

The ECLIPSE

September
2019

The Newsletter of the Barnard-Seyfert Astronomical Society

Next Membership Meeting:
September 18, 2019, 7:30 pm

Cumberland Valley
Girl Scout Council Building
4522 Granny White Pike

Topic:
Charlie Warren, Editor,
Amateur Astronomy Magazine:
"25 years of Amateur Astronomy"

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From the President

It's September and I for one cannot wait for the changing of the season and the (slightly) cooler weather. Along with a change in the weather, we are getting a change in the night sky. The summer constellations are on the way out. Starting around midnight at the beginning of the month, my favorite part of the sky is starting to rise – Taurus and Orion. I just love the objects clustered around those two constellations and they have brought me many fascinating views. The Pleiades are a great naked eye object and even better in binoculars or a smaller scope. The great Orion nebula is always a crowd pleaser at star parties and is one of my go to objects in the winter when it is visible all night. They are also two of the more recognizable constellations in the sky so I can't wait as the season progresses to see more and more of these magnificent star arrangements. Another favorite of mine that is starting to appear is the Andromeda galaxy. By the end of the month it will be well situated in the north eastern sky for binocular and telescopic viewing.

Also, on the way out this month are the two great gas giants, Jupiter and Saturn, I hope the clouds parted enough this summer for you to get some good views of these two awe inspiring planets. I don't think I got enough time viewing them, but of course I probably feel that way every time they start going away from the early night time sky.

So here's to a month of change. Change of weather, change of sky, and hopefully a change in the clouds!

Clear skies and have a great month!

Keith Rainey



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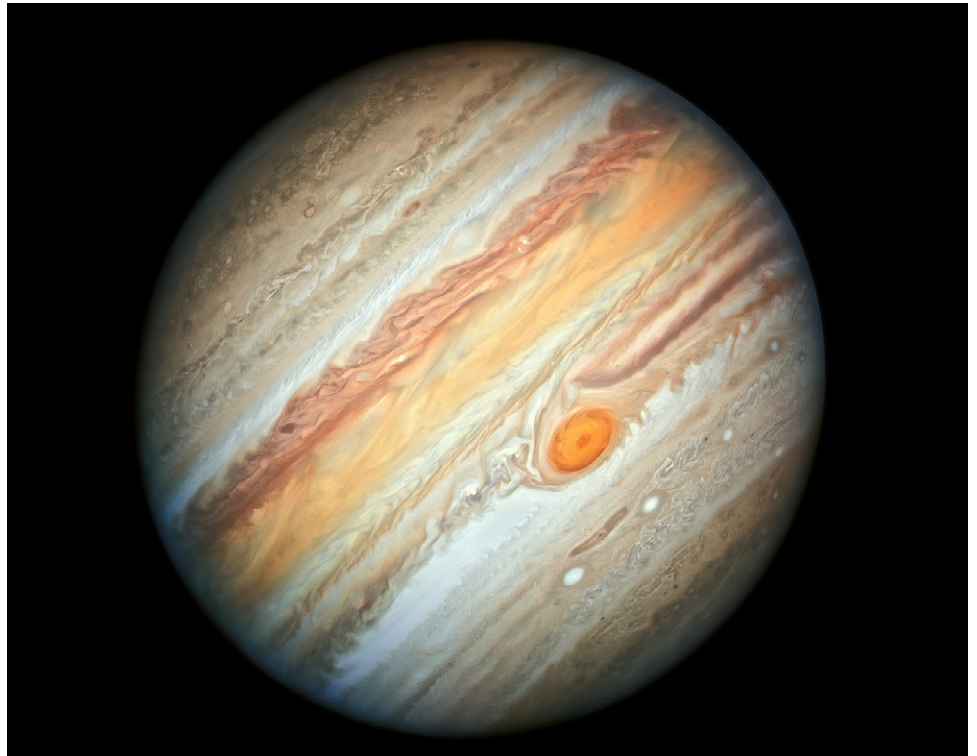
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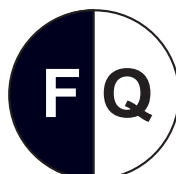
The NASA/ESA Hubble Space Telescope reveals the intricate, detailed beauty of Jupiter's clouds in this new image taken on 27 June 2019 by Hubble's Wide Field Camera 3. Credit: [NASA](#), [ESA](#), [A. Simon \(Goddard Space Flight Center\)](#), and [M.H. Wong \(University of California, Berkeley\)](#)

