

The ECLIPSE

February
2021

The Newsletter of the Barnard-Seyfert Astronomical Society

Next Membership Meeting:

February 17, 7:30 pm
Online meeting

Topic TBD

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BSAS
Barnard-Seyfert Astronomical Society

BSASNashville.com





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From the President

We filled one of the three open slots on the Board. If you can help out by serving on the Board, please let me or any of the other Board members know. Thank you.

There isn't much happening in the sky this month which kind of mirrors what's happening on the ground. Not much. We are still housebound by COVID and are holding our meetings via Zoom for safety. We get our usual crowd at the meetings with some new faces here and there. If you haven't attended a meeting in a while, why not come to a Zoom meeting? You don't have to get out in that awful Nashville traffic, and we get to see your smiling face. The meetings are fun, and the topics are always enjoyable.

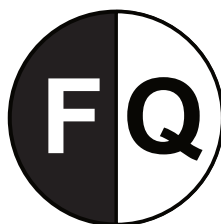
There's not much else I need to talk about at the moment so I will leave this a little short this month but please keep staying safe out there!

Clear skies,

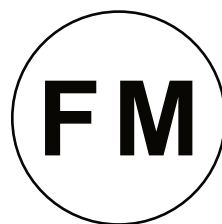
Keith Rainey



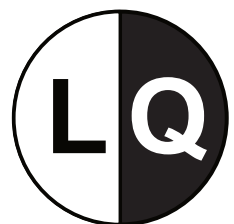
Feb 11
Mar 13



Feb 19
Mar 21



Feb 27
Mar 28



Feb 4
Mar 5

Book Review: Astrophysics for Kids **Reviewed by Robin Byrne**

Many years ago, I had signed up through a web page called Fab Fems to be available as a mentor to young women interested in astronomy as a career. After some activity at first, years went by without hearing anything from them. Last summer, out of the blue, I received an email through the site that was from the mother of a young woman who was looking for a mentor. That young woman was Hansa Giridhar.

The email included a link to a web page about Hansa. At the age of 13, she had already written a book titled A.I. for Kids, participated in many science fairs and STEM activities, and created a web forum to help young women improve their communication skills and confidence. After reading all of this, I felt it would have been more appropriate for Hansa to mentor ME! Over the summer we met multiple times via Zoom, discussing astronomy topics, career advice, and life in general. She was also working on her second book, and I gave advice on what she had written, plus providing clarification on some of the topics.

The result of all of Hansa's efforts, and my minimal input, was a book titled *Astrophysics for Kids*. At only 31 pages in length (plus three pages for the glossary), it is a very brief introduction to a handful of topics that give an overview of major ideas in astrophysics. She discusses everything from the Big Bang to dark matter and dark energy, and even exoplanets. Each short chapter covers the basics in an easy-to-understand style. Perfect for a young reader. While Hansa did test the book out on her 9-year old sister, I would suggest kids of about 12 or older would be the appropriate target audience. It would also make a good starting point for any adult interested in learning a little about astrophysics.

There are only three illustrations in the book, but they were all drawn by Hansa as well, and all well done. Each one does a good job helping to visualize the topic being discussed.

I fully admit that I am biased, but *Astrophysics for Kids* is a lovely book for getting a first little dip of the toe into the vast ocean of astronomy and astrophysics.

References:

