

The Bays Mountain Astronomy Club Newsletter

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Cosmic Reflections

Greg Penner - BMAC Chair



reetings BMAC'ers!

September is here, bringing cooler fall weather and longer nights for stargazing! Since we are moving into the fall season, that also means StarFest is approaching. This year the event will take place November 7 -9. Registration is now open, so please go to the StarFest website and check out all the details. This will be the 40th edition of StarFest, with a theme of "Sharing the Sky". Each of our four keynote speakers has a unique way of sharing the night sky with the public. Attending this year's event will broaden our horizons for sharing our love of the night sky. Also, to celebrate the 40th anniversary of StarFest, each registrant will receive a comfy, cozy zip-up hoodie with fantastic artwork! As is always the case, we will have delicious food, great conversations, and all the amenities of Bays Mountain Park in all its autumnal glory! All StarFest attendees get free access to all park programs throughout the event. Registration will go through October 19th.

Coming up at our September 5th club meeting, we will enjoy a presentation by our own Nate Wentzel with the topic "Dust and a Star: A Look at Brian May". Hearing about the astrophysical side of the Queen guitarist should be quite interesting! If anyone has ideas for future topics or activities for club meetings, or would like to make a presentation to the club, please let me know. I encourage you to share topics of interest with the club via a "show and tell" time during the meetings. We can all learn from each other's areas of interest.

Remember that starting in October, we will be having StarWatch at the park again through the end of November. If you would like to help share the sky with the public, you can go through the easy park volunteer program. If you're not ready to do that, just come to StarWatch as a member of the public to view through the telescopes. We always have a fun time, especially when you help someone see amazing sights like the rings of Saturn for the first time!

BMAC Notes



BoBfest



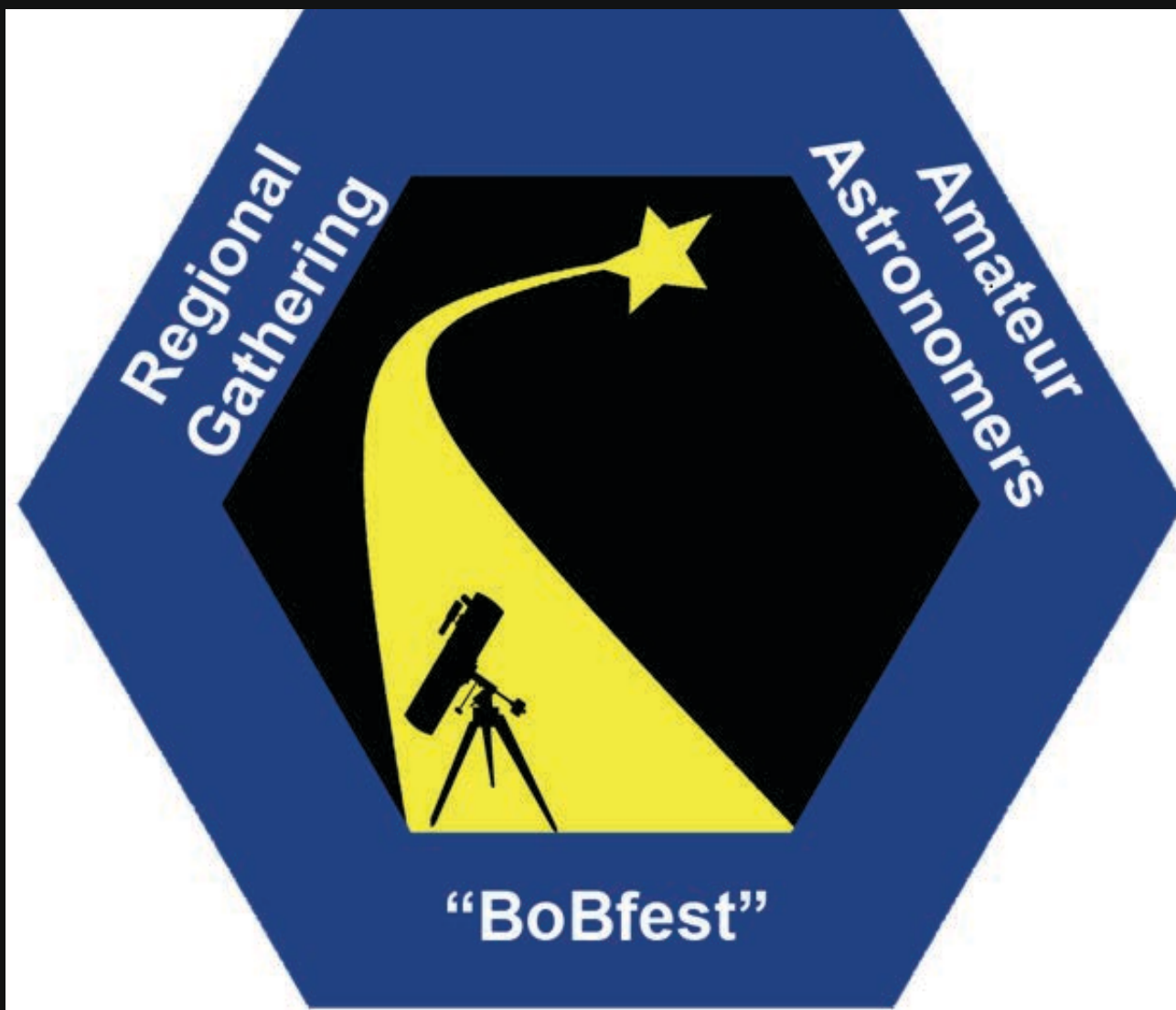
Mark your calendars for January 24, 2026, for BoBfest!

Our friends in Maiden, NC have invited our BMAC

members to attend an event an event at the Lucile

Miller Observatory to celebrate their Golden Anniversary.

Please share this with your astro-friends and make plans to joining us on January 24 at the Catawba Science Center, West Wing, in Hickory, NC for lectures, solar observing, gastronomy, table top hands-on activities and an evening of observing at the Lucile Miller Observatory in Maiden, NC!



Caption

BMAC Astronomy Public Outreach

Our BMAC member Michael Hopkins wrote about his public outreach experiences. If you want to represent the club like Michael does, feel free to contact the journal about how to become a volunteer. BMAC'er Michael writes:

Another visit to the Village at Allandale senior living center, this time solar viewing of the morning sun. Cherry picked the weather for a clear sky with cooler temps and no wind, perfect for our golden age celestial curious residents. After a few visits to this facility, it was getting easier to setup the equipment and presentations to better meet their physical abilities. Besides setting the telescope up as short as possible; included an eyepiece camera which cast real time video to a tablet for those who had vision issues or mobility limitations.

Solar viewing gets the same verbal responses as nighttime sky views (wow, cool, my gosh). That spark of excitement when their eyes seeing live photons of something they've never seen

before. Putting on the eclipse glasses and just looking at the sun was their first spark that morning. Sitting down and looking through the telescope and seeing the sun and sunspots up close was the second. Giving them the hand controller to look take control was initially tentative but quickly mastered.