Upcoming Star Parties

Saturday September 7	BSAS Public Star Party Cornelia Fort Airpark
Saturday September 28	BSAS Private Star Party Natchez Trace Parkway mile marker 435.3
Friday October 4 7:30 to 9:30 pm	BSAS Public Star Party Bells Bend Outdoor Center
Saturday October 26	BSAS Private Star Party Natchez Trace Parkway mile marker 412 (Water Valley Overlook)



Sept 28
Oct 27



Sept 5
Oct 5



Sept 13
Oct 13



Sept 21
Oct 21

Happy Birthday James Van Allen by Robin Byrne

This month we celebrate the life of a man whose name is attached to part of our magnetic field, but who did so much more. James Van Allen was born September 7, 1914 on the family farm outside of Mount Pleasant, Iowa. His parents, Alfred and Alma, had four sons, with James being the second oldest. It seems that science was James' fate, growing up with an interest in electronics and mechanical devices, with subscriptions to magazines, such as Popular Mechanics and Popular Science. James even once built his own Tesla coil that produced sparks a foot long. During his years at Mount Pleasant High School, one of his science instructors played a key role in encouraging James to pursue science. James must have been a good student during those years, because he graduated valedictorian.

Van Allen always had an interest in boats and the sea, so he applied to the U.S. Naval Academy for college. Despite doing well on the entrance exam and having wonderful grades, he was denied entrance due to failing the physical exam on three counts: flat feet, poor eyesight, and not being able to swim. On to Plan B - Iowa Wesleyan College in his home town. The summer after his Freshman year, James had a summer research position, which gave him his first glimpse at geophysics. Working with Thomas C. Poulter, James not only became hooked on the study of physics, but he also established an important relationship with the man who would become his first mentor. By June of 1935, James had a bachelors degree in Physics, graduating summa cum laude.

Van Allen's mentor, Poulter, was the chief scientist with the Second Byrd Antarctic Expedition from 1933 to 1935. Poulter was in charge of the geophysical studies conducted on the mission. Van Allen had assisted him in preparing for the expedition, including help in developing equipment to be used, such as a seismograph and a tilt-meter for measuring the motion of glaciers. Van Allen also had the job of testing out the magnetometer that was to be used. He tested it by measuring the the magnetic field around the county, creating a field map. His measurements would be published as part of the national grid made by the Department of Terrestrial Magnetism. While Van Allen got plenty of experience at home working with a wide range of equipment and other skills, his parents would not let James accompany Poulter on the expedition. Listening to the accounts from the expedition on the radio, Van Allen heard about how his mentor, Poulter, rescued Admiral Byrd from the South Pole Station in 1934. Byrd had been alone,



James Van Allen, continued

monitoring the meteorological equipment at the station for several months, sending radio messages that became increasingly incoherent. Poulter and two others, who were stationed closer to the coast, tried three times to get to Byrd, finally reaching him on the third attempt. Byrd was suffering from carbon monoxide poisoning from a stove.

After leaving Iowa Wesleyan, Van Allen chose the State University of Iowa for graduate school, continuing his studies of physics. Van Allen's Masters Degree thesis was about solid state physics, which he completed in 1936. Thanks to a fellowship, Van Allen had the opportunity to study nuclear physics in Washington, D.C. at the Carnegie Institution. His doctoral thesis concerned the particle accelerator that Van Allen and others built. Van Allen received his PhD in nuclear physics in June of 1939.