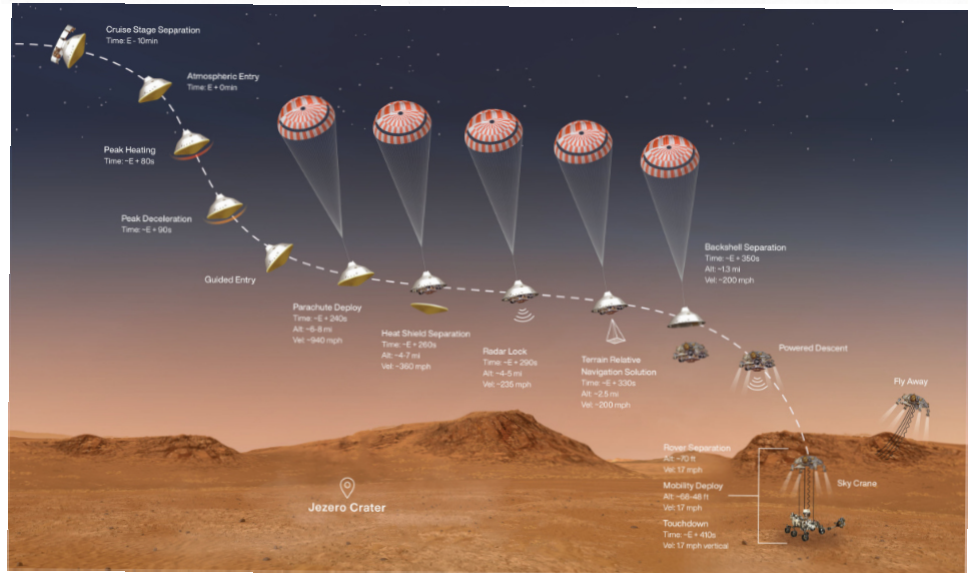
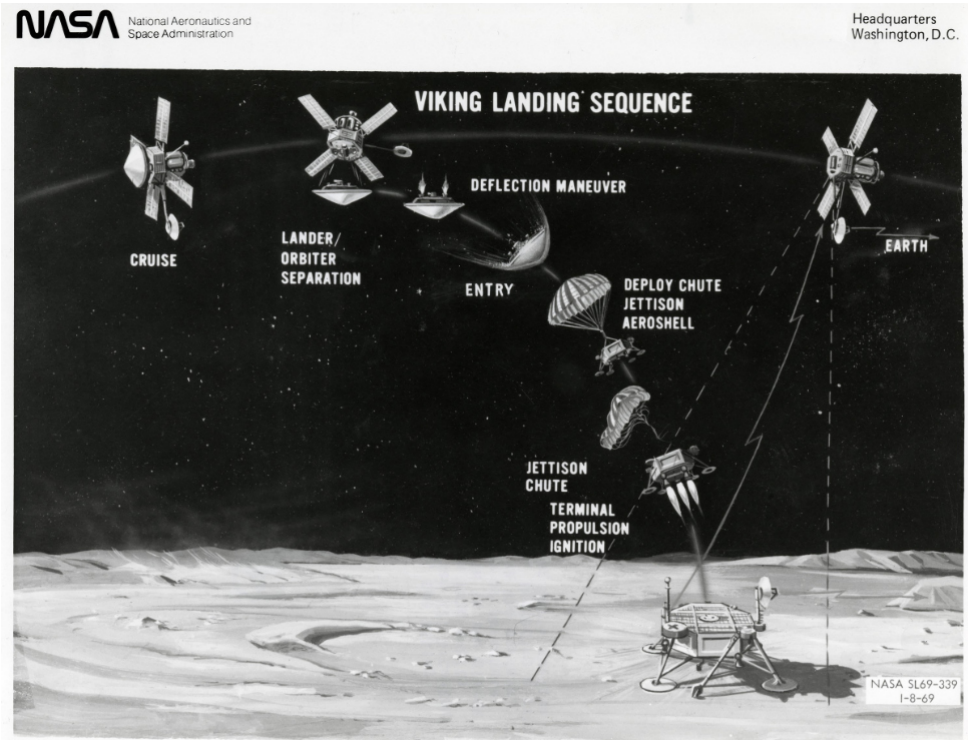
Astrophysics for Kids by Hansa Giridhar, Amazon Self Publishing, 2020



Landing On Mars: A Tricky Feat! by David Prosper

The Perseverance rover and Ingenuity helicopter will land in Mars's Jezero crater on February 18, 2021, NASA's latest mission to explore the red planet. Landing on Mars is an incredibly difficult feat that has challenged engineers for decades: while missions like Curiosity have succeeded, its surface is littered with the wreckage of many failures as well. Why is landing on Mars so difficult?

