The Bays Mountain Astronomy Club Newsletter

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Cosmic Reflections

William Troxel - BMAC Chair



reetings and it will be great to see each of you again this month! Our February meeting was a great way to review methods to get ready for the upcoming

spring observing season. I know I heard some really good reminders about things I knew and some new tricks that I felt could be good updates to my playbook. I thought that all that attended got some good ideas and a chance to remind ourselves of the basics. Thank you to everyone that came out and offered their ideas to the discussion.

I am seeking help with finding questions for next month's Astronomy Jeopardy Game. I really do want your help, so please help me find some challenging questions and answers to add to the game.

The March meeting will be welcoming the ETSU Physics and Astronomy Department. They have a great presentation planned. Afterwards, they will welcome questions and any comments you would like to share. A brief description is below. I hope you will mark the date and try to come out and support these young men and women of science.

Title: Astronomy in Appalachia: Inherited Perspectives on Our Night Sky by Dr. Christiana Erba (Research Assistant Professor, Dept. of Physics & Astronomy, ETSU) & research students Grace Anderson and Trevor Cox.

Abstract: Cultural Astronomy sits at the intersection of our study of the Universe and the human experience, exploring how we observe the stars, interpret their motions, and incorporate them into our perspectives of the nature of reality. In this talk, we will explore how the inherited experience of the night sky in Appalachia can be leveraged as a part of astronomy education and how that can serve as a cross-cultural point of connection. Using Earth's seasons as an anchor point, we will discuss several Appalachian folk science narratives, examining how they are anchored in astronomy and relating them to modern scientific interpretations of the Cosmos. I hope you are having a good February and hope to see each of you at the March meeting on March 3, 2023 @ 7p.

Until then... Clear Skies!

BMAC Notes

Outreach at Washington Elementary



he BMAC occasionally gets asked to help with an event at a local school. This occurred this last January and was reported on in the February issue of this newsletter. We recently received thank you letters with some cool drawings. Some of them are shown here. If you'd like to be a part of events like this to share the night sky, please

consider applying for the City's volunteer program.











Dear, Bay's Mountain Astoslogy Term GEMEN and bringing your telescopes for us to look at. All of the planets were so mazing 1 have never seen one in real life I did not even know you could see them in person. Once again the time was time thank you for taking your time and effort to come to the storgaze. BIGDIPPER Servicity, Graham 5th rode CANCER



Dear Bays Mountainys Atronomens, Thank you so much for bringing your a mazing telescopes to show us Juputler and Orions Nebula. I was so Cool and weird to look at things billions of miles away. I really likedy talking about what would happen to the sun when it died, and how Adrone to would Colide with the Milkyway to form Milkomeda / PM31 P-milkyway





Thank You for helping at the stur gaze I loved looking at Mars and all the other planets, P.S Thank You and I love Alex, Masa







Comet ZTF (C/2022 E3)



ou've heard the hype. You've seen the misleading images. I shared this image of the "Green" Comet with my students at NSCC to help them learn how to be a more critical thinker when it comes to social media and information from those that just don't know what's what.

On the date of this image, it was straddling Draco and Ursa Minor. It was also just shy of its expected peak brightness, being spotted at an altitude that brought it out of the horizon murk and, most importantly, was in a gap between a lot of rainy weather. The atmosphere was quite humid, so there was a good amount of light scatter to lose transparency. That's why the tail is not that visible in this image.

This comet is not a bad comet. It's just suffering from a bad case of gossip and poor understanding. Social media coverage used images of past comets that have tails stretching across the sky and are really big and bright. The tag lines of once in a 50,000

year opportunity imply one's rare chance of seeing a comet like this. Instead, this comet had an inbound period of about 50,000 years, but is now heading out of the Solar System due to planetary perturbations.

Yes, Robin & I saw it with 8x40 binoculars. We live at a dark site and we're both trained observers. The coma was seen easily, but the tail was only visible with averted vision. I *think* I saw it with the unaided eye and averted vision. It may have been averted imagination! Robin could not.

What did you see or photograph? BMACers, please send your comments, stories and images to me and I'll include them in your newsletter!



Comet ZTF (C/2022 E3) Jan. 28, 2023 0400 UT. The two brighter stars between the comet and the lower right of the trees are the two end stars of the Little Dipper's scoop. Those stars are called the Guard Stars. Sony A7ii; 90mm lens; f/2.8; 10s; ISO 3200. Image by Adam Thanz.

Moon, Jupiter & Venus Conjunction of February 22, 2023

id you get to see this conjunction or the nice alignment the night before? If so, we want to hear about it and/or see some photos!