Handling and viewing a bit of solar filter film, linked its simple purpose for the eclipse glasses and telescope solar filters. With diagrams and pictures, was able to show the sheer size of our star and its relative size to our home planet (You-Are-Here above a very small dot with the sun behind it).

They asked how long it takes for light to reach earth, so we all had a demonstration. Setting 8 minutes and 20 seconds (average light speed for sun to earth) on phones stopwatch, then said "start" the photons left the sun and headed our way. To pass the time while waiting, handed out Sun Fun Facts printed on colored strips of paper. Taking turns reading aloud the fun facts, elevated their understanding of our sun.

Eventually the stopwatch chimed, when the photons arrived.

The simple experience brought smile from them all.

Provided sun shaped spinning fidgets on the 3D printer for each of them. A few even said the little 3D printed Green Martians they received from an earlier visit were displayed in their rooms waiting for visits from their families to show them.

It was not difficult finding our target today, the sun:



Michael points his telescope towards the Sun!

Illustrations and pictures for enhanced comprehension:



Images lay on the table to show eclipses and comparisons with the Sun as the main focus.

Many had their first opportunity to look at our sun directly with simple Eclipse gasses.



*Image of the Sun taken through the safe-viewing
eclipse glasses.*



First-time viewing the Sun!

Oh wow. I see the sunspots!

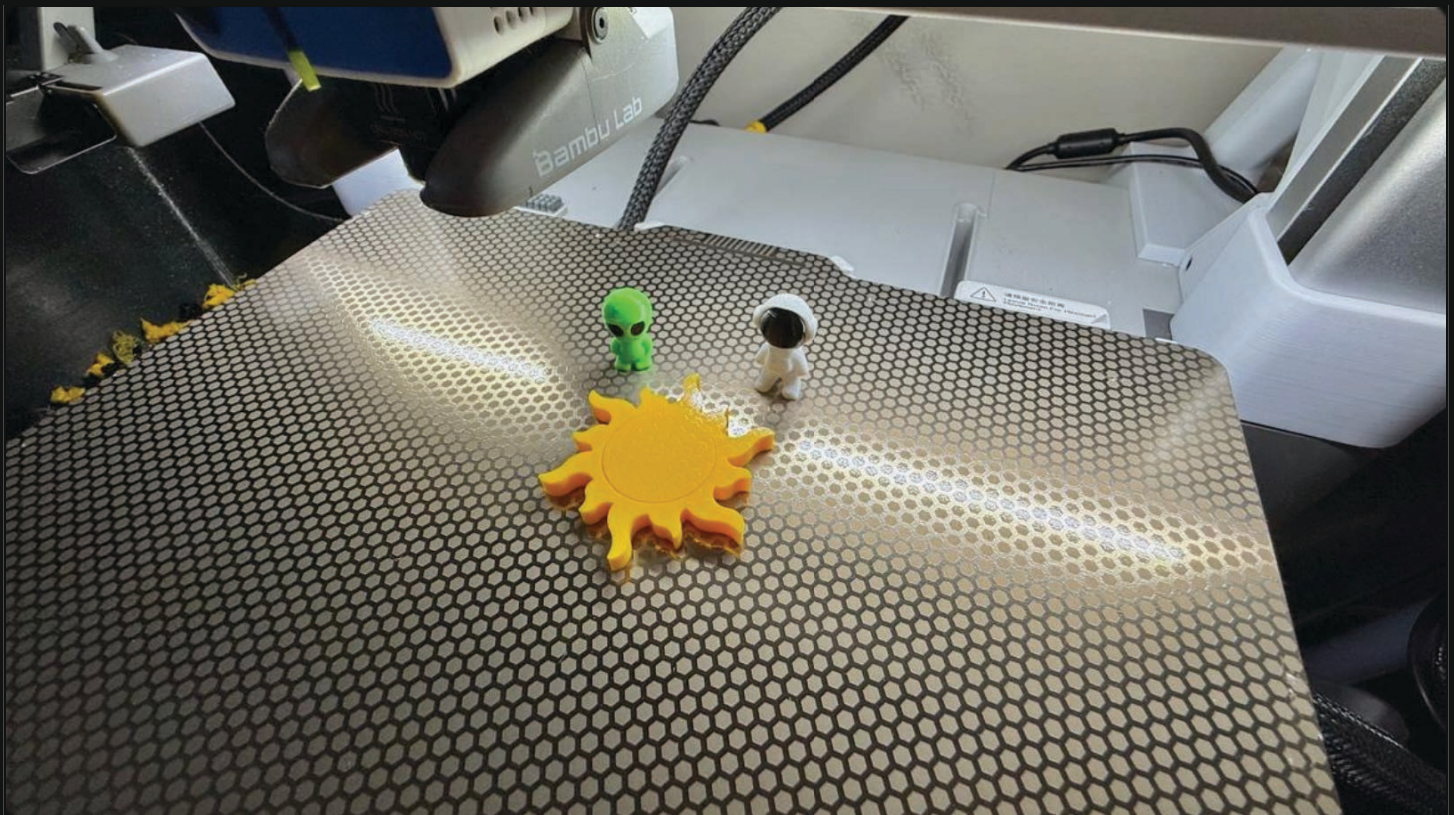


Viewing through the telescope!



Michael showing the lifespan of the Sun to residents.

To provide a memory of the activity, 3D printed sun spin fidgets were given to all who participated. We would like to give credit to Bree Poff, the Activities Director at The Village at Allendale for taking the photos and giving us the opportunity to do this for the residents!



Spinners and figurines that have been 3D printed by Michael.

