RVAS November Meeting Report

Lunar Foreshortening: Observing at the Edge

By Mike Hutkin, RVAS Secretary

President Michael Martin called the November meeting to order at 7:30 pm, presented the evening’s agenda, and welcomed the 28 members and 7 guests. Our guests were asked to introduce themselves and they included Bob Crawford, Dave Kibler, and Judy Hopping. Dave met Ray Bradley at the Mercury transit viewing at Andrew Lewis Middle School and took Ray up on his suggestion to come to our meeting. Judy is a transplant from Long Island, NY. and was looking to continue her interest in astronomy here in the Roanoke valley. In addition, we were glad to see Spenser Eason, Jessica Duvall, Taylor Poff, and Zander LeNoir. They are students in President Martin’s A.P Government class at Lord Botetourt H.S. and were here to support their teacher.

Next, Vice President Todd Atkins took a moment to pass out paper to the members in attendance and asked that they write down and turn in any ideas they have for future RVAS meeting programs. We encourage all of our members to let their interests be known so that we can bring appropriate programs to future meetings.

The next agenda item was our observing and new equipment reports. Greg Hemmings discussed his interest in astrophotography and new camera equipment he is using to look at our closest celestial body, the moon. We encourage Greg to share his work with the membership through our information sharing applications. Genevieve Goss showed, and circulated, a copy of a past “Heavenly Highlights” Roanoke Times newspaper article from New Year’s Day and encouraged our members to look for this year’s edition. She then reported on the trip she and husband John Goss had taken to

Michael Martin poses with his Lord Botetourt H.S. students here to support their teacher.

Photo by Bill Dillon

(Meeting Continued on page 2)
Sedona and Flagstaff Arizona, being there during the recent Mercury transit of the Sun. Having only binoculars at hand, the observing in Sedona was not very good, but venturing on to Flagstaff they went to the Lowell Observatory and were treated to an excellent view of the transit using the Observatory’s solar equipment.

President Martin next reported his completion of the 110 item Messier list, which is a noteworthy accomplishment. The membership acknowledged Michael’s efforts with a round of applause.

Frequent observer, Keith Wimmer, reported on some of his observations this past period including M27, the Dumbbell nebula.

Past President Dan Chrisman reported on the November 11 Mercury transit outreach event at Andrew Lewis middle school. Over 100 children, teachers, and even some passing Salem police officers got a chance to see the transit through the 5 different telescopes set up by the Outreach team. Dan mentioned the success he had in discussing the mechanics of mercury transits using his handcrafted model for visual aid.

Finally, Exec. Comm. Member at Large, Ray Bradley showed a video he had taken on a family outing to Wallops island. This showed the November 2 launch of the Antares rocket to resupply the International Space Station. Kudos to the Bradley family who left Roanoke at 9 pm on November 1 and arrived at the island at 4:00 a.m. on launch day. It was interesting to see in Ray’s video the delay of almost 20 seconds between liftoff and when the sound reached his observing location.

The next agenda item was the RVAS outreach program update presented by Ray Bradley. With a very busy year behind us and with the Thanksgiving and Christmas holidays approaching, no events are planned until February 2020. Ray then took the opportunity to present 2018 outreach support pins to recipients who were not at the RVAS annual picnic.
in October. This included Keith Wimmer, Clark Thomas, and Rick Rader, whose support is much appreciated.

Next on the agenda, Frank Baratta presented our What’s Up sky review for the coming month. Observers can begin December with a heavenly line-up visible on the 1st, about 30 minutes after sunset, but you’ll need a good southwestern horizon. Looking in that direction, Venus, a brilliant mag. -3.9, is easy to spot, hanging 12° high. Just 7° to its lower right is Jupiter, mag. -1.8, only 9° above the horizon. Head 11° the opposite direction from Venus and about 20° high you’ll encounter Saturn, at mag. 0.6. Another 25° beyond Saturn, the Moon completes our line-up.

December includes several calendrical and time events of interest to astrophiles. Among these, the earliest sunset for the year takes place on the 6th; the Winter Solstice, on the 21st; and on the 25th it’s not only Christmas, but also the Equation of Time reaches one of the four yearly instances when solar and civil time agree. And, as implied by reaching the earliest sunset, darkness arrives a bit later thereafter each day. On the night of the 13th/14th, the annual Geminid meteor shower peaks, but the Moon, just 2 days past full, will brighten the sky, sharply reducing the number seen.