A close-up of the Moon and Jupiter. Nikon D40 DSLR through a Takahashi 90mm refractor. 5%s, ISO800. Image by Greg Penner.



The Moon, Jupiter & Venus. Nikon D40 DSLR, 55mm lens, 1/20s, f/5.6, ISO1,600. Image by Greg Penner.



The Moon, Jupiter & Venus. Sony A7II. 90mm, 2s, f/2.8, ISO1,600. Image by Adam Thanz.

Green Bank Star Quest XVIII



his year's Star Quest will be held June 21-24, 2023 at the Green Bank Observatory in West Virginia. Dark skies and radio quiet!

Presentations may be outside or in depending on the weather.

Camping is available along with bunkhouses.

All the info can be found <u>here</u>.

Stellar Observations

Greg Penner

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Missions to the Moon



s I mentioned in my January article highlighting notable events for 2023, multiple missions to the Moon this year will be interesting to follow. Perhaps the first question to explore is, "Why so much interest in the Moon all of a sudden?" A good place to start in answering that question is NASA's website for the Artemis program.

NASA states that we're going back to the Moon for scientific discovery, economic benefits and inspiration for a new generation of explorers. The Apollo missions were just getting started with scientific discovery on the Moon when the program was cancelled, so Artemis intends to accomplish more scientific activity in a focused location near the lunar south pole in a region known as the Southern Cratered Highlands. The south pole has been identified as possibly holding water (in the form of ice) in some deep craters that never receive sunlight. From this water, oxygen and hydrogen could be extracted for use in life support and fuel systems. The Southern Cratered Highlands

in the south pole region also contain some very high mountain peaks, which capture sunlight nearly perpetually. Thus, sunlight is available to provide power for a permanent lunar base using solar collectors. All of these reasons combine to make the case for a permanent Artemis program base at the south pole. Aside from work being done by NASA, the Artemis program is enabling a growing lunar exploration economy by contracting with private companies to supplement and prepare for the Artemis missions. With the successful completion of the uncrewed Artemis 1 mission, much has to be evaluated and tested before the crewed Artemis 2 mission, which may be up to two years away. In the coming months, we will see the commercial missions take center stage.

Three private companies have missions planned to land on the Moon in 2023. The Japanese company, ispace, Inc., has a head start on the two American companies Astrobotic and Intuitive Machines. Ispace launched Hakuto-R back in December of 2022 on a SpaceX Falcon 9 rocket and is taking a slow, circuitous journey to the Moon, where it is slated to touch down inside the Atlas crater on the Northeastern region of the Moon sometime in April 2023. The Hakuto-R lander is carrying a small lunar rover of historic significance, the first ever Arab-built lunar rover. The Rashid Rover was built by Dubaiís Mohammed bin Rashid Space Centre (MBRSC) in the United Arab Emirates. The rover will analyze the plasma on the lunar surface and conduct experiments to understand more about lunar dust. Hopefully, additional data and analysis will be helpful to future lunar astronauts who have to cope with the dust, which can cause problems for spacesuits and equipment.

Astrobotic is a Pittsburgh based company that, according to their website, specializes in making space missions feasible and more affordable for science, exploration and commerce. They have developed a lunar lander called Peregrine, which is scheduled to launch sometime in the first quarter of 2023. The original destination for this lander was the Lacus Mortis, but as of early February, NASA has redirected the landing site to a mare just outside of the Gruithuisen Domes, an area of special interest to lunar scientists. According to a blog written by NASA's Heidi Lavelle, the Gruithuisen Domes are

a geologic enigma along the mare/highlands boundary on the northeast border of Oceanus Procellarum, or Ocean of Storms, the largest dark spot on the Moon. The Domes are suspected to have been formed by a sticky magma rich in silica, similar in composition to granite. On Earth, formations like these need significant water content and plate tectonics to form, but without these key ingredients on the Moon, lunar scientists have been left to wonder how these domes formed and evolved over time.

The Peregrine lander will be carrying a suite of 11 instruments from NASA that will be used to collect data about the mare near the domes. A future mission has already been planned for 2026, in which a lander will deliver a suite of instruments to the summit of one of the domes. Together, these two missions will give scientists much data about how these domes formed and perhaps solve this mystery.