News from the Astronomical League

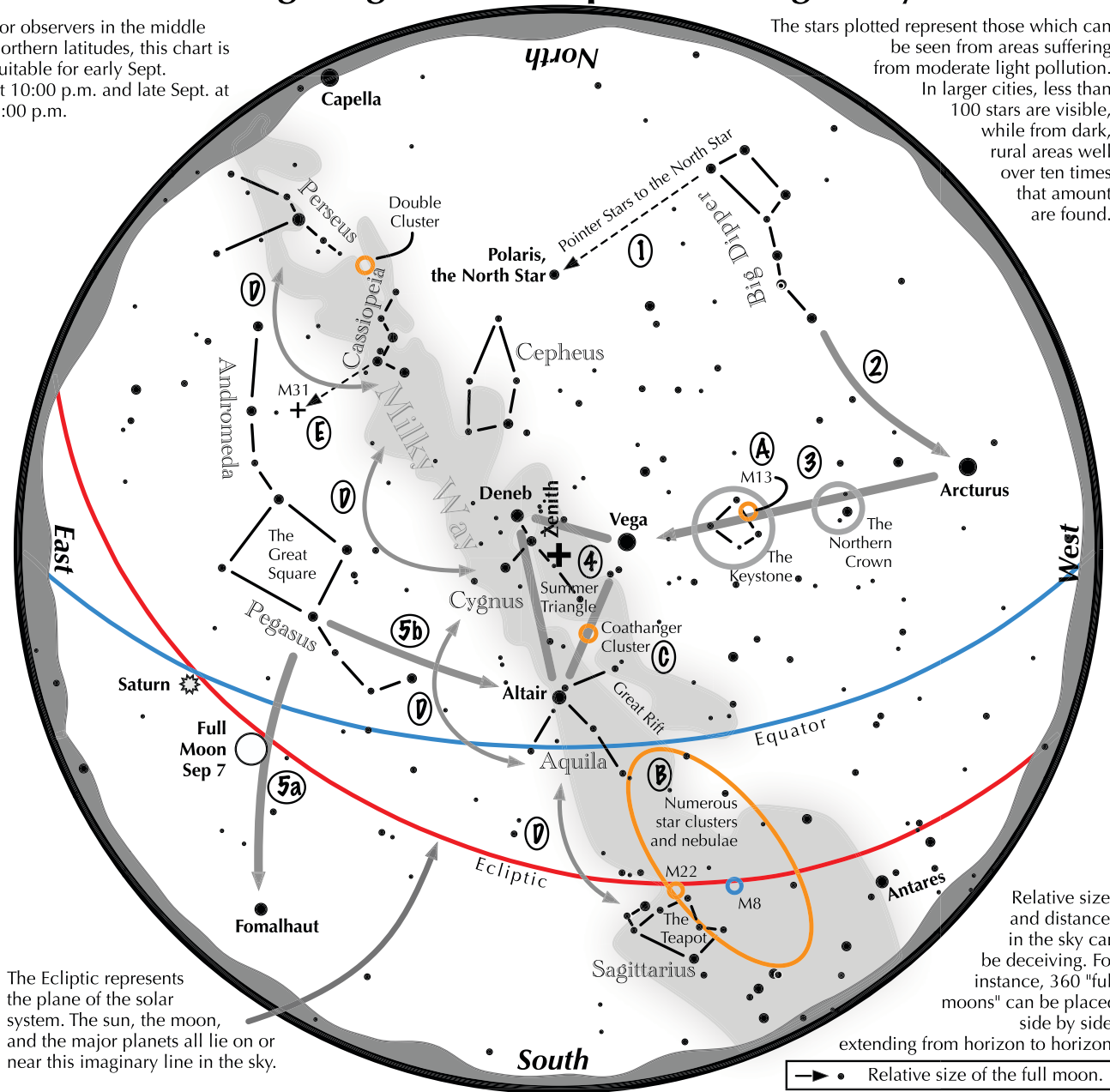


he Astronomical League has a plethora of educational content to help you learn and enjoy the night sky more. The following inserts are just a tiny bit of what they provide.

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.

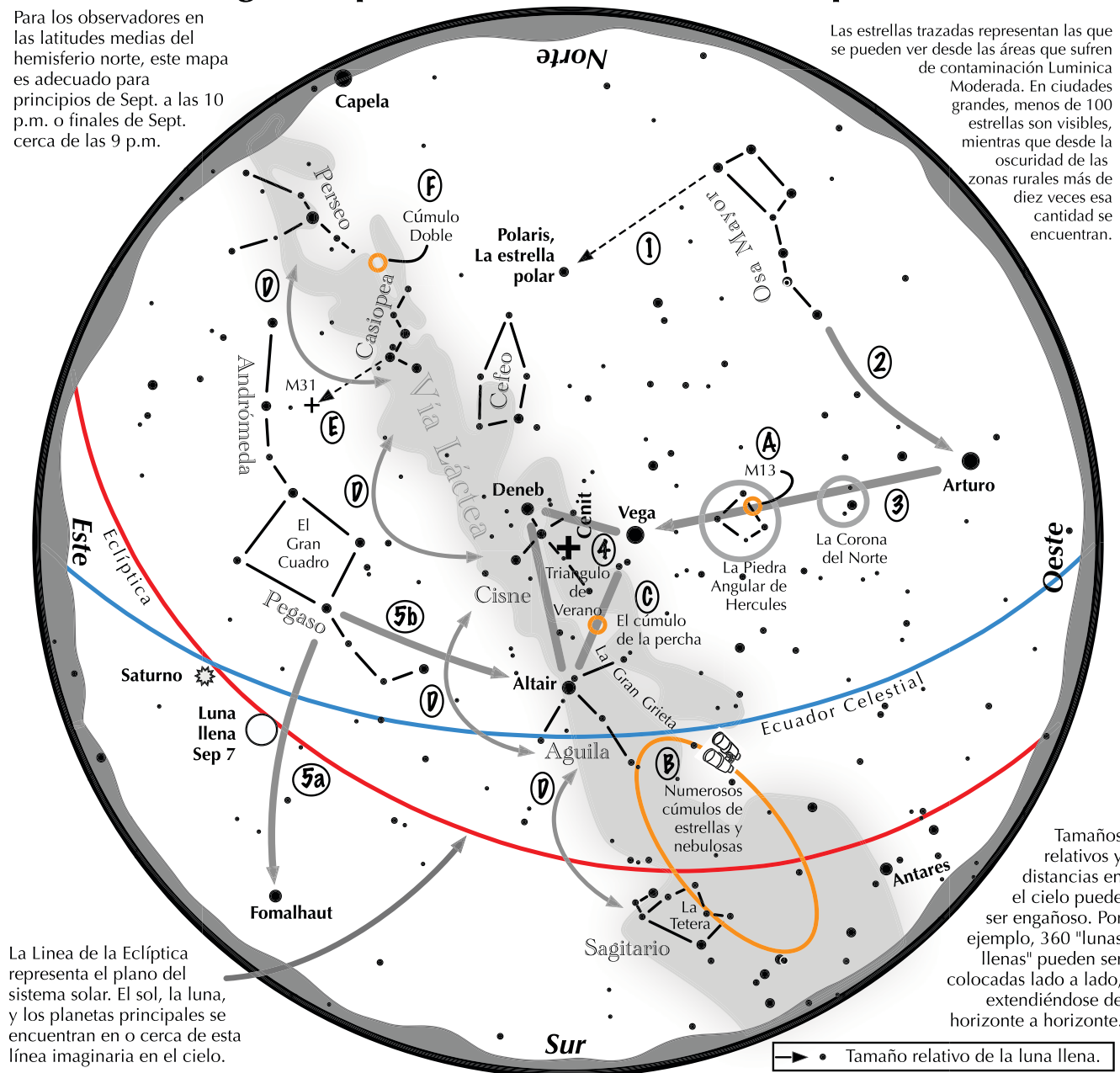
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Navegando por el cielo nocturno de Septiembre

Para los observadores en las latitudes medias del hemisferio norte, este mapa es adecuado para principios de Sept. a las 10 p.m. o finales de Sept. cerca de las 9 p.m.

Las estrellas trazadas representan las que se pueden ver desde las áreas que sufren de contaminación Luminica Moderada. En ciudades grandes, menos de 100 estrellas son visibles, mientras que desde la oscuridad de las zonas rurales más de diez veces esa cantidad se encuentran.



