



# Roanoke Valley Astronomical Society

Amateur Astronomy News and Views  
In Southwestern Virginia



Volume 40—Number 12

December 2023

## *RVAS November Meeting Notes*

# Why Are We Going Back to Venus?

By Erin Elliott, **Secretary**

The Celestial Café was opened at 7:00 pm by **President Mike Hutkin**. The Celestial Café is always a fun and engaging time where members and officers can catch up and tonight was no different. Members and officers spoke about various topics within astronomy, astrophotography, and big updates in their personal lives.

At 7:30, the Café closed and Mike, along with our Membership Coordinator, **Frank Baratta**, welcomed members and guests to the November meeting. To begin, Mike presented the evening's agenda.

**Attendance:** There were 36 members and guests at the meeting, 16 in person, including 3 guests, and 20 attending virtually.

**Astrophotography:** We thank **Tom Cerul**, **Ed Dixon**, **Michael Good**, and **Dave Thomas** for providing their work this month. We had a variety of images focusing on near and deep sky objects.

To provide each image with the focus it deserves, we are sharing the submissions in a separate article in this newsletter. Do not miss checking out the rest of these images.

**Member Observation Reports:** **Michael Martin** has been working on the [Astronomical League's Carbon Star Observing Program](#). **Mallory White** spotted a few of the Leonids Meteors.



*In-person attendees – Mike Hutkin photo*

**Outreach Reports: Rickey Parker** has been doing basic observing and an astronomy overview with boy scout troops in Danville.

**Member Outreach Committee:** We are forming a group of people who are willing to attend outreach events and programs. Currently, we have the following people who are a part of the committee: **Rand Bowden, Dan Chrisman, Ed Dixon, John Goss, Mike Hutkin, Dave Kibler** and **Bill Savage**. We would like three more volunteers to join this group. A few of the upcoming outreach opportunities at the start of 2024 include a presentation on Basics of Astronomy and Observation to both Roanoke County and Franklin County Parks and Rec, and some various programming at Community School.

**Proposed Changes to the RVAS Club Constitution and Bylaws:** The Executive Committee has voted to propose the following changes to the RVAS Constitution and Bylaws and will be asking club members to ratify these amendments. The EC will be working toward a goal of sending out the information and voting for acceptance in January.

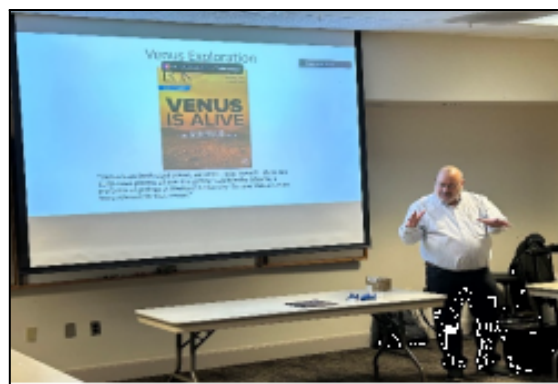
- **Reducing Time in Leadership for the Club President**
- **Adding a Person to the Executive Committee**

**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 December have in store for us. Frank's "What's Up? Highlights" in this issue provide a summary of program. His PowerPoint can be viewed by [clicking here](#). The recording of the program is available by [clicking here](#) and going to the timestamp 21:53 of the video.

**Program:** Often referred to as Earth's twin, Venus is similar in size and bulk composition. But the surfaces of these twins differ dramatically. Moreover, while Venus lacks the plate tectonics of Earth, there is abundant evidence that Venus' surface has changed. **Dr. Scott King**, a professor of geophysics and planetary science at Virginia Tech, finds this intriguing and has made Venus the focus of his most recent research. In this program he shared some of his research and how planned future missions to Venus might address the question of why we are going back to Venus.

Dr. King covered the following topics during his presentation:

