The ECLIPSE

November 2026

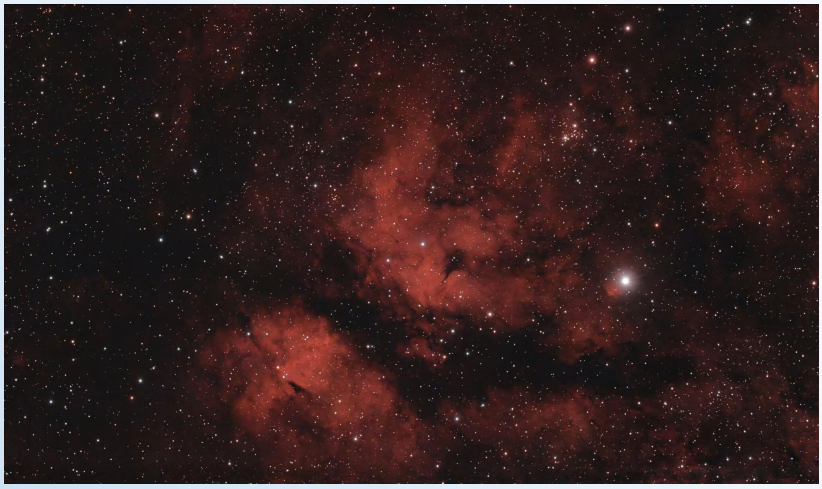
The Newsletter of the Barnard-Seyfert Astronomical Society

Seasons Changing

Fall is here and winter is surely right around the corner. BSAS members have been taking advantage of some clear nights to do some observing with great results – packed star parties, fabulous sights, and inspiring images. In this issue we have lots of BSAS member photos, including eclipses, deep sky objects and the Milky Way, and an article on the first observed Mercury transit by Robin Byrne. Also if you are interested in exploring the constellation Andromeda, which is now high in the evening sky, check out page 11. And if you want to learn about Eta Aquilae, see page 12.

For anyone considering shopping for new binoculars for a holiday gift, the Astronomical League has a guide on buying basics. It is included on page 9.

There is a lot of talent in BSAS! Note that the images in this issue and shared in our discussion forum include those taken with large set-ups and some taken on a phone. Not to mention links to videos. All amazing!



HD 194789, a bright, young star located in Cygnus with surrounding dust and gas by Tony Proctor from his back yard in Smyrna. 479 60-second exposures; Gain = 70; Duo-Band Filters; EQ Mode; Bortle 6; Processed In Stellar.

Big Milestone for Voyager 1

On November 18, the spacecraft will pass pass the 1 light-day mark. It is the farthest human-made object from Earth. It was launched on Sept 5, 1977 and has traveled 16 billion miles. It is now 5.7 times Neptune's distance. Despite the distance the sun is still very bright, 14 times the brightness of the full moon! Even though it is far from Earth, Voyage is nowhere near as far as the closest star system, Alpha Centauri.

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Barnard-Seyfert Astronomical Society

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Natalie Preston
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Donna Burgess

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Contact BSAS officers at bsanashville.com/contact, or email info@bsasnashville.com.

About BSAS

Founded in 1928, the **Barnard-Seyfert Astronomical Society** is an association of amateur and professional astronomers who have joined together to share their knowledge and love of the night - *and day* - sky! We welcome everyone from beginners to pros alike!

BSAS meets on the third Wednesday of each month at the **Warner Park Nature Center** in Nashville, TN. Experienced members or guest speakers usually talk about some aspect of astronomy or sky observing. Subjects range from how the universe first formed to how to build your own telescope, to "Pluto: Dog, planet, or KBO?..."

The meetings are very casual and time is allotted for coffee, hang out and general astro-tivity! Meetings are free and open to the public, you do NOT need to be a member to attend!... Join us!

BSAS membership entitles you to several perks such as subscription discounts to Astronomy and Sky & Telescope magazines, access to the club's Equipment Loan Program, invitations to private club events, participation in our Google chat forums, and much more!

In addition to the regular meetings, BSAS also sponsors many public astronomy events, such as our famous monthly public star parties, Astronomy Day school events, collaborations with the Dyer Observatory, tents and displays at local festivals, and "Pop-Up" star parties!

More information about BSAS can be found on our website bsasnashville.com. If you have any questions, please email us anytime at info@bsasnashville.com.

Equipment Loan Program

Did someone say **FREE** telescope loans??... Why yes, yes they did!!

BSAS has telescopes ranging from 2.5" to 10", from beginner to advanced, that members can borrow for up to 60 days at a time! We also have other items such as H-alpha solar telescopes, Dobsonians, educational CDs, tapes, DVDs, and more!

BSAS will not be held responsible for lost sleep or gear addiction from use of this excellent astronomy equipment! For information on what's currently available, contact info@bsasnashville.com.

President's Corner

By Steve Hughes

Greetings BSAS Members,

I thought I'd take this opportunity to just highlight a few of the important FYI's coming up with BSAS…

> We're going back to Dyer!! Our first member meeting back at the Dyer Observatory will be January 20th, 2027!

> Due to the move back to Dyer, the holiday season, and other factors, the board has decided to pause the new bylaws and COC business until after the new year. We will keep everyone posted.

> December 16th is our yearly Annual Meeting which will include board member elections and our holiday potluck! Nothing like free food to bring people out to vote! 😄

> December 12th is our last star party of the year at Shelby Bottoms Nature Center! AND… For anyone that's not aware, the iconic ***General Jackson*** showboat is retiring December 15th! So this will be its LAST Saturday evening cruise, and it will pass right by our star party! So join us, and come say goodbye to this beloved ship!

As always, be safe, be kind, and keep looking up!