La Línea de la Eclíptica representa el plano del sistema solar. El sol, la luna, y los planetas principales se encuentran en o cerca de esta línea imaginaria en el cielo.

Tamaños relativos y distancias en el cielo puede ser engañoso. Por ejemplo, 360 "lunas llenas" pueden ser colocadas lado a lado, extendiéndose de horizonte a horizonte.

→ • Tamaño relativo de la luna llena.

Navegando por el cielo nocturno: simplemente comience con lo que sabe o con lo que puede encontrar fácilmente.

- 1 Haz una línea hacia el norte desde las dos estrellas en la punta de la Osa Mayor. Pasa por Polaris, la estrella polar.
- 2 Siga el arco del mango de la Osa Mayor. Se cruza con Arturo, la estrella más brillante en el cielo de la noche de septiembre.
- 3 Dibuja una línea desde Arturo a Vega. Un tercio del camino se encuentra "La Corona del Norte". Dos tercios de esa distancia llevan a la "piedra angular de Hércules." Se necesita un cielo oscuro para ver estas dos configuraciones estelares tenues.
- 4 Las estrellas del Triángulo de verano, Vega, Altair y Deneb, brillan en el Cenit.
- 5 Las dos estrellas más al oeste del Gran Cuadro, que se encuentra en el este, apuntan al sur hacia Fomalhaut. Las dos estrellas más al sur apuntan al oeste hacia Altair.

Puntos destacados con binoculares

A: En el lado occidental de la Piedra Angular brilla el Gran Cúmulo de Hércules. **B:** Entre las brillantes estrellas Antares y Altair, se esconde un área que contiene muchos cúmulos de estrellas y nebulosas. **C:** Casi a la mitad de la distancia entre Altair y Vega, Brilla la "Percha," un grupo de estrellas que describe un perchero. **D:** Recorre la Vía Láctea en busca de un número asombroso de destellos tenues y bahías oscuras, incluido La Gran Grieta. **E:** Las tres estrellas más occidentales de las "W" de Casiopea apuntan hacia el sur hasta M31, la Galaxia de Andromeda, un óvalo "borroso." **F:** Entre la "W" de Casiopea y Perseo se encuentra el Doble Cúmulo.

Traducción al español por Dr. Salvador Aguirre

www.astroleague.org/outreach; Duplicación permitida y fomentada para toda distribución gratuita.

Liga Astronómica

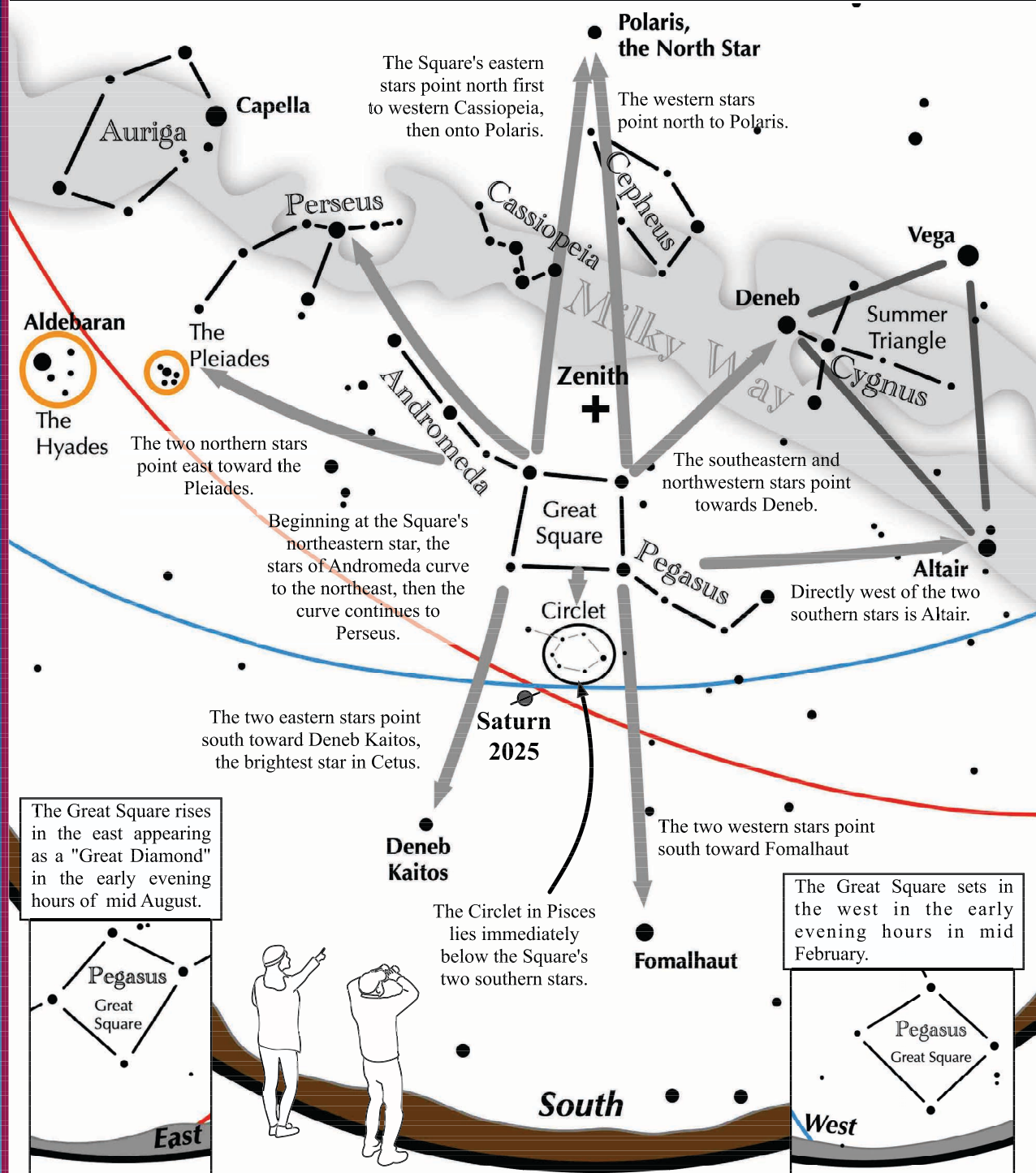




Navigating the mid Autumn Night Sky: Great Square Guide



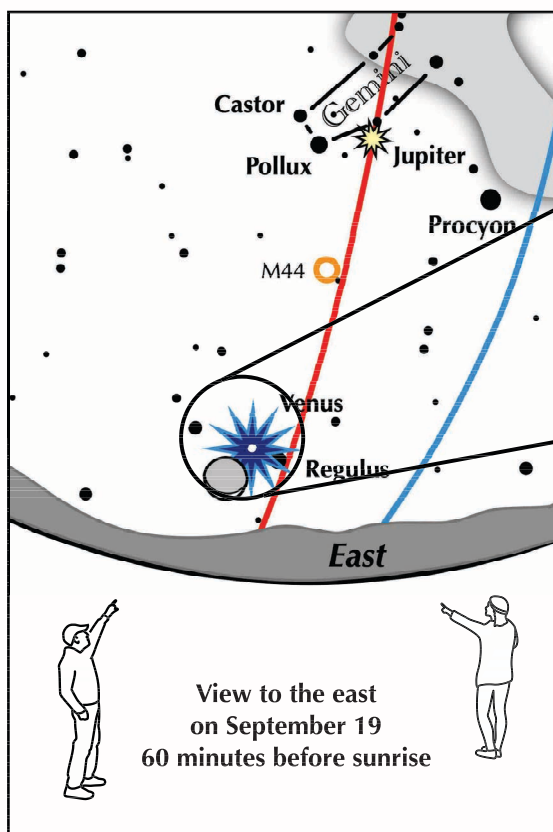
Befriend these four stars, slightly dimmer than those of the more famous Big Dipper, and they'll guide you on a tour of the Autumn sky.



