

# The Bays Mountain Astronomy Club Newsletter

A night sky photograph showing the Milky Way galaxy arching across the frame, with silhouettes of trees in the foreground.



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# *Cosmic Reflections*

William Troxel - BMAC Chair



reetings fellow BMACer's. Wow, here we are in September 2022. The year is going by very fast! We had our August meeting and we introduced the "monthly challenge question." A fun activity to get us thinking about astronomy and space at the beginning of the meeting. Jason had the correct answer for the first month. I think it was a good addition to our meeting program. We did not have any Show 'N Tell items month. We did discuss three astro topics in an open forum as our monthly program.

For September, I am very excited because we will have a speaker from Great Britain! I have been seeking a broader area to invite speakers for our meetings. Thanks to Adam who received information on this speaker opportunity with the AAVSO (American Association of Variable Star Observers). Our speaker for September is Michael Poxon. His topic is "A Visit to the Zoo."

Here is his Bio:

Poxon considers himself a "professional amateur." He runs the AAVSO's "YSO" section which studies the way very young stars behave. He also observes "cataclysmic variables" which are close binary stars which flare up in brightness on a variety of timescales. In addition, he also runs the sequence group at AAVSO which has recently undertaken work for such bodies as NASA, the HST and even the new JWST, providing charts to aid in the detection of extrasolar planets.

He's been a variable star observer since age 14. Poxon states: "I know the sky (literally) better than the back of my hand, and independently discovered Nova Cygni in 1975 whilst at high school. In 2002, I was awarded a NASA grant to attend an astrophysics meeting on the big island of Hawai'i. I have also written a book on astronomy with binoculars. Basically, I'm a variable star nerd!"

Due to his distance, Michael will be visiting with us via Zoom. And, due to the dramatic increase in COVID 19 cases in our region, we'll have our September meeting via Zoom. The link will be coming out to you in the next few days. Hope to Zoom you at the September Meeting!

Until next time... Clear Skies!



# BMAC Notes





# *US Space & Rocket Center*



here are many cool space-related places to visit in the area. One of which is the US Space & Rocket Center in Huntsville, AL. Here's the Saturn V rocket visible for miles. Image by Adam Thanz.





# Stellar Observations

Greg Penner





# *The Veil Nebula*



For many people, the autumn season is their favorite time of year. In our household we get excited when September rolls around and ushers in the "ber"

months (or "brrrr" months)! The hot summer temperatures are on the decline, evenings are cooler (but not yet cold) and are noticeably longer lasting as the Sun is setting earlier. All of this adds up to a great time to get out and observe the night sky.

The September night sky still features Cygnus the Swan, which has been flying high near the zenith since mid-summer. Viewed from a moderately dark-sky site, this part of the sky can be appreciated at multiple levels. With the naked eye, the Milky Way is clearly visible with its noticeable dark lane, "The Great Rift." Scanning this part of the sky with binoculars allows you to see a jaw-dropping number of stars. There are numerous open clusters visible through binoculars or small telescopes. If the sky is dark enough, the North America nebula is usually best viewed through binoculars or even the naked eye rather than a



telescope, which would typically have too narrow a view. My favorite object to telescopically view in Cygnus is the Veil Nebula.

