

Roanoke Valley Astronomical Society

Amateur Astronomy News and Views In Southwestern Virginia



Volume 41—Number 3

March 2024

RVAS February Meeting Notes

Member's Potpourri

By Erin Elliott, Secretary

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

Attendance: There were 38 members and 2 guests in attendance at this month's meeting. 15 were in person and 25 attended virtually.

New Members: We would like to welcome the following new members of RVAS: Ellie, Bret, Chrystal and Lucy Shawn and Rick Shawn. We are excited to have them join us, and you can find an introductory write-up of them in a future newsletter.

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



Caleb White speaking – Mike Hutkin photo

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.



Horsehead and Flame Nebula – Tom Cerul photo

Member Observation Reports: John Goss shared about an observation opportunity at Natural Bridge State Park on February 3. There were 8 people (including Dave and Betsy Kibler, Michael Martin, Jeff and Andrelie Reynolds, and Vincent St. Angelo) on a cold, clear night ready to observe.

Volunteering: John Goss shared a quick moment about how important volunteers are to our club community. Serving as an officer of RVAS is a vital volunteer role for the club, and there are elections coming up in June. There are also chances to help with outreach and special events. If you are interested in learning more about opportunities, please reach out to **Mike Hutkin** or another club officer for more information.

Member Outreach Committee: It has been a busy start to the year for our club's Outreach Committee! A huge thank you to our volunteers for helping spread their love of astronomy to the community. In January and February, we had many of our members head over to Community School to teach students the following topics:

- Ed Dixon discussed gear used for astrophotography, showed students how to use the Seestar set up on his phone, and exhibited some of his photography.
- Mike Hutkin came by twice to talk with students about the Planets & Moons of the Solar System and Our Sun.
- **Rand Bowden** brought over two of his telescopes and showed the class how to set up, use and take down the scopes.
- Mark Hodges brought his solar scope to let students view the Sun.
- **Bill Savage** and his daughter taught students about solar eclipses and helped them make a safe viewing device for the upcoming April eclipse.

On February 6, **Tom Cerul** and **Mike Hutkin** talked with about 25 adults and kids at an event hosted by Franklin County Parks and Recreation. This was an Astronomy 101 Workshop for the community. Tom brought his telescope, and they talked about what to see in the night sky. On February 7, **Mike Hutkin** went to East Salem Elementary School and did a presentation on the Planets and Moons of our Solar System with 66 students and teachers.

Salem Montessori School has reached out looking for opportunities to share with students a wide variety of topics in Astronomy. **Caleb White** is helping to spearhead this project with the school's director. The school has done units in the past with astronomy and now would like more hands-on opportunities for students. They are especially seeking for volunteers for a star gazing opportunity and also showing students the complexities of astrophotography.

There are more upcoming outreach events on the horizon, which include the following:

- March 6, 2024: Ferrum Elementary School has asked for an astronomy presentation and Mike Hutkin will be leading.
- March 9, 2024: Roanoke County Parks and Recreation have requested a 30-minute presentation on the basics of Astronomy and equipment use, which will be followed by an observing session.
- April 8, 2024: Frank Baratta and Ed Dixon are coordinating a Solar Eclipse event with Roanoke Parks and Recreation at the Mill Mountain Discovery Center.
- Claytor Nature Center/Belk Observatory is looking for partnership opportunities with RVAS. They have public programs for the community once a month and they would like us to visit or lead a program. An idea is to help with a Perseid Watch Party August 11-12.

Star Parties in 2024: You asked for it! There will be 4 Star Parties in 2024. These are opportunities for members to come together and share the sky with each other. The first one was supposed to be **Saturday, February 10 at 6:00pm at Cahas Overlook**. Due to rain, it is now rescheduled for March 1 at 6:15pm (with a rain date of March 2 at 6:15). The following parties are projected to be May 4, August 3, and November 22. Please reach out to Mike Hutkin at president@rvasclub.org to join RVAS' Google Group to stay up to date in communication on these events.

What's Up?: Before turning to our program for the evening, Mike asked Frank Baratta for his "What's Up?" program on what the skies of March 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 <u>clicking here.</u> The recording of the program is available by <u>clicking here</u>.

Member's Potpourri Program: A thank you to the members who spent their time preparing for and sharing during this potpourri. If you would like to view the whole program by video, you may do so by <u>clicking this link</u>.