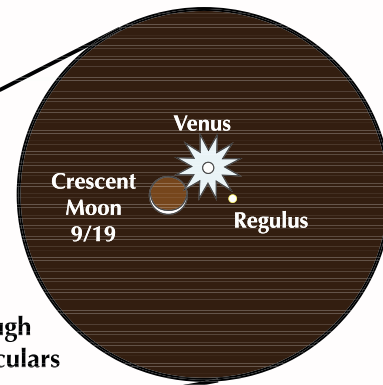
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If you can see only one celestial event in the morning this September, see this one!



View
through
binoculars



Crescent moon meets brilliant Venus and the star Regulus

On the morning of September 19, the crescent moon, full with earthshine, joins brilliant Venus and the brightest star in Leo, Regulus, for a dramatic sight. Look low in the east-northeast 60 minutes before sunrise.

Be sure to use binoculars to cleanly separate this celestial trio!

Above them all shines bright Jupiter, itself forming an attractive isosceles triangle with the twin stars of Gemini, Castor and Pollux. To their lower right shines the bright star Procyon.



Stellar Observations

Greg Penner



Queen of the Night



As we move into the month of September, we look forward to cooler, less humid nights as the fall season begins. One of the star patterns that “signals” the beginning of autumn is queen Cassiopeia, the mother of Andromeda in Greek mythology. By the first day of fall on September 22nd, this prominent asterism/constellation is easily recognizable as the letter “W” turned sideways, midway up in the northeastern sky. Turning a telescope toward some



*Cassiopeia objects chart - from Stellarium, annotated by
Greg Penner*

colorful double/triple stars and shapely star clusters will give you an enjoyable fall evening.

Starting with the double stars, we will first look at Eta Cassiopeiae (the "Easter Egg" double). Eta Cas is easily visible to the naked eye and found about 1/3 of the way from Alpha Cas to Gamma Cas. Composed of a primary of 3.4 magnitude and secondary of 7.4 magnitude, this pair has a nice color combination. Separated by 13 arcseconds, the primary appears whitish-yellow and the dimmer secondary has been described anywhere from orange to red to purple. What does it look like through your telescope?



Eta Cassiopeiae - by Greg Penner

The next double will be more of a challenge to split. Sigma Cassiopeiae lies about 3 ½ degrees from Beta Cas (see chart) and is composed of a 5.0 magnitude primary and a 7.2 magnitude secondary separated by only 3 arcseconds. Most observers report bluish colors and some see greenish. Use a higher magnification eyepiece to split these stars and see what colors they appear to you.

Now let's take a look at a triple star system, Iota Cassiopeiae. To find Iota, go to the bottom two bright stars that make the "W"

The first star cluster we will visit is M52, which can be found by letting the two bright stars at the top of the "W" point you in the right direction (see chart). In a small telescope, M52 shows a sparkling group of faint stars with one bright 8th magnitude star standing out. This star may or may not be part of the true cluster, but it is a nice contrast with the fainter cluster. Larger telescopes will show even more of the cluster's stars plus more of the background Milky Way stars for a very nice effect. M52 has been described as looking like a scorpion or a bird with outstretched wings. What do you see?



M52 - by Jim Mazur

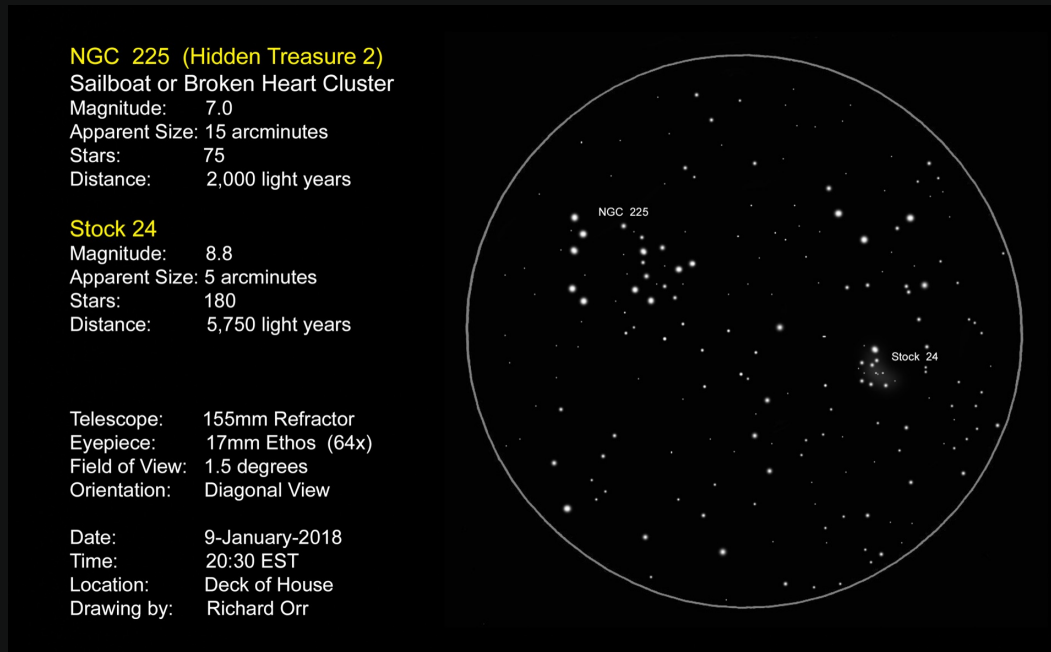
NGC 7789 is the next star cluster we will investigate. Located only about 1 degree from the double star Sigma Cas that we looked at earlier, this cluster is also known as Caroline's Rose or Caroline's Haystack. Named after astronomer Caroline Herschel who discovered it in 1787, this is one of the most beautiful open star clusters for telescopes. The magnitude of the brightest star is 10.7, so 6-inch telescopes and larger would be best to view this cluster. The Sky Atlas 2000 Companion quotes astronomer William Henry Smyth in describing Caroline's Haystack as "a very glorious assemblage, both in extent and richness, having spangly rays of stars which give it a remote resemblance to a crab". Walter Scott Houston states "one of those rare objects that is impressive in any size instrument". How can you not want to track down this beauty after hearing those descriptions?