Mars presents a unique problem to potential landers as it possesses a relatively large mass and a thin, but not insubstantial, atmosphere. The atmosphere is thick enough that spacecraft are stuffed inside a streamlined aeroshell sporting a protective heat shield to prevent burning up upon entry - but that same atmosphere is not thick enough to rely on parachutes alone for a safe landing, since they can't catch sufficient air to slow down quickly enough. This is even worse for larger explorers like Perseverance, weighing in at 2,260 lbs (1,025 kg). Fortunately, engineers have crafted some ingenious landing methods over the decades to allow their spacecraft to survive what is called Entry, Descent, and Landing (EDL).



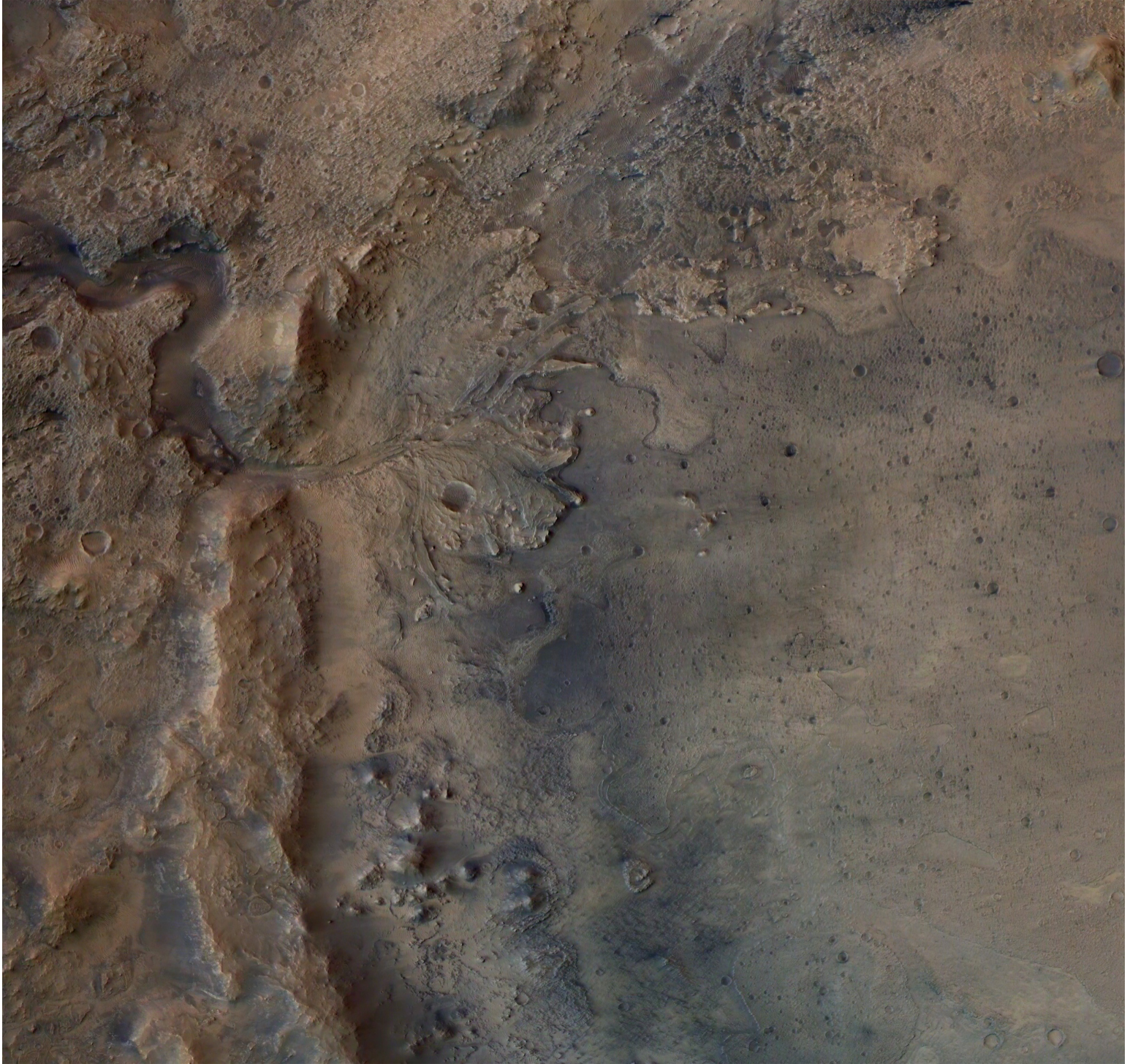
Illustrations of the Entry, Descent, and Landing (EDL) sequences for Viking in 1976, and Perseverance in 2021. Despite the wide gap between these missions in terms of technology, they both performed their landing maneuvers automatically, since our planets are too far apart to allow Earth-based engineers to control them in real time! (NASA/JPL/Caltech)