After graduation, Van Allen went to work at the Department of Terrestrial Magnetism (DTM) at the Carnegie Institution. Here his work focused on nuclear physics, studying the breaking apart of deuterium using gamma rays, and measuring the size of atomic nuclei. With Europe already engaged in World War II, war research began to dominate the activities at DTM. Beginning in 1940, Van Allen worked on proximity fuses, which were used to increase the effectiveness of anti-aircraft weapons used by ships. This work moved James to the Applied Physics Lab (APL) at Johns Hopkins University in April of 1942. In November of 1942, James joined the Navy, spending 16 months visiting various destroyers in the South Pacific, training the men in how to use and test the fuses. On one of his assignments, Van Allen was stationed as an assistant staff gunnery officer, helping to defend the ship from a Japanese attack. Van Allen was awarded four battle stars for his service, and left the Navy with the rank of Lieutenant Commander.

On October 13, 1945, James married Abigail Halsey, whom he met at the Applied Physics Laboratory during the war years. They would have five children: three girls and two boys.

After the war, Van Allen returned to APL. This was when he began conducting high altitude experiments using V-2 rockets that had been captured from Germany. He wanted to study the upper atmosphere. Van Allen and his colleagues would become known as the High Altitude Research Group. After using the V-2's, Van Allen worked on the development of the Aerobee rockets for continued use in high altitude atmospheric research.

In 1951, Van Allen joined the faculty of the University of Iowa and was named the head of the Physics and Astronomy Department. Van Allen would remain in this position until 1985, when he retired. It was here that Van Allen began work with "rockoons" - balloons that would carry rockets to a high altitude, and then the rocket would fire, carrying it even higher, so they could detect cosmic rays in the upper reaches of the atmosphere. Van Allen and his students would launch the balloons from the school's football practice field. In one of their flights, they discovered that aurorae were caused by energetic electrons. This was the first hint of Earth having a radiation belt.

James Van Allen, continued

In 1950, Van Allen hosted a gathering of various geoscientists at his home. During the course of the evening, someone had mentioned that, with the development of rocketry and advanced equipment, the geosciences should have an “International Year” to encourage new discoveries in the same way that the International Polar Years had spurred expeditions to the North and South Poles. Everyone was excited by the idea, and soon government officials were being contacted to get the go-ahead. The plan was to designate 1957-1958 as the International Geophysical Year (IGY), coinciding with solar maximum. The idea was to launch satellites equipped with devices designed for studying the Earth and its magnetic field. The Soviet Union got to space first in October of 1957 with their Sputnik satellite, but it did not contain any scientific equipment. In preparation for the United States’ attempt to put a satellite in orbit, Wernher von Braun believed they needed a “real, honest-to-goodness scientist” as part of the team. Van Allen’s reputation was already well established, and his name was the first to be suggested. Van Allen was excited at the prospect of sending his equipment into space. On January 31, 1958, the United States launched its first successful satellite, Explorer 1. On board was a detector for micrometeorites, and a cosmic ray detector built by Van Allen. During its orbit around Earth, the detector found that Earth was surrounded by a donut-shaped region of charged particles trapped by Earth’s magnetic field. A second launch as part of the IGY sent a probe to the Moon. Although the probe never reached the Moon, it did achieve a high enough altitude to discover a second region of radiation trapped in the magnetic field. These regions are now known as the Van Allen Belts.

Van Allen continued to teach at the University of Iowa, where he and his many students would work on most of the major unmanned space program missions: Pioneer, Mariner, Voyager, Galileo, and Cassini. Van Allen himself was involved in a total of 24 missions, either studying Earth or other planets, studying the magnetic fields of every planet in our solar system. Van Allen would mentor 34 doctoral students and 47 master’s students, not to mention the myriads who took his undergraduate General Astronomy class.