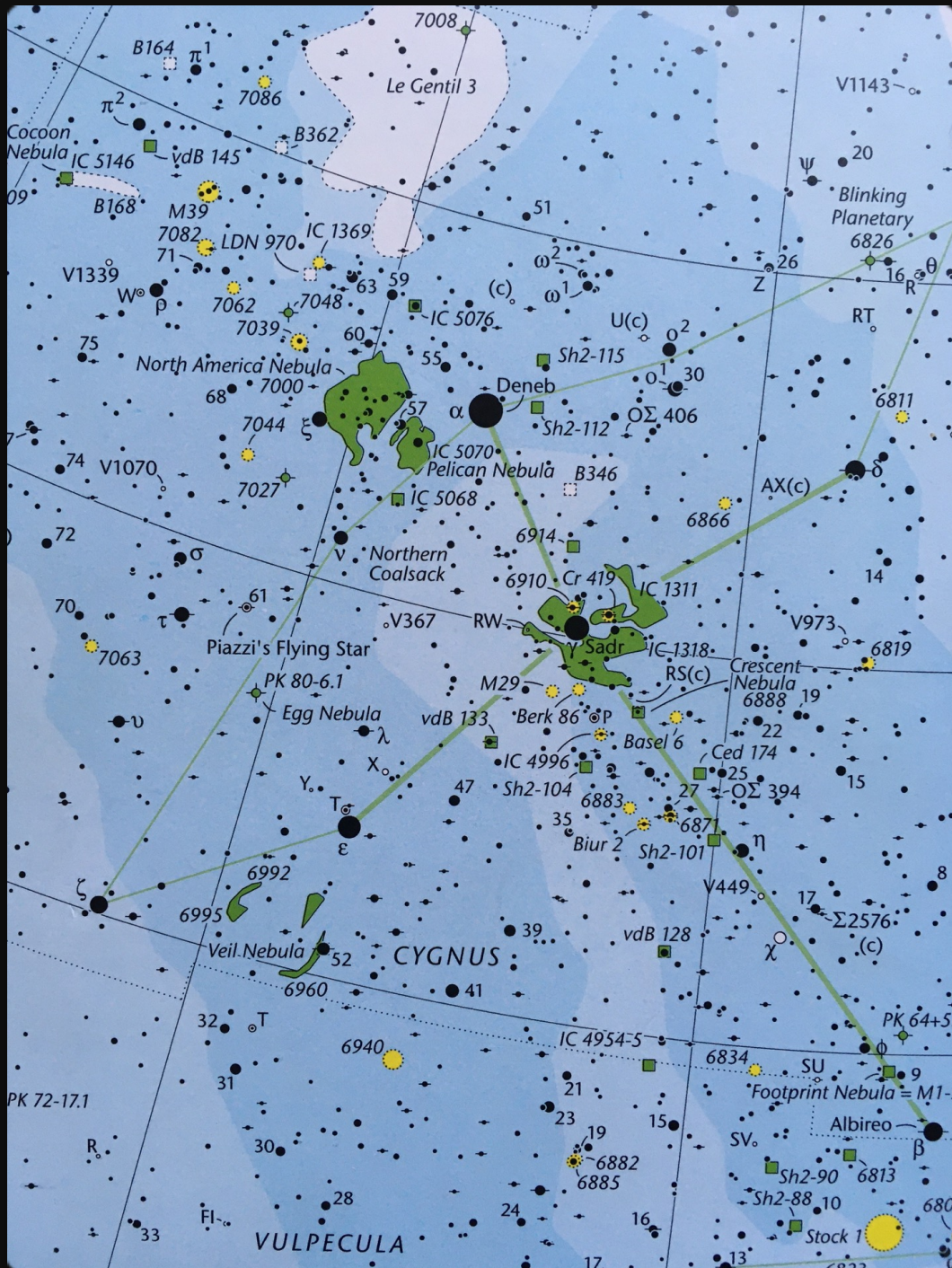