Steve Hughes
President, BSAS

"Every star may be a sun to someone..." - Carl Sagan

Upcoming Meetings

November Member Meeting
Wednesday, November 18
7:00 - 9:00 p.m.
Warner Park Nature Center
7311 Highway 100 Nashville

December Member Meeting
Potluck / Elections
Wednesday, December 16
7:00 - 9:00 p.m.
Warner Park Nature Center
7311 Highway 100 Nashville
+++

We will be back at Dyer starting in January!
+++

BSAS is a non-profit, 100% volunteer operated organization. Please consider lending a hand if you can! We could use some help with the following:
+ Monthly Meeting Setup and tech support.
+ Program Committee: Help research content for our monthly meetings.
+ Event Crew: Help with setting up our various events.

If you can help, please send an email to volunteer@bsasnashville.com.

BSAS
Barnard-Seyfert Astronomical Society

The *Eclipse* is the monthly newsletter of the Barnard-Seyfert Astronomical Society, Nashville, Tennessee.

Comments, questions, and submissions for future issues are welcome and may be sent to eclipse@bsasnashville.com.

Don Filer, Editor

BSAS Gallery

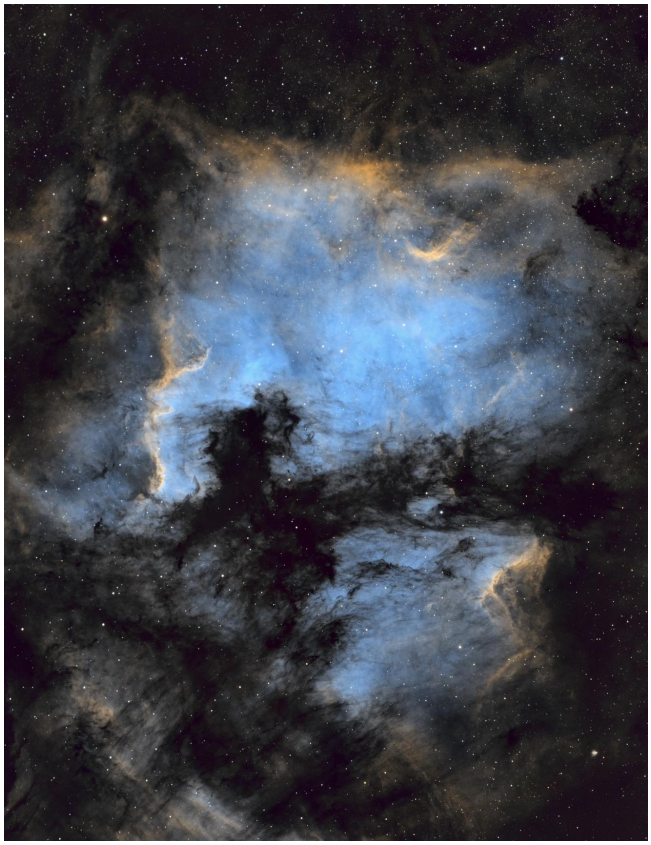
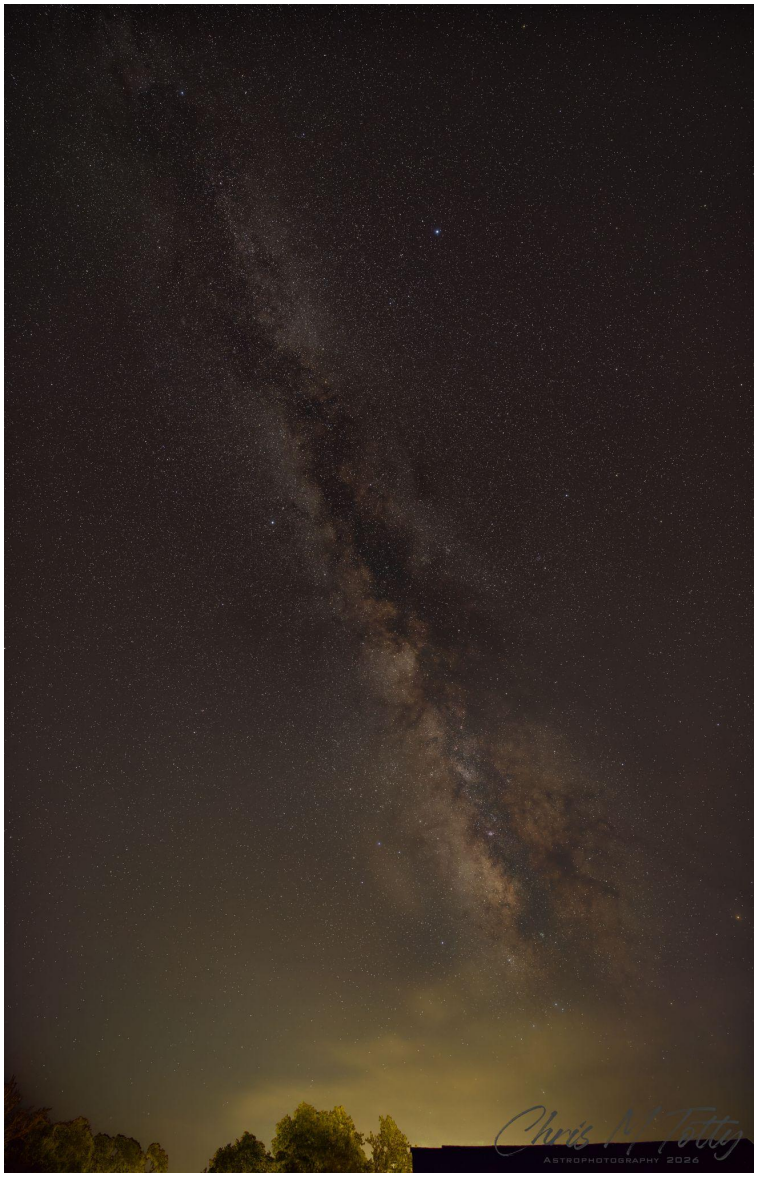


Image of the North American Nebula by Kevin Taylor at the Bells Bend star party in August.



Milky Way image by Chris Totty from his new place in Chapel Hill. It was very hazy/smoky. Taken with a Canon 6D MkII and a Samyang 14mm lens. 25 pics stacked in Sequator and tweaked in Pixinsight.

