



Roanoke Valley Astronomical Society

Amateur Astronomy News and Views
In Southwestern Virginia



Volume 40—Number 9

September 2023

RVAS August Meeting Notes

Member Potpourri

By Erin Elliott, Secretary

Usually, President **Mike Hutkin** opens the Celestial Café at 7:00 pm, and officers and members spend the ensuing half-hour catching up on astronomy and personal lives. But not this evening. Technical difficulties with computers and Zoom intervened early and continued for much of the pre-meeting gathering. But the group took it in stride as Assistant Professor and RVAS member **Mallory White** and **Mike** grappled with and tamed the wayward technology.

At 7:30, the Café closed and Mike, along with our Membership Coordinator, **Frank Baratta**, welcomed members and guests to the August meeting. It was great to have the following new members join us: **Gregory and Doris Mercado**, and **Dylan De Meyts**. Also attending were guests **Lauren De Meyts** and **Parker and Colin Ray**. To begin, Mike presented the evening's agenda.

Attendance: There were 43 members and 3 guests in attendance at this month's meeting. 22 were in person and 24 attended virtually.

Astrophotography: We thank **Vince St. Angelo**, **Tom Cerul**, **Ed Dixon**, **Michael Good**, **Mike Hutkin**, and **Dave Thomas** for providing their work this month. We had a variety of images focusing on the Perseids, nebulae, galaxies, clusters, along with sunspots and pictures of the moon.

To provide each image with the focus it deserves, we are sharing the submissions in a separate arti-



In-person attendees - Mike Hutkin photo

cle in this newsletter. Don't miss checking out the rest of these images.

Member Observation Reports: **Mark Hodges** went to the Explore park overlook on Friday August 18 where he teamed up with **Ben Hartman** and **Tony Easley** for some deep sky observation work using his Dwarf II Smart Telescope. On Saturday night August 19 he ventured to the Cahas overlook to team up with member **Randy Sowden** and Randy's son to image the night sky. With that done, Mark has a lot of image processing to tend to.

(Meeting Continued on page 2)

(Meeting Continued from page 1)



NGC7635 Bubble Nebula & M52 Star Cluster - Tom Cerul photo

Outreach: Michelle Bass, leader of a Girl Scout Troop in Bay Minette, Alabama, reached out to the club's email address recently to thank us for having great resources on our website. [Here is the page](#) her troop used as a reference.

What's Up?: Before turning to our featured speaker for the evening, Mike asked **Frank Baratta** for his "What's Up?" program on what the skies of September have in store for us. Frank's "What's Up? Highlights" in this issue provide a summary of the program. His PowerPoint can be viewed by clicking [here](#). No recording of the program is available this month.

Program: Our August program was a Member's Pot-pourri where the following members got to share on

various topics: **John Goss, Genevieve Goss, Michael Martin, Mark Hodges, Carson Ray, Bill Krause, Erin Elliott and Mike Hutkin**. You can find highlights from their presentation below along with a link to watch the full program. The first bullet point of each presentation has a timestamp to help you jump to the different talks.

1. Galileo and You, by John Goss, Genevieve Goss and Michael Martin

- Video Timestamp - 1:21
- **John Goss** started out by giving an overview on the Astronomical League's "Galileo Observing Program."
- This program can be done by using 10x50 binoculars on a steady mount.



John Goss, Genevieve Goss & Michael Martin
Mike Hutkin photo

(Meeting Continued on page 3)

The Roanoke Valley Astronomical Society is a membership organization of amateur astronomers dedicated to the pursuit of observational and photographic astronomical activities. **Meetings are held at 7:30 p.m. on the third Monday of each month. See calendar on last page of newsletter for location. Meetings are open to the public.** Observing sessions are held one or two weekends a month at a dark-sky site. For information regarding joining RVAS, including annual dues, [click here](#). Articles, quotes, etc. published in the newsletter do not necessarily reflect the views of the RVAS or its editor.