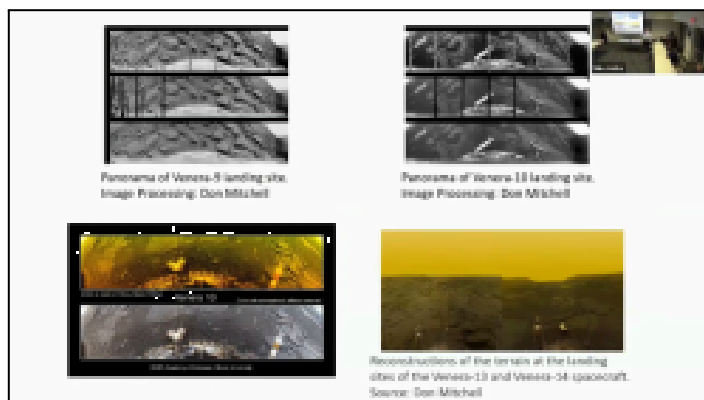
- Why Are We Going Back to Venus
- An update on his involvement with InSight on Mars and what they learned
  - 2018 vs 2022 selfie from InSight
  - Quakes on Mars
- Video on NASA's upcoming Venus missions: DAVINCI+ and VERITAS
- Venus, Earth's nearest neighbor
  - An overview of previous Venus Missions
- Venus' surface
  - Images from Venera-9, Venera-10, Venera-13 and Venera-14
- Earth vs Venus' formation
  - An overview of the past 4.5 billion years
- Bifurcation Event
  - Endogenic vs exogenic



*Dr. Scott King - Mike Hutkin photo*

A big takeaway from this talk is how little we know about Venus and how hopefully these upcoming missions can give us more information about the planet

Dr. King's talk can be viewed in full [here](#).



*Venus Surface - Zoom screenshot*

**Next month:** Next month's meeting will be held on Monday, December 18<sup>th</sup> and will have the following items on the agenda:

- **John Wenskovitch** will review 2023 and give a taste of 2024's programs
- **John Goss** and **Michael Martin** will talk about volunteerism and how you can help
- **Frank Baratta** will give a What's Up for January
- **Mike Hutkin** will go over member goals for 2024
- **Erin Elliott** will present RVAS Awards from 2023
- **Nancy Vogelaar** will lead us in the infamous limericks for 2024. Do not forget to submit your limerick if you're feeling creative!

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 rejoining during the month of December:

**Fred Davis and Sharon Stinnette (2003) - 20 years**

**Dan and Carolyn Chrisman (20012) - 11 years**

**Bill Krause (2020) - 3 years**

**Kathi, Mike and Christian Rakes (2020) - 3 years**

**Richard Stverak (2021) - 2 years**

**Jack, John, Kym, Claire, James and Barrett Ricketts (2022) - 1 year**

**Thanks to all of you for being RVAS members!**

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.

**Officers/Executive Committee/Editor/Webmaster**

**Mike Hutkin, President** ([president@rvasclub.org](mailto:president@rvasclub.org))

**John Wenskovitch, Vice President** ([vicepresident@rvasclub.org](mailto:vicepresident@rvasclub.org))

**Erin Elliott, Secretary** ([secretary@rvasclub.org](mailto:secretary@rvasclub.org))

**Frank Baratta, Treasurer** ([treasurer@rvasclub.org](mailto:treasurer@rvasclub.org))

**Nancy Vogelaar, Member at Large** ([memberatlarge@rvasclub.org](mailto:memberatlarge@rvasclub.org))

**John Goss, Immediate Past President** ([immediatepastpresident@rvasclub.org](mailto:immediatepastpresident@rvasclub.org))

**Michael Martin, Past President** ([pastpresident@rvasclub.org](mailto:pastpresident@rvasclub.org))

**Ed Dixon, RVAS Newsletter Editor** ([editor@rvasclub.org](mailto:editor@rvasclub.org))

**Erin Elliott, Webmaster** ([webmaster@rvasclub.org](mailto:webmaster@rvasclub.org))



Surrounded by a starry background, Dave Thomas beams at the Certificate of Appreciation from the Society.

*Photo by Dave Thomas*

## Editor and Webmaster Retires

After 12 years of dedicated and reliable service to the Society, Dave Thomas announced during the summer that October would be his last newsletter as editor and that he would also be ending his role as our webmaster. He's shown here holding the Certificate of Appreciation awarded to him by the Society in recognition of all the time and effort he's put forth each month. Dave also received a \$100.00 VISA gift card as an additional token of our appreciation.

Dave and his wife, Remona, have been members of the Society since July 1992, placing their 31 consecutive years of membership sixth in terms of Society longevity!

**Congratulations, Dave, and thanks for a job well done!**



# What's Up? Highlights

December 1 to 31, 2023

(From the program presented at the November 20, 2023, meeting. Click [here](#) for the PowerPoint and [here](#) for the video.)

## This Month:

There's lots going on in December beyond it being the heart of the holiday season. Soon after the month begins, we experience the earliest sunset of the year, an event that many non-astrophiles wrongly associate with the solstice, an event that comes two weeks later and that signifies the astronomical beginning of winter. December is also the month of the annual Geminid meteor shower, one of the year's best of such events.