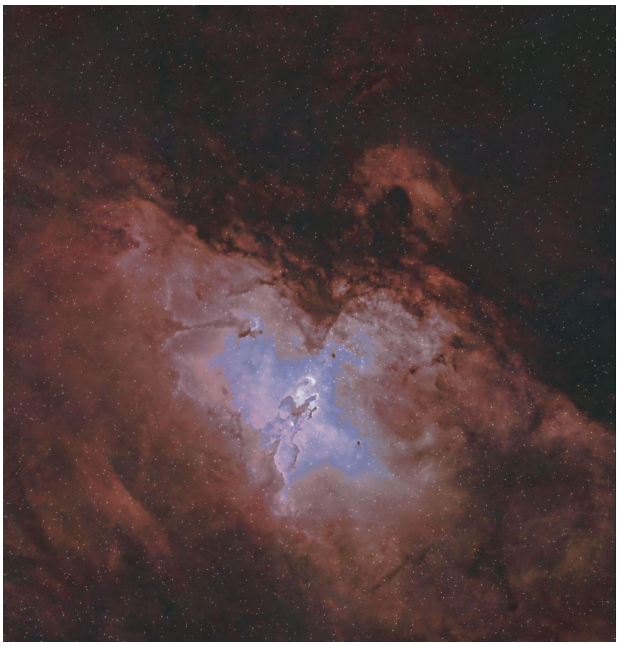


Saturn by Brad Hill with his 16" Meade SCT. This is a screen shot from an animation that shows some spokes in the rings rotating, as well as a little white storm on the planet.
https://app.astrobin.com/i/mp9n3a?r=0

BSAS Gallery (continued)



Milky Way and landscape by Sheri Vaughn.



CORRECTION: Last month the image of the Cygnus Wall by new member Jesse Scruggs was mislabeled as the Eagle Nebula. So, with apologies, here is the Eagle Nebula (M16). Taken with Seestar S50, TH10 EQ mount, 10 second exposures, 5.5hrs integration time.



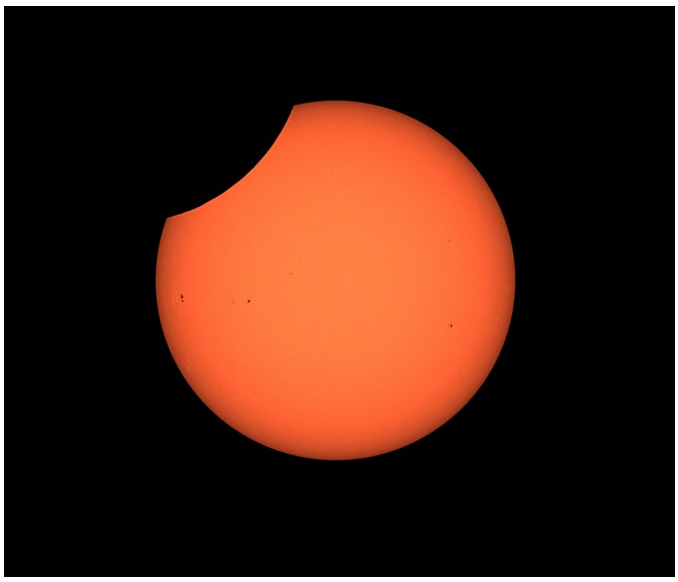
Image of NGC 1333 by Chris Totty. EdgeHD 8" Reduced (1422MM), camera: ASI 2600MM Pro, filters: Optolong R/G/B, 120 Second Exposures of each color. Number of images: Roughly 80 per color for 8 hours total integration time. Stacked and Processed: Pixinsight

BSAS Eclipse Gallery

(a sampling)



I-phone photo of the August solar eclipse from Spain by Gary Eaton.



Partial eclipse Image by Dave Cantrell in northern Michigan, about 7% supposedly, from his new Dwarf 3.



Moon dodging thunderstorms in Yellowstone. mage by Steve Hilliard on his phone.



Image by Tony Drinkwine through the eyepiece of his telescope.

Several members nabbed timelapse of the lunar eclipse.

Nathan Hubbard's start to finish, clouds, and all can be found at: https://youtu.be/cCmfvqgnHGE

Conner Hall's is at: https://youtu.be/YFBcZs90wHM

BSAS Star Parties

BSAS hosted another successful star party in September at Warner Park in cooperation with Dyer Observatory. The images on this page are a sampling from that star party.

Remember to check the BSAS event calendar for upcoming events at: https://www.bsasnashville.com/calendar-new/









BSAS star parties and the other outreach events organized by our members are successful because of the collective efforts of all who bring scopes, help with set-up, work with partners, and publicize it. If you have not had a chance to join one of these, try one out near you. They are also huge fun!

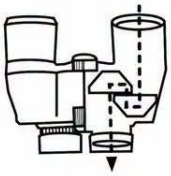
After the November 7 astronomy night at Henry Horton State Park, Randy Oakes sent this follow up: *"An outstanding group of BSAS volunteers, Scott , Chris, Javier , Mike, Lloyd, Tony and Donna, treated an audience of 25 +/- attendees to a better than expected night of viewing. Scott told me that seeing was good enough to see his favorite target Jones 1. Saturn, as always, was a huge hit with the group. Other displays included Freya's Hens/Subaru or the Pleiades, the Veil, M31, and M42 before a heavy dew brought a conclusion to the evening."* Thanks to all!

Binocular Buying Basics



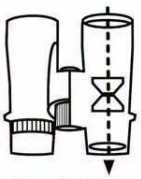
Because they show an upright image, and are easy to aim, binoculars are very useful for examining any 5–7º degree portion of the sky. They are perfect for scanning the Milky Way – its bright regions, its dark bays, and its misty glows. **Plus,** hundreds of objects are visible. In fact, some objects need the low power – and wide field – only a good pair of binoculars can provide.

Buy quality optics with the best glass you can afford. For instance, BAK-4 glass prisms give better light transmission than BA-7 prisms, and, therefore, are more desirable – but are more costly. A good pair of binoculars will give you a lifetime of enjoyment – take good care of them!