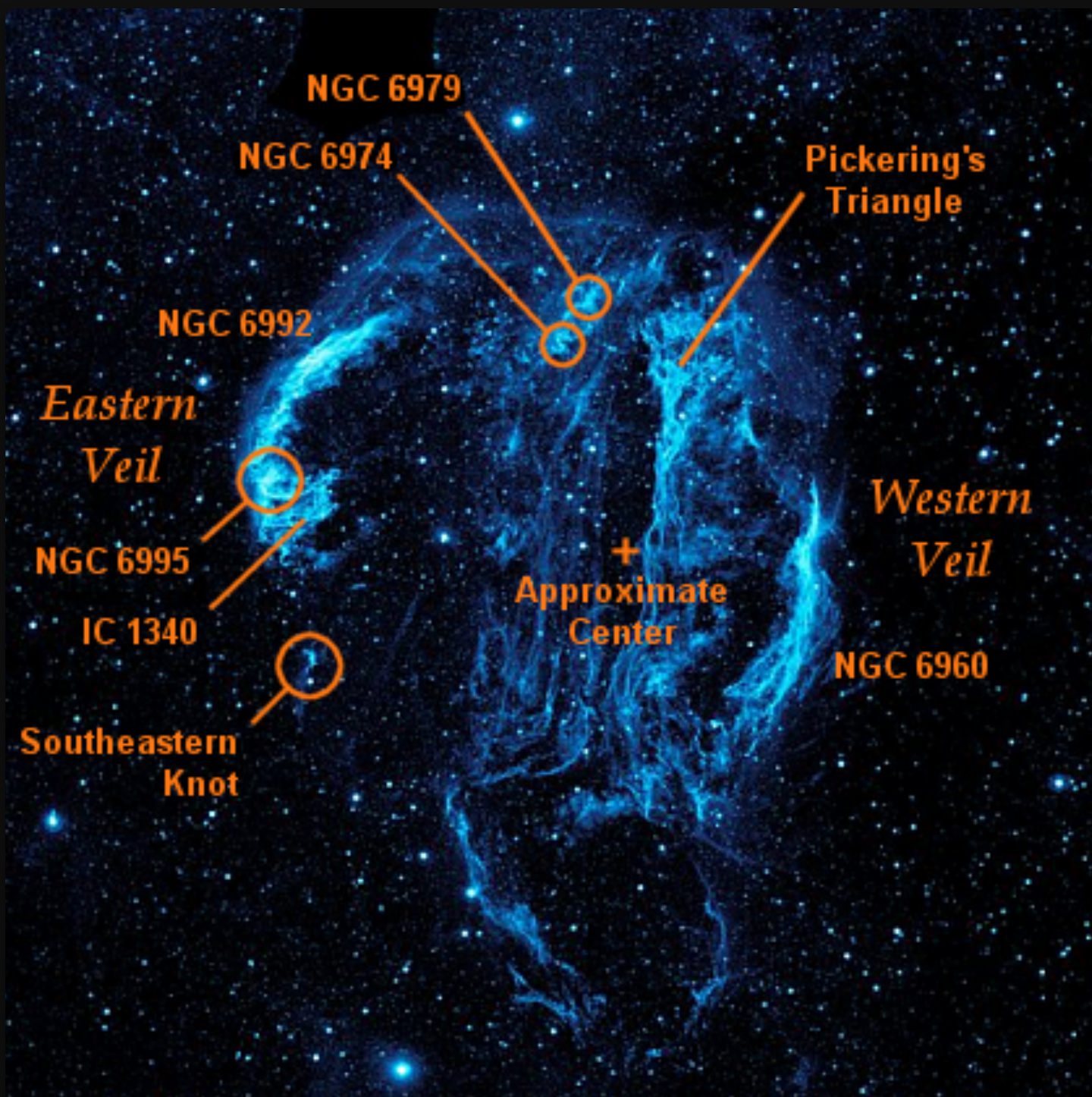