Todd Atkins Planet 9 – Zoom screenshot

Chris Savage - Roanoke Planetarium

- The Eye: A Planetarium Reopens at Roanoke's Center in the Square
 - Legacy Dome
 - 99 New Stadium Seats
 - Dual Laser Projection System: 12,00 Lumens each, 3840 x 3840 resolution
- WorldViewer2 System
- Planned Activities
 - Public Shows
 - School Groups
 - Special Events
 - Live Entertainment
 - Possible Collaborations with RVAS
 - Expert consultations on star shows
 - Guest "lecturers" for premier events

- Docents for weekend interactive shows
- Meeting space?
- Anything else you can think of?

<u>Michael Martin – Astronomical League Sunspotter</u> <u>Program</u>

- Accessible if you have a solar telescope.
- Track the Sun for 2 solar rotations.
- Learn about different sunspots.
- Takes about 2 months to complete.
- Pro tip if you do not have a solar telescope, then wait until after the April 8th eclipse for prices to drop.

John Goss – The Moons of Jupiter

- John showed a video reflecting his observation of Ganymede (one of Jupiter's moons) emerging from eclipse. The video had the following sections:
 - Ganymede Emerges Limerick
 - The "Oh! Wow!" moments of seeing something amazing while stargazing
 - \circ The scene in Jupiter space
 - Ganymede heading into eclipse, disappearing
 - Europa sliding in front of Jupiter
 - Ganymede's Emergence (Oh! Wow! moment)
 - March 7 and March 8 are upcoming events of moons disappearing and emerging from Jupiter

Todd Atkins - Planet Nine Presentation Review

- This is a review of a presentation by Michael E. Brown from Caltech
- "The Solar System is nearly impossible to explain without the existence of Planet Nine" is a quote by Michael Brown
- A historical overview of planetary and object discoveries in our solar system:
 - Uranus
 - Neptune
 - Pluto
 - Kuiper Belt Objects
 - o Sedna
- The presentation showed the importance of math as a tool in discovering these planets and objects.

- The scientists working with Michael Brown have calculations to predict the size and location of Planet Nine.
- Michael Brown's prediction is that Planet Nine will be discovered in the next couple of years. We shall see!

Ed Dixon - New Equipment

- Ed gave an overview of his astronomy viewing background and evolution of the technology leading up to today.
- He has ditched the laptop and now uses a mini-PC and slim monitor.
- Hot and cold weather can be a deterrence for star gazing. Ed has found a way to use technology in his set up to sit in the car and remotely access what the telescope is viewing.
- He utilizes small storage bins to keep his set up, take down and storage simple.



Ed Dixon's Set Up Containers – Ed Dixon photo

Next month: On March 18, 2024, we will have two potentials for the program:

- Plan A Roanoke College StarShade
 Project: Roanoke Students earn second place in a national NASA challenge. A StarShade is a machine created to help telescope systems record data about faraway exoplanets that orbit large stars.
- Plan B A PhD student from the UK who works on variable stars with machine learning.

The meeting was adjourned at 9:00 pm.

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, <u>click here</u>. Articles, quotes, etc. published in the newsletter do not necessarily reflect the views of the RVAS or its editor.

<u>Officers/Executive Committee/Editor/Webmaster</u> Mike Hutkin, President (president@rvasclub.org) John Wenskovitch, Vice President (vicepresident@rvasclub.org) Erin Elliott , Secretary (secretary@rvasclub.org) Frank Baratta, Treasurer (treasurer@rvasclub.org) Nancy Vogelaar, Member at Large (memberatlarge@rvasclub.org) John Goss, Immediate Past President (immediatepastpresident@rvasclub.org) Michael Martin, Past President (pastpresident@rvasclub.org) Ed Dixon, RVAS Newsletter Editor (editor@rvasclub.org) Erin Elliott, Webmaster (webmaster@rvasclub.org)



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 <u>nightsky.jpl.nasa.gov</u> to find local clubs, events, and more!