Porro Prism

Porro Prisms or Roof Prisms? Binoculars with Porro prisms have the traditional zig-zag shape and those with roof prisms have straight barrels. Porro prisms give better light transmission than most roof prisms, and, therefore, are better suited for astronomy.

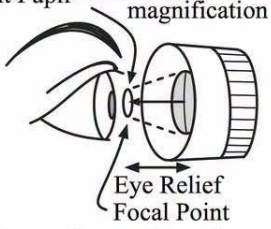


Roof Prism

Coatings? Yes! Coatings help improve the transmission of light through the binoculars. You want binoculars with fully multi-coated optics to give the best possible light transmission. Look for a slight purplish tint when light glints off the front lens.

What size is best? *It is a matter of light collecting ability vs. weight.* When evaluating binoculars, two numbers are given, 10x50 for example. The first number is the magnification. The second is the diameter of the objective (front) lenses expressed in millimeters. Glasses larger than 50 mm might be good, but will be heavier and likely require support such as a tripod. Glasses smaller than 50 mm will give dimmer night sky scenes. Anything less than 7 magnification will show images too small, larger than 10 power will likely be too heavy and will have a smaller field.

$$\text{Exit Pupil} = \frac{\text{front lens diameter}}{\text{magnification}}$$



Best to have exit pupil match the eye's pupil diameter.

Exit Pupil. The diameter of the truncated cone of light at the focal point is the exit pupil and should match your eye's pupil diameter. Too large EP – not all the light enters the eye. Too small EP – a dimmer image. The diameter of the exit pupil equals the objective lens diameter divided by the magnification. The eye's pupil under dark conditions has a diameter of about 5 mm (or smaller) for older adults, 7 mm for young adults. 10x50 binoculars have a 5 mm exit pupil, which is nearly ideal for older adults.

Field of view. Common fields are 5-7º. Wider fields result in heavier, more costly binoculars, and may suffer from edge distortions.



Extras. Shock resistant, waterproof, and gas filled glasses are beneficial. And a standard tripod screw socket is almost essential. Don't forget a comfortable strap, a carrying case, lens caps, and warranties.

Original material from AL AstroNotes

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Miscellany

Best Hotels for Stargazing

The latest thing seems to be publishing lists of the best hotels offering programs for astronomers (or those who are simply interested) and/or dark skies.

AFAR (a travel magazine) published a list of 19 best hotels at: https://www.afar.com/hotels/10-hotels-where-you-can-go-stargazing

The writer is Megan Eaves whose book is featured at right!

Astronomy On Tap Nashville

The last Astronomy On Tap of the year is December 8

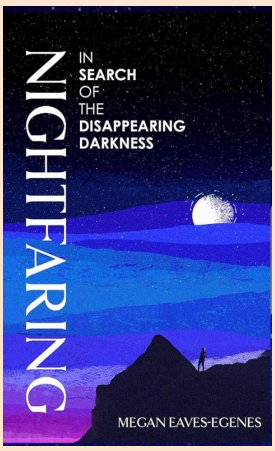
AoT events begin at 7:00pm at Fait la Force Brewing, 1414 3rd Ave S, Nashville.

The Night Sky Network (NSN) supports astronomy clubs across the USA dedicated to astronomy outreach. Visit https://nightsky.jpl.nasa.gov/ to find events, planners, news, and more!

DarkSky reads: Go dark with a good book

Another selection of interest from DarkSky International's list of dark sky–themed books.

***Nightfaring* by Megan Eaves**
In this lyrical exploration of what unfolds when we slow down and step into the dark, Eaves blends travel, personal reflection, and encounters with the nocturnal world, from stargazing to walking through cities after midnight. She gently challenges the idea that night is empty or unsafe, revealing it instead as a space of beauty, intimacy, and discovery.



Find more good star reads at DarkSky International: *https://darksky.org/news/darksky-reads-go-dark-with-a-good-book*

Constellation Draw

Here is a fun game (better than doomscrolling) where you can draw your own constellations. Make the night sky reflect how you see it instead of those ancient Greeks!

https://neal.fun/constellation-draw/

Become a Member of BSAS! Visit bsasnashville.com to join online. All memberships have a vote in BSAS elections and other membership votes.

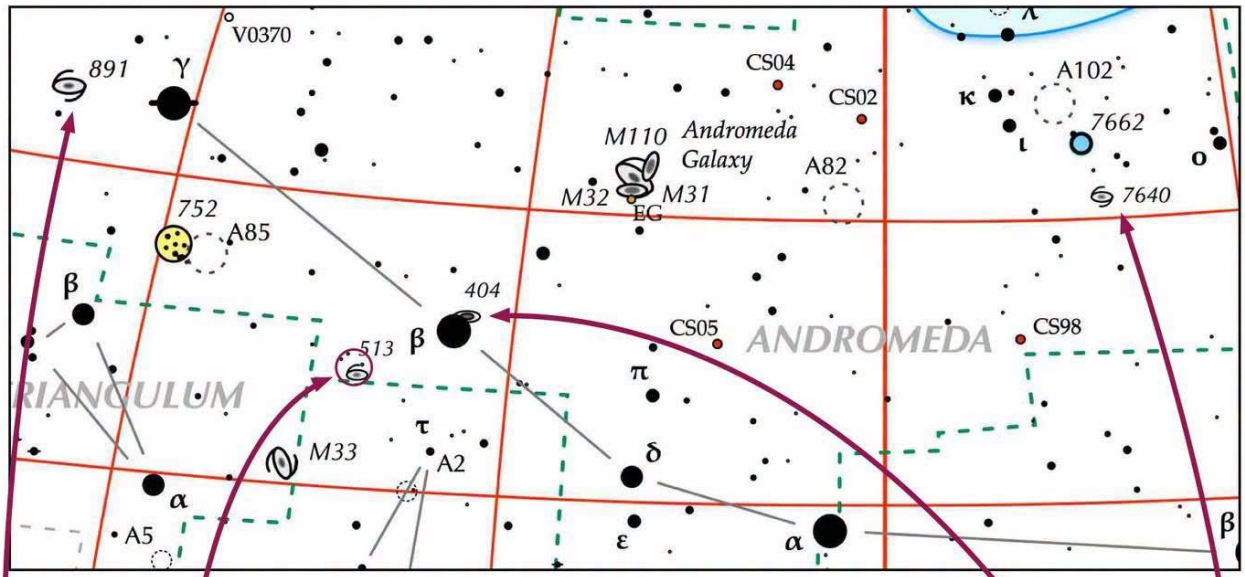
Also included are subscriptions to the BSAS and Astronomical League newsletters. Annual dues: • Regular: $25 • Family: $35 • Senior/Senior Family: $20 • Student:* $15 * To qualify as a student, you must be enrolled full time in an accredited institution or home schooled.

