The Bays Mountain Astronomy Club Newsletter

November 2021

Kingsport, TN

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Cosmic Reflections

William Troxel - BMAC Chair

Greetings fellow BMACer's. Well, here we are looking into the start of November. Man-o-man, this year has gone by in a flash. I wanted to thank everyone for your input and feelings about adding the short videos as part of the meetings moving forward. I also want each of you to know that I am trying a lot of new things. Some of them we will love and feel it's a perfect fit for our club, some will not and that is to be expected. I say this every month, and I mean it, this is not just my club. This is your club as well. If you have ideas, let me know and we can try them out at one of the Zoom meetings and see how it works. That is the only way I know for us to grow. All the links to the videos that I showed are on the NASA website and totally free for anyone to enjoy. I encourage you to check them out.

I hope you will remember to bring your photos to share during Zoom time at the next meeting and of course if you got any new or new to you toys we would love to see them. I am still looking for a member or members to host a monthly game time for the meeting. To refresh your memory, the rules are that it be a fun game that we can do either in person or over the Zoom platform.

Looking forward to our November meeting, our very Chris Ayres will be sharing his adventure at the Okie-Tex Star Party. He will be sharing the adventure and experience at a very big star Party. Please try to attend the Zoom meeting and check it out. I will be sending out the link for the meeting a few days before.

The site for the videos I showed last month are all on the **mars.nasa.gov** site. Below is the list of the ones I had picked for the presentation.

- **Launching Curiosity to Mars**
- **Imagine Mars Overview**
- **The Martians: Testing Curiosity Parachute**
- **Mars Report: Update on NASA's Perseverance Rover & Ingenuity Helicopter**

I want to do a big shot out to Adam, Mike, Rob and Wayne for their items during show-n-tell last month. Again, thank you to everyone and hope to see you on November 5th.

Until then, Clear skies.

BMACer Astrophotos

Ryan Carlock sent in a photo of M13 taken with his cell phone and a telescope!

M13, the globular cluster in Hercules. Image by Ryan Carlock.

ALCON 2022 FYI

Flyer for ALCON 2022

Stellar Observations

Greg Penner

Tracking Asteroids

As the autumn season progresses and nights get colder, it can be challenging to observe deep into the night. Fortunately, there are some nice targets in November that are well placed in the early evening. The giant planets Saturn, Jupiter, and Neptune are all lined up in the South 30 to 40 degrees above the horizon around 8 p.m. in early November (or 7 p.m. after we "fall back" to standard time on November 7th). Most observers can easily spot Saturn and Jupiter without assistance. The bluish disk of Neptune can be found a little further east by using whatever app or online resource you like and a pair of binoculars. While these "major planets" currently dominate the southern sky, in this article I would like to focus on some "minor planets," better known as asteroids, that are lurking among these giants.

Observing and identifying asteroids requires a different process than most other celestial objects. While there are many asteroids bright enough to be seen through even small telescopes, they all appear to be stellar instead of disks like the planets. So in order to distinguish an asteroid from the background stars, you need a good finder chart to identify its location at a given time and patience to observe its motion relative to the stationary stars. The asteroid Pallas was discovered on the night of March 28, 1802, by the German astronomer Heinrich Olbers. Olbers had been following the first asteroid discovered, Ceres, when he noticed a "new" star nearby. After a few hours that night he suspected motion, so the following night he made another observation, and it was obvious it had moved relative to the stars. We can replicate his discovery process ourselves because Pallas is currently located almost at the half-way point between Jupiter and Neptune shining at magnitude +9.5, which makes it visible in any size telescope. You will need a chart that shows the star field around Pallas. You can use an app or website on your phone like Sky Safari or Stellarium, which shows the location of Pallas real time, or print out a chart obtainable from a website such as Heavens Above. Remember, Pallas will move significantly each night, so your chart needs to be very close to the time you are observing.