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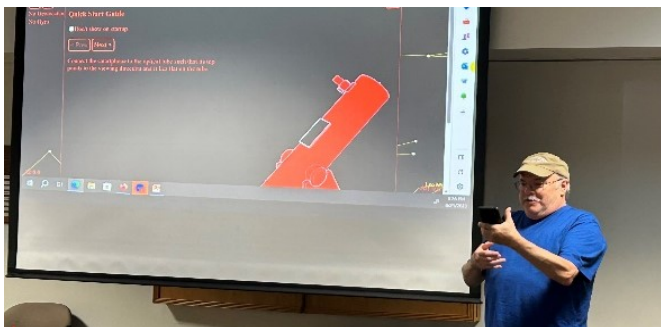
RVAS web page: <http://www.rvasclub.org>

(Meeting Continued from page 2)

- It involves observing and drawing out the night sky across different seasons, which mimics how Galileo observed.
- **Geneive Goss** brought it together by answering the "why's" of doing this program. It is a way to experience history and get closer to the cosmos.
- Each month there will be a few minutes of our meetings dedicated to go over the different observing activities of this program. This will give members the opportunity to follow along and learn.
- If you are interested in completing this program, **Michael Martin** has created an easy to follow along packet for breaking down the objectives.

2. Astrohopper, by **Mark Hodges**

- Timestamp - 11:55
- [Astrohopper](#) is a browser application that helps users find objects across the night sky.
- To use it, attach your smartphone to a telescope so that it is the same angle as your telescope. There are prompts on the screen that help you align your telescope to the night sky after your phone is mounted.
- Once you are aligned, you can search the night sky on your phone screen for an object that you want to observe. It will point you in the direction that you need to move your telescope and guide you to the object.
- It is such a helpful resource for observing. You can flag it in your browser or pin it to your phone's home screen. [The website application can be found here.](#)



Mark Hodges - Mike Hutkin, photo



Carson Ray - Mike Hutkin, photo

3. Asteroid Occultation Research Project - Introduction, by **Carson Ray**

- Timestamp - 19:32
- Carson was inspired by Steve Conard's presentation to the club a few months ago on Asteroid Occultation.
- He gave a background and overview of Asteroid Occultations and reasons people do not get into it.
- He then presented his research projection and goals for making Asteroid Occultations accessible for more people to observe. This is what he calls *Occultime*.
- He listed the comparisons between the system present now and his projection of *Occultime*.
- He also presented his progress so far with both the observing and engineering of *Occultime*.

4. AstroSense, by **Bill Krause**

- Timestamp - 28:44



Bill Krause - Mike Hutkin, photo

(Meeting Continued from page 3)

- Celestron StarSense Auto Alignment Telescope Camera replaces the two- and three-star alignment process by using a technique called "plate solving."
- It takes pictures of the sky, then cross references those pictures to the database to figure out what it is viewing.
- He goes over how helpful of a resource it is for observing and how easy it is to use.
- He also gives an overview of the new generation StarSense Auto Guider, which is a package helpful for astrophotography.

5. Community School - Outreach Project, by Erin Elliott

- Timestamp - 40:01
- Erin gave an overview of an outreach opportunity for the club at Community School in Hollins.
- Her opportunity is a chance to teach middle school students about astronomy. It is a 6-8-week program that will take place on Fridays during January and February.
- She is asking for people to help students dive into astronomy by teaching some basics of

observing, an overview of astrophotography, and help with a night of observation.

- If you are interested in helping, you can email her at mucha.erin@gmail.com

6. Finding M51 and other deep sky objects by Mike Hutkin

- Timestamp - 45:50
- **John Goss** produces "How To" Finds that **Mike Hutkin** wanted to highlight.
- You can find the video resource by [clicking this link](#).

We thank our members for highlighting resources and information for us. The full program can be viewed here

Next month: The RVAS annual picnic and star party takes the place of the regular monthly meeting. The event is being held Saturday, September 23rd (Rain Date: September 30th) at Apple Ridge Farm. See the picnic information and map page elsewhere in this issue.

The meeting was adjourned at 9:07 pm

RVAS Member Anniversaries

Congratulations to the following members who reach the indicated number of consecutive years with the RVAS since joining or re-joining during the month of September:

Vince and Pamela St. Angelo (1996) - 27 years
Jim Rollings (2015) - 8 years *
Peter and Betty-Paige Rosenfeld (2015) - 8 years
Ed Dixon (2019) - 4 years
Shannon Durham (2019) - 5 years
Sam Austin (2021) - 2 years
Sasha Mintz (2021) - 2 years
Mallory, Edwin and Caleb White (2021) - 2 years

* Jim Rollings is the Society's only Honorary member.

Thanks to all of you for being RVAS members!