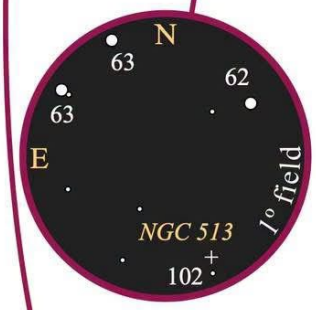
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To many amateur observers, the word "Andromeda" means M31. But it is a constellation, too, with many worthy celestial attractions.

Andromeda, more than a famous galaxy

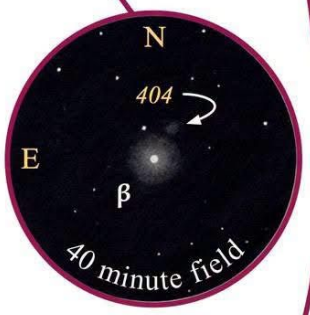
Take a brief tour what lies outside of the Local Group of Galaxies in the constellation Andromeda.

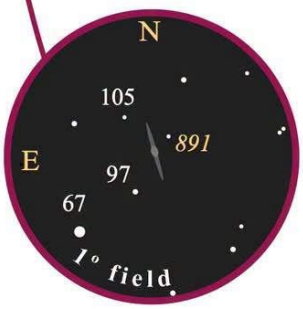




NGC 513
50 minutes ssw of three 6th mag. stars.
Magnitude: 12.9
Size: 1.0' x 0.5'
Distance: 260 million ly!

NGC 404
In the glare of Beta.
Magnitude: 11.2
Size: 3.5' x 3.5'
Distance: 10 million ly





NGC 891
3.5° east of Gamma.
Magnitude: 10.1
Size: 13.5' x 2.5'
Distance: 27 million ly

NGC 7640
2.5° s of NGC 7662.
Magnitude: 11.1
Size: 10.5' x 2.0'
Distance: 30 million ly



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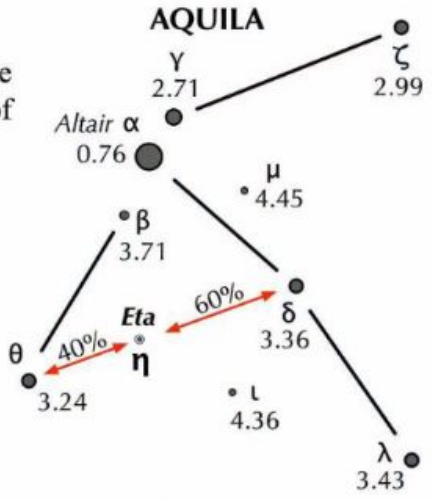
An easy naked-eye Cepheid variable star

Eta Aquilae

Observing Activity

Where is Eta Aquilae in the sky?

- On summer evenings, the bright star Altair shines high in the south. (In the fall, Altair lies in the west.) It is the primary star of the constellation Aquila.
- Much of Aquila stretches southwest of Altair.
- Theta lies at the southeastern tip of Aquila's eastern wing.
- Eta is 60% between Delta and Theta.



Your Observing Project

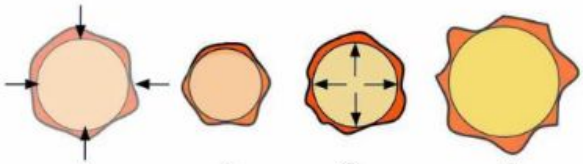


Use binoculars!

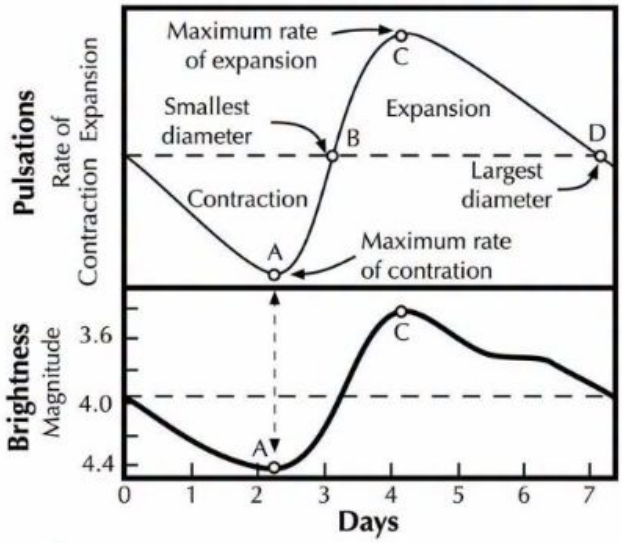
Recording your observations

A. Record date and time. Convert to decimal days.
B. Using binoculars will help.
C. Compare the brightness of Eta with Delta and Iota. Estimate its magnitude by interpolating between the magnitudes of Delta and Iota.
3.36 – as bright as Delta
3.9 – midway between Delta and Iota
4.36 – as faint as Iota
D. Plot the brightness vs. decimal days.

Pulsation Cycle of Eta Aquilae



A	B	C	D
Max rate of contraction 2.2 days.	Smallest diameter 3.2 days.	Max rate of expansion 4.2 days.	Largest diameter 6.9 days.