This year, December offers a great time to observe the asteroid Vesta. It's at opposition just before Christmas and just skirts the top of Orion's club, with several stars and an interesting open cluster and diffuse nebula nearby on the 11<sup>th</sup> helping to start your search. And, as our star map indicates, this month continues the dominance of the outer planets in the evening sky, joined by the Moon, which grows from a slender crescent to nearly full from the 16<sup>th</sup> to the 24<sup>th</sup>.



## Celestial Events:

- Wed., 6<sup>th</sup> - Earliest sunset - 5:03:30 p.m. - of 2023 for Roanoke. See link: <https://earthsky.org/tonight/earliest-sunset-today-but-not-shortest-day/>
- Sat., 9<sup>th</sup> - Early risers can view a gibbous Venus (71% illum.) and a slender crescent Moon (13% illum.) separated by 3.8° in the pre-dawn sky.
- Mon., 11<sup>th</sup> - Begin tracking asteroid 4 Vesta, < 0.5° SW of open cluster NGC 2175, embedded within the "Monkey Head" nebula. Vesta, brightest and 2<sup>nd</sup> largest main belt asteroid, reaches opposition on the 21<sup>st</sup>.
- Wed./Thu., 13<sup>th</sup>/14<sup>th</sup> - The annual Geminid meteors peak. The 1-day-old Moon sets early. Expect over 100 meteors per hour from a dark site.
- Thu., 21<sup>st</sup>, 10:27 p.m. EST - Winter begins for the N. Hemisphere as Earth reaches the solstice, the maximum tilt away from the Sun. Longest night of the year and shortest day.
- Sun., 31<sup>st</sup> - Algol ( $\beta$  Per) is at min. brightness for 2 hours centered on 8:23 p.m. (Also, 9:27 p.m. on 14<sup>th</sup>.)

## Sunset and Twilight:

Sunset Range: 5:02 p.m. (Dec. 1<sup>st</sup>) to 5:12 p.m. (Dec. 30<sup>th</sup>)

Twilight Ends: 6:35 p.m. (Dec. 1<sup>st</sup>) to 6:45 p.m. (Dec. 30<sup>th</sup>)

## Moon Phases:

Tue., 5<sup>th</sup> - Last Quarter

Tue., 12<sup>th</sup> - New Moon

Tue., 19<sup>th</sup> - First Quarter

Tue., 26<sup>th</sup> - Full Moon

## Weekend Observing Opportunities:

(Dark of the Moon Weekends)

Dec. 1<sup>st</sup>/2<sup>nd</sup>

Dec. 8<sup>th</sup>/9<sup>th</sup>

# Welcome Mat

The Society bids a warm welcome to Corey Taylor, of Salem, who joined in October with a Free Introductory Student Membership. Corey's a native son of Roanoke's neighbor city. He and his wife, Kaitlin, a native daughter of Salem, were high school sweethearts and have recently celebrated their first anniversary. Corey's pursuing an associate degree as a physical therapist assistant at Virginia Western Community College. It's a long-time interest of his, including two years interning as a rehabilitation aide at Carilion Roanoke Memorial Hospital prior to entering his current degree program. Kaitlin has been employed as a teller at Freedom First Federal Credit Union for about five years. Corey's interest in astronomy was prompted by his fascination with the possibility of life on other worlds, in turn prompting a desire to read more about the cosmos. Elon Musk's vision of colonizing Mars sparked an interest in humans becoming an interplanetary species; Neil deGrasse Tyson became a valuable information resource. While Corey hasn't had opportunities to observe from a dark sky site and doesn't yet own any astronomical equipment, he does enjoy gazing naked-eye at whatever is visible through the Valley's skyglow. He learned about the RVAS from our member Mallory White, his anatomy and physiology professor at VWCC. We're his first experience as a member of an astronomy club and he's looking forward to interacting with other members and learning about our shared interests. When not busy with his studies, spending time with Kaitlin or thinking the cosmos and spacefaring, Corey enjoys being a recreational hockey player and weightlifting. Corey, we're glad that Dr. White informed you about the RVAS and that you've taken advantage of our free student membership. We're also glad that you were able to attend our October meeting in person and found members welcoming and easy to talk with.

## Robert Neil Richert

March 7, 1939 - November 4, 2023



It is with sadness that we report the death of our member and friend Bob Richert on Saturday, November 4, 2023. Bob and his wife, Joel, were family members of the RVAS from October 1989 until her death in 2016, after which he carried on the membership to the end, a total of 34 continuous years.