What's Up? Highlights

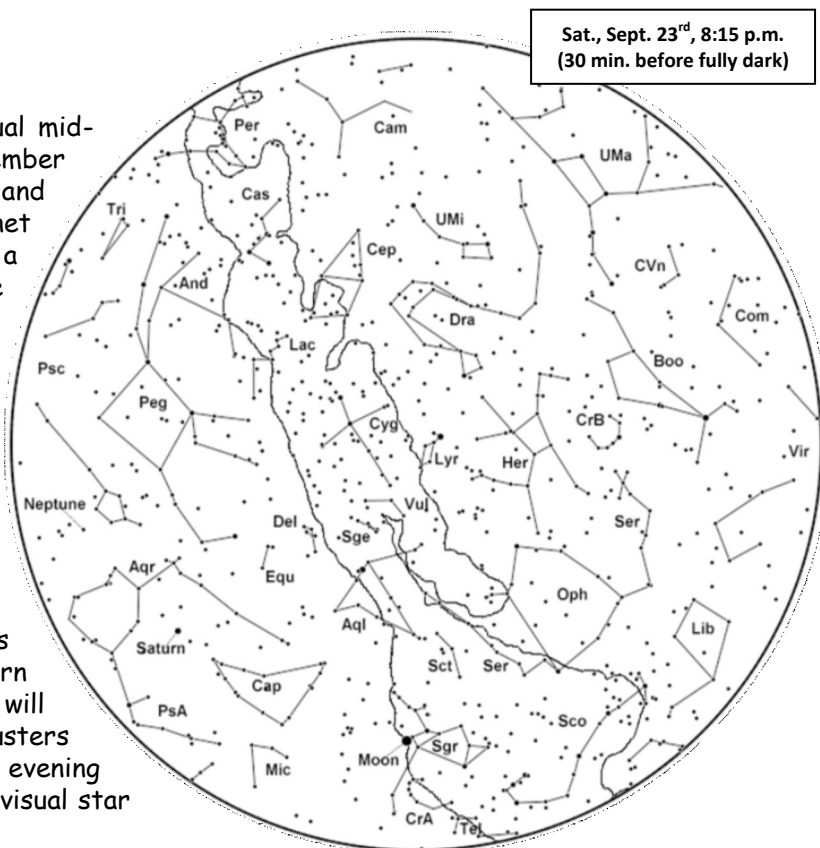
September 1 to 30, 2023

Including, but not limited to, information presented at the August 21st meeting.

To review the PowerPoint, click [here](#).

This Month:

This month, we depart a bit from our usual mid-month star chart for the evening of September 23rd, the date of the 2023 RVAS picnic and star party. But first, let's talk about planet watching overall in September. For quite a while, the inner planets have gotten the attention. Now, throughout the month, they're absent in the evening hours and are replaced by the outer planets. Early in the month Saturn rises around 7:30 p.m. and Neptune, an hour later. Jupiter rises around 10:40 p.m. and Uranus, 20 minutes afterwards. By month's end, all four will have risen by about 9:00 p.m. Switching briefly now to picnic night and our star map, we note Saturn, Neptune and the Moon are up. The latter is waxing gibbous and doesn't set until after midnight. Saturn and the Moon will offer much to view, as will areas farther away from the Moon. Star clusters may hold up fairly well. But it won't be an evening for hunting "dim fuzzies" by old fashioned visual star hopping!



Sat., Sept. 23rd, 8:15 p.m.
(30 min. before fully dark)

Celestial Events:

- Fri., 1st - The Equation of Time is 0; one of 4 points each year when solar (sundial) time and clocks agree. They otherwise disagree due to Earth's elliptical orbit and tilt of its rotational axis: one reaches noon before the other.
- Tue., 12th - Look for the Zodiacal Light in the eastern pre-dawn sky the next two weeks. The Moon and Venus rising hinder view. The Moon rises later on the 14th and after.
- Sat., 23rd, 2:50 a.m. EDT - The Autumnal Equinox arrives for the Northern Hemisphere. The RVAS holds its picnic and star party Saturday afternoon and evening at Apple Ridge Farm.

Sunset and Twilight:

Sunset Range: 7:49 p.m. (Sept. 1st) to 7:05 p.m. (Sept. 30th)

Twilight Ends: 9:20 p.m. (Sept. 1st) to 8:31 p.m. (Sept. 30th)

Weekend Observing Opportunities:

(Dark of the Moon Weekends)

Sept. 8th/9th
Sept. 15th/16th

Moon Phases:

Wed., 6th - Last Quarter

Thu., 14th - New Moon

Fri., 22nd - First Quarter

Fri., 29th - Full Moon



RVAS Annual Picnic and Star Party

Apple Ridge Farm, Copper Hill (Floyd Co.)
Saturday, September 23, 2023, 4:00 – 10:00 PM
(Note: This event takes the place of the September monthly meeting.)