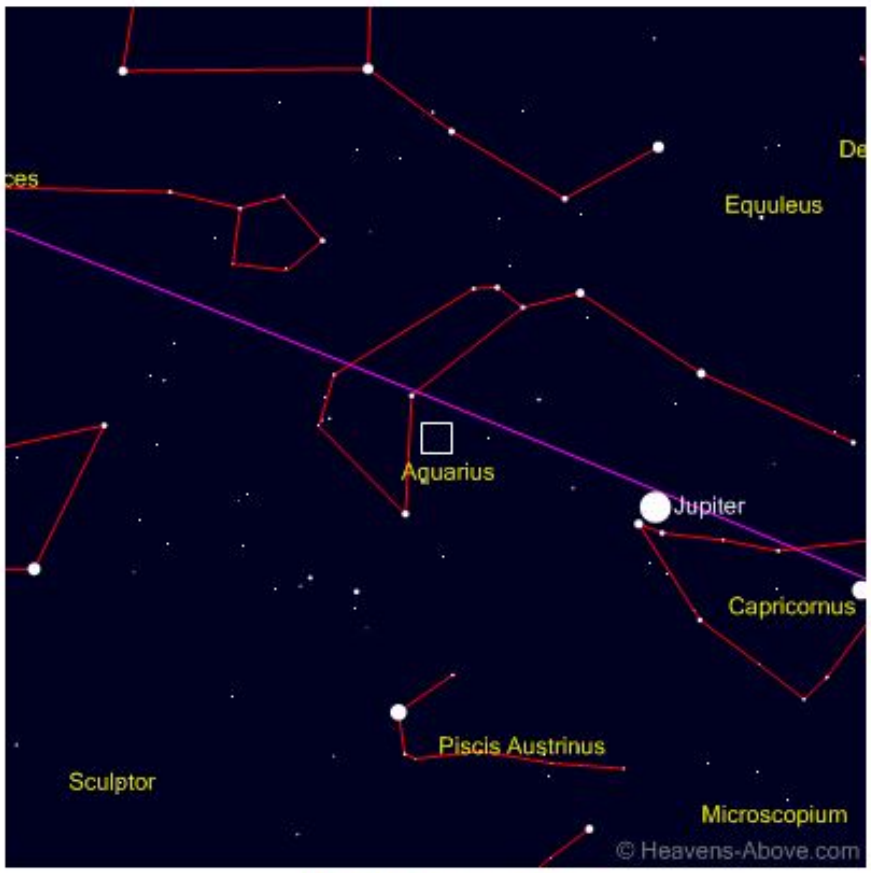
When you are at your telescope and all set for a night of observing with your finder chart, remember that the movement of Pallas won't be noticeable on a minute-by-minute or hour-by-hour basis. Perhaps you will notice some motion if you observe over multiple hours. So go ahead and have a list of other objects to enjoy (such as the aforementioned giant planets) and periodically go back and check on Pallas. A great way to hone your observing skills is to take a little time to sketch the star field around Pallas as you see it through your eyepiece. Do the best you can to position all the stars you see in relation to each other and Pallas. You may not even be sure which white dot is Pallas, which is part of the challenge. When you go back and check a few hours later you might notice one of the white dots is in a slightly different position than your sketch. If you are able to do more observations the following evening, you should definitely notice the movement, and you will have confirmed which object is Pallas, just as Olbers did over 200 years ago! Making observations that document the motion of astronomical objects like asteroids is a rewarding experience for me that I find to be similar to watching eclipses or the motion of Jupiter's moons. It really gives me the sense of the "machinery" of the Universe at work.

Some other asteroids that are observable in November are Harmonia and Julia, both +10 magnitude. Harmonia can be found east of Neptune in the constellation Pisces, and Julia can be found north of Jupiter in the constellation Aquarius. Just rising on the eastern horizon will be Ceres, the largest asteroid and the first discovered. Ceres will be better placed for telescopic viewing in December and January when it will be high in the sky in the constellation Taurus shining relatively brightly at +8 magnitude.