Image of Cygnus from S&T Pocket Sky Atlas



The components of the Veil Nebula are the remnants of a supernova that exploded around 8,000 years ago. If you had been around at that time, you would have seen a star brighter than Venus below the left mid-wing of the Swan in the throes of a spectacular explosion. Astronomers estimate this star was 20 times more massive than the Sun. As explained in an article by Bob King (Sky & Telescope, September 5, 2018), giant stars are known for losing mass in the form of high-speed winds of subatomic particles and dust. Astronomers suspect that strong winds from the progenitor star blew a large, roughly spherical cavity into the surrounding interstellar gas long before the explosion. Later, when the star self-destructed, the expanding shock wave slammed into the shell, heating and exciting the gas to glow. This is what we now see as the Veil Nebula. The nebula continues to expand outward, which can be seen in comparative [photos taken by the Hubble Telescope](#) showing movement of filaments from 1997 to 2015.





*Image of Cygnus Loop with labels. GALEX ultraviolet image. Annotations by Elphion.*

Through my 12.5" reflector telescope, I can clearly see both the eastern and western arcs of the nebula. These sections of the nebula are brighter because we see them edge-on. An Ultra High Contrast or Oxygen 3 filter can really help bring out the fainter wisps of the nebula. I have been able to see the Veil in my smaller 90mm refractor using a filter. Scanning the area from the Eastern to the Western Veil with a large enough telescope might show you hints of other areas of nebulosity such as "Pickering's Triangle." If you follow this [link](#) to the previously mentioned article by Bob King, you will see some great resources for finding and identifying other elements of nebulosity. Moving your telescope among all of the areas of nebulosity spread out over 3 degrees of sky really gives a great impression of the stellar explosion that occurred here so long ago. Viewing all of these remnants of a supernova explosion is like seeing the smoke from a cosmic gun shot, reminding us that there may be another star somewhere in the sky that will someday (hopefully in our lifetime) put on a great show such as this one did thousands of years ago.



# *The Queen Speaks*

Robin Byrne



# *Book Review: Managing Martians*



ince this summer marked the 25th anniversary of the landing of the first Mars Rover, it seemed appropriate to read a book about the woman who oversaw that mission. "Managing Martians: The Extraordinary Story of a Woman's Lifelong Quest to 'Get to Mars' - and of the Team Behind the Space Robot That Has Captured the Imagination of the World" by Donna Shirley and Danelle Morton is a personal memoir of Shirley's life up to and including the Mars Sojourner mission.

It begins with Shirley's early life in the 1940s and 50s. She was not a stereotypical little girl. Her fascination with airplanes and fictional stories of Mars set her apart. Despite her mother's attempts to make her fit in, even entering her in a local beauty contest, Shirley had her own ideas about who she was and what she wanted to do, including learning to fly an airplane while still a high school student.





Book cover to "Managing Martians."



In college, Shirley majored in engineering, while still pursuing her love of flying. Not surprisingly for the late 1950s/early 1960s, Shirley was in an extreme minority as a woman in the engineering program. Her male professors were quick to dismiss her, which didn't help. When a relationship affected her grades, Shirley decided to change majors to something easier - journalism. After graduation, she looked for work as a technical writer, in the hopes of combining her writing skills with her enduring love of engineering.

Shirley discovered that she was not satisfied writing about other people's creations. She returned to school, completing her engineering degree, and also studied management. Now, she could finally work as an engineer - or so she thought. Female engineers were still few and far between, and were typically given menial assignments. After several unsatisfying jobs, Shirley was hired by the Jet Propulsion Laboratory (JPL). Finally, she found a place that had exciting opportunities for her. During the 1970s, Shirley participated in many of the missions that sent spacecraft to various planets in our Solar System.



However, she had yet to be involved in developing the actual hardware that went to space.

It was a classic Catch-22 situation: to move up the ladder at JPL, you had to have experience with actual hardware that went to space, but to work on actual hardware, you needed to be higher up in the system. As a woman, it was that much more difficult to be given the initial break needed to start the process. Finally, though, Shirley was given the assignment to work on a Mars rover. At this point, it was purely speculative, and may never go to space, but it was a start.

As time went on, Shirley found herself managing the development of a small rover that would fit the budget constraints of the new "better, faster, cheaper" mantra of NASA. One of her first innovations was changing the management structure of the team. She implemented more of a collaborative team of equals, instead of JPL's traditional top-down structure. For those who were accustomed to being the "boss" over their



underlings, this egalitarian approach rankled. But Shirley's management style proved to be very successful.