In 1985, Van Allen retired, but he didn’t stop working. Now as an Emeritus Professor, Van Allen continued his research and work as an advisor to students. In 1987, President Reagan awarded Van Allen with the highest scientific honor in the country, the National Medal of Science. On August 9, 2006, Van Allen experienced heart failure and died in Iowa City, Iowa. He was ninety-one years old.

continued on next page

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James Van Allen, continued

Van Allen's name lives on, not only with "his" radiation belts, but also on two space probes. Originally named the Radiation Belt Storm Probes, the Van Allen Probes were renamed by NASA in his honor in 2012. Slated to last for two years, the probes orbit Earth in the heart of the Van Allen Belts, studying their structure. Not expected to last much past two years due to the harsh environment of the radiation belts, the probes have proven to be as robust as their namesake. Still functioning perfectly, the probes have just this past year had their orbits altered to allow for a controlled reentry into Earth's atmosphere. But don't worry. The reentry won't occur until 2034. In the meantime, as long as their fuel lasts, the probes will continue to send back information about the radiation belts and Earth's upper atmosphere. It seems fitting that these spacecraft named after James Van Allen would work perfectly well for so long. After all, that's what James did!

References:

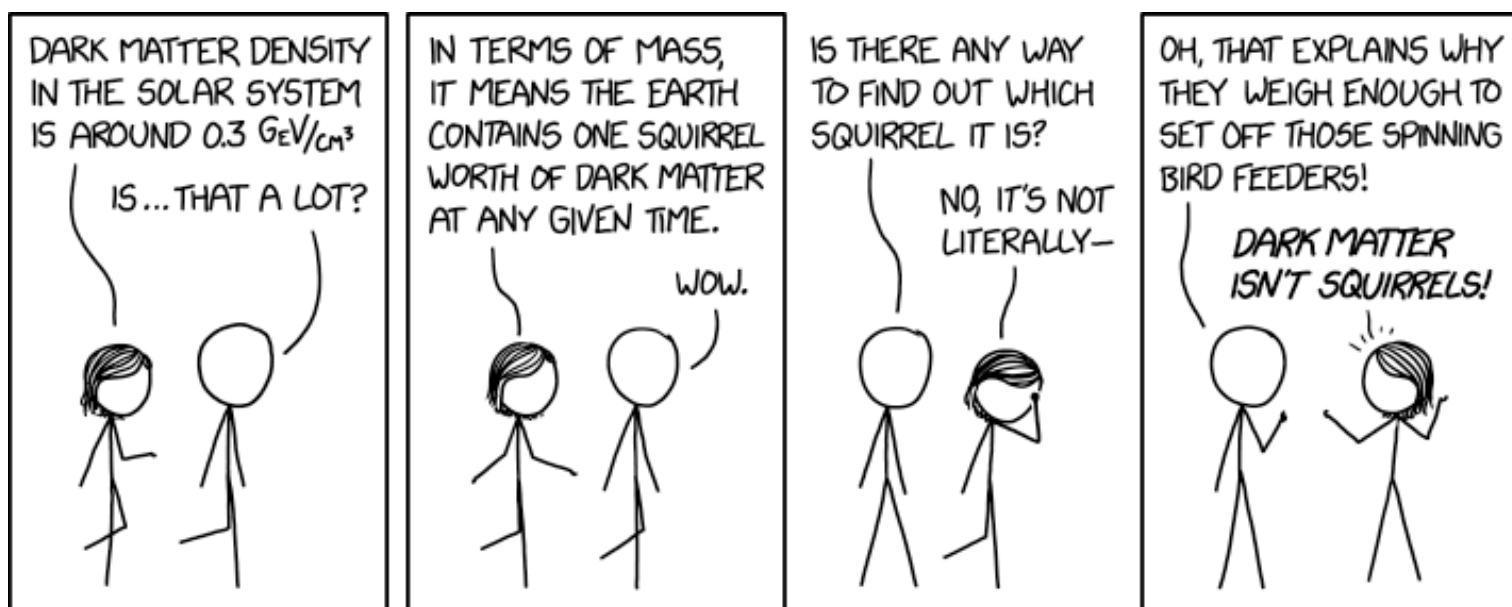
[James Van Allen - Wikipedia](#)

[International Space Hall of Fame at the New Mexico Museum of Space History - James Van Allen](#)

[American Astronomical Society - James Alfred Van Allen \(1914-2006\) by George H. Ludwig and Carl Edwin McIlwain](#)