Intuitive Machines is a Houston-based company that provides lunar surface access, lunar orbit delivery and communications at lunar distance. They have developed the IM-1 mission that will deliver multiple NASA payloads to the lunar surface later this year. Originally planned for a landing in the lunar equatorial regions, NASA has redirected the lander to a location in the south pole region to complement its long-term goals in that area. The exact location was not announced, although SpaceNews states that a company representative says the new location is the crater Malapert A, which had previously been identified as a potential landing site for future lunar expeditions. The IM-1 lander is now estimated to launch in June 2023 and will carry payloads that will focus on plume-surface interactions, space weather/lunar surface interactions, radio astronomy, precision landing technologies and a communication and navigation node for future autonomous navigation technologies.

Amateur astronomers can follow these missions online by visiting each company's website. Also, amateurs can find all of March 2023 The Bays Mountain Astronomy Club Newsletter Page 33 of 63 the mission landing regions with their telescopes. I have included in this article photos of the various areas of the Moon to be visited by these landers. Atlas crater is in the northeast region of the Moon and is best viewed about 4 days after new moon or 3 days after full moon. The Gruithuisen Domes are best viewed just a couple of days before full moon. They are located in the northwest region slightly south of the prominent feature Sinus Iridium. If you look at a lunar map, the domes are labled Gamma and Delta. The Southern Cratered Highlands are best viewed when lunar libration (the effect caused by the wobbling motion of the Moon) tilts the south pole toward us. In March, the best libration dates for the south pole are the 4th and the 31st.



Atlas Crater location - from "The Modern Moon: A Personal View" by Charles A. Wood



Gruithuisen Domes location (bottom left of image) - from "The Modern Moon: A Personal View" by Charles A. Wood



Gruithuisen Domes - NASA image



Southeast region of Moon showing location of Southern Cratered Highlands - image by Greg Penner Telescope users often view the bright Moon as a curse on a night of stargazing. In the coming months as these lunar landing missions progress, perhaps we can embrace the Moon and go along for the ride as we observe some fascinating lunar features and learn more about our nearest celestial neighbor.

The Queen Speaks

Robin Byrne

-

Happy Birthday Christopher Clavius



his month we recognize the contributions from a man whose name is not as well known as his work.

Christopher Clavius was born in Bamburg, Germany

on March 25 in either 1537 or 1538. The name Clavius (Latin for "key") is one he took later in life, but there's no record of his original last name. Scholars have suggested Clavius could have been a Latinized version of Clau, Klay, or possibly Schlüssel (German for "key"). At the time of his birth, the Protestant Reformation was taking place in Germany, however the region where Clavius lived was still devoted to Catholicism. When Clavius was three years old, the Jesuit Order was established, which would be an integral part of the remainder of his life.

At the age of 17, Clavius joined the Jesuit Order. As part of his studies, he attended the University of Coimbra in Portugal, followed by studying in Rome at the Jesuit Collegio Romano. During his time in school, the one subject that really took a hold of Clavius was mathematics. His interest in astronomy began shortly later, with a solar eclipse he observed on August 21, 1560 while in Coimbra.

In 1564, Clavius was ordained and he began his lifelong position as Professor of Mathematics at the Collegio Romano. As was typical for the Jesuits, Clavius continued his religious studies for many years after being ordained, not becoming a full member of the Jesuit Order until 1575. Clavius developed the math curriculum for the college, adding courses in optics, statics, astronomy, and acoustics. He made many contributions to the mathematics field, including being one of the first in the West to use a decimal point.

Clavius had the opportunity to observe a second solar eclipse, this time in Rome on April 9, 1567. In his description of the event, Clavius wrote, "... although the Moon was placed between my sight and the Sun it did not obscure the whole Sun as previously but ... a certain narrow circle was left on the Sun, surrounding the whole of the Moon on all sides." This sounds <u>like an annular eclipse, but calculations</u> show that it was just barely a total eclipse, with only 14 seconds of totality. What Clavius observed could have been a form of Bailey's Beads all around the Moon's limb, or it could have been light from the Chromosphere.

In 1570, Clavius continued his astronomical work by writing a commentary on "De Sphaera," which was considered the most important astronomy book of the era. This commentary became one of the standard astronomy text books, with 15 revisions being published over the next 48 years. In one of the revisions, Clavius wrote about observing a nova in 1572 in the constellation of Cassiopeia. This was the same nova observed by Tycho Brahe. Clavius compared his observation with those of other astronomers across Europe. He concluded that everyone recorded the nova in exactly the same location relative to the stars, leading to the conclusion that the nova had to be farther away from Earth than the Moon. This was one of the first proofs that the Aristotelian claim of unchanging heavens was false.