March's Night Sky Notes: Constant Companions: Circumpolar Constellations, Part II



In the appearance of left to right: constellations Perseus, Camelopardalis, and Lynx in the night sky. Also featured: Cassiopeia as a guide constellation, and Capella as a guide star. Credit: Stellarium Web

by Kat Troche of the Astronomical Society of the Pacific

As the seasons shift from Winter to Spring, heralding in the promise of warmer weather here in the northern hemisphere, our circumpolar constellations remain the same. Depending on your latitude, you will be able to see up to nine circumpolar constellations. This month, we'll focus on: Lynx, Camelopardalis, and Perseus. The objects within these constellations can all be spotted with a pair of binoculars or a small to medium-sized telescope, depending on your <u>Bortle scale</u> – the darkness of your night skies.

- **Double Stars:** The area that comprises the constellation Lynx is famous for its multiple star systems, all of which can be separated with a telescope under dark skies. Some of the notable stars in Lynx are the following:
 - \circ 12 Lyncis a triple star that can be resolved with a medium-sized telescope.
 - 10 Ursae Majoris a double star that was once a part of Ursa Major.
 - **38 Lyncis** a double star that is described as blue-white and lilac.
- Kemble's Cascade: This <u>asterism</u> located in Camelopardalis, has over 20 stars, ranging in visible magnitude (brightness) and temperature. The stars give the appearance of flowing in a straight line leading to the Jolly Roger Cluster (NGC 1502). On the opposite side of this constellation, you find the asterism Kemble's Kite. All three objects can be spotted with a pair of binoculars or a telescope and require moderate dark skies.



A ground-based image from the Digitized Sky Survey (DSS) in the upper left shows Caldwell 14, the Double Cluster in Perseus, with an outline of the region imaged by Hubble's Wide Field and Planetary Camera 2 (WFPC2).

Ground-based image: Digitized Sky Survey (DSS); Hubble image: NASA, ESA, and S. Casertano (Space Telescope Science Institute); Processing: Gladys Kober (NASA/Catholic University of America)

• **Double Cluster:** The constellation Perseus contains the beautiful Double Cluster, two open star clusters (NGC 869 and 884) approximately 7,500 light-years from Earth. This object can be spotted with a small telescope or binoculars and is photographed by amateur and professional photographers alike. It can even be seen with the naked eye in very dark skies. Also in Perseus lies **Algol, the Demon Star**. Algol is a triple-star system that contains an eclipsing binary, meaning two of its three stars constantly orbit each other. Because of this orbit, you can watch the brightness dim every two days, 20 hours, 49 minutes – for 10-hour periods at a time. For a visual representation of this, revisit <u>NASA's What's Up: November 2019</u>.

From constellations you can see all year to a once in a lifetime event! Up next, find out how you can partner with NASA volunteers for the April 8, 2024, total solar eclipse with our upcoming mid-month article on the <u>Night Sky Network</u> page through NASA's website!

Welcome Mat

The Society welcomes Rick Shawn, of Roanoke, who received a gift membership from his son and daughter-in-law, Bret and Chrystal Shawn, of Roanoke, who also became members since the last meeting.

Thanks to all the Shawns for joining the RVAS!

February Observing at a Dark Sky Park

By John Goss

On the first Saturday of February, while California was being pummeled by record rain, good weather dominated the scene in southwest Virginia. Eight RVAS members took advantage of the clear skies – and cold temperatures – by heading to Natural Bridge State Park for an evening of mighty fine observing.

In their own words ...

Bill Krause spotted the elusive Uranus for his first time, targeted Jupiter, explored the Orion Nebula, and located a number of Messier objects – M31, M42, and the like. "Jupiter was so bright, I could hardly look at it." Bill used his Celestron 8 inch SCT with Star Sense auto alignment as his ship to the stars.

Betsy Kibler admired the Andromeda Galaxy, the Double Cluster, and the Orion Nebula through her 8x42 binoculars. And she was amazed as she followed the band of the Milky Way across the sky from horizon to horizon. Betsy said that it was one of her best viewing sessions!

Dave Kibler sought objects with his giant 25x100 binoculars. His thoughts about the evening's observing session? "I am always impressed by the friendliness of our club members at these outings, particularly our very experienced observers, who are more than willing to share viewing tips and even the chance to view through their scopes. This is a terrific learning experience for those of us looking to become better night sky observers. This was all possible because of the dark-sky opportunity at NBSP."

Jeff and Relee Reynolds brought their new Sky-Watcher 10" Collapsible Dobsonian telescope with SynScan that had recently arrived. Jeff said, "We didn't see anything that would qualify as unusual as we are learning the basics, but we were particularly excited to resolve the features of the Orion nebula, as well as spot Andromeda with the naked eye and then compare it through the scope."