[NASA's Van Allen Probes Begin Final Phase of Exploration in Earth's Radiation Belts by Geoff Brown](#)

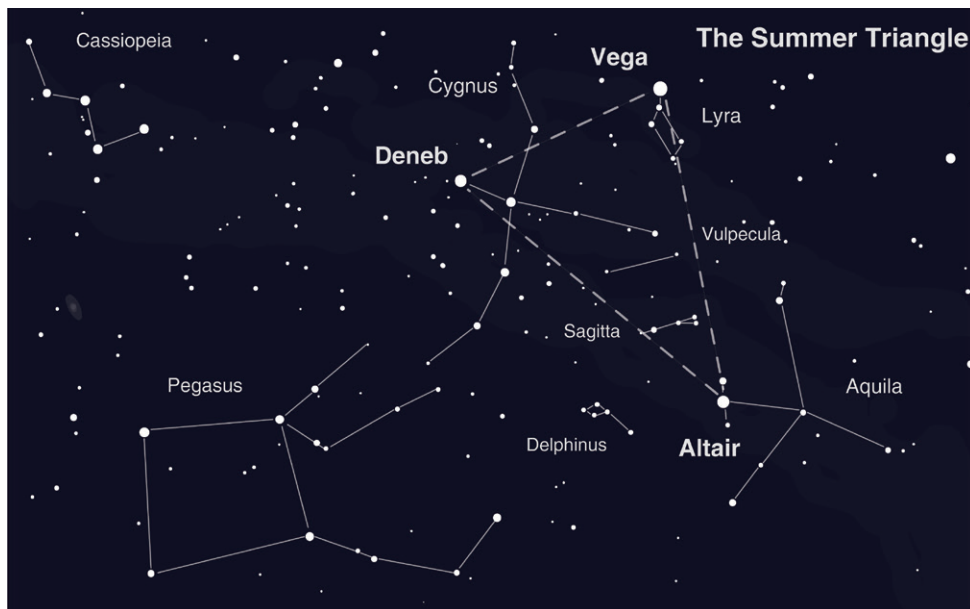
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Spot the Stars of the Summer Triangle by David Prosper

September skies are a showcase for the Summer Triangle, its three stars gleaming directly overhead after sunset. The equinox ushers in the official change of seasons on September 23. Jupiter and Saturn maintain their vigil over the southern horizon, but set earlier each evening, while the terrestrial planets remain hidden.

The bright three points of the Summer Triangle are among the first stars you can see after sunset: Deneb, Vega, and Altair. The Summer Triangle is called an asterism, as it's not an official constellation, but still a striking group of stars. However, the Triangle is the key to spotting multiple constellations! Its three stars are themselves the brightest in their respective constellations: Deneb, in Cygnus the Swan; Vega, in Lyra the Harp; and Altair, in Aquila the Eagle. That alone would be impressive, but the Summer Triangle also contains two small constellations inside its lines, Vulpecula the Fox and Sagitta the Arrow. There is even another small constellation just outside its borders: diminutive Delphinus the Dolphin. The Summer Triangle is huge!