For more on the December sky, see the “What’s Up Highlights” in this issue. Frank’s entire “What’s Up” PowerPoint can be found on the RVAS website, rvasclub.org, under “Tips and Topics”.

President Martin then introduced Immediate Past President of the Astronomical League and RVAS member John Goss who presented "Observing at the Edge: Understanding foreshortened lunar features". For many months, as we moved toward the 50th anniversary of the Apollo 11 moon landing, John shared his challenging lunar questions of the day (LQOD), encouraging RVAS members to think about and acquaint themselves with our closest celestial neighbor.

John’s interest in the moon, which he noted began at about age 6, was again on display today as he reminded us that the moon, which is an average of 240,000 miles away, has been observable to anyone who has lived on earth just by looking up into the evening skies. Amateur or professional, having telescope equipment or not, anyone can look up and with their own eyes observe the moon.

But what do we really see? We know that the moon is tidally locked to the earth with its orbital period matching its rotation, taking 28 days to go around the Earth and 28 days to rotate once around its own axis. Thus, excluding lunar phases, the observable lunar surface we see from our point on earth never changes.

Our speaker reminded us that what we observe is a flat disc with craters and mountains appearing only as changes in light and shadows.

Looking straight on at a full moon, craters located at the center of the disc appear in their true shape relative to diameters and surface area. But what about the craters that appear closer to the edges or actually on the edge? Because we are looking at a sphere but seeing a disc, mare and craters become compressed and more oval the closer they are to the edge. Those on the edge appear only as a line distinguishable by variations in the heights of
the mare or crater rim. This was, as John explained, the concept of “foreshortening”.

Our speaker would then go on to examine the effect in more detail for Mare Crisium, Crater Grimaldi, and Crater Riccioli. In the photo shown later in this newsletter titled, “Foreshortening: Mare Crisium” one can see John’s use of the trigonometric (secant) function to mathematically stretch the image along the horizontal and vertical axis achieving a result that closely matches actual photographs taken by NASA’s lunar reconnaissance orbiter missions to map the lunar surface. Our speaker then went on to demonstrate the same technique to look at the images of Crater Grimaldi and Crater Riccioli which are located on the left edge of our observable lunar surface.

Thus far we were learning about foreshortening with one-dimensional viewing and an image projected onto a screen. John then wowed the audience by going three dimensional and projecting the two-dimensional image of the lunar surface onto a white globe.

This was a great way to understand lunar foreshortening because the flat projection on a 3-dimensional surface provided us the opportunity to
walk around the globe and see the mare and craters in an approximation of their true (unstretched) image. Members were then encouraged to come up to the front of the room and check this out for themselves and many took advantage of this opportunity. The floor was then opened to questions and several were posed and discussed.

At the conclusion of the presentation, President Martin thanked John for his informative and engaging presentation, and the meeting was adjourned.
What's Up Highlights
December 1–31, 2019

(A summary of the What's Up program presented at the November 18th meeting.)

This Month:
We're once again in the thick of the holidays, that
time of year when it seems like one big meal from
Thanksgiving to New Year's day. But for astro-
philes, it's also the time of year when the
earliest sunset brings earlier evening ob-
serving opportunities, when the evening
chill deepens and Orion and other daz-
zling patterns appear in an often trans-
parent but shimmering night sky. For
devotees of meteor watching, December
brings one of the year's best showers,
the Geminids, though the Moon interferes
with the show this year. Later in the
month, the Sun reaches its lowest arc
across the daytime sky, marking the official
change of the seasons and the longest day of
the year. Happy Holidays! Bundle up, get out
and enjoy the celestial feast!

December Celestial Events:
- Wed., 4th - Moon at apogee; 63.41 Earth-radii from Earth.
- Fri., 6th - Earliest sunset of 2019 for Roanoke, 5:02:05 p.m. (The latest sunrise takes place on January 6, 2020, 7:34:04 a.m., after the Winter Solstice on December 21st.)
- Fri., 13th - Moon at ascending node (ecliptic longitude 98.4°).
- Fri., 13th /Sat.,14th - Peak of annual Geminid Meteor Shower. Moon is just 2 days past full.
- Fri., 18th - Moon at perigee; 58.05 Earth-radii from Earth. (8.5% closer than on the 5th.)
- Sat., 21st - Winter Solstice (11:21 p.m.) Beginning of winter; longest night of the year.
- Wed., 25th - Christmas. Also, the Equation of Time is 0 - sundials and clocks momentarily agree
and then begin to diverge.
- Thurs, 26th - Moon at descending node (ecliptic longitude 278.4°) and at southernmost declina-
tion for 2019 (- 23.23°).