What you are seeing

Cepheid light curve

- Rapid rise to maximum followed by a slower fall to minimum.
- In some cases, as with Eta, the descending portion shows a bump, a brief slowing decline in brightness.
- The bump is common for Cepheids with periods about 6 days. Eta's period is 7.2 days.
- Minimum brightness occurs at the maximum rate of contraction.
- Smallest diameter occurs between the maximum rates of contraction and expansion.
- Maximum brightness occurs at the maximum rate of expansion.
- Largest diameter occurs between the maximum rates of expansion and contraction.
- Only a 10% difference between maximum and minimum diameters.

Examine the Eta Aquilae reports at the American Association of Variable Star Observers:
app.aavso.org/webobs/results/?star=000-BCT-763&num_ results=200

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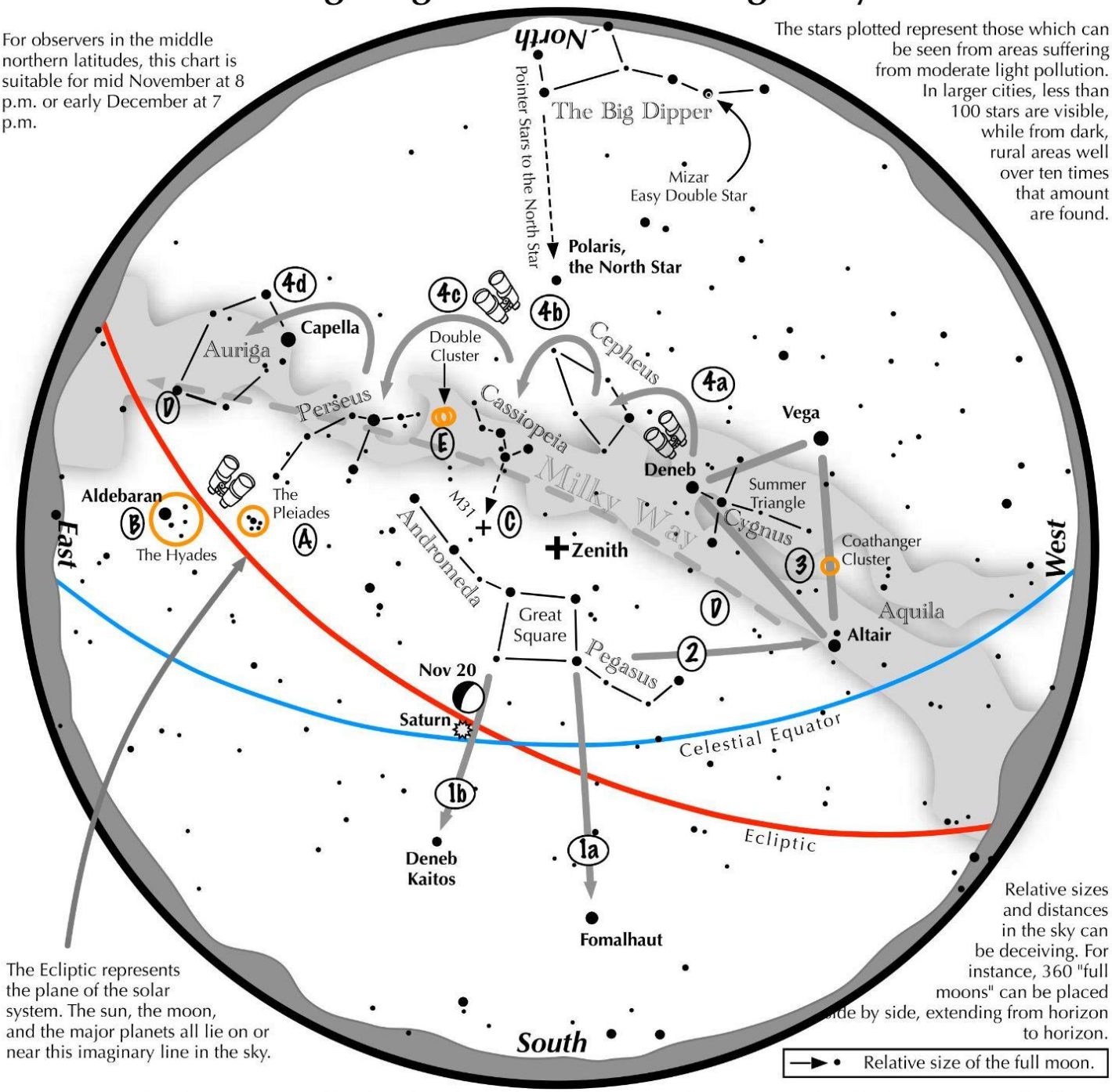
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Navigating the November Night Sky

2026

For observers in the middle northern latitudes, this chart is suitable for mid November at 8 p.m. or early December at 7 p.m.

The stars plotted represent those which can be seen from areas suffering from moderate light pollution. In larger cities, less than 100 stars are visible, while from dark, rural areas well over ten times that amount are found.



The Ecliptic represents the plane of the solar system. The sun, the moon, and the major planets all lie on or near this imaginary line in the sky.

Relative sizes and distances in the sky can be deceiving. For instance, 360 "full moons" can be placed side by side, extending from horizon to horizon.

Relative size of the full moon.

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

1. Face south. Almost overhead lies the "Great Square" with four stars about the same brightness as those of the Big Dipper. Extend a line southward following the Square's two westernmost stars. The line strikes Fomalhaut, the brightest star in the south. A line extending southward from the two easternmost stars, passes Deneb Kaitos, the second brighest star in the south.
2. Draw a line westward following the southern edge of the Square until it strikes Altair, part of the "Summer Triangle."
3. Locate Vega and Deneb, the other two stars of the Summer Triangle. Vega is its brightest member, while Deneb sits in the middle of the Milky Way.
4. Jump along the Milky Way from Deneb to Cepheus, which resembles the outline of a house. Continue jumping to the "W" of Cassiopeia, then to Perseus, and finally to Auriga with its bright star Capella.