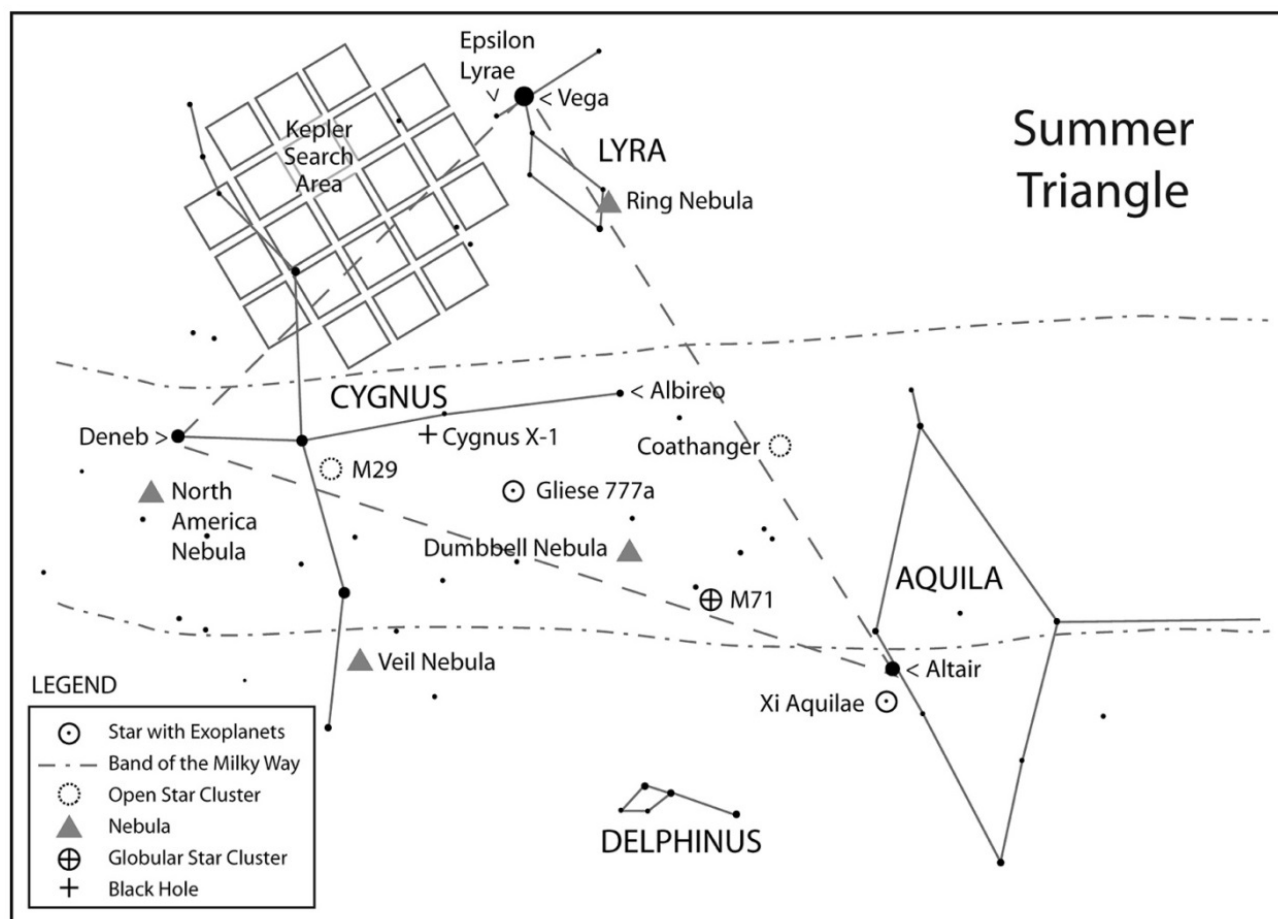
Caption: This wider view of the area around the Summer Triangle includes another nearby asterism: the Great Square of Pegasus.

The equinox occurs on September 23, officially ushering in autumn for folks in the Northern Hemisphere and bringing with it longer nights and shorter days, a change many stargazers appreciate. Right before sunrise on the 23rd, look for Deneb - the Summer Triangle's last visible point - flickering right above the western horizon, almost as if saying goodbye to summer.

The Summer Triangle region is home to many important astronomical discoveries. Cygnus X-1, the first confirmed black hole, was initially detected here by x-ray equipment on board a sounding rocket launched in 1964. NASA's Kepler Mission, which revolutionized our understanding of exoplanets, discovered thousands of planet candidates within its initial field of view in Cygnus. The Dumbbell Nebula (M27), the first planetary nebula discovered, was spotted by Charles Messier in the diminutive constellation Vulpecula way back in 1764!