Born in Columbus, Ohio, with deep roots in Knox County, Bob served in the U.S. Air Force and settled in Roanoke, working for General Electric's Drive Systems Plant in Salem. He was fascinated by the heavens and earth, and often traveled across the country studying and learning more about geodes, rock and minerals of earth. He was a founding member of the historic Old Southwest Neighborhood organization. He also contributed to the 611 steam engine refurbishment and was thrilled to take the first Amtrak train from Roanoke when passenger rail service returned.

He is survived by his daughter, Tam, and son, Curt and his wife, Wendi, along with grandsons, Camden and Benjamin. There are no plans for any type of service at this time. RVAS members who wish to do so may offer a message of remembrance with Oakey's Funeral Service by clicking [here](#) and scrolling down to "Add a Memory."

# December's Night Sky Notes: A Flame in the Sky - the Orion Nebula



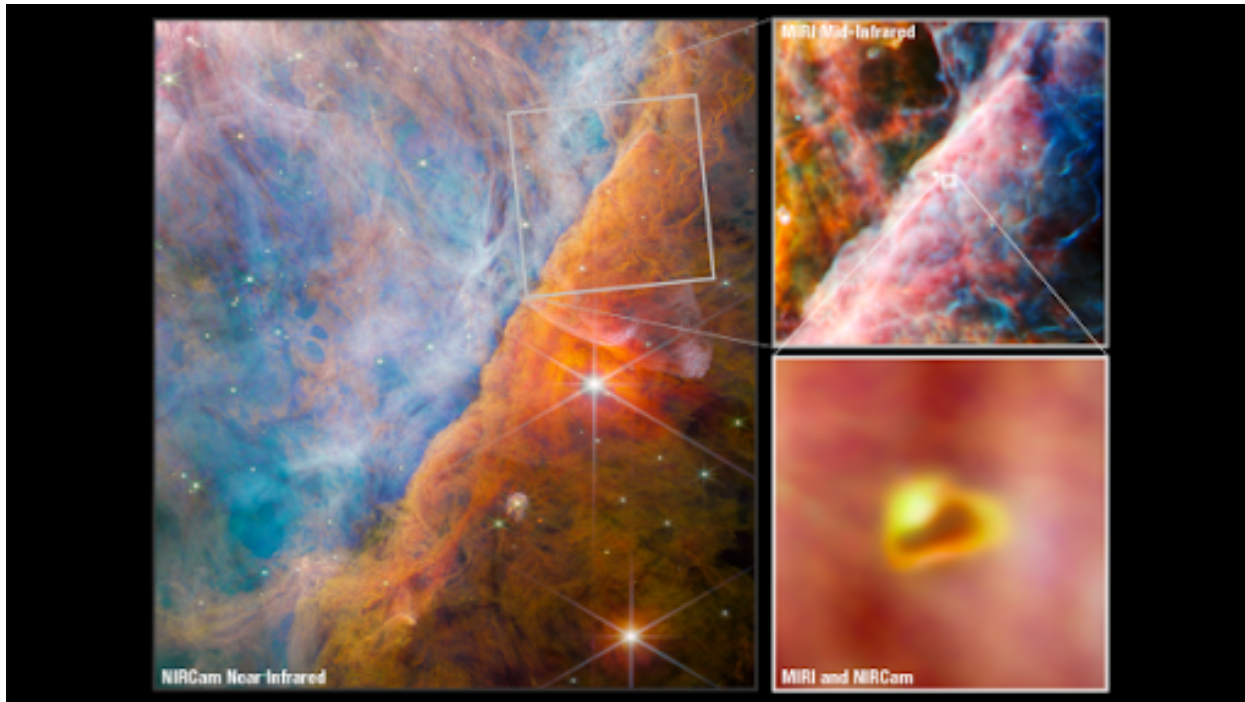
It's that time of year again: Winter! Here in the Northern Hemisphere, the clear, crisp sky offers spectacular views of various objects, the most famous of all being [Orion the Hunter](#).

As we've previously mentioned, Orion is a great way to [test your sky darkness](#). With the naked eye, you can easily spot this hourglass-shaped constellation. Known as an epic hunter in Greco-Roman antiquity, Orion and all its parts have many names and meanings across many cultures. In Egyptian mythology, this constellation represented the god Sah. The Babylonians referred to it as The Heavenly Shepard. In most cultures, it is Orion's Belt that has many stories: [Shen](#) in Chinese folklore, or [Tayamnicankhu](#) in Lakota storytelling. But the Maya of Mesoamerica believed that part of Orion contained [The Cosmic Hearth](#) – the fire of creation.