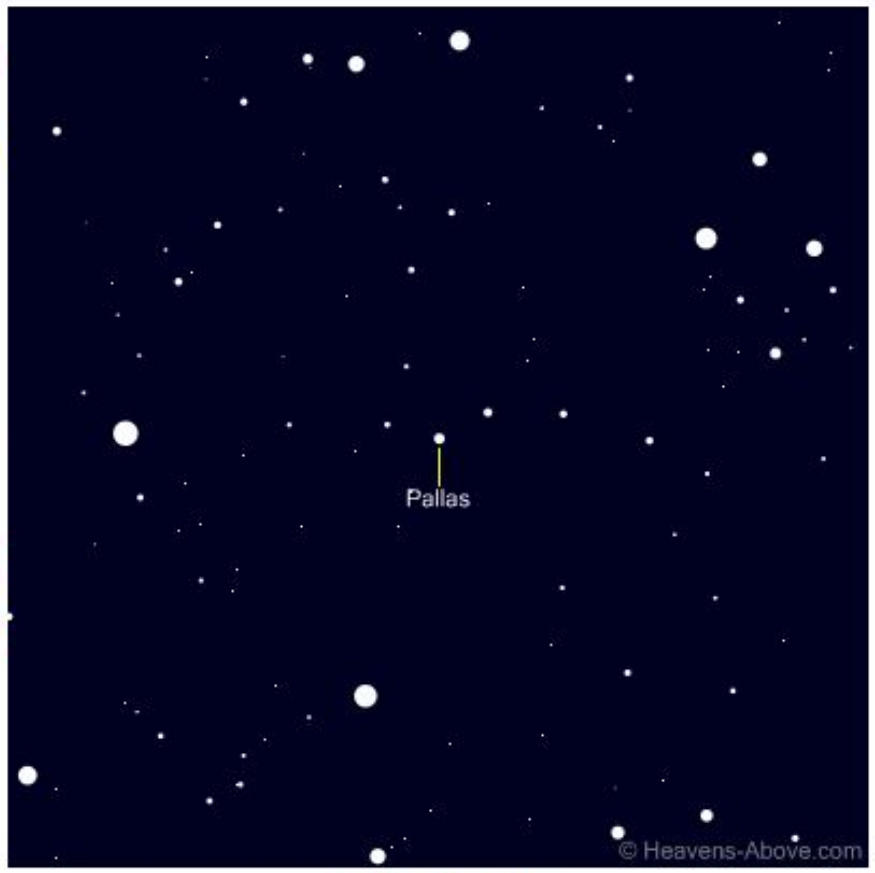
HEAVENS ABOVE

Asteroid 2 Pallas

Year 2021 Month November Day 5 Time 20:00:00 Update Reset to now



Coarse finder chart
(Field of view=60°, Limiting magnitude=5)



Fine finder chart
(Field of view=2°, Limiting magnitude=12)

Position	
Right ascension	22^h 45.5^m
Declination	-10° 34'
Constellation	Aquarius
Magnitude	9.5
Distance from Earth	2.486 AU