NGC 7789 - by Jim Mazur

Our next star cluster has accumulated a few names to describe its appearance. NGC 225 has been called the Sailboat Cluster, Broken Heart Cluster, and Halloween Cat. With all these different names, I intend to observe this cluster with my telescope to see which name is most accurate. Astronomer Stephen James O'Meara has compiled a "Hidden Treasures" list of objects that are not included in either the Messier list or the

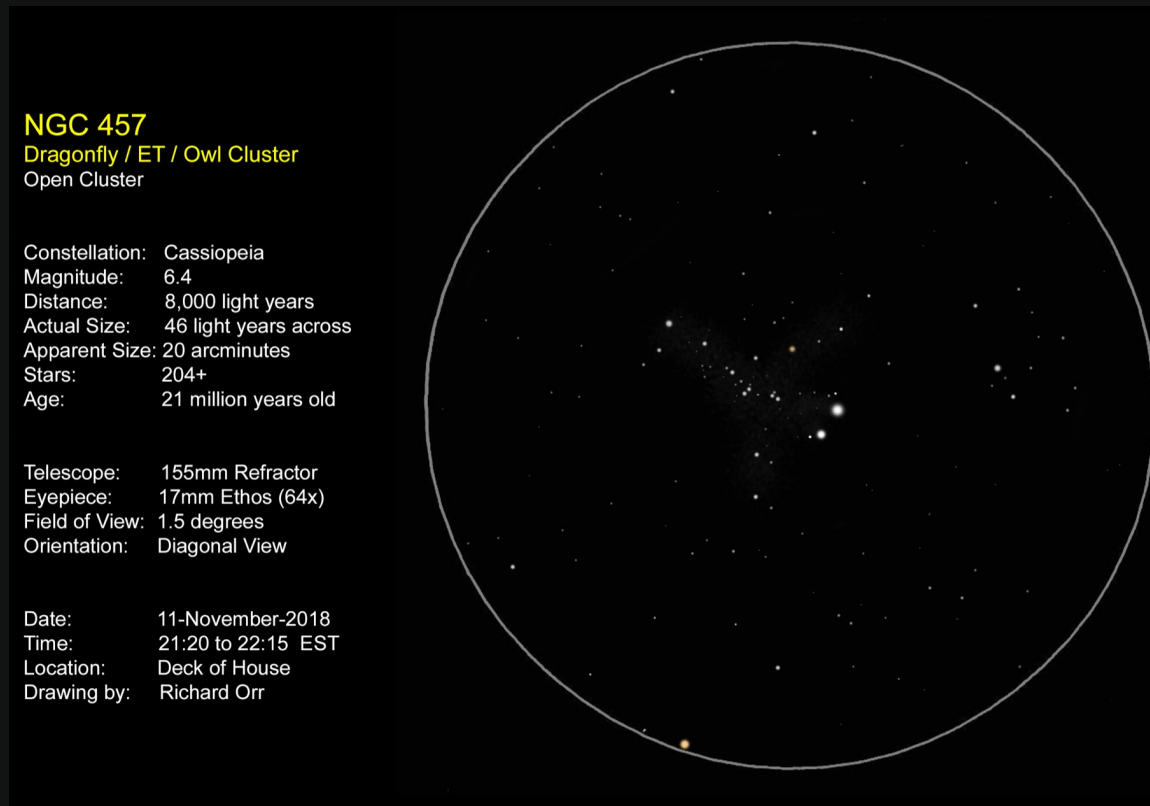
Caldwell list. NGC 225 is the second object on that list and can be found about 2 degrees from Gamma Cassiopeiae.



NGC 225 - drawing by Richard Orr

NGC 457 is a favorite star cluster to view at star parties. Referred to as either the Owl Cluster or the E.T. Cluster, two bright stars stare out at you like eyes from a head and body that resembles either an owl or the famous extraterrestrial. Three stars really stand out in this cluster. The two eyes are composed of 5th magnitude Phi Cassiopeiae (a type-F supergiant) and 7th

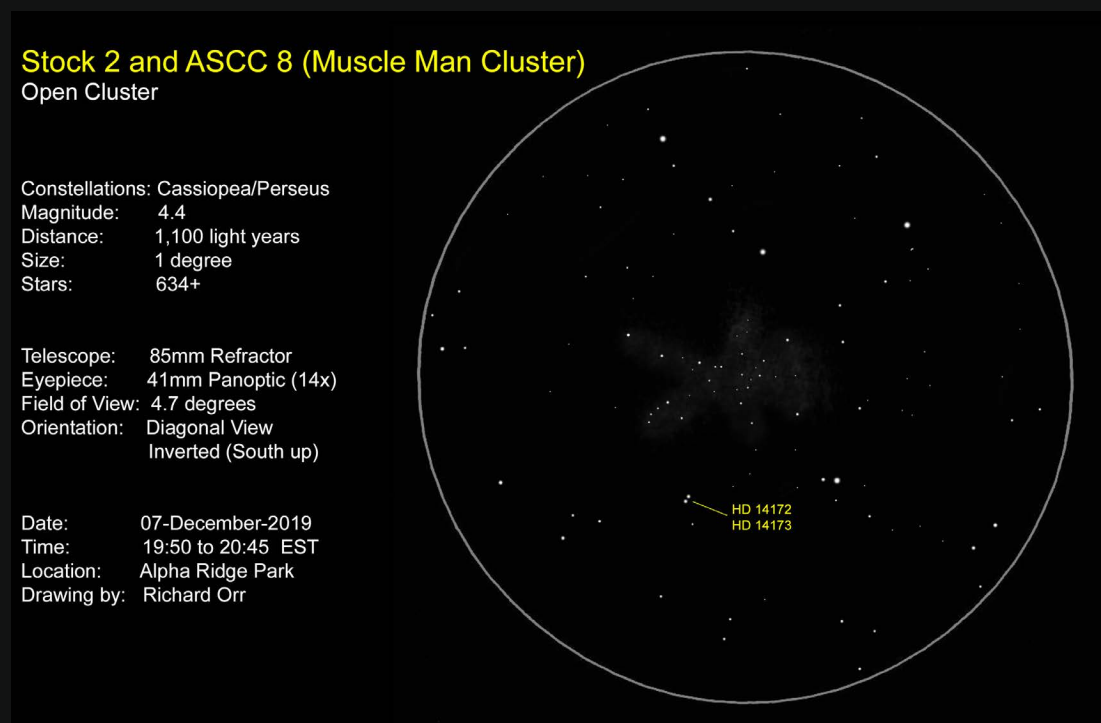
magnitude HD 7902 (a type-B supergiant). The third stand-out star is 8.5 magnitude V466, a long-period variable with a distinctly orange-red color.