Sunset and Twilight:
Sunset Range: 5:02 p.m. (Dec. 1st) to 5:12 p.m. (Dec. 31st)
Twilight Ends: 6:35 p.m. (Dec. 1st) to 6:45 p.m. (Dec. 31st)

Weekend Observing Opportunities:
Dec. 20th/21st
Dec. 27th/28th

Moon Phases:
Wed., 4th - First Quarter
Thurs., 12th - Full Moon
Wed., 18th - Last Quarter
Thurs., 26th - New Moon

RVAS NL— December 2019— Pg 6 of 17
RVAS from the Past

By Bill Dillon

RVAS 25 Years Ago

Newsletter articles from December 1994

Neptune’s Great Dark Spot Disappears!

As reported in the November 1994 edition of *Science News*, in just over a few months or weeks the Great Dark Spot in Neptune’s atmosphere appears to have vanished. Current (1994) speculation by planetary scientists point to actual “storm” dissipation or a masking by other, yet unexplained, aspects of the planet’s atmosphere. (If one searched now, 25 years later, what would be seen?)

VAAS Fate, Hubble and a Starshow (sic)

While the December 1994 RVAS monthly meeting will include a two-part program featuring recent Hubble images and a starshow (sic) about the constellations and objects to observe in the early winter skies, of most interest will be the RVAS Officers’ final decision whether “to host” or “not to host” VAAS in early 1995. (If you don’t know how that turned out, stay tuned to this column next month.)

Meteors Close and Open the Years

Each year-end and year-beginning skywatchers are treated to meteor showers in both December (Geminids) and January (Quadrantids). As luck would have it the December 1994 Geminids would be mostly washed out by a Waxing Moon. When “peak” arrives on December 13th at 10 p.m. it will be greeted by a bright moon which doesn’t set until 4:16 a.m., just an hour and a half before twilight. On the other hand, the January 1995 Quadrantids will take place in dark skies on January 3rd, with a slender crescent Moon having set shortly after 8 p.m. Always the unknown, will of course be the fickle Roanoke weather.

RVAS 10 Years Ago

Newsletter articles from December 2009

Take Me to Your Leaders

An entertaining summary of the regular November 2009 RVAS monthly meeting opened the December 2009 Newsletter. “This month’s Society meeting, held in the Hopkins Planetarium, was dedicated to learning and observing the November early evening sky”. There were four presentations by Leading Society members, John Goss on “Navigating November’s Night Sky”; Dave Godman on “The Attack of the Leonids”; Jack Gross on “The Wreck of the Andromeda Galaxy; and Michael Good with an “Observing Challenge”.

8 WAHOOS IN SPACE

A short article asked readers, “Did you know that eight UVA graduates have been astronauts in space?” The article went on to introduce and describe some of these folks who included one who was the oldest man in space, one who resided in Lynchburg, one who paid $20 million for a “ride” to the Space Station, and the only female in the

(Past Continued on page 8)
group, Kathryn C. Thornton, who was a major speaker at VAAS 2009.

Happy 463rd Birthday!

In a short but complete and well-written history penned by Genevieve Goss the Danish nobleman and astronomer Tycho Brahe was wished a Happy Birthday in honor of his birth in December of 1546. While attending the University of Copenhagen Tycho observed a partial solar eclipse and his life was forever changed. Designing, building and calibrating his astronomical instruments he made amazingly accurate observations regularly achieving 2 arc minute accuracy, with his best achieving accuracy of about half an arc minute. In the words of Genevieve, "not bad for somebody not using a telescope".