Annual event for RVAS members and their families. “Tailgate Style Picnic” – Bring your own food, beverages (no alcohol, please) and other dinner needs. Bring your own folding chairs, if desired. Door prizes, silent auction, giveaways and evening observing at ARF observatory! Members are welcome to bring their own scopes.

Directions from Roanoke to Apple Ridge Farm

Rt 221 South up Bent Mountain to Copper Hill

In Copper Hill, turn Right onto Rt 796

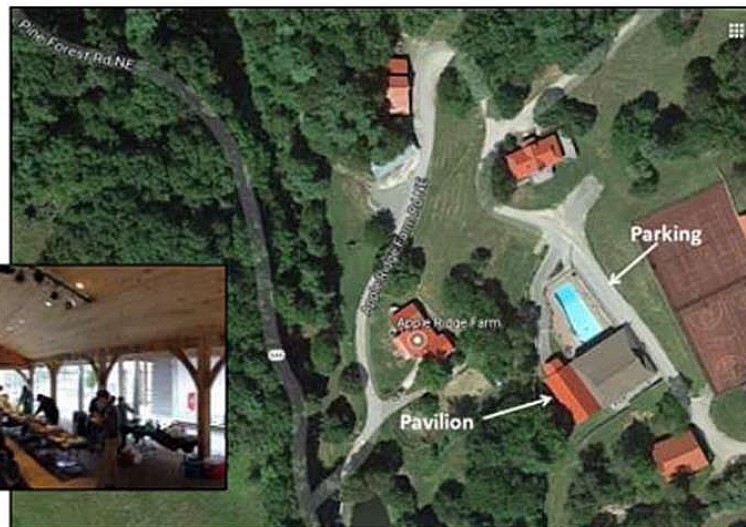
Continue 0.8 mile on Rt. 796 until it meets and becomes Rt 645 (bear left onto Rt 645)

Continue 0.2 mile on Rt 645 and bear right onto Rt 644 (Pine Forest Road)

Continue 1.3 miles on Rt 644 to ARF entrance

Drive past the Lewis’ house, up the hill and around to parking area between tennis/basketball courts and pool. See map below.

Using GPS or Google Maps?
ARF is located at 9230 Pine Forest Road NE, Copper Hill, Virginia 24079



Are we now at a historic juncture in amateur astronomy, particularly in binocular observing?

On August 18, Vince St. Angelo, Harry Kessler, and I observed under the dark skies of Natural Bridge State Park. It was an excellent night, indeed.

We saw a train of eight fourth magnitude Starlink satellites traverse Scorpius, passing near Antares. Later in the evening, whenever I pointed my binoculars towards the northern sky, in every sixty seconds I saw 1, 2, or 3 satellites – presumably Starlink satellites – cross the field taking 13 seconds to do so. They all were either 6th or 7th magnitude.

All very interesting. But this led me to consider ...

Since the sky has 42,000 square degrees and when they are all finally positioned in 5 years or so, the constellation satellites will total 100,000 – giving 2.5 satellites for every square degree. The bowl of the Big Dipper covers about 42 square degrees in the sky. This means that the Dipper's bowl will always contain about 100 seventh magnitude – or brighter – satellites slowly moving in different directions. These will be visible when it is dark, and when sunlight is able to illuminate them, i.e., for a couple of hours after evening twilight ends and before morning twilight commences, and during most of the night between the ten weeks before and after the summer solstice.

Can you imagine pointing common 10x50 binoculars northward and always seeing upwards of seventy 7th magnitude points of light moving across the field? You won't have to imagine this for much longer. You soon will be able to witness it yourself.