In addition to writing several other mathematical text books (the reason he's known as "the Euclid of the sixteenth century"), Clavius also designed various instruments. One device was used to measure fractions of angles. This was based on a technique he described concerning a method for dividing a measuring scale into smaller increments. Other instruments designed by Clavius included a sundial and a surveyor's quadrant.

What is easily his most important contribution to society began in 1579, when Clavius was given the assignment to reform the existing Julian calendar. Because the Julian calendar included a leap year every 4 years (making the average length of the year slightly too long), the date of Easter had shifted relative to the seasons. Clavius proposed a modification in which leap years occur every 4 years in years divisible by 4, with the exception of century years, when a leap year only occurs if the century year is divisible by 400. In 1582, by order of Pope Gregory XIII, this calendar was adopted in all Catholic nations, and is now known as the Gregorian Calendar, which we still use today. When the calendar was adopted, Clavius proposed that October 4, 1582



Christopher Clavius (1538-1612). German mathematician and astronomer. A 16th century engraving after a painting by Francisco Villamena. Image from Wikipedia. be followed by October 15, 1582, in order to realign the date of March 21 with the actual occurrence of the Spring Equinox. While not exact, this calendar will take 3,500 years before having an error of one day.

In his astronomical books, Clavius clearly favors the Geocentric model of the heavens, and he argued against the Heliocentric Model of Copernicus, using evidence from both scripture and physical arguments. In 1587, Galileo Galilei made a point of meeting the famous mathematician while visiting Rome. The two men exchanged correspondence from this point on, arguing their ideas and comparing mathematical proofs. Both men would send copies of their latest books to the other for constructive feedback. Clavius may have been instrumental in helping Galileo to clarify his arguments (something with which Galileo is reputed to have had difficulty), since Galileo was first trying to convince Clavius.

In 1611, Galileo visited Clavius again, this time armed with his recent discoveries made using a telescope and his recently

published "Siderius Nuncius." Clavius, as the senior scientist at the Collegio, was responsible for passing judgement on Galileo's new book. At first, he didn't have access to a quality telescope, making it difficult to confirm Galileo's observations. Once he had used a sufficiently well-made telescope, Clavius agreed that he could see more stars through the telescope than with the naked eye, craters on the Moon were visible, Jupiter's moons were observed to orbit around the planet, and, most importantly, Venus exhibits phases like the moon. This last observation could only be explained by Venus orbiting the Sun, not Earth. He concluded by saying, "Since things are thus, astronomers ought to consider how the celestial orbs may be arranged in order to save these phenomena." In other words, the Geocentric Model cannot account for these observations. However, Clavius never accepted the Heliocentric Model, instead, the Jesuits embraced Tycho Brahe's compromise system of all planets orbiting the Sun while the Sun orbits Earth.

Christopher Clavius died the following year on February 6, 1612. The one place where Clavius' name lives on is on the March 2023 The Bays Mountain Astronomy Club Newsletter Pag Moon - Crater Clavius. This is ironic, since he originally had serious doubts about Galileo's claim that the Moon was covered in rugged features. Despite his resistance to the Heliocentric Model of the Solar System, the rest of Clavius' career has aged well. While the Gregorian Calendar is by far his most lasting contribution, his writings in both mathematics and astronomy influenced the scientific world for years to come. The next time the skies cooperate, and the Moon is between 1st and 3rd Quarter, pull out a pair of binoculars or a telescope, and enjoy the crater that was named after this month's honoree: Christopher Clavius.

References:

Christopher Clavius - Wikipedia

<u>Christopher Clavius by J J O'Connor and E F Robertson, School</u> of Mathematics and Statistics University of St Andrews, <u>Scotland</u>

Christopher Clavius (1537-1612) - The Galileo Project

The Space Place MASA Nights

Metwork

David Prosper

. The Bays Mountain Astronomy Club Newsletter

Spot the Morning and Evening Star: Observe Venus

enus is usually the brightest planet in our skies and is called "Earth's Twin" due to its similar size to Earth and its rocky composition. However, Venus is a nightmare version of our planet, featuring a thick, crushing atmosphere of acidic clouds, greenhouse gasses, howling winds and intense heat at its surface.