Member Observation

Mercury Transit

By Dave Thomas

This photo of the transit of Mercury is the result of 11 layered frames showing the effect of field rotation over the five and one half hour period of the transit. The camera was mounted on a tripod.
I’ll never forget the 2012 Venus Transit. That was my first astronomy outreach event conducted a couple of years before I joined RVAS. I invited friends, colleagues, and family to watch the transit at a local school in North Carolina. What I remember most is a lesson learned about safety. One of the visitors put on a pair of cheap, cardboard and film solar glasses provided by NASA and proceeded to look at the sun through a pair of binoculars for a better view of the transit. The laser-like beam of sunlight coming through the focused lenses quickly burned holes through the thin mylar plastic of those glasses. Major retinal damage was barely avoided.

When I relayed this story as a warning to visitors at an outreach event this past summer, the host of the event pulled me aside afterwards and thanked me for the warning. They had plans to hold a public viewing of the upcoming Mercury transit using leftovers and binoculars. Major retinal damage was barely avoided once again. In response, I offered the experience of the RVAS Outreach Team to assist with a safe public viewing of the Mercury Transit using appropriate equipment. However, we learned about two weeks out from the event that their staff had decided the timing wasn’t opportune and had cancelled their plans. That left our team without a venue for an outreach event during this historic occasion.

Coincidentally, Ms. Wendy Grisham, a teacher at Andrew Lewis Middle School in Salem, asked John Goss, past president of the Astronomical League, for astronomical assistance with her 6th grade science classes. The students were currently studying the solar system. As the RVAS outreach coordinator, John asked if I could schedule something for Ms. Grisham’s classes. Let’s see. RVAS needed a venue for the Mercury Transit Ms. Grisham teaches three science classes from 8:30am to 1:30pm. The transit would start at 7:30am and last until about 1:00pm, on a school day at that. A more perfect match couldn’t be had! So, after a site visit to ensure an unobstructed eastern view, I committed to the event, then broadcast a call to the RVAS Outreach Team for available volunteers. Agreeing to join me, four team members answered the call: Dan Chrisman, Mike Hutkin, Roger Pommerenke, and John Sheffey. Wanting to see the transit and enthusiastic to help, my brother Allen Bradley volunteered as well.

Given the experience of the 2012 Venus Transit, solar viewing safety was our utmost concern. So, we made sure that each telescope was supervised by an outreach member. Fortunately, we had from the event that their staff had decided the timing wasn’t opportune and had cancelled their plans. That left our team without a venue for an outreach event during this historic occasion.

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Given the experience of the 2012 Venus Transit, solar viewing safety was our utmost concern. So, we made sure that each telescope was supervised by an outreach member. Fortunately, we had
enough volunteers and telescopes to manage the
100+ students and faculty who filtered through our
site at the northeastern side of the school over
the 5 ½ hours of the transit.

Unfortunately for the students, the first couple
hours of the transit were obscured by haze and
clouds. Ms. Grisham’s 8:30am science class didn’t
see much more than the silhouette of the sun as
they peered, shivering from the cold morning air,
into the variety of solar filtered telescopes which
we had set up outside the school building. Howev-
er, with two-to-four students gathered around
each telescope, the team members described the
different types of solar-filtered telescopes,
mounts, cameras, finder scopes and sun locators.

In addition, Dan led a discussion of why we might
expect but do not observe three or four Mercury
transits EVERY year using his homemade orbital
rings.

By the time the second class arrived, the air
warmed to a comfortable 50°F and the skies
cleared sufficiently to catch glimpses of a small
black ball appearing 1/158th the size of the sun as it
crossed between it and Earth. Students were very
surprised at Mercury’s small size against the back-
drop of the sun. Around 10:30am, the skies com-
pletely cleared, and students had no trouble spot-
ting Mercury as it slowly sailed across the face of
the sun until 4th contact at 1:03:56pm marked the
end of the transit.

Thanks to one engaging teacher and her enthusias-
tic students, we really couldn’t have asked for a
better outreach opportunity to observe the Mer-
cury Transit. Sadly, it’s going to be a long 13 years
before the next one, 30 years for people in North
America! I wonder where those students will be
then. I bet that more than a few will remember
seeing their first transit and will be looking sky-
ward in May 2049, perhaps sharing the experience
with the next generation of curious students.
A Neighborly Dot Spotting Get-together

by Frank Baratta

I guess it was a couple of years ago that I met Ben Crandell. Carolyn and I were taking a walk and had stopped to chat with some neighbors a few houses up the street. Ben was walking on the other side in the opposite direction. Our neighbors greeted him, announcing that he and we shared an interest in the stars. I ambled across to Ben to talk more about this thing we had in common. In a coincidence of things to come, he had his binoculars with him and was trying to spot Mercury from this somewhat more elevated area of our block. He soon did so, handed me the binoculars and I did as well. We spoke for a while, ending with an open door to some future observing together. Since then, there’d been some chats while on other walks, and I’d taken the liberty of adding Ben to the RVAS “Friends” email list. But we hadn’t made good on observing. That is, not until the Mercury transit.