... John Goss

Welcome Mat

The Society bids a warm welcome to Gregory and Doris Mercado, of Bassett, Virginia, who joined the RVAS with a Senior Family membership in July. Both are originally from Long Island, New York. Greg's a 25-year Navy veteran last stationed in Virginia Beach. Doris served 10 years with the Navy's retail sector corporate headquarters, focusing on electronics equipment. They have two grown and married children, Gregory, Jr. and Rachael Ann, whose families have each graced them with two grandchildren. After his Navy years while in Virginia Beach, Greg worked in Environmental Health and Safety in the manufacturing sector. A Martinsville job opportunity for Greg in 2004 brought the couple to Southwest Virginia. They loved the area and settled in Bassett. Greg's long been interested in astronomy. But it was the stars and a meteor shower while aboard a Navy vessel sailing the mid-Atlantic in the 1980s that truly captivated him. About two years ago he invested in a Celestron EdgeHD 9.25" AZ-EQ6 GT telescope and has been viewing the sky from his home. Doris, who credits Greg for her interest, enjoys the night sky and is awed by objects such as the Andromeda galaxy. A web search led Greg and Doris to the RVAS, their first experience with an astronomy club. Connecting with others astrophiles and sharing time under dark skies are primary motivators for their joining, but Greg is also looking for help to develop astrophotography skills. The Mercados are travel and outdoors lovers, who for ten years alternated 5 or 6 months on the road with their RV and the remainder at home. They heartily remember their joy from 5 days backpacking the Grand Canyon from rim to rim and back, and the beauty of the night sky.

Greg and Doris, thanks for becoming RVAS members We're looking forward to meeting you soon. And that includes your 15-year-old Chihuahua, Tequila! We hope you'll be able to join us at upcoming meetings and our annual picnic and star party on September 23rd.

Welcome Mat

The Society bids a warm welcome to Dylan De Meyts (pronounced "mets"), of Roanoke, who joined in August through our Free Introductory Student Membership Offer. Dylan and his sister, Ashen, are Roanoke natives; his mother, Lauren, is a North Carolinian and father, Daniel, a Belgian native. Previously living in Rockville, MD, the family moved here in the fall of 2005 in response to an employment opportunity for Daniel and in hopes of a calmer lifestyle. Dylan's interest in astronomy was given impetus by videos he encountered on the subject during the COVID pandemic. These deepened his perceptions of "what's out there" to a greater appreciation of the universe's diversity, beauty and sheer incomprehensible size. Among the impacts of this is Dylan's contemplation of a career in astrophysics. He's eager to learn and sought an astronomy club in the area. A Google search hit on the RVAS Meetup site and led to his becoming a member, his first experience with an amateur club. Though hindered by trees and light pollution, Dylan enjoys observing from home with his binoculars. He's looking to acquire a decent, portable telescope such as a Celestron 8SE or an 8" Dobsonian, and would appreciate advice from his fellow members. In fact, learning, gaining experience and developing observing skills are his major goals as a new member. Dylan participates in a wide range of extracurricular activities, from playing tennis (including lessons on Mondays), Ultimate Frisbee (a non-contact sport like constant motion football) and video games like Minecraft. He balances these through his love of music, and plays the violin and piano. Dylan's recently taken up the viola in order to join the Roanoke Youth Symphony Orchestra and attended his first rehearsal late last month.

Dylan, we're glad that you've become an RVAS member and are looking forward to enjoying your company at meetings and activities. The RVAS annual picnic and star party for our members and their families is September 23rd. It'll be a great time to connect with other members and take in a dark night sky! We hope to see you and all your family there!