At this point in the book, we learn all about the various iterations in the development of the rover, and all the designs that were considered, as well as the struggles to afford even seeing the project through to completion. Every aspect is discussed, as well as the people responsible for developing the hardware and software that would ultimately become the Sojourner Rover. We also read about the conflict between Shirley's rover team and the team designing the Pathfinder lander that would carry the rover. What looked to the world like a spacecraft duo that was always meant to be together, they were not quite the "match made in Heaven" that they appeared. Thankfully for everyone, the differences were resolved.

After Pathfinder had successfully launched, with Sojourner safely tucked away inside, and was well on its way to Mars, Shirley found herself offered a new position - Manager of the Mars Exploration Program. Shirley was now in charge of not



one, but all missions destined for Mars. Her new job included working with the scientists to establish the research goals of the missions. This process led to the "follow the water" theme of the program. This was the beginning of the push to launch spacecraft to Mars roughly every 1.5 years (when Mars is well-placed for a spacecraft to make the journey). The orbiting and roving U.S. spacecraft that have since visited Mars were all developed under Shirley's leadership. Since the book was published in 1998, not long after the conclusion of the Pathfinder mission, most of the subsequent flights had not yet occurred when it was being written.

Reading this book almost 25 years after being published, it was interesting to hear about the push for a Mars sample return mission being discussed as early as the 1990s. It is only now, with the samples being collected by Perseverance, that we may actually see that goal finally come to pass.

Shirley retired from JPL in 1998, eventually taking a position as Associate Dean of Engineering at the University of Oklahoma

for three years. She then helped found the Science Fiction Museum in Seattle. In 2004, Shirley founded Managing Creativity, which is a platform she developed to share her innovative management techniques.

"Managing Martians" was a very enjoyable and well-written read. Donna Shirley's personal story is inspiring, and the behind-the-scenes look at how a JPL mission is developed is fascinating. This is a book, despite being a quarter century old, that I would highly recommend reading as a "timely" look at Mars exploration.

## ***References:***

"Managing Martians: The Extraordinary Story of a Woman's Lifelong Quest to 'Get to Mars' - and of the Team Behind the Space Robot That Has Captured the Imagination of the World" by Donna Shirley and Danelle Morton; Broadway Books; 1998

**[Donna Shirley - Wikipedia](#)**





# *The Space Place - NASA Night Sky Network*

David Prosper



# *The Summer Triangle's Hidden Treasures*



September skies bring the lovely Summer Triangle asterism into prime position after nightfall for observers in the Northern Hemisphere. Its position high in the sky may make it difficult for some to observe its member stars comfortably, since looking straight up while standing can be hard on one's neck! While that isn't much of a problem for those that just want to quickly spot its brightest stars and member constellations, this difficulty can prevent folks from seeing some of the lesser known and dimmer star patterns scattered around its informal borders. The solution? Lie down on the ground with a comfortable blanket or mat, or grab a lawn or gravity chair and sit luxuriously while facing up. You'll quickly spot the major constellations about the Summer Triangle's three corner stars: Lyra with bright star Vega, Cygnus with brilliant star Deneb and Aquila with its blazing star, Altair. As you get comfortable and your eyes adjust, you'll soon find yourself able to spot a few constellations hidden in plain sight in the region