A few days before the event, Ben emailed me. Still being fairly new to Roanoke, he asked where a good viewing site would be, hoping someone might have an H-alpha scope. I suggested one of the parking areas leading to Explore Park, as a plan to observe it together began to emerge. Unfortunately, the club’s Coronado was already scheduled for a school activity. And the weather was looking pretty iffy, anyway. So, rather than chance driving somewhere just to be clouded-out, we agreed to try viewing from Ben’s backyard with my 60mm white light solar scope. It was worth a shot. Plus, Ben’s had a string of transit sightings and was eager to keep it going, if possible.

Monday, November 11th, started early. Morning twilight had barely begun as I stepped out into the chill and could see stars. Maybe we’d luck out. I headed back inside to start the day with some decaf, a bagel and fruit. A quick weather check indicated a somewhat improved outlook, but clouds were still expected. I bundled up, grabbed my gear and more coffee and was heading down the block around 6:50.

Ben, an early riser, was already in his backyard, a mug of coffee in hand, gazing eastward where the sun’s rising was imminent. We’d hoped it would appear where there was low vegetation, but it was rising in the trees. Oh, well . . . I turned my attention to setting up my scope. The transit was set to begin at 7:36 a.m., less than a half-hour away.
Transit Sketches

All sketches were made at the telescope, except for the one for 7:43 a.m., which was made later from memory. The transit was viewed with a refractor equipped with a star diagonal, flipping the image horizontally. So, Mercury curved up and to the left, rather than up and to the right, as would have been seen in a naked eye view. The sketches have been scanned and reduced. In order from top to bottom they are: 7:43 a.m., 11:16 a.m., 12:06 p.m., 12:31 p.m., 12:50 p.m. and 1:00 p.m. The dot of Mercury has been drawn as close to what was seen as possible, but large enough to be visible when the sketch was reduced in size. Hopefully, the small arrows will help to locate the dots in each sketch.

First contact was approaching as we took quick turns at the eyepiece, seeing the disk of the sun in the upper tree branches. It would be a while before it climbed free, but new clouds had formed in its path. Birds chirped as the time of first contact arrived. Ben was at the eyepiece trying to detect a dot on the sun in an opening among the branches and leaves, as the clouds broke up a bit.

At 7:41 Ben exclaimed, “Oh, yeah; it’s there, at ‘6-o’clock.’” The dot that was Mercury was about its own width into the sun’s face. I took a look and at 7:43, after waiting out some clouds, confirmed the sighting. Other than the dot of Mercury, the sun was a blank disk. Not a sunspot to be seen. Around 8:05, I switched from the 25mm Plossl eyepiece that came with the scope, yielding a mere 14.4 power, to a 12.4mm Plossl, doubling the power. Mercury remained a dot, debatably bigger than before.

Ben went inside for bit to share what was going on with the transit with his wife, Jenny. He returned and she soon joined us. Ben offered some guidance on the view and Mercury’s location as Jenny stepped up to the eyepiece. She paused for a moment and then confirmed that she could see the dot. “It’s tiny but it’s there. It’s not so much how well you’re seeing it, but that you’re seeing it.” I said somewhat vaguely, inanely apologizing for the view. We chatted for a bit and then both headed inside again. They had to leave for work around 9:00 and needed to get some breakfast.

I hung around taking intermittent looks as the electronic drive tracked the sun and Mercury. Clouds were gathering, morphing the sun into a diffuse glow. After a while, Jenny returned to talk with me about an outdoor plant question I’d posed to Ben—they do landscaping work together. At 8:40, her advice in mind, I began tearing down, and soon was thanking them for having me over. In a minute or two I was at my front door.

Over the next hour and a half I checked for changes in the cloud cover. Around 10:20 I noticed that the soft shadows cast by the diffuse sunglow were now more defined. With some eclipse shades over my
glasses I craned my neck to peer through our living room window and could see a sharp-edged sun. I hurriedly grabbed my gear and began setting up in the front yard. By 10:50, I was again seeing and tracking Mercury. It now was about two-thirds of the way along the arcing path it was taking across the sun.