Landing on Mars, continued

The Viking landers touched down on Mars in 1976 using heat shields, parachutes, and retrorockets. Despite using large parachutes, the large Viking landers fired retrorockets at the end to land at a safe speed. This complex combination has been followed by almost every mission since, but subsequent missions have innovated in the landing segment. The 1997 Mars Pathfinder mission added airbags in conjunction with parachutes and retrorockets to safely bounce its way to a landing on the Martian surface. Then three sturdy “petals” ensured the lander was pushed into an upright position after landing on an ancient floodplain. The Opportunity and Spirit missions used a very similar method to place their rovers on the Martian surface in 2004. Phoenix (2008) and Insight (2018) actually utilized Viking-style landings. The large and heavy Curiosity rover required extra power at the end to safely land the car-sized rover, and so the daring “Sky Crane” deployment system was successfully used in 2012. After an initial descent using a massive heat shield and parachute, powerful retrorockets finished slowing down the spacecraft to about 2 miles per hour. The Sky Crane then safely lowered the rover down to the Martian surface using a strong cable. Its job done, the Sky Crane then flew off and crash-landed a safe distance away. Having proved the efficacy of the Sky Crane system, NASA will use this same method to attempt a safe landing for Perseverance this month!

You can watch coverage of the Mars Perseverance landing starting at 11:00 AM PST (2:00 PM EST) on February 18 at nasa.gov/nasalive. Touchdown is expected around 12:55 PM PST (3:55 PM EST). NASA has great resources about the Perseverance Rover and accompanying Ingenuity helicopter on mars.nasa.gov/mars2020. And of course, find out how we plan to land on many different worlds at nasa.gov.

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.gov 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!



This image shows the remains of an ancient delta in Mars' Jezero Crater, which NASA's Perseverance Mars rover will explore for signs of fossilized microbial life. The image was taken by the High Resolution Stereo Camera aboard the ESA (European Space Agency) Mars Express orbiter. The European Space Operations Centre in Darmstadt, Germany, operates the ESA mission. The High Resolution Stereo Camera was developed by a group with leadership at the Freie Universität Berlin.