While everyone else had their eyes glued to their eyepieces, Relee was excited to see a meteor streak across the heavens. Her summation of the evening, "I had fun, it was my first time seeing Jupiter, Orion Nebula, Andromeda, etc. It was so beautiful."

Michael Martin first used his 10x50 binoculars before switching to his 12 inch Sky-Watcher Dobsonian. "I began the night finishing my last two objects for the Astronomical League's Messier Binocular Program – M33, the Pinwheel Galaxy and M1, the Crab Nebula."

Then Michael gave his new telescope, being used for the first time under dark skies, a real test. "Open star clusters were the theme of the night with M37, M67, M44 the Beehive Cluster, and the Double Cluster



being the "stars" of the show. One thing that jumped out at me was the increased density and number of stars in these objects under darker skies. Outside of star clusters, I was able to view NGC 2024, the Flame Nebula, for the first time. The cigar shape of M82 had more structure and complexity than I have ever seen. A 35 minute drive for a Bortle 3 sky isn't a bad deal!!!"

Vincent St. Angelo, traveling from Forest, brought his wide field 6 inch f/5 reflector along with his Canon t3i camera with an 18 mm lens. Taking advantage of the good southern horizon, he spent time on the globular cluster M79 in Lepus. He was pleased that he spotted the stars of Columba, even further south than those of Lepus. Vince commented, "It was fun sharing views and experiences with the others in attendance."

John Goss brought his 10x50 binoculars and an 8 inch f/4 reflecting telescope to Natural Bridge. "In the unusual category, I particularly enjoyed viewing the "37 cluster" (NGC 2169) at 77x. (Yes, its stars really do trace the figure of a "37".) I also liked the challenge of splitting the double star Iota Cancri with 10x50 binoculars."

Thank you Dave and Betsy Kibler, Jeff and Relee Reynolds, Bill Krause, Michael



Martin, Vincent St Angelo, and John Goss for participating in this wonderful evening full of celestial wonders!

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 March:

Harry Montoro (1991) – 33 years Tom and Dolores Skelly (2000) – 24 years Rand Bowden (2003) – 21 years Michael and Barbara Hutkin (2016) – 8 years David Rauchle (2019) – 5 years Andy Dupree (2023) – 1 year

Thanks to all of you for being RVAS members!

RVAS Meeting Room Change

Effective for the February 19th Meeting and Thereafter Celestial Café at 7:00p.m.; Meeting at 7:30 p.m.

Beginning with last month's meeting, our previous meeting room at VWCC became unavailable due to a class being held there this Spring. Thanks to RVAS member Mallory White, Assistant Professor at VWCC, we are now meeting in VWCC's STEM Building, Room ST112, a larger, more modern room (like a small auditorium with desks) with the same technology. Read the following note carefully and see the map below.

Note: Using Google for directions to the STEM Building yields incorrect guidance to access the parking lot from the roundabout at McNeill Drive. That roundabout <u>does not</u> provide an entrance to the parking lot. Access to the parking lot is from the roundabout at Overland Drive and Colonial Avenue, near the Campus Security Building at the top right of the map below. Follow the darker blue path from that roundabout and park anywhere in the lot. The STEM Building is at the opposite end of the lot from Campus Security.



RVAS EXECUTIVE COMMITTEE MEETING

RVAS executive committee met on February 22, 2024. This meeting was open to the membership. Attendees: Frank Baratta, John Goss, Michael Martin, Erin Elliott, John Wenskovitch, Mike Hutkin

Topics discussed:

New meeting location

- The committee acknowledged the work of Mallory White to secure our VWCC meeting location and for providing logistical support.
- A web cam will be tested at the next meeting to provide greater in person coverage

June Elections status

- Nominating committee members Michael Martin and John Goss reported that two candidates have agreed to be placed in nomination for president and vice-president.
- A candidate for the second Member at Large position is still needed

Bylaws / Constitution changes - approved

• The latest amendments were approved 100% by 43 respondents. The latest version of the documents will be put on the website

Business cards vs handouts

• While the RVAS has a handout sheet describing the club and how to contact us, it was felt that for the cost, business cards would be a good option and will be pursued

Picnic 2024

Claytor Nature Center / BELK Observatory

Night Sky Network ambassador

- This item was tabled until the next EC meeting. More discussion needed
- Earth Day
 - April 20 in Roanoke Grandin area. We will plan to participate with one space allocated. A coordinator is needed