The RVAS Astro-photographers

AUGUST 2023

There is a table with pertinent information after the pictures

VINCE ST. ANGELO – 1



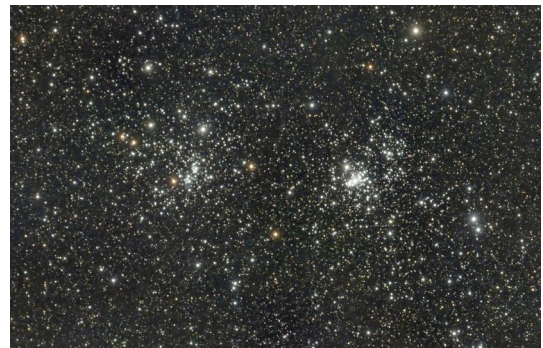
TOM CERUL – 2



TOM CERUL – 3



TOM CERUL – 4



TOM CERUL – 5



TOM CERUL – 6



TOM CERUL – 7



ED DIXON – 8



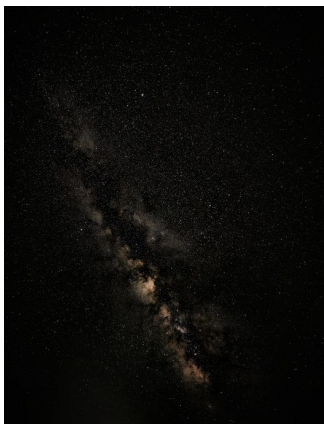
ED DIXON – 9



ED DIXON – 10



ED DIXON – 11



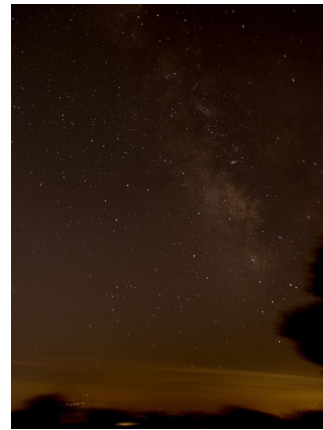
MICHAEL GOOD – 12



MIKE HUTKIN – 13



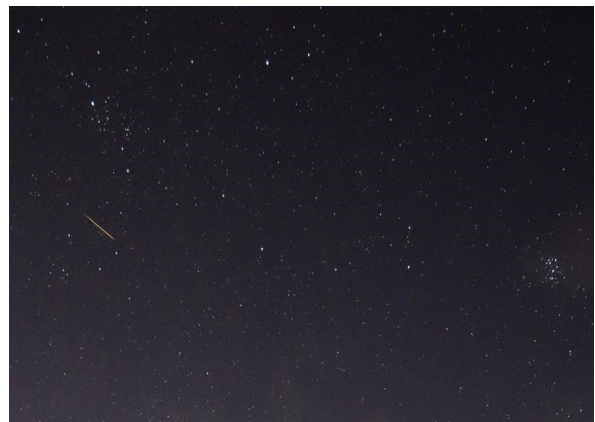
DAVE THOMAS – 14



DAVE THOMAS – 15



DAVE THOMAS – 16



LEGEND

1	Vince St. Angelo - 2 hours from 4-6am on Sunday morning in my back yard. Using my Canon t3i, I was using a Rokinon 8mm Fisheye and luckily was able to catch 1 dim Perseid at the bottom of this photo. For this photo I tracked for 5 minutes at ISO800, f5. North is at the top of the frame, South to the bottom. The Milky Way stretches from left to right near the top of the frame. M31 is clearly visible in the center, while a bit to the left is M33. Jupiter is left center of the frame.
2	Tom Cerul - Old standby, M20 Triffid Nebula. Didn't think I'd get much it was so low in the sky. Plan to image this again when it's above 35 degrees.
3	Tom Cerul - M64 Black Eye Galaxy; Failure, with my 115mm Refractor it was perhaps a "reach to far"! Especially with only 3 subs to stack. Maybe another night with 250 subs I might get better data to work with. Surprised I could even make out the "black eye".
4	Tom Cerul - Double Cluster in Perseus, NGC884 & NGC869
5	Tom Cerul - NGC7635 Bubble Nebula, visual Magnitude 11.0, Apparent size 15 X 8 arcmin, 1400 LY distance. The "bubble" in ngc7635 is about 10 LY across. It was created by stellar wind from the hot, young, massive central star (SAO20575, thought have a mass of 10-20 solar masses) blasted out of the structure of glowing gas against denser material in the surrounding molecular cloud of the nebula.

6	Tom Cerul - NGC7635 Bubble Nebula and M52 Star Cluster
7	Tom Cerul - M27 Dumbbell Nebula also called the Apple Core Nebula. Visual magnitude 7.09 and 1400 light years away, although distance estimates vary from 490 to 3500 light years. I applied some star reduction to more clearly
8	Ed Dixon - A meteor from last night's Perseids meteor shower. Taken with a Nikon D780 and Nikon 24mm f/1.8 lens at 3:33AM. 15 second exposure at f/1.8 and -0.3 under ISO 100. This was one of a few hundred taken over about 2 hours. This was taken at home looking NE with the camera mounted on an iOptron SkyGuider Pro rotator mount.
9	Ed Dixon - First cut at an image of the Moon from 7/26/23. This was taken with a iOptron RC6 scope riding on a iOptron HEM27 mount and a ZWO ASI294MM camera. Image taken at 9:30 PM as a video with 200 total frames at a gain 0, exposure 28ms, and resolution of 8288x5644. Best 25% stacked and processed with Autostakkert, Registax, Pixinsight, and Windows and Apple edit.
10	Ed Dixon - First cut at an image of the Moon from 7/26/23. This was taken with a iOptron RC6 scope riding on a iOptron HEM27 mount and a ZWO ASI294MM camera. Image taken at 9:30 PM as a video with 200 total frames at a gain 0, exposure 28ms, and resolution of 8288x5644. Best 25% stacked and processed with Autostakkert, Registax, Pixinsight, and Windows and Apple edit.
11	Ed Dixon - Image of the Milky Way taken at 10:05PM on 8-5-23 in Middlebury Vermont. Taken as a series of 11 exposures at ISO 1000, 15 seconds, f2.8 with a Nikon Zfc camera and Rokinon 10mm f/2.8 lens mounted on a fixed tripod. Exposures stacked and processed with Pixinsight, GraXpert, Windows and Apple edit.
12	Michael Good - My current project is 5 hours of H-alpha on M57, Ring Nebula. B&W only. Guided at 12 to 15 times a second. What excites me is the literally HUNDREDS of galaxies I have captured in the background, visible on a zoom in as faint non-stellar smudges. This is from four nights, imaging only an hour or so from the zenith.
13	Mike Hutkin - June 21 Blue Ridge Park event; iphone photo
14	Dave Thomas - Photo of Sagittarius made on 08/09/23. 15 second exposure, ISO 2000, 18 mm lens, 30 exposures stacked in DeepSkyStacker64.
15	Dave Thomas - Sunspots from Lynchburg August 16 at 4PM. Canon 850D, Solar filter, 300mm lens, 1/800 exposure, ISO 100
16	Dave Thomas - Perseid meteor 08/13/23 0521am. Canon 850D, 15 second exposure ISO 2000 18 mm.