Summer Triangle, continued

Planet watchers can easily find Jupiter and Saturn shining in the south after sunset, with Jupiter to the right and brighter than Saturn. At the beginning of September, Jupiter sets shortly after midnight, with Saturn following a couple of hours later, around 2:00am. By month's end the gas giant duo are setting noticeably earlier: Jupiter sets right before 10:30pm, with Saturn following just after midnight. Thankfully for planet watchers, earlier fall sunsets help these giant worlds remain in view for a bit longer. The terrestrial planets, Mars, Venus, and Mercury, remain hidden in the Sun's glare for the entire month.



Once you spot the Summer Triangle, you can explore the cosmic treasures found in this busy region of the Milky Way. Make sure to “Take a Trip Around the Triangle” before it sets this fall! Find the full handout at bit.ly/TriangleTrip

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.jpl.nasa.org to find local clubs, events, and more! You can catch up on all of NASA's current and future missions at nasa.gov.

With articles, activities and games NASA Space Place encourages everyone to get excited about science and technology. Visit spaceplace.nasa.gov to explore space and Earth science!



In honor of the club's 90th anniversary we partnered with Hatch Show Print to create a unique poster that would honor the achievement of the club. For those who don't know Hatch Show has been making posters for a variety of events and concerts for 140 years. In all that time we are their first astronomy club.

On the poster at the center is the moon. This was made from a wood grained stencil that the shop has used for over 50 years. To contrast that the telescope that the people are using is a brand new stencil made for our poster. The poster has three colors. First the pale yellow color of the moon was applied. Next the small stars, circles, and figures at the bottom were colored in metallic gold.

The third color is a blue for the night sky. Where it overlaps with the metallic gold it creates a darker blue leaving the figures at the bottom looking like silhouettes. This was a one time printing so the 100 that we have are all that will be printed.

The prints are approximately 13 3/4" x 22 1/4" and are available for \$20 at our membership meetings, or \$25 with shipping by ordering through bsasnashville.com. Frame not included.

Barnard-Seyfert Astronomical Society
Minutes of a Regular Meeting of the Board of Directors
Held On Wednesday, August 7, 2019

The regular meeting of the Board of Directors of the Barnard-Seyfert Astronomical Society was held August 7, 2019, at the Girl Scouts Center, 4522 Granny White Pike, Nashville, TN 37204. Present were Tom Beckermann, Chip Crossmann, Drew Gilmore, Bud Hamblen, Andy Reeves and Theo Wellington. A quorum being present, Tom called the meeting to order at 7:30 PM and asked for a motion to approve the minutes of the July 3, 2019, meeting as printed in the August edition of the Eclipse. Theo so moved, Chip seconded, and the minutes were adopted by unanimous voice vote. Theo reported that there was \$9,396.62 in the bank account, and that 21 posters have been sold. Tom reported that there are 119 paid up members out of a total of 127.

Upcoming meetings were discussed. The August meeting will have a “What’s Up” presented by Theo Wellington. September will bring Charlie Warren, editor of Amateur Astronomy magazine, and a presentation on 25 years of amateur astronomy. Dr David Weintraub will talk about Life on Mars: What you need to know before you go to Mars, based on his new book, in October. November will feature astronomy toys for Christmas. December will be the potluck dinner and a presentation on the trip to Chile to study a total solar eclipse, by Theo Wellington.

Discussion of the upcoming Bowie Nature Park star party on August 9 was pessimistic about the weather.

Managing the equipment list was discussed.

Liability insurance for club activity was discussed, including guidelines on what constituted a club event, dealing with children at events, and potentially dangerous activities such as solar viewing.

Drew Gilmore commented on phishing emails that have been received. Do not respond to emails that appear to be from an officer of the club and ask for money. They are not authentic.

There being no further business, Tom asked for a motion to adjourn. Theo so moved, Bud seconded, and the meeting was adjourned at 8:30 PM.