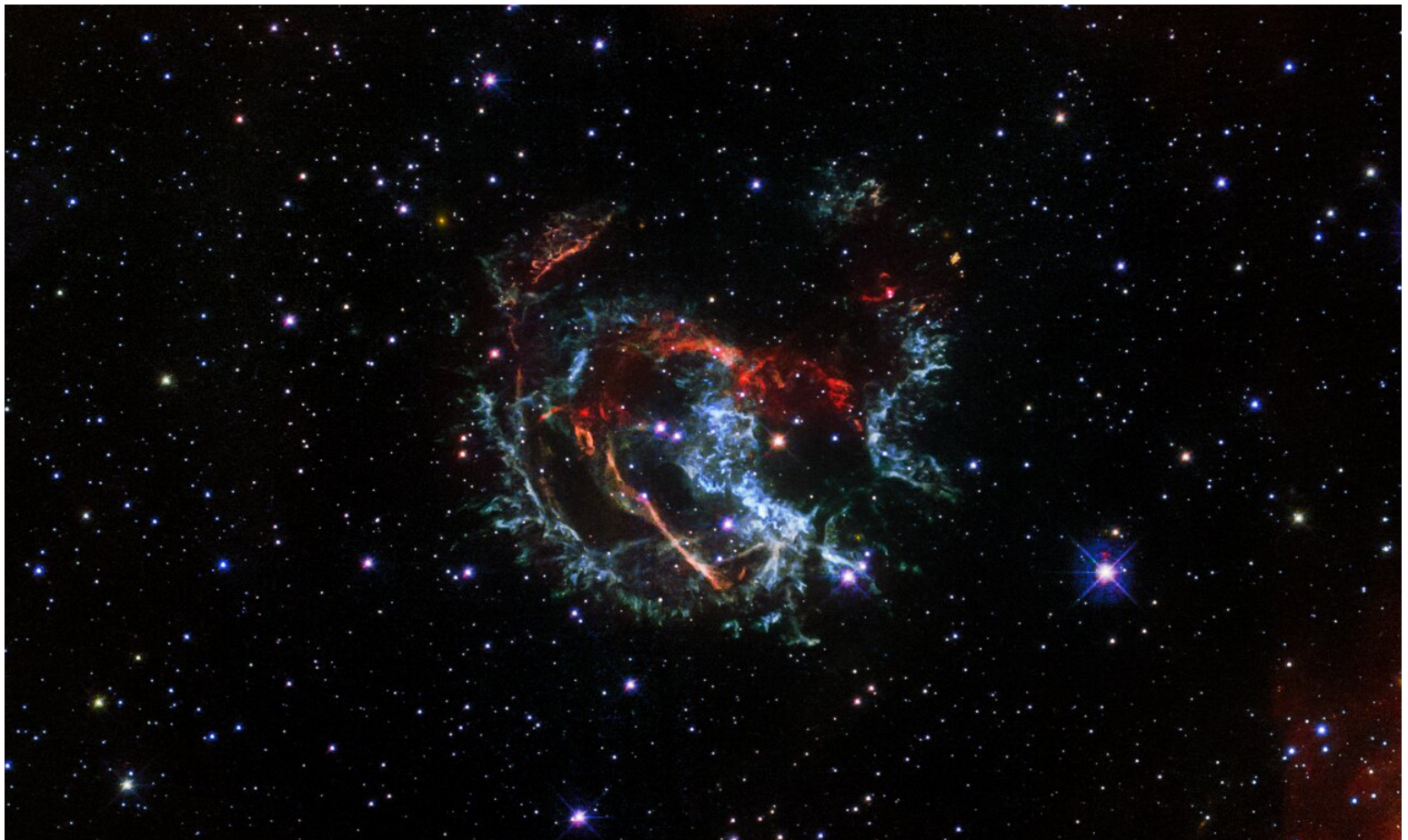
Credit: [ESA/DLR/FU-Berlin](#)

Next Membership Meeting:

Wednesday, February 17, 7:30 pm Central
online on Zoom

Topic TBD

Zoom link will be posted to bsasnashville.com



On the Cover: *Featured in this Hubble image is an expanding, gaseous corpse — a supernova remnant — known as 1E 0102.2-7219. It is the remnant of a star that exploded long ago in the Small Magellanic Cloud, a satellite galaxy of our Milky Way located roughly 200 000 light-years away.*

Credit: NASA, ESA, and J. Banovetz and D. Milisavljevic (Purdue University)

**Barnard-Seyfert Astronomical Society
Minutes of a Regular Meeting of the Board of Directors
Held On Wednesday, January 6, 2020**

The regular meeting of the Board of Directors of the Barnard-Seyfert Astronomical Society was held January 6, 2021, online. Logged in were Tom Beckermann, Gary Eaton, Bud Hamblen, Keith Rainey, Andy Reeves, Kathy Underwood and Theo Wellington. A quorum being present, Keith called the meeting to order at 7:50 PM. Keith asked for a vote to adopt the December 6, 2020, minutes as printed in the January, 2021, issue of the Eclipse and the minutes were adopted by voice vote. Theo reported that the Suntrust balance was \$10,753.77 and the PayPal balance was \$700.00. The corporation fee and the insurance premium have been paid. Keith noted that there were 179 members. Gary noted that should be taken off the automatic email response as member coordinator.