Wanted

Astro photos for publication on the RVAS Web page, or in the RVAS Newsletter. Send the photos to editor@rvasclub.org. Observing reports and articles are also welcome.



This article is distributed by NASA's Night Sky Network (NSN). The NSN program supports astronomy clubs across the USA dedicated to astronomy outreach.

Visit nightsky.jpl.nasa.gov to find local clubs, events, and more!

Looking Beyond the Stars

Brian Kruse

Looking up in awe at the night sky, the stars and planets pop out as bright points against a dark background. All of the stars that we see are nearby, within our own Milky Way Galaxy. And while the amount of stars visible from a dark sky location seems immense, the actual number is measurable only in the thousands. But what lies between the stars and why can't we see it? Both the Hubble telescope and the James Webb Space Telescope (Webb) have revealed that what appears as a dark background, even in our backyard telescopes, is populated with as many galaxies as there are stars in the Milky Way.

So, why is the night sky dark and not blazing with the light of all those distant galaxies? Much like looking into a dense forest where every line of sight has a tree, every direction we look in the sky has billions of stars with no vacant spots. Many philosophers and astronomers have considered this paradox. However, it has taken the name of Heinrich Wilhelm Olbers, an early 19th century German astronomer. Basically, Olbers Paradox asks why the night sky is dark if the Universe is infinitely old and static – there should be stars everywhere. The observable phenomenon of a dark sky leads us directly into the debate about the very nature of the Universe – is it eternal and static, or is it dynamic and evolving?

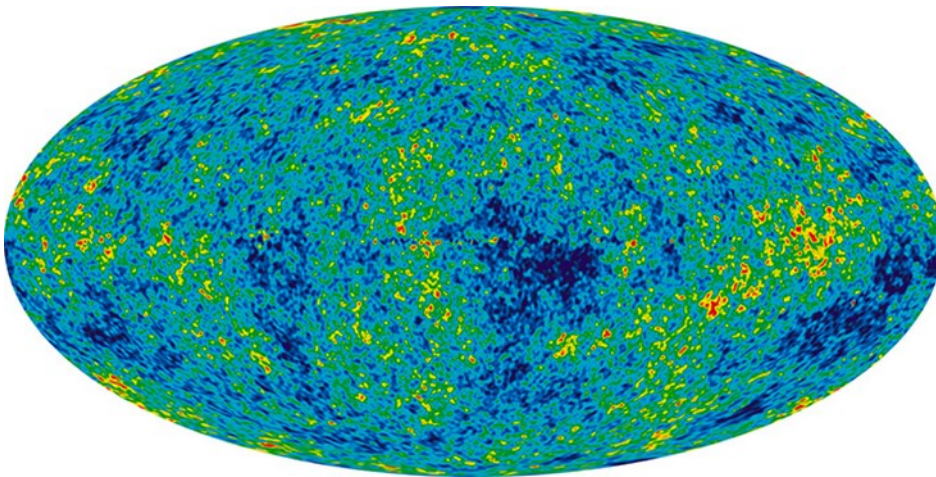
It was not until the 1960s with the discovery of the Cosmic Microwave Background that the debate was finally settled, though various lines of evidence for an evolving universe had built up over the previous half century. The equations of Einstein's General Theory of Relativity suggested a dynamic universe, not eternal and unchanging as previously thought. Edwin Hubble used the cosmic distance ladder discovered by Henrietta Swan Leavitt to show that distant galaxies are moving away from us – and the greater the distance, the faster they're moving away. Along with other evidence, this led to the recognition of an evolving Universe.