1,500 light years away from Earth sits the star-forming region, and crown jewel of Orion – Messier 42 (M42), the Orion Nebula. Part of the “sword” of Orion, this 24 light year wide cloud of dust and gas sits below the first star in Orion’s Belt, Alnitak, and can easily be spotted with the naked eye under moderate dark skies. You can also use binoculars or a telescope to resolve more details, such as the Trapezium: four stars in the shape of a keystone (or baseball diamond). These young stars make up the core of this magnificent object.

Of course, it’s not just for looking at! M42 is easily one of the most photographed nebulae around, imaged by amateur astrophotographers, professional observatories and space telescopes alike. It has long been a place of interest for the Hubble, Spitzer, and Chandra X-ray Space Telescopes, with James Webb Space Telescope now joining the list in February 2023. Earlier this year, NASA and the European Space Agency released [a new photo](#) of the Orion Nebula taken from JWST’s NIRCam (Near-Infrared Camera), which allowed scientists to image this early star forming region in both short and long wavelengths.



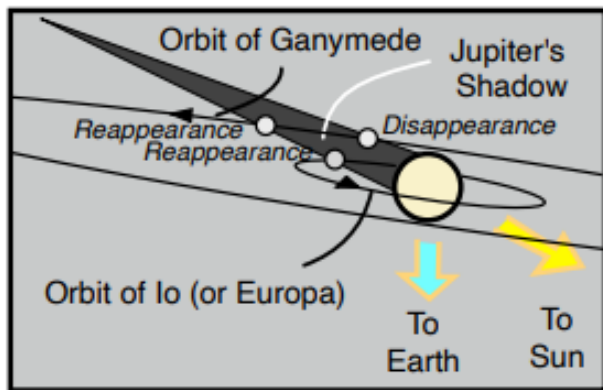
ESA/Webb, NASA, CSA, M. Zamani (ESA/Webb), PDRs4ALL ERS Team

But stars aren’t the only items visible here. In June 2023, JWST’s NIRCam and MIRI (mid-infrared instrument) imaged a developing star system with a protoplanetary disk forming around it. That’s right – a solar system happening in real time – located within the edges of a section called the [Orion Bar](#). Scientists have named this planet-forming disk d203-506, and you can learn more about the chemistry found [here](#). By capturing these objects in multiple wavelengths of light, astronomers now have even greater insight into what other objects might be hiding within these hazy hydrogen regions of our night sky. This technique is called Multi-spectral Imaging, made possible by numerous new space based telescopes.

In addition to the Night Sky Network Dark Sky Wheel, a fun activity you can share with your astronomy club would be [Universe Discovery Guide: Orion Nebula, Nursery of Newborn Stars](#). This will allow you to explain to audiences how infrared astronomy, like JWST, helps to reveal the secrets of nebulae. Or you can use public projects like the NASA-funded [MicroObservatory](#) to capture M42 and other objects.

Learn more about what to spy in the winter sky with our upcoming mid-month article on the [Night Sky Network page](#) through NASA's website!





### Galilean moon emergence

(Elapsed time varies with moon)

Elapsed  
time: 30 sec.

Elapsed  
time: 2 min.

Elapsed  
time: 4 min.



## An "Oh! Wow!" moment through your telescope

Imagine seeing a world emerge in the darkness, taking several minutes to fully appear. Such a body is Io, Europa, or Ganymede on multiple occasions this December.

Aim a telescope at Jupiter shining in the south a few minutes before the event is predicted to take place. Look away from the planet's bright disk, about one planet diameter from its eastern edge. At the designated time, a faint speck can be discerned. As the seconds pass, that speck grows brighter and brighter.

This is one of the large Galilean moons, slowly leaving Jupiter's shadow while orbiting the giant planet. December is a good month this year to witness an event like this in the evening sky, because Jupiter's shadow angles to the east of the planet, putting the emerging moon relatively far from the planet's glare. Each moon takes a different time to fully emerge, because of its diameter and of its orbital velocity around the planet.

Note: December 12 and 19 have Ganymede disappearing into the shadow and reappearing. December 21 and 28 have Io and Europa both disappearing near the same time.

Make sure that Jupiter is sufficiently above the horizon at your location and that the evening twilight has sufficiently darkened. Begin viewing a few minutes before the listed times.