Respectfully submitted,

Bud Hamblen

Secretary

**Barnard-Seyfert Astronomical Society
Minutes of the Monthly Membership Meeting
Held On Wednesday, August 21, 2019**

The Barnard-Seyfert Astronomical Society held its monthly meeting at the Girl Scout Center, Nashville, Tennessee, on Wednesday, August 21, 2019. Thirty-three members and guests signed in. Tom Beckermann called the meeting to order at 7:34 PM and asked for a motion to approve the minutes of the July 17, 2019, meeting. Chuck Schlemm so moved, Theo Wellington seconded, and the minutes were approved by a unanimous voice vote. Theo reported that there was \$9,396.62 in the bank account and \$52.80 in the PayPal account. Tom related that Keith reported there were 131 members. Tom recognized new member Greg, and visitors Cathy, Mike, Caroline, Angelo, Karol, Chris, Tree and Matthew. Tom announced star parties at Cornelia Fort Air Park on Saturday, September 7, from 8 to 10 PM, and the Belmont University Humanities Symposium on Sunday, September 15, from 8 to 9:30. Theo mentioned the Astronomy Weekend at Pickett CCC Memorial State Park beginning August 30. The cost for accommodations and meals is \$60.

Theo presented “What’s Up” in the sky for the season.

There being no further business, Chuck moved for adjournment, Bud seconded, and the meeting was adjourned at about 8:47 PM.

Respectfully submitted,

Bud Hamblen

Secretary



The giant star Zeta Ophiuchi is having a "shocking" effect on the surrounding dust clouds in this infrared image from NASA's Spitzer Space Telescope. Stellar winds flowing out from this fast-moving star are making ripples in the dust as it approaches, creating a bow shock seen as glowing gossamer threads, which, for this star, are only seen in infrared light.

Zeta Ophiuchi is a young, large and hot star located around 370 light-years away. It dwarfs our own sun in many ways -- it is about six times hotter, eight times wider, 20 times more massive, and about 80,000 times as bright. Even at its great distance, it would be one of the brightest stars in the sky were it not largely obscured by foreground dust clouds.

Credit: [NASA/JPL-Caltech](#)



Become a Member of BSAS!
Visit bsasnashville.com to join online.

All memberships have a vote in BSAS elections and other membership votes. Also included are subscriptions to the BSAS and Astronomical League newsletters.

Annual dues:

Regular: \$25
Family: \$35
Senior/Senior family: \$20
Student:* \$15

* To qualify as a student, you must be enrolled full time in an accredited institution or home schooled.

About BSAS

Organized in 1928, the Barnard-Seyfert Astronomical Society is an association of amateur and professional astronomers who have joined to share our knowledge and our love of the sky.

The BSAS meets on the third Wednesday of each month at the Cumberland Valley Girl Scout Building at the intersection of Granny White Pike and Harding Place in Nashville. Experienced members or guest speakers talk about some aspect of astronomy or observing. Subjects range from how the universe first formed to how to build your own telescope. The meetings are informal and time is allotted for fellowship. You do not have to be a member to attend the meetings.

Membership entitles you to subscriptions to *Astronomy and Sky & Telescope* at reduced rates; the club's newsletter, the *Eclipse*, is sent to members monthly. BSAS members also receive membership in the Astronomical League, receiving their quarterly newsletter, the *Reflector*, discounts on all astronomical books, and many other benefits.

In addition to the meetings, BSAS also sponsors many public events, such as star parties and Astronomy Day; we go into the schools on occasion to hold star parties for the children and their parents. Often the public star parties are centered on a special astronomical event, such as a lunar eclipse or a planetary opposition.

Most information about BSAS and our activities may be found at bsasnashville.com. If you need more information, write to us at info@bsasnashville.com.

Free Telescope Offer!

Did someone say free telescope? Yes, you did read that correctly. The BSAS Equipment & Facilities Committee has free telescopes ranging in size from 2.6" to 8" that current members can actually have to use for up to 60 days at a time. We also have some other items in the loaner program such as a photometer, H-alpha solar telescope, educational CDs, tapes, DVDs, and books. Some restrictions apply. A waiting list is applicable in some cases. The BSAS Equipment Committee will not be held responsible for lost sleep or other problems arising from use of this excellent astronomy gear. For information on what equipment is currently available, contact info@bsasnashville.com.