Website

- Nancy Vogelaar will assist with wording updates; the newsletter needs to be updated each month Newsletter
 - Looking good; Thanks to Ed Dixon

April Meeting

• John Goss will preside in Mike Hutkin's absence

LiTel East Salem Library

- John Goss has a LiTel scope available to place in a library
- Mike Hutkin to contact the Salem Library and gauge interest

Programming

- Priority is on settling the March program
- John W. has options he is pursuing

What's Up? Highlights March 1 to 31, 2024

(See RVAS February Meeting Notes in this issue for links to the PowerPoint and program video.)

This Month:

In Shakespeare's play, Julius Caesar proclaims, "I am constant as the northern star . . . ," seemingly unaware that Hipparchus had discovered otherwise a generation before his birth. Over sixteen hundred years passed before Galileo intoned-in a wholly different circumstance—"E pur si muove! (Italian: "And vet it moves!") Fast forward to today and we've become accustomed to change, as in the paradoxical saying, "The only constant is change!" Here it is, March, a month again reminding us of change, as we reset our clocks to align with the equinox marking the beginning of our spring. Of course, the budding forsythias, quinces and maples have been alerting us to the changing seasons for weeks. Moreover, change and motion are linked, and March begins and ends with two visible occasions of motion: the first, an occultation; the second, the passage of a Halley-type periodic comet, first recorded in 1385. Each an example of "Tutto si muove!" (Italian: "Everything moves!")



Moon Phases:

Sun., 3rd – Last Quarter

Celestial Events:

- Sun., 3rd Moon occults Antares (α
 Sco). Disappearance near terminator about 2:20 a.m. EST; reappearance 2:45 a.m. at dark edge. Grazing event?
 - Sun, 10th Daylight Saving Time begins at 2:00 a.m. Set clocks ahead one hour at bedtime Saturday, the 9th.
 - Tue., 19th The equinox (11:06 p.m. EDT). Spring begins for N. Hemisphere. Usually, best time to view the
 - Zodiacal Light in west an hour after sunset, but Moon phases obscure its faint glow until the 27th and for next ten days.
 - Sun., 24th Best view of Mercury for 2024: mag. –0.2 and 12° high in WNW 30 minutes after sunset. Find a clear horizon. Try naked-eye and binoculars.
 - Sun./Mon., 24th/25th Deep penumbral lunar eclipse. Begins 12:53 a.m. EDT on 25th. Max eclipse 3:13 a.m. eclipse ends 5:33 a.m.
 - Sat., 30th View comet 12/P Pons-Brooks, possibly at magnitude 5 (near naked-eye visibility under dark skies), 0.5° NW of Hamal (α Ari).

Sunset and Twilight:

Sunset Range: 6:13 p.m. (Mar. 1^{st}) to 7:41 p.m. (Mar. 31^{st}) Twilight Ends: 7:40 p.m. (Mar. 1^{st}) to 9:10 p.m. (Mar. 31^{st})

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Weekend O	bserving Or	portur	ities:		Mar. $1^{st}/2^{nd}$	Sun., 10^{m} – New Moon
	Dark of the N	Moon V	Voolvonde	a –	Mar 8 th /0 th	Sun., 17 th – First Quarter
(1		veckenus	18)	Mar. $\frac{0}{7}$	Mon., 25 th – Full Moon	
					Mar. $29^{-7}30^{-1}$	

Roanoke Valley Astronomical Society Monday, March 18, 2024, 7:30 PM

"The Hunt for Dark Matter Axions"

Christian Boutan, PhD Pacific Northwest National Laboratory



Christian Boutan Experimental Physicist Pacific Northwest National Laboratory The discovery of the axion, a hypothetical elementary particle, could simultaneously solve deep mysteries in quantum chromodynamics and cosmology. The Axion Dark Matter eXperiment (ADMX) is a DoE "Generation 2" dark matter project searching for the conversion of axions to photons. Over the last decade, ADMX has undergone multiple upgrades and is now operating with unprecedented sensitivity. Dr. Boutan will discuss the axion as a dark matter candidate, present an overview of ADMX, discuss recent results, and outline his own plans in the continued hunt for the elusive axion.