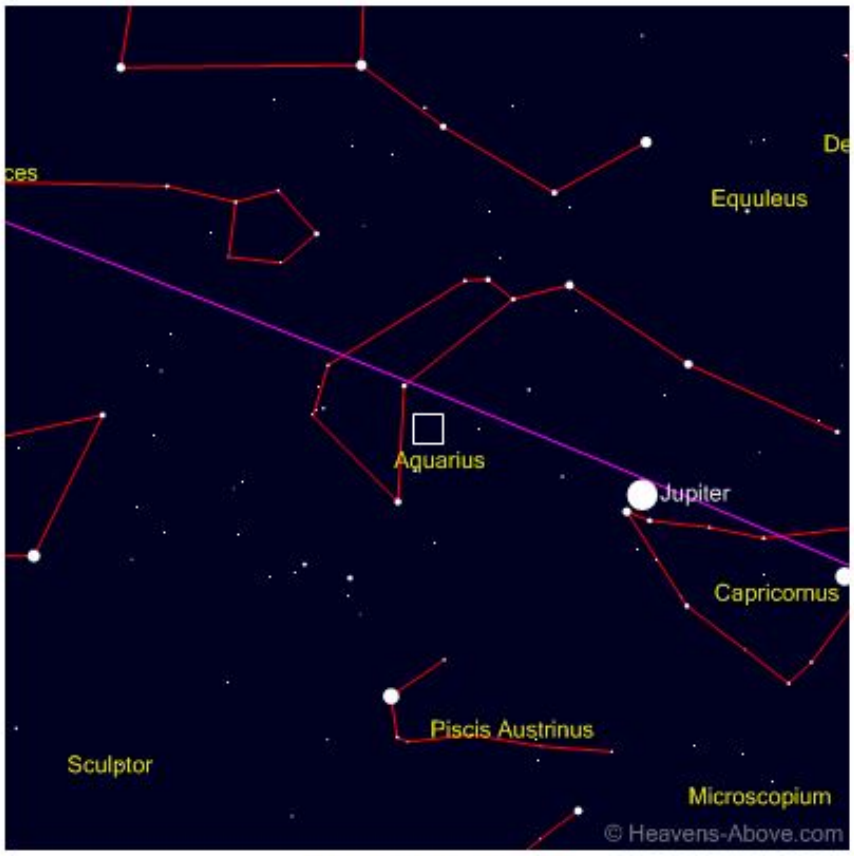
Orbit	
Distance from Sun	3.045 AU
Perihelion	2.136 AU (21/07/2018)
Aphelion	3.412 AU
Period	4.62 years
Eccentricity	0.229972
Inclination to ecliptic	34.8°
Epoch	31/05/2020

Pallas Finder Chart for November 5th.

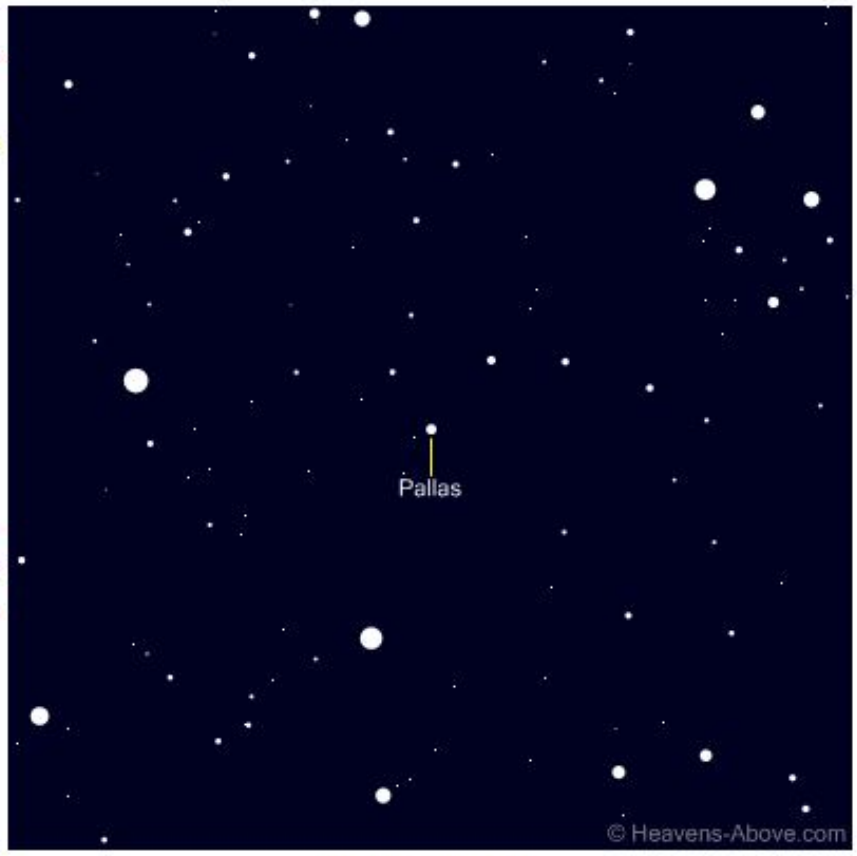
HEAVENS ABOVE

Asteroid 2 Pallas

Year 2021 Month November Day 6 Time 20:00:00 Update Reset to now



Coarse finder chart
(Field of view=60°, Limiting magnitude=5)



Fine finder chart
(Field of view=2°, Limiting magnitude=12)

Position	
Right ascension	22^h 45.7^m
Declination	-10° 40'
Constellation	Aquarius
Magnitude	9.5
Distance from Earth	2.498 AU

Orbit	
Distance from Sun	3.043 AU
Perihelion	2.136 AU (21/07/2018)
Aphelion	3.412 AU
Period	4.62 years
Eccentricity	0.229972
Inclination to ecliptic	34.8°
Epoch	31/05/2020

Pallas Finder Chart for November 6th.