I was suddenly seized with a compelling urge to make some sketches over the remainder of the transit. (I’m not given to sketching, but surely I could place a dot in a circle.) Heading inside, I traced a half-dozen circles on copy paper using the lid of a jar. Intermittently returning to the scope, I plotted Mercury’s progress at 11:16, 12:06, 12:31, and 12:48. I then stayed with the scope as the end of the full transit at 1:02 approached. My last sketch was at 1:00, when a white space barely the width of the dot remained between Mercury and the edge of the sun. I watched continuously now as Mercury drew closer and closer, and at 1:02 saw it begin to merge with the edge. At the scale of my view I was unable to discern the tear-drop effect. At 1:03 I lost all sense of a dot at the limb. The sun was at about azimuth 210° when the transit ended.

The last transit I had observed was that of Venus in 2012. That was interesting, but I was nowhere near as engaged as with this one. I kept oral notes with a hand-held micro-recorder for later reviewing (and using for this write-up), an approach I’d adopted while pursuing the Astronomical League’s Messier and Herschel 400 observing programs. Needless to say, with no other transit of Mercury visible from the U.S. until 2049 and a Venus transit even farther in the future, I’m glad that Ben, Jenny and I took the time for this one!

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Monday, December 16, 2019, 7:30 PM
Classroom B, 3rd Floor, Center on Church
20 E. Church Avenue, downtown Roanoke

RVAS Annual Winter Solstice Social

It’s the holiday season! Time again for members and friends to gather for an evening of fun, food and fellowship. The RVAS is providing the beverages. Members are asked to bring a treat or two to share. We’ll have our 8th annual end-of-year slideshow and plenty of “open mic” time for anyone who’d like to show their latest astro-photos, astro-gizmos or short videos, do short talks or otherwise add to the evening’s enjoyment. We’ll also have a What’s Up sky summary, maybe a game or two, and who knows what else.

We’re hoping to see everyone at our Winter Solstice Social, especially members who haven’t been to a meeting or other activity for a while. So, plan your treats, collect your show-and-tells, circle December 16th on your calendar and be sure to join us!
Member Observation

Barnard’s Loop in Orion

By Dave Thomas

This is a photo I made of the Orion Nebula from the patio of my home in Lynchburg, Virginia. It shows the emission nebula known as Barnard’s Loop. The object was named after astrophotographer E.E. Barnard who photographed the nebula in 1894.

I made the photo on November 25, 2019 using a Canon T7i DSLR with a 80 mm zoom lens. The camera was mounted on an iOptron Sky Guider Pro. The photo consists of nine frames of 120 seconds each, ISO 1600, f/4. The frames were stacked and processed to produce the final photograph.
Spooktacular Juggernaut Continues
Thank you, Hannah Weiss

By Ray Bradley and Dan Chrisman

This year marked the fourth annual Science Spooktacular at the Science Museum of Western Virginia (SMWV). There are no signs that the successful Spooktacular juggernaut can be stopped. It all started in 2016 when, after participating in the Virginia Tech Science Festival, Dr. Phyllis Newbill reached out and invited RVAS to contact Hannah Weiss, then Education Manager for the SMWV, if we were interested in being a part of the museum’s first Science Spooktacular. Of course, we said “Yes!” And thus, began the tradition of dawning costumes each fall to celebrate science in a spooky fashion (see December 2016 newsletter’s “Weirdest Volunteers Ever at the Science Spooktacular”.

Five RVAS members contributed to this year’s activities. Sierra Bradley worked the Planetary Board game while Rene’ Bradley taught enthusiastic kids how the moon’s orbit produces the lunar phases. Darien Bradley enticed visitors with the club’s infamous planetary weight scales. All the while, Ray Bradley gave guided virtual tours of the universe using Mitaka astronomical software projected through a VR headset. New to the Science Spooktacular, Keith Wimmer added, with great success, a telescope construction activity to our lineup. It was a long day starting with setup at 9:30am and ending as we loaded our cars at 3:30pm. In between, we had over 45 visitors to our astronomical stations making for another stellar year of spooky outreach.