Binocular Highlights

A and B: Examine the stars of the Pleiades and Hyades, two naked eye star clusters. **C:** The three westernmost stars of Cassiopeia's "W" point south to M31, the Andromeda Galaxy, a "fuzzy" oval. **D:** Sweep along the Milky Way from Altair, past Deneb, through Cepheus, Cassiopeia and Perseus, then to Auriga for many intriguing star clusters and nebulous areas. **E.** The Double Cluster.

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

Barnard-Seyfert Astronomical Society
Minutes of the Monthly Membership Meeting
Held on Wednesday, October 21, 2026

The Barnard-Seyfert Astronomical Society met at the Edwin Warner Park Nature Center for the regular monthly meeting on Wednesday, October 21, 2026, Steve Hughes presiding. The meeting was called to order at 7 PM.

In “Visual Astronomy in the Age of Astrophotography,” Tsula (“Tsula’s Big Adventure”) talked about her amateur astronomy journey, visual observing and the need to conserve darkness at night. Tsula’s YouTube channel is at https://www.youtube.com/@tsulasbigadventures. Her web page is at https://tsulasbigadventures.com/. One book mentioned was Nightfaring: In Search of the Disappearing Darkness by travel writer and dark sky advocate Megan Eaves-Egenes. This title is available in hardcover, audio book and Kindle.

Treasurer’s Report: Natalie reported the Truist bank account to have a balance of $7,545.59 and the PayPal account to have a balance of $347.14.

Previous events: The public star party scheduled for October 3, 2026, at the Shelby Bottoms Nature Center was canceled because of poor weather. Weather was poor for observing at the Natchez Trace site on October 10, 2026. The Bowie Nature Fest scheduled for October 10 was canceled because of the weather.

Future events: The Water Valley Overlook observing site on the Natchez Trace Parkway (Mile Marker 412) will be available on November 7, 2026. Bring a copy of the permit if you use this site. A public star party is scheduled at the Bells Bend Outdoor Center for November 14, 2026, from 7:00 to 9:30 PM. A general meeting is scheduled for November 18, 2026, beginning at 7:00 PM. The Pea Ridge observing site on the Natchez Trace Parkway (Mile Marker 435.3) will be available on December 5, 2026, weather permitting. Bring a copy of the Park Service permit with you if you use this site. A public star party is scheduled at the Shelby Bottoms Nature Center on December 12, 2026, from 7:00 to 9:30 PM. The annual meeting and potluck dinner is scheduled for December 16, 2026, from 6:00 PM. This is an hour earlier than usual. A note on the location for the meetings in November 18 and December 16: Tentatively, Dyer Observatory will be available for meetings; therefore, watch for announcements.

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

Respectfully submitted,
Bud Hamblen
Secretary

Barnard-Seyfert Astronomical Society
Minutes of a Regular Meeting of the Board of Directors
Held on Wednesday, October 7, 2026.

The regular meeting of the Board of Directors of the Barnard-Seyfert Astronomical Society was held October 7, 2026, online. Logged in for the meeting were Stef Brake, Donna Burgess, Tony Drinkwine, Bud Hamblen, Steve Hughes (presiding), Gene Matthews, Natalie Preston and Andy Reeves. A quorum being present, Steve called the meeting to order at 7 PM.

The minutes of the September 2, 2026, board meeting were adopted without discussion.

Membership report: 20 new members have joined this year.

Treasurer's report: There was $7,567.01 in the Truist account and $200.72 in the PayPal account.

Events: Public stargazing with Dyer Observatory at the Edwin Warner Park model airplane field on 9/12/26 was a success. Cliff Mygatt made a Zoom presentation on Astronomical League observing programs at the 9/16/26 club meeting. The star gazing event at Shelby Bottoms on 10/3/26 was canceled due to weather. The daytime Fall Fun Day at Bowie Nature Park on 10/10/26 was canceled because of rain. Tsula (Tsula's Sky Adventures) is scheduled to make a Zoom presentation at the October club meeting.

Other Business: Discussions continued with the Smyrna parks department on having public star gazing at Sharp Springs Park. Dyer Observatory is expected to reopen at the beginning of November. Gene stated that he was resigning from the board owing to family concerns and will no longer be able to manage the storage unit.

Bylaws: A vote on the revised bylaws is scheduled for the 10/21/26 club meeting. A copy of the revised by-laws is planned to be emailed to members at least 10 days before the meeting.

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

Respectfully submitted,
Bud Hamblen
Secretary

Barnard-Seyfert Astronomical Society
Minutes of a Regular Meeting of the Board of Directors
Held on Wednesday, November 5, 2026.

The regular meeting of the Board of Directors of the Barnard-Seyfert Astronomical Society was held on November 5, 2026, online. Logged in for the meeting were Stef Brake, Donna Burgess, Tony Drinkwine, Bud Hamblen, Steve Hughes (presiding), Natalie Preston, Andy Reeves and Theo Wellington. A quorum being present, Steve called the meeting to order at 7 PM.

The minutes of the board meeting for October 7, 2026, were adopted without discussion.

Treasurer's report: Natalie reported that there was $7,587.87 in the Truist account and $266.25 in the PayPal account. Dues were remitted to the Astronomical League for the members who joined during the recent quarter year.

Social Media: Donna reported that there were 3,178 followers on Facebook and 584 followers on Instagram. The numbers of followers are steadily increasing.

Events: The permit for the Natchez Trace Water Valley Overlook (Mile Marker 412) is for November 7. A public star party with Dyer Observatory is scheduled for November 14 at the Bells Bend Outdoor Center. Dyer has signed up 400 potential guests. The November membership meeting is scheduled for November 18 at the Warner Park Nature Center. Bill McClain will present shopping for the holidays. A public star party is scheduled for December 12 at the Shelby Bottoms Nature Center. The annual meeting is scheduled for December 16 at the Warner Park Nature Center. There will be the annual potluck dinner, the silent auction and election of officers and directors. The annual meeting will be at Warner Park because Dyer is not available on that date.

Discussions with Castle Gwynn, site of the Tennessee Renaissance Festival, about having a star party there did not pan out owing to the fees Castle Gwynn demanded. The location for stary parties at Sharp Springs Park, Smyrna, will be in the field just east of the John Coleman Elementary School. Scheduling is uncertain. We do not want to conflict with events at Cedars of Lebanon State Park or Henry Horton State Park.