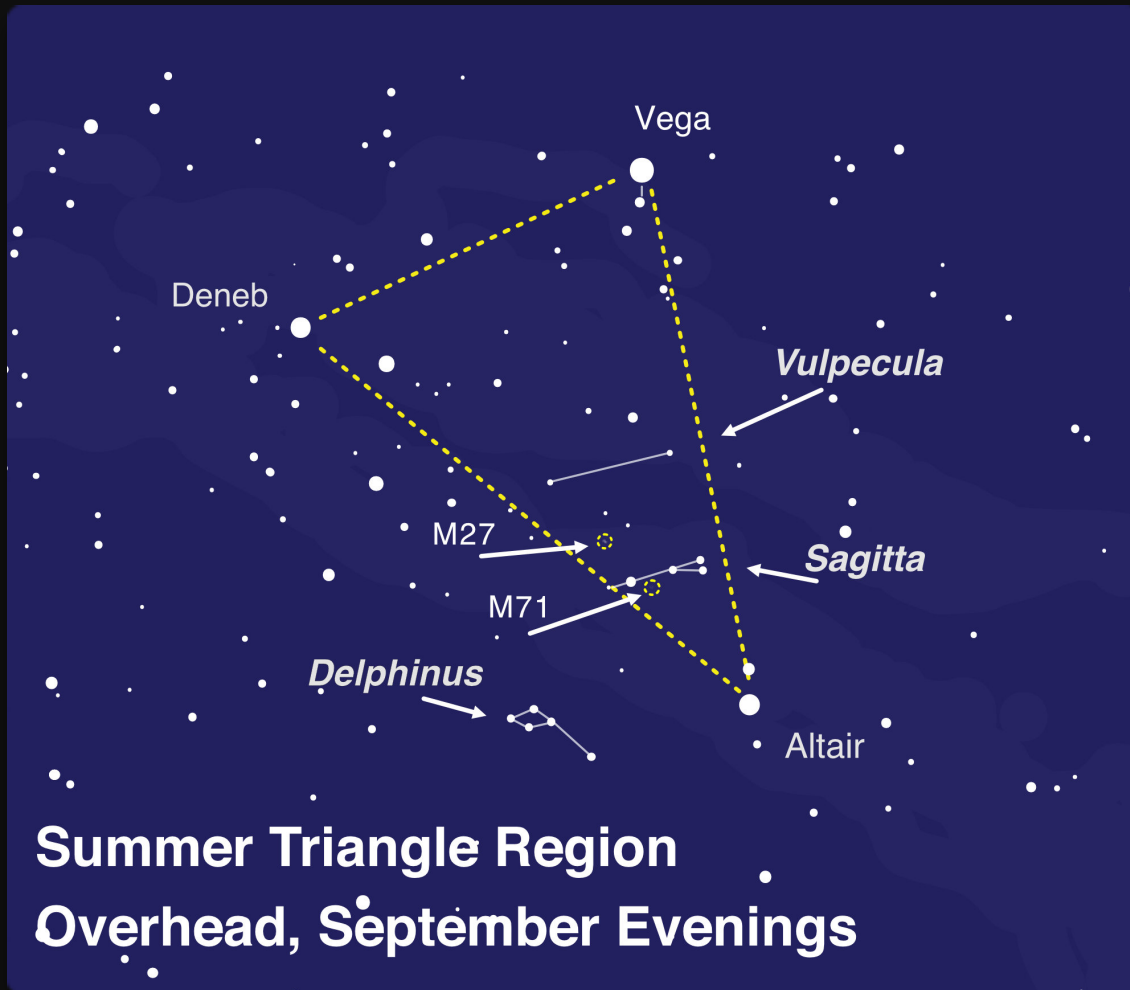


around the Summer Triangle: Vulpecula the Fox, Sagitta the Arrow, and Delphinus the Dolphin! You could call these the Summer Triangle's "hidden treasures" - and they are hidden in plain sight for those that know where to look!

Vulpecula the Fox is located near the middle of the Summer Triangle and is relatively small, like its namesake. Despite its size, it features the largest planetary nebula in our skies: M27, aka the Dumbbell Nebula! It's visible in binoculars as a fuzzy "star" and when seen through telescopes, its distinctive shape can be observed more readily - especially with larger telescopes. Planetary nebulae, named such because their round, fuzzy appearances were initially thought to resemble the disk of a planet by early telescopic observers, form when stars similar to our Sun begin to die. The star will expand into a massive red giant, and its gasses drift off into space, forming a nebula. Eventually the star collapses into a white dwarf - as seen with M27 - and eventually the colorful shell of gasses will dissipate throughout the galaxy, leaving behind a solitary, tiny, dense,

white dwarf star. You are getting a peek into our Sun's far-distant future when you observe this object!