Theo noted that a virtual star party was scheduled for next weekend.

The club program for Wednesday, January 20, will be a telescope question and answer session.

The club is seeking nominations for directors.

There being no further business, the meeting was adjourned at 8:15.

Respectfully submitted,

Bud Hamblen

Secretary

Barnard-Seyfert Astronomical Society Minutes of the Monthly Membership Meeting Held On Wednesday, January 20, 2020

Because monthly in-person meetings are suspended due to the COVID-19 epidemic, the Barnard-Seyfert Astronomical Society held an on-line meeting via Zoom on Wednesday, January 20, 2021. About 20 participants zoomed in.

Keith Rainey called the meeting to order at 7:30 PM and asked for a vote to adopt the minutes for the December, 2020, meeting and the minutes were adopted by voice vote. Theo Wellington reported that the SunTrust balance was \$11,545.78 and that the PayPal balance was \$23.97. The corporation fee and the insurance premium have been paid. Theo noted that our insurance policy does not cover communicable diseases. Posters sold numbered 34.

On social media, the December Virtual Star Party had 112 views this year. The January has had 562 views. The Dyer broadcast of the Great Conjunction had over 400,000 views. The club's Facebook page is liked by 1904, and is followed by 2035. Twitter 267 followers.

Keith reported 180 members.

Tony Drinkwine stepped up to be a nominee for the board.

The telescope question and answer session had participation by the zoomed-in members and guests.

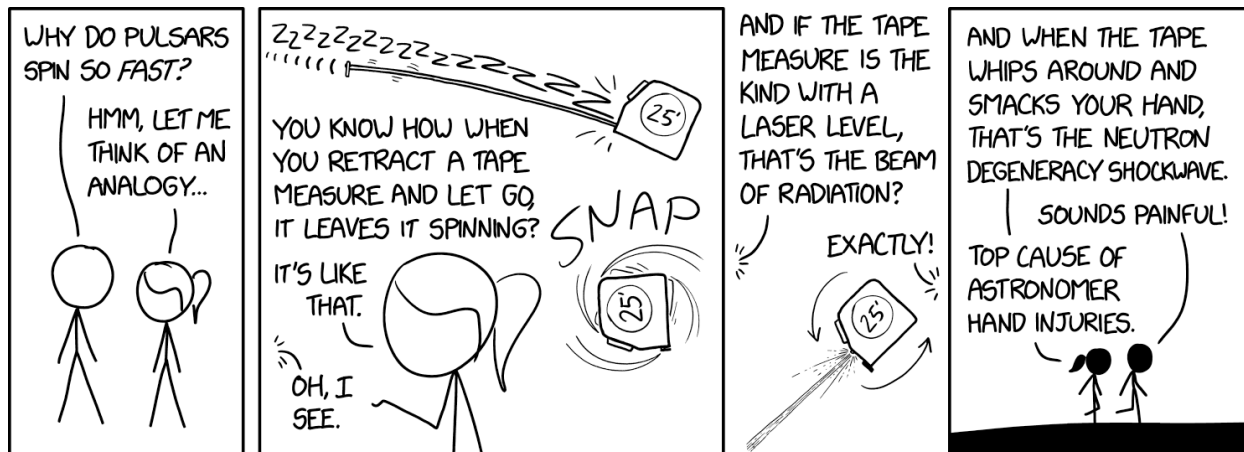
The being no further business, the meeting was adjourned at about 9 PM.

Respectfully submitted,

Bud Hamblen

Secretary

xkcd





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.



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.