Election of officers: The terms of all officers (president, vice president, treasurer and secretary) and two directors (Stef Brake and Theo Wellington) expire at the end of 2026. The terms of two directors (Tony Drinkwine and Andy Reeves) expire in 2027 and two terms (Donna Burgess and Andy Reeves) expire in 2028. Steve is going to send an email to the members asking for nominees. This will also be discussed at the November membership meeting. Elections will be at the December meeting.

Stef Brake was appointed to fill the vacant vice-president office through the end of the year. The vacancy was from Gene Matthews' needing to resign. Steve made the motion, Donna seconded the motion and the vote was by a unanimous show of hands.

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Other business: Quite a few astrophotos have been received for the 2027 calendar. It should be available for ordering and distribution soon.

Bylaws: The existing 2011 bylaws were discovered to be unclear on some provisions concerning vacancies on the board of the corporation. This also affected the proposed bylaws, which will need to be revised. Revisions also need to be made to the code of conduct. This will require bringing up the revised bylaws in 2027 instead of at the December, 2026, meeting.

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

Respectfully submitted,
Bud Hamblen
Secretary

First Observed Mercury Transit by Robin Byrne

This month we celebrate an event that ultimately led to understanding the relative sizes of the planets. Our story begins in 1627 when Johannes Kepler completed his work on the Rudolphine Tables. Based on the observations of Tycho Brahe, these tables included positions of the stars, plus the data necessary to plot the future course of the planets. Kepler used this information to determine that on November 7, 1631, Mercury would pass in front of the Sun, followed on December 6 with Venus doing the same thing. A planet transiting the Sun was something that had never before been seen. Sadly, Kepler died before either of these events would occur.

Meanwhile in France, there was a Catholic priest, Pierre Gassendi, who was also a philosopher, mathematician, and astronomer. He lived from 1592 - 1655, during an era that saw great advancements in astronomy and physics. When he heard of the upcoming event, he began to make plans to observe it. Telescopes were still quite primitive, having been introduced only a couple decades earlier, and the idea of a proper solar filter was still far into the future. So instead, Gassendi devised a way to project the image of the Sun onto the wall of a darkened room. Using a small pinhole, he created an image of the Sun on the wall which was approximately 10 inches across.

But observing the transit wasn't the only goal. Accurate timings of the event and precise measurements of position were needed for the observation to have any scientific value. Gassendi built a screen the same size as the Sun's image, with lines of division drawn on it to use as reference points for measurements. Since accurate clocks were not available, during the transit, Gassendi had an assistant standing outside. Armed with a quadrant, he was instructed to measure the Sun's altitude every time Gassendi stomped on the floor. In that way, he would be able to record the precise timing for each measured observation of Mercury as it passed in front of the Sun.

Gassendi knew that astronomical measurements, even Brahe's, had a limited amount of precision, so he decided to play it safe and started his observations two days prior to the predicted transit. Of course, it was cloudy and rainy during most of those days. And even the morning of the predicted day of November 7 didn't bode well, but the Sun did finally start to peek through the clouds. By the time the clouds had thinned enough for the projected image to be clear, Gassendi saw that there was a small black dot, but he thought it was a sunspot. Kepler had predicted that Venus would appear to be about one fourth the Sun's diameter, and Mercury would be about one tenth the diameter, so there was no reason to think this tiny spot was of importance. But he still measured its position, if anything to use as a reference point for when Mercury did appear. But then he saw that this small spot had moved. However, he still wasn't convinced that it was Mercury since the predicted time of transit had not yet arrived. When its motion finally proved that it most certainly had to be Mercury, he stomped on the floor for his assistant to get the Sun's position. Sadly, by that point, his assistant had left his post. Fortunately, he did return in time to get a sun reading for when Mercury left the face of the Sun.

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The following month, Gassendi tried to also observe the transit of Venus. Unfortunately, the timing of the transit ended up being when the Sun was below the horizon, so he did not get to see that event. While Gassendi wasn't the only person to observe this transit, he was the only one who published his observations, which he did in 1631. This publication included his measurements of the apparent size of Mercury compared to the Sun. This was the first time anyone had determined how much bigger the Sun was compared to the planets.

Transits of Mercury across the Sun are quite rare, happening about 13 times in a century, so for anyone to observe one is a special event. Being the first person to observe one is remarkable! In honor of this amazing achievement, there is a crater on the Moon named for Gassendi.

Hopefully you had a chance to see the Mercury transit that took place on November 11, 2019. The next time Mercury will transit the Sun will be November 13, 2032, but it won't be visible from here. If you want to see it, plan to travel to Asia, Eastern Europe, or Africa. To see another Mercury transit from this region, you'll need to wait until May 7, 2049. Whether you saw the last transit, or plan to see one of the future transits, it's a special event that carries with it historical importance for learning our place in the solar system, and the relative sizes of the planets and the Sun.

References:

Gassendi's Transit by Joseph Sant, 2019
https://www.scientus.org/Gassendi-Transit-Mercury.html
Fr. Pierre Gassendi - Meet the Priest Who First Recorded the Transit of Mercury by Fr. James Kurzynski, Vatican Observatory
https://www.vaticanobservatory.org/sacred-space-astronomy/priests-deacons-religious-science-meet-priest-first-recorded-transit-mercury-pierre-gassendi/
Mercury in Transit: The History and Future of Measuring Transits by Tri Astraatmadja, Carnegie Science
https://carnegiescience.edu/news/mercury-transit-history-and-future-measuring-transits
Pierre Gassendi - Wikipedia
https://en.wikipedia.org/wiki/Pierre_Gassendi



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 bsas nashville.com. Frame not included.

BSAS
Barnard-Seyfert Astronomical Society

Next BSAS meeting
Wednesday, Nov 18, 7:00 p.m.

Warner Park Nature Center
7311 Tennessee Highway 100
Nashville, TN 37221