### Event commencement: (all times CST)









Io	Dec 5, 11:34 pm
Io	Dec 7, 6:04 pm
Ganymede	Dec 12, disappearance 5:41 pm, reappearance 7:48 pm
Io	Dec 13, 1:30 am
Europa	Dec 14, 6:24 pm
Io	Dec 14, 7:58 pm
Ganymede	Dec 19, disappearance 9:45 pm, reappearance 11:49 pm
Europa	Dec 21, 9:03 pm
Io	Dec 21, 9:53 pm
Europa	Dec 28, 11:42 pm
Io	Dec 28, 11:48 pm
Io	Dec 30, 6:18 pm

**Use a "high"  
magnification!**


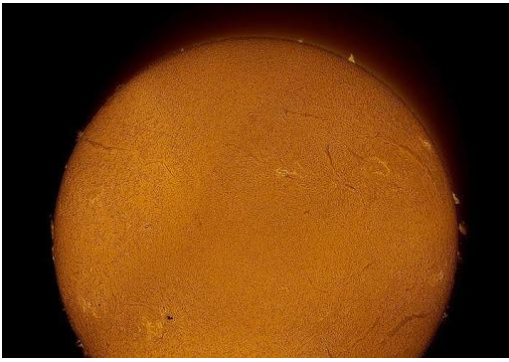
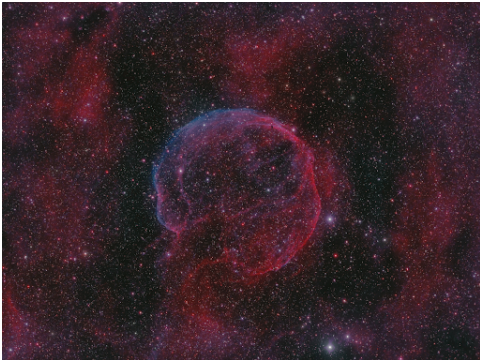


# The RVAS Astro-photographers

NOVEMBER 2023

*There is a table with pertinent information after the pictures*

<p>TOM CERUL -1</p> 	<p>TOM CERUL – 2</p> 
<p>TOM CERUL – 3</p> 	<p>TOM CERUL – 4</p> 
<p>TOM CERUL – 5</p> 	<p>ED DIXON – 6</p> 
<p>ED DIXON – 7</p> 	<p>ED DIXON – 8</p> 



<p><b>ED DIXON – 9</b></p> 	<p><b>ED DIXON – 10</b></p> 
<p><b>CLEM ELECHI – 11</b></p> 	<p><b>MICHAEL GOOD – 12</b></p> 
<p><b>DAVE THOMAS – 13</b></p> 	

#### LEGEND

1	<b>TOM CERUL</b> - M31 Andromeda Galaxy. Need a smaller telescope to better frame this iconic object.
2	<b>TOM CERUL</b> - IC 1848 The Soul Nebula. I set my phone alarm for the Meridian Flip, have one cable that snags occasionally. Decided to add to the 5 hours of images I had and fell asleep again with no alarm. Luckily I woke up before a telescope and mount collision. New item for the to do list while imaging, set a wake up alarm before collision can occur.
3	<b>TOM CERUL</b> - Cygnus Wall (no catalog designation I could find), a portion of NGC 7000 the North American Nebula. If you rotate the image 90 degrees clockwise, the image would represent the east coast of Mexico. The North American Nebula is much to large to capture in one image (at least with my telescope), perhaps in the future I'll try a mosaic to get it all.
4	<b>TOM CERUL</b> - IC 1805 the Heart Nebula. The nebula is a little too large (even with the reducer), needs some "space" around it.
5	<b>TOM CERUL</b> - IC 1396A Elephant Trunk Nebula - 8 1/2 hours total integration time.
6	<b>ED DIXON</b> - First cut at an image of the Heart Nebula. The Heart Nebula, IC 1805, is an emission nebula located 7,500 light years from us in the Perseus Arm of the Galaxy in the constellation