The Queen Speaks

Robin Byrne

Happy Birthday Ida Barney

This month, we celebrate the life of a woman who was another trailblazer for women in astronomy, but who is not well known. Ida Barney was born in New Haven, Connecticut on November 6, 1886. Her parents were Ida Bushnell and Samuel Eben Barney, who was a Professor of Civil Engineering at Yale University. Ida was a lifelong birdwatcher, eventually becoming president of the New Haven Bird Club.

Ida studied mathematics at Smith College, where she excelled academically, being elected to two honor societies: Phi Beta Kappa and Sigma Xi. After graduating with a Bachelor of Arts degree in 1908, Ida enrolled in graduate school at Yale University, where she was awarded a Ph.D. in Mathematics in 1911.

For the next 11 years, Dr. Barney taught mathematics at a variety of women's colleges: Rollins, Smith, Lake Erie, and Meredith Colleges. However, she found teaching mathematics to students who had little desire to learn to be frustrating, so Ida decided to move into another line of work.

Frank Schlesinger was the Director of the Yale Observatory from 1920 to 1941. Much like Edward Pickering at Harvard Observatory, Schlesinger hired women to work as assistants in the observatory. Schlesinger expressed his reasoning for hiring women as, "Not only are women available at smaller salaries than are men, but for routine work they have important advantages. Men are more likely to grow impatient after the novelty of the work has worn off and would be harder to retain for that reason." Schlesinger's area of research was the measurement of the proper motions of stars. This is the motion of stars across the line of sight. To make these measurements, images of star fields must be taken many years apart. The images are then compared in an effort to detect and measure the small changes in position over that time.

In 1922, Dr. Barney was hired as a research assistant at Yale Observatory to work for Dr. Schlesinger. Barney's early job duties involved determining accurate positions of stars from photographic plates. She would first find their position on the image, and then calculate

the corresponding astronomical coordinates of right ascension and declination. Then she would compare the coordinates with those from older observations to determine the rate of motion. Although Schlesinger hired women with the expectation that they would not make any independent contributions to the work, Barney proved her worth by developing techniques that improved both the speed and accuracy of determining the star positions. While Dr. Barney truly enjoyed her work, she did later confess to being angry that she was not given the same rank or pay as men with comparable qualifications.

In 1940, the Women's Centennial Congress organized a celebration of 100 years of female progress by honoring 100 American women who were working in jobs that would have been unheard of 100 years earlier. In the category of "Science," Ida Barney was honored with the likes of Annie Cannon and Margaret Mead.

In 1942, Frank Schlesinger retired, and Ida Barney was placed in charge of supervising the completion of the catalog they had been working on for the past two decades. In 1949, Dr. Barney was promoted to the position of research associate, and in 1950, her component of the Yale Observatory Zone Catalogue was finally completed. During this time, Dr. Barney had adopted the use of of an electronic device developed by the IBM Watson Scientific Laboratory, which helped to both improve the accuracy of the measurements and reduce eye strain. Dr. Barney alone was responsible for the position, magnitude (brightness), and proper motion values of almost 150,000 stars in 22 volumes of catalogues published in the Transactions of the Yale University Observatory. These measurements are still used today for further studies of proper motion.

In 1952, in honor of this gargantuan undertaking, Ida Barney was awarded the Annie J. Cannon Award in Astronomy by the American Astronomical Society. This award was established in 1934 by Annie Cannon to "be awarded to women for distinguished contributions to astronomy…" Ida Barney was only the fourth woman to receive the award.