NGC 457 - drawing by Richard Orr

The final cluster in our tour of Cassiopeia is officially designated Stock 2, but it has the much more intriguing name, Muscle Man. This cluster has a similar overall brightness to the more famous nearby Double Cluster in Perseus, but the stars are more spread out and not as concentrated. I know that I have

never observed the Muscle Man, as my attention has always been on the Double Cluster. Viewing through a telescope with less than 50x magnification, you should see about 50 stars spread out in a human shape. Apparently, there are faint background stars that tend to give the human figure a puffed-up appearance, like a man with muscles.



Stock 2 (Muscle Man) - drawing by Richard Orr

The Queen Speaks

Robin Byrne



Happy Birthday Sunita Williams



his month we celebrate the life of an astronaut who has some of the most extensive space experience of any living human. Sunita "Suni" Pandya was born September 19, 1965 in Euclid, Ohio. Her father, Deepak, was a neuroanatomist from India, while her mother, Ursuline, was from Slovenia. Along with her older brother and sister, the Pandya family moved to Needham, Massachusetts when Suni was still quite young, and this town is where she considers home.

After graduating from Needham High School in 1983, Suni enrolled in the United States Naval Academy, where she majored in Physical Science. After graduating in 1987 with a Bachelor of Science degree, Suni was commissioned in the U. S. Navy. The Navy would be Suni's career for the next 11 years. Among her duties during this time would be: Basic Diving Officer, Naval Aviator, and Helicopter Combat Support. Her

missions included a deployment to the Middle East as part of Operation Desert Shield and to Miami, Florida to aid in relief efforts after Hurricane Andrew.

In 1993, Suni began training at the U.S. Naval Test Pilot School, graduating a year later. She then flew a variety of aircraft as a test pilot. In 1995, Suni graduated from the Florida Institute of Technology with a Master of Science degree in Engineering Management. That led to a return to the Test Pilot School, but now as an instructor. A few more years of active duty would follow before her career would take a very new direction. During her time in the Navy, Sunita Pandya would log over 3000 hours of flight in 30+ different aircraft.

In June of 1998, Sunita received word that she had been selected by NASA for the astronaut program. Training at the Johnson Space Center began the following month. Like all

astronaut candidates, Suni learned all about the specifications and operation of the Space Shuttle and the International Space Station, plus survival techniques for possible water or wilderness landings, as well as as experience flying the T-38 jet aircraft. Suni also went to Russia to work with the Russian Space Agency as support for the first mission to the International Space Station. Additionally, she trained on the two robotic arms designed for ISS. It was during this time that Suni met Michael J. Williams, who was a federal marshal. They married, leading Sunita Pandya to change her name to Sunita Williams.

After almost 8 years of training, Sunita Williams' first trip to space would occur aboard the Space Shuttle Discovery, launching on December 9, 2006. After docking with ISS, Sunita became a member of the ISS crew as part of Expeditions 14 and 15. For the next 6 months, Williams served as Flight Engineer, performing a total of four spacewalks while aboard - a record for women at the time. She also cut her hair during the mission,

saving her tresses for the next shuttle crew to take back to Earth and donate to Locks of Love. On April 16, 2007, Sunita Williams participated in the Boston Marathon while in Earth orbit.

Running on the treadmill aboard the Space Station, she ran the distance in 4 hours 24 minutes. After 192 days in space, Sunita Williams returned to Earth on June 22, 2007.



Astronaut Sunita Williams, Expedition 14 flight engineer, circled Earth almost three times as she participated in the Boston Marathon from space. She is seen here with her feet off the station treadmill on which she ultimately ran about six miles per hour while flying more than five miles each second. NASA, Public domain, via Wikimedia Commons

Five years later, on July 14, 2012, Sunita Williams returned to the ISS, but this time her trip to the Space Station was aboard a Soyuz spacecraft launched from the Baikonur Cosmodrome. For the next four months, as a member of Expeditions 32/33, she would participate in the low-gravity research projects. Sunita would also perform three more spacewalks, to add to her growing space-based résumé. When the crew swapped out on September 17, 2012, transitioning to Expedition 33, Sunita Williams then became Commander of the ISS mission. She was only the second woman to hold this title. Not to let her marathon in space be her only unique physical accomplishment, during this mission, Sunita became the first person to compete in a triathlon from space. In September 2012, the Nautica Malibu Triathlon was held, and Williams performed the equivalent tasks in orbit. To simulate swimming, she used the Advanced Resistive Exercise Device, designed to mimic weightlifting, while cycling was on the stationary bike, and the treadmill was for the running portion. Williams completed the 0.5 miles of "swimming," 18 miles of biking, and 4 miles of running in 1

hour, 48 minutes and 33 seconds. Suni returned to Earth, landing in Kazakhstan, on November 18, 2012, adding another 127 days to her total time in space.

As private companies began to get into the space travel business, NASA assigned some of their seasoned astronauts to participate in these new ventures. Williams was among the first to be named in NASA's July 2015 announcement. She worked with both SpaceX and Boeing, training in the vehicles designed by each company. Then, in August 2018, it was announced that Williams would be among the astronauts assigned to fly on the Boeing Starliner vehicle. On June 16, 2022, NASA formally announced that Williams and Butch Wilmore would fly the first Boeing Starliner mission, on a trip to ISS. In 2024, on June 5, Williams and Wilmore entered Earth orbit aboard the Starliner, and docked with the International Space Station the next day. However, some issues were discovered with the Starliner spacecraft that were cause for concern, including helium leaks

and propulsion system malfunctions. The decision was made for Williams and Wilmore to remain on ISS, and for the Starliner to return to Earth unmanned.

What was supposed to be an eight day mission ended up being over nine months. Williams and Wilmore were officially designated Expedition 72 crew members, and went to work performing the expected tasks of anyone aboard ISS. That included yet another spacewalk for Williams, making her the record-holder for time spent by a woman on EVAs and oldest woman to perform an EVA at the age of 59. Finally, on March 18, 2025, Williams and Wilmore, along with two other ISS crew members, returned to Earth aboard a SpaceX spacecraft, splashing down in the Gulf of Mexico.



Suni Williams and Butch Wilmore touching down off the coast in Tallahassee Florida March 18th, 2025. By Keegan Barber, courtesy of NASA, Public domain, via Wikimedia Commons

During her career with NASA, Sunita Williams has racked up many accomplishments. She ranks 9th for longest single trip to space (for the Boeing Starliner trip) at 286 days, and I think that also deserves an extra accolade for second longest delay in returning to Earth of 278 days. Her cumulative total time in space is 608 days, ranking her 12th in the world for time spent in orbit. She is among only 12 other people who have flown on 3 different launch vehicles, in her case: the Space Shuttle, the

Soyuz, and the Boeing Starliner. She also flew on a 4th vehicle: the SpaceX ship that brought her back to Earth, even if she didn't launch in it. The Boeing mission also made her the first woman to perform a test flight of an orbital vehicle. And her spacewalking ranks her 4th in the world for most time spent on an EVA, as well as the most time by a woman, and the oldest woman to perform a spacewalk.

Needless to say, Sunita Williams is an impressive woman. So this year, on her 60th birthday, we should all wish her a very Happy Birthday, and may she continue to inspire and impress us for many more years.

