnearspace" or on Instagram as "#ncnearspace". There is a Google Group at <https://groups.google.com/g/ncnearspace>,

Star Parties: The skies were partly cloudy at Bowie Nature Park on July 22, but some objects were visible. Participating members nearly outnumbered the public. A public star party for August is scheduled for 8:30 – 10:30 PM on Saturday, August 19, at the Edwin Warner Park Special Events Field. A public star party for September is scheduled for 7:30-9:30 PM on Saturday, September 23, at Mill Ridge Park, 12965 Old Hickory Blvd, Antioch. A private star party is scheduled for August 25 or 26, depending on the weather. Ron Ladd will be hosting this event. A private star party is scheduled for Saturday, September 16, at Natchez Trace Mile Marker 435.3. Pickett State Park will be having an astronomy weekend on September 15-17.

Treasurer's Report: The Truist bank balance is \$9,673.04. The PayPal balance is \$350.35.

Social Media: The Facebook page has 2,100 likes and 2,200 followers (<https://www.facebook.com/bsasnashville>). The service formerly known as Twitter has 318 followers for @BSASNashville (<https://twitter.com/BSASNashville>).

The recorded live stream of the meeting is at <https://www.youtube.com/watch?v=55rIH3uXis>

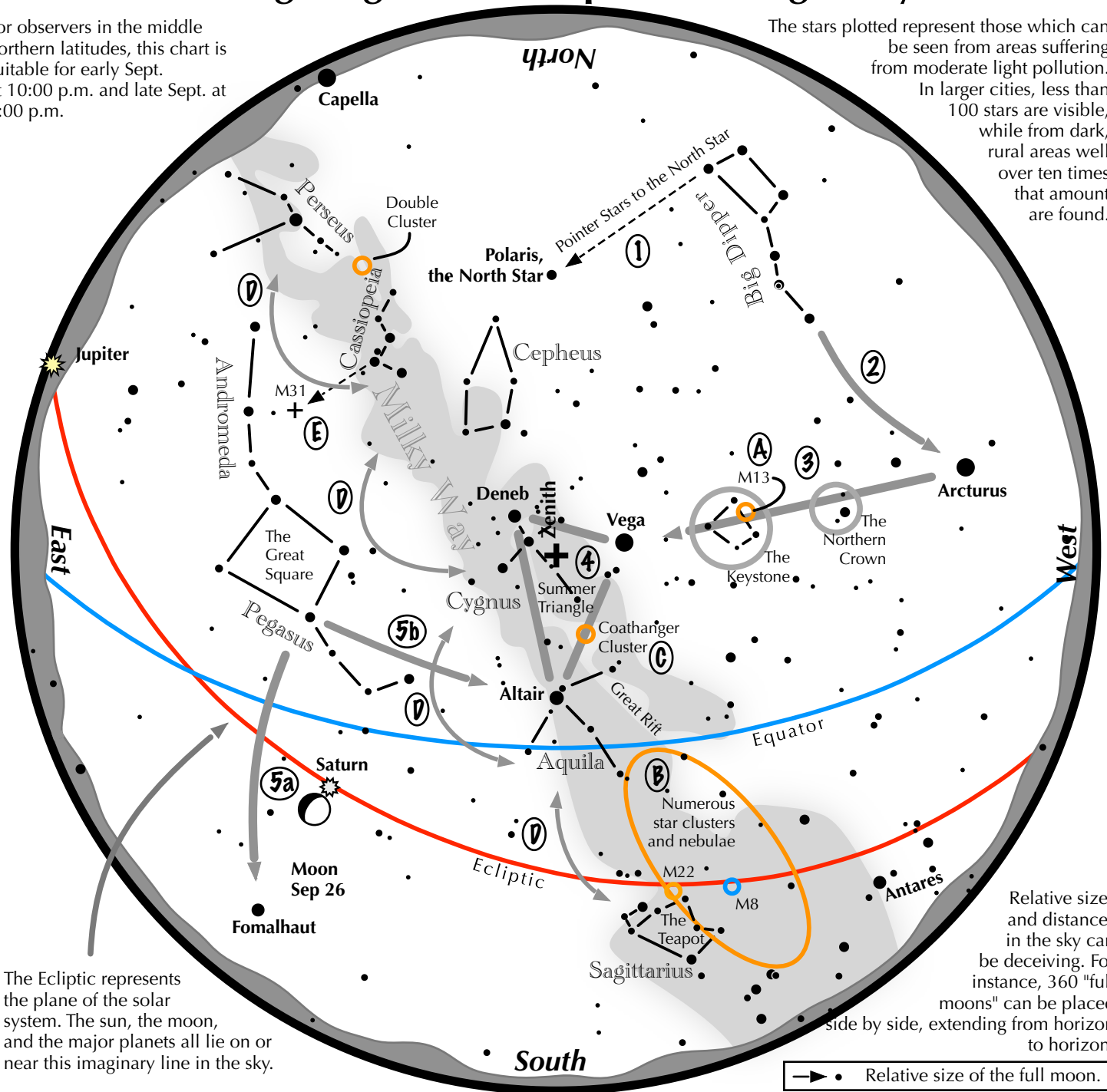
Respectfully submitted,

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.