In 1955, Ida Barney retired and was succeeded by Ellen Dorrit Hoffleit. Dr. Hoffleit had worked with Barney for many years and shared some of her own memories of the, sometimes difficult, woman in the article, "Ida M. Barney, Ace Astrometrist." As Barney got

closer to retirement, she once complained about the IBM computers they were using, saying “We used to get out a catalogue every three years. Now with the high speed computing machines, it has taken us ten years and we are not through yet! She failed to mention that the data produced by the computers had a much higher accuracy than the work they had previously done by hand. Dr. Barney had asked Dr. Hoffleit to write an introduction to the final volume of the catalogue. Dr. Hoffleit had included a statement about the problem of accuracy in the data for binary stars due to a lack of consistency regarding which star in the system was used when measuring the position. Dr. Barney removed the statement, saying, “Dr. Schlesinger did not include that, so why should you?” Dr. Hoffleit shared another story about when she first arrived in New Haven, one of her colleagues had extolled the local spring water, sending her home with several jugs full. When Dr. Barney was asked if she drank the spring water, she exclaimed, “No! My father was a sanitary engineer!”

Ida Barney never married, living her entire life with her sister, who worked at the Berkeley Divinity School. In 1973, Asteroid 5655 was named Barney in Dr. Barney’s honor. Ida Barney died in New Haven, Connecticut on March 7, 1982 at the age of 95.

Ida Barney’s name is not one that typically appears in texts or popular books about astronomy. She made no groundbreaking discoveries and remained out of the limelight. However, Dr. Barney’s 28-year effort to measure and catalogue stars has left a scientific legacy that is invaluable. Hers is a name that should be remembered, so let us all celebrate the achievements of Ida Barney.

References:

Wikipedia - Ida Barney

Ida M. Barney, Ace Astrometrist by E. Dorrit Hoffleit, American Astronomical Society Committee on the Status of Women in Astronomy, June 1990

The Space Place - NASA Night Sky Network

David Prosper

Measure the Night Sky

Fall and winter months bring longer nights, and with these earlier evenings, even the youngest astronomers can get stargazing. One of the handiest things you can teach a new astronomer is how to measure the sky – and if you haven't yet learned yourself, it's easier than you think!

Astronomers measure the sky using degrees, minutes, and seconds as units. These may sound more like terms for measuring time - and that's a good catch! But today, we are focused on measuring angular distance. Degrees are largest, and are each made up of 60 minutes, and each minute is made up of 60 seconds. To start, go outside and imagine yourself in the center of a massive sphere, with yourself at the center, extending out to the stars. Appropriately enough, this is called the celestial sphere. A circle contains 360 degrees. If you have a good view of the horizon all around you, you can slowly spin around exactly once to see what 360 degrees looks like. You are drawing a circle with yourself at the center! Now break up that circle into quarters, starting from due North. Each quarter measures 90 degrees, equal to the distance between each main cardinal direction! There are 90 degrees between due North and due East, and a full 180 degrees along the horizon between due North and due South. Now, switch from a horizontal circle to a vertical one, extending above and below your head. Look straight above your head: this point is called the zenith, the highest point in the sky. Now look toward the horizon; it measures 90 degrees from the zenith to the horizon. You now have some basic measurements for your sky.

Use a combination of your fingers held at arm's length, along with notable objects in the night sky, to make smaller measurements. A full Moon measures about half a degree in width - or ½ of your pinky finger, since each pinky measures 1 degree. The three stars of Orion's Belt create a line about 3 degrees long. The famed "Big Dipper" asterism is a great reference for Northern Hemisphere observers, since it's circumpolar and visible all night for many. The Dipper's "Pointer Stars," Dubhe and Merak, have 5.5 degrees between them - roughly three middle fingers wide. The entire asterism stretches 25 degrees from Dubhe

to Alkaid - roughly the space between your outstretched thumb and pinky. On the other end of the scale, can you split Mizar and Alcor? They are separated by 12 arc minutes - about ⅕ the width of your pinky.