This rocky, inner world's orbit brings it closer to Earth than any of the other planets and is the second closest to the Sun after Mercury. Like Mercury, Venus orbits between our planet and the Sun, so Earth-based observers can observe Venus in the morning before sunrise or in the evening after sunset - but never high in the sky in the middle of the evening, unlike the outer planets. Since Venus is so striking in its twilight appearances, the planet features heavily in sky mythologies worldwide. Venus's bright morning and evening appearances are the origin for its dual nicknames: the Morning Star and the

Evening Star. Some ancient astronomers never made the connection and assumed the Evening Star and Morning Star were two unrelated objects! Observers can even spot Venus during the daytime, if the sky is very clear and the planet is bright enough. Venus also has phases, similar to the Moon and Mercury. Galileo's observations of Venus's phases helped turn the astronomy world upside down in the early 1600s, and you can see them yourself using a telescope or even a surprisingly low-power pair of binoculars. Warning: Please be very careful when observing Venus with a telescope in the early morning or daytime. Never allow the Sun to enter your instrument's field of view, as you could be permanently blinded.

Sky Guide: Spot Venus



Venus and Jupiter continue to move closer together in the evening sky this month. Jupiter will continue its descent towards the horizon while Venus will continue to climb and will be visible in the evenings though mid-summer of 2023. It's a great year for Venus fans! Image created with assistance from Stellarium.

Venus's other moniker of "Earth's Twin" is a bit misleading. In terms of their surface temperatures and atmospheres, Venus and Earth are extremely different! The surface of Venus is warmer than that of Mercury, despite Mercury being many millions of miles closer to the Sun. While Mercury is still a scorching 800 degrees Fahrenheit (427 degrees Celsius), Venus is even hotter: 900 degrees Fahrenheit (482 degrees Celsius). The vast amount of carbon dioxide in the thick Venusian atmosphere acts as an insulating blanket that retains much of the Sun's heat, creating the runaway greenhouse effect that dominates its present-day climate. The Venusian surface is a crushing 90 Earth atmospheres on top of its absurd temperatures. These extreme conditions mean that the mission life of any past Venusian robotic landers were measured in hours at best - and usually minutes! However, conditions in Venus's upper atmosphere may be much more hospitable, with temperatures and pressures at 30 miles (50 km) above the surface that are much more Earth-like in temperature and pressure. Studies of the Venusian atmosphere, including

seasonal appearances of dark streaks and faint signals of suggestive chemistry, intrigue researchers with the possibility that some sort of life may persist in its clouds. But far more evidence is needed to confirm such a claim, since nonbiological factors like volcanism and other processes could also be the source for these signals.

Venus from Mariner 10



The top layers of Venus' clouds pop in this contrast-enhanced image, reprocessed with modern techniques from Mariner 10 data. Credit & Source: <u>NASA/JPL-Caltech</u>

Venus's thick, sulfuric acid clouds block direct visual observations of its surface from optical telescopes on Earth. Multiwavelength observations from space probes show evidence of active volcanoes and possibly some sort of plate tectonics, but followup missions will be needed to confirm the presence of active volcanism, plate tectonics and any possible signs of life. In order to do so, NASA is sending two new missions to Venus by the end of this decade: the orbiter VERITAS, which will map the surface in high detail and study the chemistry of its rocks and volcanoes and DAVINCI+, which will study its atmosphere and possible tectonic surface features via a "descent sphere" that will plunge into Venus's clouds. Follow their development and discover more about Venus here, and of course, continue your exploration of the Universe at NASA.

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 <u>nightsky</u> to find local clubs, events, and more!

BMAC Calendar & More

Calendar:



MAC Meetings:

- Friday, March 3, 2023 7p Astronomy in Appalachia: Inherited Perspectives on Our Night Sky by Dr. Christiana Erba (Research Assistant Professor, Dept. of Physics & Astronomy, ETSU) & research students Grace Anderson and Trevor Cox.
- Friday, April 7, 2023 7p Astronomy Jeopardy. This will be a full game. There will be 3 rounds and winners will receive an additional 4,000 points!
- 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.



- Every clear Saturday & Sunday 3p-3:30p March-October By the Dam
 - View the Sun safely with a white-light 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:

- March 4 & 11, 2023 7p
- March 18 & 25, 2023 8p
- April 1, 8, 15, 22 & 29, 2023 8:30p
 - 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.





• 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 & Time TBD

 Site location will be sent directly to full BMAC members. BMACers and their families are welcome to enjoy an evening of astronomythemed games and activities along with a potluck dinner and observing.

• StarFest 2023 - November 3, 4 & 5, 2023

- Our 38th 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. 13, 2023 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.

Regular Contributors:



William Troxel



Greg Penner



Robin Byrne



Adam Thanz



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).

reg Penner is a semi-retired architect living in the Tri-Cities area since 2018. He G 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.



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:

B ays Mountain Astronomy Club:

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



- 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 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 <u>link</u>. If you want to add family members, then add them via the internal link. You can also pay at the gift shop, by mail or over the phone.

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.