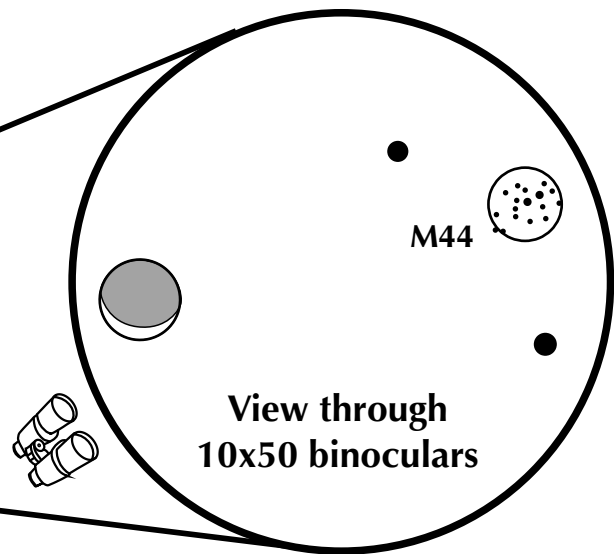
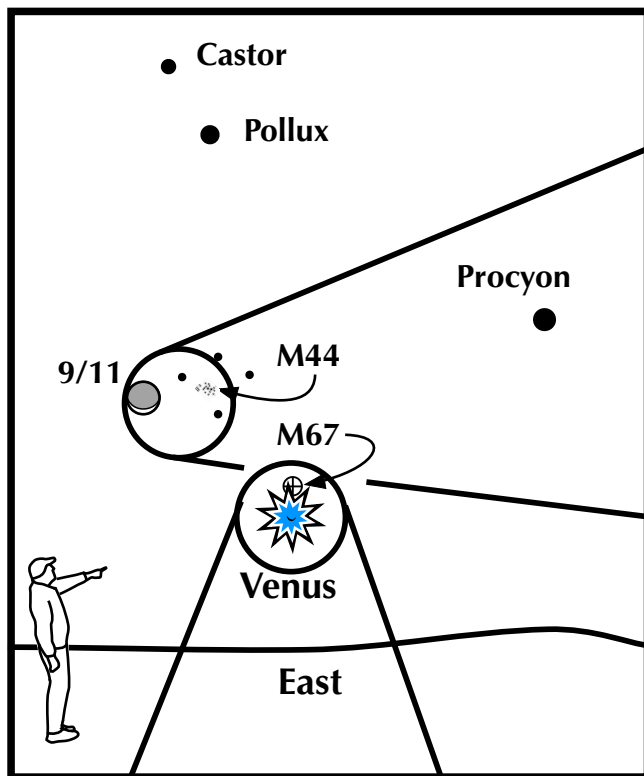
- 1 Extend a line north from the two stars at the tip of the Big Dipper's bowl. It passes by Polaris, the North Star.
- 2 Follow the arc of the Dipper's handle. It intersects Arcturus, the brightest star in the September evening sky.
- 3 Nearly overhead shines a star of similar brightness as Arcturus, 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

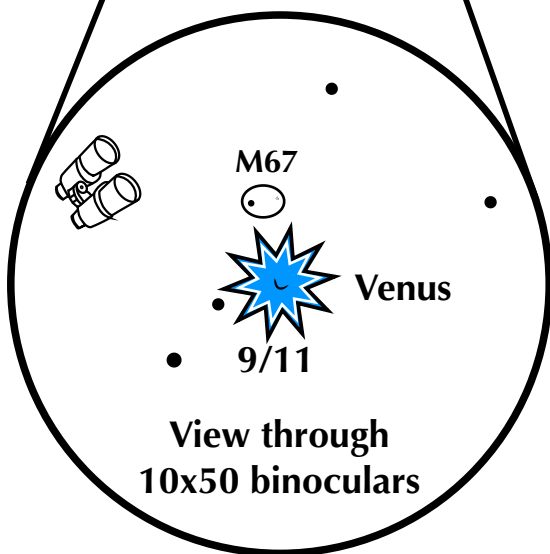
- A: On the western side of the Keystone glows the Great Hercules Cluster.
- B: Between the bright stars Antares and Altair, hides an area containing many star clusters and nebulae.
- C: 40% of the way between Altair and Vega, twinkles the "Coathanger," a group of stars outlining a coathanger.
- D: Sweep 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.



If you can see only one celestial event in the morning this September, see this one.



Moon visits M44, Venus visits M67

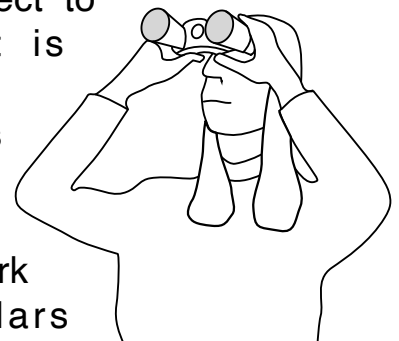


On the morning of Sep 11, look to the east 90 minutes before sunrise.

- The crescent moon, full with earthshine, glows left of M44, the Beehive cluster.
- M44 can easily be seen in binoculars.
- The dazzling object to their lower right is Venus.

- Just above Venus lies another star cluster, M67. If viewed from a dark location, binoculars should reveal its fuzzy presence.

- If the binoculars are securely mounted, the tiny crescent of Venus should be barely discerned amid the planet's glare.





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 Cumberland Valley Girl Scout Building at the intersection of Granny White Pike and Harding Place 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.