The paradox has since been resolved, now that we understand that the Universe has a finite age and size, with the speed of light having a definite value. Here's what's happening – due to the expansion of the Universe, the light from the oldest, most distant galaxies is shifted towards the longer wavelengths of the electromagnetic spectrum. So the farther an object is from us, the redder it appears. The Webb telescope is designed to detect light from distant objects in infrared light, beyond the visible spectrum. Other telescopes detect light at still longer wavelengths, where it is stretched into the radio and microwave portions of the spectrum. The farther back we look, the more things are shifted out of the visible, past the infrared, and all the way into the microwave wavelengths. If our eyes could see microwaves, we would behold a sky blazing with the light of the hot, young Universe – the Cosmic Microwave Background.

The next time you look up at the stars at night, turn your attention to the darkness between the stars, and ponder how you are seeing the result of a dynamic, evolving Universe



NASA's James Webb Space Telescope has produced the deepest and sharpest infrared image of the distant universe to date. Known as Webb's First Deep Field, this image of galaxy cluster SMACS 0723 is overflowing with detail. This slice of the vast universe is approximately the size of a grain of sand held at arm's length by someone on the ground. (Image Credit: NASA, ESA, CSA, STScI) <https://bit.ly/webbdeep>



The oldest light in the universe, called the cosmic microwave background, as observed by the Planck space telescope is shown in the oval sky map. An artist's concept of Planck is next to the map. The cosmic microwave background was imprinted on the sky when the universe was just 380,000 years old. It shows tiny temperature fluctuations that correspond to regions of slightly different densities, representing the seeds of all future structure: the stars and galaxies of today. (Image credit: ESA and the Planck Collaboration - D. Ducros) <https://go.nasa.gov/3qC4G5q>

Monthly Calendar

RVAS 2023 Picnic and Star Party: Saturday, September 23rd, 4:00 p.m. to 10 p.m., Apple Ridge Farm, Copper Hill (Rain Date: Saturday, September 30th). Our annual event for RVAS members and their families. **(Takes the place of the September monthly meeting.)** Tailgate Style Picnic" - Bring your own food, beverages (no alcohol, please) and other dinner needs. Bring your own folding chairs, if desired. Door prizes, silent auction, giveaways and evening observing at ARF observatory! Members are welcome to bring their own scopes. See elsewhere in this issue for additional information, directions and ARF map. Mark your calendar and be sure to join in the fun! The next regular monthly meeting is October 16th.

WEEKEND OBSERVING OPPORTUNITIES: The following information on Fridays and Saturdays that may be suitable for observing is provided as a courtesy to RVAS members and other readers. The RVAS assumes no responsibility for the health and safety of anyone venturing out to stargaze, and cautions all who may do so to observe appropriate COVID-19 health and safety precautions.

Friday and Saturday, September 8th & 9th. Sunset is at 7:39p.m. Astronomical twilight ends at 9:07 p.m. The Moon sets at 4:20 and 5:07 p.m., respectively.

Friday and Saturday, September 15th & 16th. Sunset is at 7:28 p.m. Astronomical twilight ends at 8:55 p.m. The Moon sets at 7:57 and 8:19 p.m., respectively.

Future Weekend Observing Opportunities: October 6th & 7th; 13th & 14th.

Astro-Quiz

How many days out of its average 29.5-day synodic cycle is the Moon visible?

Answer to Last Month's Quiz: Last month we asked which of our solar system's major planets have orbits inclined more than 2.5° from the ecliptic and by how much? By "major planets," we're excluding Pluto, which was downgraded to a "dwarf planet" in 2006. Among the remaining 7 major planets, two have orbits inclined more than 2.5°: Mercury and Venus. Mercury's inclination is 7.0°, while Venus' is 3.4°. Saturn, with an orbital inclination of 2.49°, comes in just a shade from joining Mercury and Venus. Uranus takes the prize for having the least inclined orbit, only 0.8°. Have an answer to this month's quiz (or a future quiz question and answer to suggest)? E-mail it to astroquiz@rvasclub.org!