Christian Boutan is a post-doctoral research physicist at the Pacific Northwest National Laboratory, Richland, Washington. He earned his PhD in physics at the University of Washington in 2017 and has been extensively involved in dark matter research for more than a decade, especially the detection of the axion. Recently, the Department of Energy honored Boutan with a 2023 Early Career award through its Office of High Energy Physics. The \$2.5 million prize gives Boutan five years of funding to develop a scalable strategy for discovering high-mass axions.

RVAS 2024-2025 Elections – Proposed Slate!

It's that time of year again—Elections! The Nominating Committee composed of past presidents John Goss and Michael Martin proposes the following slate of candidates:

President: Michael Good Vice President: Bill Krause Secretary: Erin Elliot (incumbent) Treasurer: Frank Baratta (incumbent) Officer at Large #1: Nancy Vogelaar (incumbent) Officer at Large #2: Caleb White

Any member in good standing age 18 or older who wishes to the run for an RVAS office is welcomed and encouraged to do so. Simply send to secretary@rvasclub.org an e-mail indicating the office for which you want to run and briefly describing why you're interested in running. In order to be added to the list of candidates, your e-mail must be received within 15 calendar days of the date this newsletter was published (i.e., emailed to RVAS members).

The RVAS Astro-photographers

February 2023

Ctrl- Click on the picture see the source file and additional information





Monthly Calendar

RVAS Monthly Meeting: Monday, March 18th, 7:30 p.m. (Informal "Celestial Café" chat session begins at 7:00 p.m.) STEM Building, Room ST112, Virginia Western Community College, Colonial Avenue, Roanoke, VA. See campus map and information in this issue. This month's featured program is "The Hunt for Dark Matter Axions," presented by Christian Boutan, PhD. Dr. Boutan is an experimental physicist with the Pacific Northwest National Laboratory (PNNL) and has an extensive background in dark matter physics. He is especially associated with the Axion Dark Matter eXpeiment (ADMX), a Department of Energy "Generation 2" project. He will be discussing this field of research and his own involvement in the continuing hunt for this elusive hypothetical particle. (See elsewhere in this issue for more about Dr. Boutan and his program). Rounding out the evening will be announcements, outreach updates, astrophotography, observing reports and What's Up for April. Make plans to attend, 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 or safety of anyone venturing out to stargaze, and cautions all who may do so to observe appropriate health and safety precautions.

- Friday and Saturday, March 1st and 2nd. Sunset is at 6:15 p.m. Astronomical twilight ends at 7:41p.m. The Moon rises at 12:20 and 1:26 a.m., respectively. All times listed are EST.
- Friday and Saturday, March 8th and 9th. Sunset is at 6:22 p.m. Astronomical twilight ends at 7:49 p.m. The Moon sets at 4:27 and 5:44 p.m., respectively. All times listed are EST.
- Friday and Saturday, March 29th and 30th. Sunset is at 7:40 p.m. Astronomical twilight ends at 9:10 p.m. The Moon rises at 12:18 a.m. and 1:22 a.m., respectively. All times listed are EDT.
- Future Weekend Observing Opportunities: April 5th and 6th; May 3rd and 4th. Note: May 3rd (rain date, May 4th) is the quarterly RVAS star party.

Astro-Quiz

Among the objects listed in the Messier catalog is the globular star cluster that is closest to Earth, which has a distinctive feature when viewed at moderate magnification. What is the cluster's Messier catalog number and what is its distinctive feature?

Answer to Last Month's Quiz: Last month we noted that it was Galileo's observation of a full series of Venus' phases—not his observations of the motions of Jupiter's moons—that overturned Ptolemy's earth-centered system. We asked what it was about Venus' phases that ended the Ptolemaic system's thousand-year reign. Proceeding in order outward from Earth in Ptolemy's system are the Moon, Mercury, Venus, the Sun, Mars, Jupiter, Saturn, and the Fixed Stars. However, seeing all the phases of Venus includes seeing it fully illuminated. But that is something that cannot happen if Venus remains between Earth and the Sun—some portion of Venus's dark side will be seen. A fully illuminated Venus can only be seen from Earth if it lies beyond the Sun from Earth, and this violates the Ptolemaic order, while supporting the heliocentric model of the heavens. Thanks to Dan Chrisman for answering the quiz. Have an answer to this month's quiz (or a future quiz question and answer to suggest)? E-mail it to treasurer@rvasclub.org!