### ***Sky Map for the Summer Triangle Region***



*Search around the Summer Triangle to spot some of its hidden treasures! To improve readability, the lines for the constellations of Aquila, Lyra, and Cygnus have been removed, but you can find a map which includes them in our previous article, *Spot the Stars of the Summer Triangle*, from August 2019. These aren't the only wonderful celestial sights found around its borders; since the Milky Way passes through this region, it's littered with many incredible deep-sky objects for those using binoculars or a telescope to scan the heavens. Image created with assistance from [\*\*Stellarium\*\*](#).*



Sagitta the Arrow is even smaller than Vulpecula - it's the third smallest constellation in the sky! Located between the stars of Vulpecula and Aquila the Eagle, Sagitta's stars resemble its namesake arrow. It, too, contains an interesting deep-sky object: M71, an unusually small and young globular cluster whose lack of a strong central core has long confused and intrigued astronomers. It's visible in binoculars and a larger telescope will enable you to separate its stars a bit more easily than most globulars; you'll certainly see why it was thought to be an open cluster!

Delicate Delphinus the Dolphin appears to dive in and out of the Milky Way near Aquila and Sagitta! Many stargazers identify Delphinus as a herald of the fainter water constellations, rising in the east after sunset as fall approaches. The starry dolphin appears to leap out of the great celestial ocean, announcing the arrival of more wonderful sights later in the evening.

## ***Hubble Photo of M71***



*M71 as seen by Hubble. Your own views very likely won't be as sharp or close as this. However, this photo does show the cluster's lack of a bright, concentrated core, which led astronomers until fairly recently to classify this unusual cluster as an "open cluster" rather than as a "globular cluster." Studies in the 1970s proved it to be a globular cluster after all - though an unusually young and small one! Credit **ESA/Hubble and NASA**.*



Want to hunt for more treasures? You'll need a treasure map and the Night Sky Network's "Trip Around the Triangle" handout is the perfect guide for your quest! Download one before your observing session. And of course, while you wait for the Sun to set - or skies to clear - you can always find out more about the objects and science hidden inside these treasures by checking out NASA's latest.

*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:

- Friday, September 2, 2022 - 7p - via Zoom. Michael Poxon from the AAVSO will speak. His topic is "A Visit to the Zoo." BMAC members will receive the link by e-mail.
- Friday, October 7, 2022 - 7p - Topic TBA.
- Friday, December 2, 2022 - 7p - Topic TBA.
- Friday, February 3, 2023 - 7p - Topic TBA.
- Friday, March 3, 2023 - 7p - Topic TBA.
- Friday, April 7, 2023 - 7p - Topic TBA.
- Friday, May 5, 2023 - 7p - Topic TBA.
- Friday, June 2, 2023 - 7p - Topic TBA.
- Friday, August 4, 2023 - 7p - Topic TBA.
- Friday, September 1, 2023 - 7p - Topic TBA.
- Friday, October 6, 2023 - 7p - Topic TBA.
- Friday, December 1, 2023 - 7p - Topic TBA.



## **unWatch:**

- Every clear Saturday & Sunday - 3p-3:30p - March-October - On the Dam
  - View the Sun safely with a white-light & H $\alpha$  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:**

- October 1 & 8, 2022 - 7:30p
- October 15, 22, 29 & November 5, 2022 - 7p
- November 12, 19 & 26, 2022 - 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:

- **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, 3 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."**
- [Link for all the StarFest info including registration and hotel reservation links.](#)

- **BMAC Dinner - January 2023 - Day & Time TBD**

- Look for an e-mail with the latest information.

- **Astronomy Day - April 29, 2023 - 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 2023 - 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.

# Regular Contributors:



*William Troxel*



*Robin Byrne*



*Greg Penner*



*Adam Thanz*

**W**illiam 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.

**R**obin 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).

**G**reg 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.

**A**dam 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 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 Association 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, *[through the gift shop](#)*, by mail, over the phone or in person.

# 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 2022.*
- **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.**