References:

Sunita Williams - Wikipedia

https://en.wikipedia.org/wiki/Sunita_Williams

Sunita L. Williams - NASA

<https://www.nasa.gov/people/sunita-l-williams/>

NASA astronauts Butch Wilmore and Sunita Williams complete recovery phase after extended stay at ISS, May 29 2025 - Times of India World Desk

<https://timesofindia.indiatimes.com/world/us/nasa-astronauts-butch-wilmore-and-sunita-williams-complete-recovery-phase-after-extended-stay-at-iss/articleshow/121479154.cms>

BMAC Calendar & More



Calendar:



MAC Meetings:

- Friday, September 5, 2025 - 7p - Nate Wentzel - Topic: "Dust and a Star: A Look at Brian May"
- Friday, October 3, 2025 - 7p - Robin Byrne - Topic: "Nancy Grace Roman: the Telescope and the Woman"
- Friday, December 5, 2025 - 7p - Topic TBA
- Friday, January 2, 2026 - 7p - Topic TBA
- Friday, February 6, 2026 - 7p - Topic TBA
- Friday, March 6, 2026 - 7p - Topic TBA
- Friday, April 3, 2026 - 7p - Topic: TBA
- Friday, May 1, 2025 - 7p - Topic: TBA
- Friday, June 5, 2025 - 7p - Topic: TBA



unWatch:

- Every clear Saturday & Sunday - 3p-3:30p - March-October - By the Dam
 - View the Sun safely with a white-light view if clear.; Free.
 - You must have completed the Park Volunteer Program in order to help with the public program. If you have, and have been trained, please show up at least 30 minutes prior to the official start time.



tarWatch:

- Every Saturday in October and November - By the observatory
 - View the night sky with large telescopes at the observatories. If poor weather, an alternate live tour of the night sky will be held in the planetarium theater. Free.
 - You must have completed the Park Volunteer Program in order to help with the public program. If you have, and have been trained, please show up at least 30 minutes prior to the official start time.



Special Events:

- **StarFest 2025 - November 7-9, 2025**

- Our 40th annual astronomy convention / star gathering for the Southeast United States. Three days of astronomy fun, 5 meals, 4 keynote speakers, unique zip-up hoodie jacket and more!
- **Pre-registration by Oct. 19, 2025 with full payment is mandatory for attendance. Sorry, no walk-ins nor "visits."**
- [Link for all the StarFest info including registration and hotel reservation links.](#)

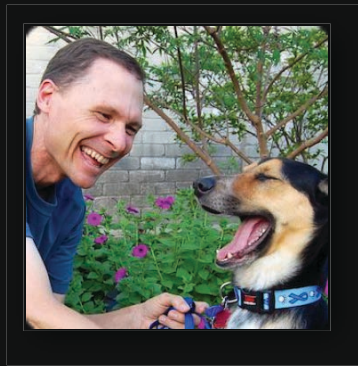
- **BMAC Dinner - January 2026**

- This event is for members and their families. Look for an e-mail in January with all the information.

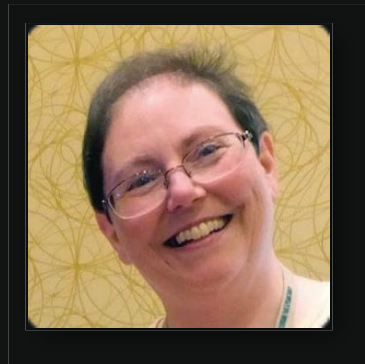
- **Annual Club Picnic - July 2026**

- [Date and site location will be sent directly to full BMAC members.](#)
BMACers and their families are welcome to enjoy an evening of astronomy-themed games and activities along with a potluck dinner and observing.

Regular Contributors:



Greg Penner



Robin Byrne



Mackenzie Henley

Greg Penner is a semi-retired architect living in the Tri-Cities area since 2018. He has enjoyed astronomy since childhood when he received a “department store telescope” and viewed Saturn for the first time. He has been a member since 2018.

Robin Byrne has been writing the science history column since 1992 and was chair in 1997. She is an Associate Professor of Astronomy & Physics at Northeast State Community College (NSCC).

Mackenzie Henley is our new head editor of the Bays Mountain Astronomy Club newsletter. She is an undergraduate student at the University of Tennessee Knoxville.

Connection:

Bays Mountain Astronomy Club:

- 853 Bays Mountain Park Road; Kingsport, TN 37650
- (423) 229-9447 - [Park Site](#) - [Club Site](#)
- Newsletter edited by [Mackenzie Henley](#)

Dues:

- Dues are highly supplemented by the Bays Mountain Park Association and volunteerism by the club. As such, our dues are kept at an extremely low cost.
- \$16 / person / year
- \$6 / each additional family member
- Note: if you are a Park Member (which incurs a separate, additional fee), then a 50% reduction in BMAC dues are applied.
- Dues can be paid in many ways. The easiest way is to pay via the CivicRec online portal. If you are a current member, please log in with your e-mail address and reset your password if you have not already done so. You can then update your membership. Here's the direct [link](#). If you want to add family members, then add them via the [internal link](#). You can also pay at the gift shop, by mail or over the phone.

Chapter Background Image Credits:

- **Cover image of Southern Milky Way by Adam Thanz.**
 - *Sony A7ii with Zeiss Batis 2.8/18 lens, f/2.8, 8 sec., ISO 6,400, September 9, 2020.*
- **Table of Contents image of Comet NEOWISE (C/2020 F3) by Adam Thanz**
 - *Sony A7ii with Sony FE 2.8/90 Macro G OSS lens, f/2.8, 8 sec., ISO 4,000, September 15, 2020.*
- **Cosmic Reflections image of the Summer Triangle area of the Milky Way by William Troxel.**
 - *Image captured September 23, 2016.*
- **BMAC Notes painting of the Moon with moon glow by Christa Cartwright.**
 - *Painting based on a photograph of the Moon Christa captured September 2020.*
- **Stellar Observations image of Crescent Nebula by David Reagan.**
 - *This image was taken with a 140mm refractor in his suburban backyard using an AstroPhysics 900 mount, 8.7 hours of 5 minute Ha and OIII subexposures, combined in AstroPixelProcessor as an HOO image and processed in Lightroom and Photoshop. Image captured in 2022.*
- **The Queen Speaks image of a solar halo by Robin Byrne.**
 - *iPhone 7, September 8, 2020.*
- **The Space Place - NASA Night Sky Network image of the Rho Ophiuchi cloud complex by Brandon Stroupe.**
 - *Canon 6D with Canon 2.8/70-200mm lens, f/2.8 @200mm, 20 x 120 sec. exposures, ISO 1,000, stacked in Deepsky Stacker, processed in Adobe Photoshop CC, Skywatcher Star Adventure mount, September 19, 2015.*
- **BMAC Calendar & More image of the Moon by Greg Penner.**
 - *iPhone shooting through a 9mm eyepiece and 12.5" Truss Tube Dobsonian @212x.*

- **All background images used with permission by their authors.**