Keep practicing to build advanced star-hopping skills. How far away is Polaris from the pointer stars of the Big Dipper? Between Spica and Arcturus? Missions like Gaia and Hipparcos measure tiny differences in the angular distance between stars, at an extremely fine level. Precise measurement of the heavens is known as astrometry. Discover more about how we measure the Universe, and the missions that do so, at **nasa.gov**.

[Ed.: It is rare for me to edit these articles from David Prosper. For transparency, I did need to do quite a bit of editing to make this article clearer.]

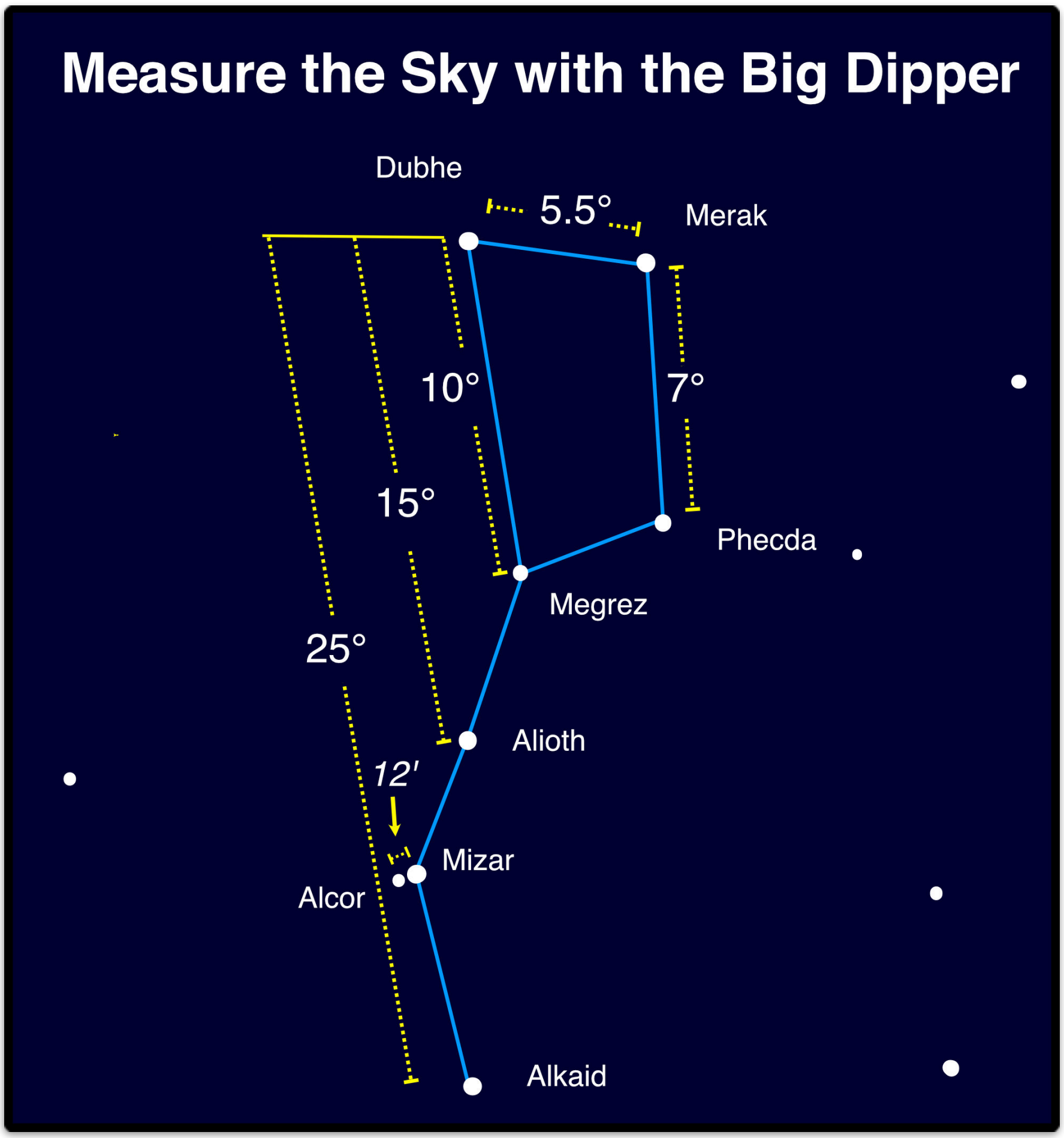


Image created with assistance from Stellarium

This article is distributed by NASA Night Sky Network

The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit **nightsky** to find local clubs, events, and more!