	Cassiopeia. The data is from seven 600 second exposures with an ASI2600MC Pro camera and a gain of 105. Taken 11/5/23, around 11:00 PM, at home with a iOptron HEM27 mount, William Optics GT 71 scope, 0.8m focal reducer, and Optolong L-Extreme Ha filter. Guiding using PHD2 with a ZWO ASI120mm-S camera and ZWO 30mm guide scope. Stacked and processed with Pixinsight, Windows, and Apple Edit.
7	<b>ED DIXON</b> - First cut at an image of the Elephant Trunk Nebula, a concentration of interstellar gas and dust within the much larger ionized gas region IC 1396 located in the constellation Cepheus about 2,400 light years away from Earth. Taken 11/5/23, around 7:45PM, at home with a iOptron HEM27 mount, William Optics GT 71 scope, 0.8m focal reducer, and Optolong L-Extreme Ha filter. Guiding using PHD2 with a ZWO ASI120mm-S camera and ZWO 30mm guide scope. Taken as a series of three 300 second exposures using a ZWO ASI2600MC Pro camera with gain 105. Stacked and processed with Pixinsight, Windows, and Apple Edit.
8	<b>ED DIXON</b> - First cut at an image of M33, the Triangulum Galaxy, taken 11/12/23 , around 11:00 PM, here at home. M33 is a spiral galaxy about 2.7 million light-years from Earth in the constellation Triangulum. Taken with a iOptron HEM27 mount, iOptron RC6 scope, UV/IR cut filter, and ASI2600MC Pro camera. Captured as a series of 18 five minutes exposures and gain of 105. Stacked and processed with Pixinsight, GIMP, Windows and Apple edit.
9	<b>ED DIXON</b> - First cut at an image of Jupiter and 2 of its moons taken 11/6/23 , around 1:00 AM, here at home. Taken with a iOptron HEM27 mount, Celestron 8SE scope, ASI662MC camera, and Televue Powermate 2.5x barlow. Captured as a 60 second video with 6113 frames, gain of 195 and exposure of 7ms. Best 25% of frames stacked and processed with PIPP, AutoStakkert, Registax, Pixinsight, Windows and Apple edit.
10	<b>ED DIXON</b> - First cut at an image of the Sun (11/4/23 around 1:46 PM) with a Daystar Quark eyepiece attachment. This was taken with a William Optics Z61 riding on a iOptron HEM27 mount and a ZWO ASI294MM camera. This is from two sets of about 1381 frames each at 4144x2822 resolution with one for the surface portion and a second for the prominence part. Exposure was 40ms and a gain of 0 for surface, and gain 129 for the second with the best 25% stacked and processed. Resulting images were processed and combined with PIPP, Autostakkert, GIMP, Pixinsight, and Windows, and Apple edit.
11	<b>CLEM ELECHI</b> - LBN 576 in Cassiopeia was imaged in October through Ha and OIII filters using a small refractor.
12	<p><b>MICHAEL GOOD</b> - This is the first planetary image with my new (bought used) C14 telescope. Paul Caffrey has my old C14 now. I have his solar scope J. This image captures Ganymede at 1<sup>st</sup> contact on the limb of Jupiter (this was only visible in the red image, and the moon was behind Jupiter for the green and blue images, showing how quickly it was moving). I manually de-reddened Ganymede when creating the color image.</p> <ol style="list-style-type: none"> <li>1) Improved C14 collimation (Bob's Knobs) with the 2x barlow attached to color filter wheel attached to ZWO 178mm camera.</li> <li>2) Collimation done using star's diffraction rings, which despite reasonable atmospheric seeing, exhibited what is known as Tube Thermals.</li> <li>3) Despite temperature at 40F, tube thermals persisted and I pointed two desktop fans to the carbon fiber tube for a couple hours before I proceeded at around 9pm.</li> <li>4) Took Red, green, and blue series of images using the monochrome camera through filters.</li> <li>5) Jupiter was 49.2 arc seconds in size, at an altitude of 60 degrees above horizon, or Airmass of 1.14</li> <li>6) Focal length was (an amazing) 9,650mm, or equivalent to a 31.6 FOOT long focal length (f27 for this scope), sensor at 17.2 Centigrade.</li> <li>7) I was taking 14msec exposures, gain at 350 (68%), at about 47 frames per second, for 60 second duration. (can reach &gt;100fps without barlow)</li> </ol>