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Sadly, though, this year is also the last for Hannah Weiss as she and her significant other move on to Life’s next great adventure. Hannah was born near New York City and attended the University of Rochester where she earned a bachelor’s degree in biology with a minor in mathematics. She subsequently earned a Masters degree from Radford University in Curriculum and Development. Hannah also earned her Virginia Teaching license which

(Spooktacular Continued on page 16)
This month, the ninth installment in our series, we’re highlighting the current RVAS members who celebrate their anniversary with the club in December. Those who joined during this month, and the years when their membership began, include: Fred Davis and Sharon Stinnette (2003), Dan and Carolyn Chrisman (2012) and Eddie Leonard (2015). For Fred and Sharon, this makes 16 consecutive years with the RVAS! For Dan and Carolyn, it’s 7 years and for Eddie, it’s 4 years. Congratulations and thanks to all of you for being RVAS members.

In response to a request from our Outreach Coordinator, Ray Bradley, who is also our Executive Committee Member at Large (one of the five elected officers of the club, in case you were unclear about this title), the following are the club’s ten most senior members, including the month and year their memberships began: Mark Hodges (1/1986); Frank and Carolyn Baratta (7/1986); Bob Richert (10/1989); Ed Stinson (11/1989); Harry Montoro (3/1991); Kevin and Emily Hamilton (4/1991); David and Remona Thomas (7/1992); Ellen and Roger Holtman (10/1992); Melanie Minnix (6/1994); and Roger Pommenke (10/1995). That’s a lot of consecutive years!

Whether your membership is just starting, has been going for years or is measured in decades, your continuing support of the RVAS is important to us all. Thanks, everyone!
MONTHLY MEETING: “Winter Solstice Social”, Monday, December 16th, 7:30 p.m., Classroom B, 3rd floor, Center on Church, Downtown Roanoke. Time again for our annual end-of-year get together. Bring a treat or two to share with others. The RVAS will provide the beverages. Bring your latest astro-gizmo, photos, short videos, stories or whatever to share during “open mic” time. We’ll have our annual end-of-year slideshow, maybe a game or two, and festive music to add to the holiday spirit. See elsewhere in this newsletter for more. Mark the date and plan to spend a fun evening with your RVAS friends!

RVAS WEEKEND OBSERVING OPPORTUNITIES: RVAS members observe from various sites, with Cahas Knob Overlook, at milepost 139 on the Blue Ridge Parkway, being our traditional location. For updates on members’ observing plans, log onto the RVAS Yahoo Group (RVAS members only) and/or call the RVAS Message Line, 540-774-5651, about an hour before sunset on the indicated dates.

-- Friday and Saturday, December 20th and 21st. Sunset is at 5:06 p.m. Astronomical twilight ends at 6:39 p.m. The Moon sets at 1:33 and 2:05 p.m., respectively.

-- Friday and Saturday, December 27th and 28th. Sunset is at 5:10 p.m. Astronomical twilight ends at 6:43 p.m. The Moon sets at 6:39 and 7:38 p.m., respectively.

-- Future Weekend Observing Opportunities: January 17th and 18th: 24th and 25th.

ROANOKE CITY PARKS and RECREATION PUBLIC STARGAZE: Saturday, December 21st, 5:45 p.m., Cahas Knob Overlook, milepost 139, Blue Ridge Parkway. Nonmembers must register with Parks & Rec. at 540-853-2236. Members can call 540-774-5651 for information. (Next session: January 18th, 6:15 p.m., Cahas Knob Overlook.)

Astro-Quiz

It’s midnight. The Moon is near the meridian and very high in the sky. What is the Moon’s phase and what time of year is it?

Answer to Last Month’s Quiz: Last month we asked about the system of using numbers to label stars on star charts; in particular, what these numbers are called and why this is ironic. As RVAS member Rick Rad-er correctly answered, they are called Flamsteed Numbers and are given by constellation in order of right ascension. But the irony, as Rick also stated, is that—contrary to popular belief—English astronomer John Flamsteed wasn’t the one who introduced the numbers. Flamsteed’s original Atlas Coelestis continued Bayer’s earlier system of using Greek letters for the stars. It was in a 1780’s French edition of Atlas Coelestis that French astronomer Joseph Jerome de Lalande first assigned numbers to the stars. Have an an-swver to this month’s quiz (or a future question and answer to suggest)? E-mail it to astroquiz@rvasclub.org!