BMAC Calendar & More

Calendar:

MAC Meetings:

- **BMAC meetings will be held on Zoom until further notice.**
- Friday, November 5, 2021 - 7p - Via Zoom - Social time 30m before and after meeting. BMACer Chris Ayres will be sharing his adventure at the Okie-Tex Star Party.
- Friday, December 3, 2021 - 7p - Via Zoom? - Social time 30m before and after meeting. Topic TBA.
- Friday, February 4, 2022 - 7p - Via Zoom? - Social time 30m before and after meeting. Topic TBA.
- Friday, March 4, 2022 - 7p - Via Zoom? - Social time 30m before and after meeting. Topic TBA.
- Friday, April 1, 2022 - 7p - Via Zoom? - Social time 30m before and after meeting. Topic TBA.
- ? - Friday, May 6, 2022 - 7p - Via Zoom? - Social time 30m before and after meeting. Topic TBA. May be cancelled if we have Astronomy Day 2022.

unWatch:

- **Cancelled until further notice.**
- Every clear Saturday & Sunday - 3p-3:30p - March-October - On the Dam
  - View the Sun safely with a white-light & Hα 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.

StarWatch:

- **Cancelled until further notice.**
- October 2 & 9, 2021 - 7:30p
- October 16, 23, 30 & November 6, 2021 - 7p
- November 13, 20 & 27 - 6p
  - 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:

- **All special events are cancelled until further notice.**
- **BMAC Dinner - January 2022 - Day TBD - 6p?**
  - BMACers gather to have a nice meal at a restaurant.
- **Astronomy Day - May 7, 2022 - 1p-4p; 8:30p-9:30p**
  - Come help share the fun of astronomy with the public. There will be tables with different themed topics plus solar and night viewing.
- **Annual Club Picnic - July 2022 - Day TBD - 6p?**
  - 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.
  - **Please bring a dish to share and bring your own chair.**
- **StarFest 2022 - November 4, 5 & 6, 2022**

- Our 37th annual astronomy convention / star gathering for the Southeast United States. Three days of astronomy fun, 5 meals, 4 keynote speakers, unique T-shirt, and more!
- **Pre-registration by Oct. 14, 2022 with full payment is mandatory for attendance. Sorry, no walk-ins nor "visits."**
- MeadowView Marriott special hotel rate.
- **StarFest Link**

Regular Contributors:

William Troxel

Robin Byrne

Greg Penner

Adam Thanz

William is the current chair of the club. He enjoys everything to do with astronomy, including sharing this exciting and interesting hobby with anyone that will listen! He has been a member since 2010.

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).

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.

Adam Thanz has been the BMAC Newsletter Editor for all but a small number of issues since 1992. He is the Planetarium Director at Bays Mountain Park and an astronomy adjunct instructor at NSCC since 2000.

Connection:

Bays Mountain Astronomy Club:

- 853 Bays Mountain Park Road; Kingsport, TN 37650
- (423) 229-9447 - **Park Site** - **Club Site**
- Newsletter edited by **Adam Thanz**

Dues:

- Dues are 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 Association member (which incurs a separate, additional fee), then a 50% reduction in BMAC dues are applied.
- Dues can be paid in many ways. For renewals, you will be sent an e-mail with an invoice and a direct link to pay online. You can also pay by mail, over the phone or in person at the gift shop.

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, August 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, July 15, 2020.
- **Cosmic Reflections image of the Summer Triangle area of the Milky Way by William Troxel.**
  - Image captured July 23, 2016.
- **BMAC Notes painting of the Moon with moon glow by Christa Cartwright.**
  - Painting based on a photograph of the Moon Christa captured July 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 2021.
- **The Queen Speaks image of a solar halo by Robin Byrne.**
  - iPhone 7, June 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.**