	8) This produced more than 3 GIGABYTES of disk space per each 60 second series, despite tight region of interest (only part of imaging chip used). 9) I selected five sets of images, rotating through red, green, and blue (15 images). 10) Combined each image with AutoStakkert choosing the top 10% of the frames to reject tube thermals and bad seeing. Yes – experimented! 11) Applied three wavelets in Registax for sharpening (middle three at about 10%). Don't use smaller wavelets – just add noise. 12) Opened each image in Photoshop, applying Unsharp Mask and then Topaz DeNoise PER image. Save as jpg's after "converting to grayscale". 13) Opened WinJupos, a tool to combine and account for planetary rotation. 14) Measured each of the RGB images in WinJupos, saving positional data of planet's orientation in special WinJupos text files. 15) Used WinJupos to combine the Red-Green-Blue images into color RGB images, accounting for planet's (small) rotation over about 3 minutes 16) Used WinJupos to combine five of the RGB images into a single MASTER RGB image, accounting for Jupiter's rotation over 24 minute interval. 17) Opened in Photoshop, applied another Unsharp Mask, then another Topaz DeNoise with sharpening. 18) Center point of these 5 RGB images is time tagged as November 13, 2023, at 03:04 Universal Time. Note 19) All in – two days of work for a so-so image of Jupiter. We call this "practice".
13	<b>DAVE THOMAS</b> - A few views of the Moon and Venus this morning.

## ASTRONOMICAL LIMERICKS

It's time to get creative and write your 2023 astronomical limerick to share at the December meeting. Join the fun.

### General form of a limerick:

Line 1:        7-10   syllables A  
Line 2:        7-10   syllables A  
Line 3:        5-7     syllables B  
Line 4:        5-7     syllables B  
Line 5:        7-10   syllables A

### For example:

#### CLOUDY

1. Tonight's the night and observing I will go
2. My scope is ready in my car it's been stowed
3. Cahas mountain is to where I drive
4. Right turn, left turn, soon I arrive
5. Parked and out, but looks like it's cloudy, oh no

Please send your entries to [president@rvasclub.org](mailto:president@rvasclub.org) before December 18.

# Monthly Calendar

**RVAS Monthly Meeting: Monday, December 18<sup>th</sup>, 7:30 p.m. (Informal “Celestial Café” chat session begins at 7:00 p.m.)** Natural Science Center, Virginia Western Community College, Colonial Avenue, Roanoke, VA. This month's meeting is our annual Winter Solstice Social. For those attending in person the RVAS will provide brownies, cake and drinks (nonalcoholic). Those Zooming in are encouraged to join in the spirit of the evening by having their favorite treats and beverages as well while attending virtually. We have a variety of activities planned, including the year 2023 in review and a taste of what's to come in 2024; recognition of members receiving observing, outreach or other awards in 2023; and how members can help through volunteering for leadership opportunities. We'll also have our annual limericks segment for members to share verses submitted in advance or concocted spur of the moment, plus astronomical goals that members have for the new year. And, of course, we'll have our usual announcements, outreach updates, astrophotography, observing reports and What's Up for January. So, plan to attend the festivities, in person or virtually, and watch for the Zoom invitation in the days prior to the meeting.

**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 health and safety precautions.

- **Friday and Saturday, December 1<sup>st</sup> & 2<sup>nd</sup>.** Sunset is at 5:04 p.m. Astronomical twilight ends at 6:35 p.m. The Moon rises at 8:54 p.m. and 9:56 p.m., respectively.
- **Friday and Saturday, December 8<sup>th</sup> & 9<sup>th</sup>.** Sunset is at 5:04 p.m. Astronomical twilight ends at 6:35 p.m. The Moon sets at 2:14 and 2:40 p.m., respectively.
- **Future Weekend Observing Opportunities: January 5<sup>th</sup> & 6<sup>th</sup>; 12<sup>th</sup> & 13<sup>th</sup>.**

## Astro-Quiz

What are the three components of a comet?

**Answer to Last Month's Quiz:** Last month we asked which among the eight planets have been found to possess ring systems and how was each of these systems discovered. The four outer planets—Jupiter, Saturn, Uranus and Neptune—are the only ones known to have ring systems. The earliest to be discovered was that of Saturn. In 1610, Galileo was the first to note extensions to the sides of the planet, but it was 1655 when Christian Huygens accurately determined that a disk encircled Saturn. It was over two centuries later when, in 1777, astronomer James Elliot and his colleagues determined that Uranus had rings during a stellar occultation by the planet. Then, in 1979, Jupiter's rings were revealed in images obtained during the fly-by of the Voyager 1 spacecraft. Records of Neptune's rings include, but are not limited to, an unconfirmed detection by William Lassell in 1846, stellar occultation data from 1968 that went unnoticed until 1977 and another occultation in 1983; definitive evidence of complete rings was not obtained until the Voyager 2 spacecraft's fly-by in 1989. Have an answer to this month's quiz (or a future quiz question and answer to suggest)? E-mail it to [astroquiz@rvasclub.org](mailto:astroquiz@rvasclub.org)!