

www.raclub.org

THE STARGAZER

Newsletter of the Rappahannock Astronomy Club

No. 2, Vol. 1 August–October 2012

Stars in the Classroom

By David Abbou

Back in the 1970s when I was in elementary school, the United States had a very active manned space program that captured our nation's interest. Children were fascinated by the Apollo missions and aspired to learn about the universe. I was one of those children captivated by seeing astronauts walking on the Moon's surface in 1972, and I was fortunate enough to have a teacher who recognized the significance of the Apollo missions and ensured we saw the events as they unfolded on television.

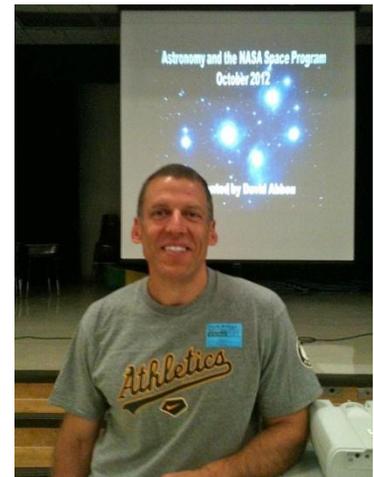
Today, I am trying to return the favor by inspiring children's interest in astronomy and the space program. I first got involved with astronomy outreach in 1998 when my daughter was a kindergartener by speaking to her class about astronomy and the universe. I had no idea how rewarding it would become, year after year, as I did the same for my son's classes when he attended elementary school in the years after my daughter moved on to middle and high school.

Although my kids have long since departed elementary school, I have been asked to make astronomy presentations each year for new sets of students and have been honored and thrilled to oblige. I also have come to realize that children have natural interests in astronomy and the space program despite America's lack of manned space missions and the competition from distractions such as television, cell phones, and video games.

A trip to the classroom to provide astronomy outreach is an enjoyable and refreshing adventure each time I do it. Year after year, I am met by curious students of all ages who genuinely want to know about our universe and our place in it, so I try to bring the universe down to their level. For example, the distance from Earth to the Sun is 93 million miles, a distance so great that is difficult to envision, so I also tell the kids it would take 177 years to drive to the Sun at 60 mph. A sample of other topics discussed include the differences between a star and planet, the size of the planets in our solar system, our dependence on the Sun, cosmic collisions, our Milky Way galaxy, the distance between the stars, the light year, and objects you can see with and without a telescope.

In addition to fascinating astronomy facts, I convey information about past, ongoing, and future NASA missions as a member of the NASA Solar System Ambassador (SSA) volunteer program, an initiative I have been involved with since 2008. The SSA program is a natural fit for providing public outreach on the space program, and NASA provides valuable outreach resources and support to its SSA volunteers that were unavailable to me before joining the SSA program.

Undoubtedly, the most rewarding aspect of providing astronomy and space program outreach has been encouraging children and adults to look skyward and become interested in the universe. I have accumulated hundreds of thank-you notes from both students and teachers over the 14 years I have been involved with astronomy outreach in the classroom—these letters motivate me to continue and refine my presentations year after year. *(continued on page 9)*



How to Join RAClub

RAClub is a non-profit organization located in the Fredericksburg, Virginia, area. The club is dedicated to the advancement of public interest in, and knowledge of, the science of astronomy. Members share a common interest in astronomy and related fields as well as a love of observing the night sky.

Membership is open to anyone interested in astronomy, regardless of his/her level of knowledge. Owning a telescope is not a requirement. All you need is a desire to expand your knowledge of astronomy. RAClub members are primarily from the Fredericksburg area, including, but not limited to, the City of Fredericksburg and the counties of Stafford, Spotsylvania, King George, and Orange.

RAClub annual membership is \$15 per family. Student membership is \$7.50. Click [here](#) for a printable PDF application form.

The RAClub offers you a great opportunity to learn more about the stars, get advice on equipment purchases, and participate in community events. We meet once a month on the 2nd Wednesday of the month and hold regular star parties each month on the Saturday closest to the dark of the Moon. Our website, www.raclub.org is the best source of information on our events.

We also have an active [Yahoo group](#) that you can join to communicate with the group as a whole. Just click the link, then the blue Join this Group! button, and follow the instructions to sign up.

The StarGazer

August–October 2012

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Editor: [Linda Billard](#)

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Website: www.raclub.org

Yahoo Group:

http://tech.groups.yahoo.com/group/rac_group/

RAClub Officers

[Jerry Hubbell](#) President

[Glenn Holliday](#) Vice-President

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[Jerry Hubbell](#) Public Outreach

[Glenn Holliday](#) Scout Clinics

[David Abbou](#) School Programs

[Glenn Holliday](#) Star Parties

[Leigh Gettier](#) Beginners

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Glenn Holliday, Jerry Hubbell Web/Image Editors

[Don Clark](#) Internet Administrator

[Tim Plunkett](#) Librarian

[Glenn Holliday](#) Equipment Loan

[Jerry Hubbell](#) Astrophotography

Calendar of Upcoming Events

Star Party, Shiloh Historic Schools, Kilmarnock	November 10
Club Meeting, Fredericksburg Library (elections)	November 14
Star Party Caledon State Park, King George	November 17
Star Party Caledon State Park, King George	December 8
Club Meeting, Fredericksburg Library	December 12
Star Party Caledon State Park, King George	December 15
Club Meeting, Fredericksburg Library	January 9
Star Party Caledon State Park, King George	January 12

Recent Outreach Events Completed

Talk & Star Party, Warrenton Public Library	Aug 1
Star Party Caledon State Park, King George	Sep 15
Star Party, Stratford Hall, Westmoreland	Oct 6
Star Party, Caledon State Park, King George	Oct 13
Star Party, Lake Anna State Park, Spotsylvania	Oct 20
Concert & Talk, University of Mary Washington	Oct 20

President's Corner—Club Membership and What It Means to You

As some of you may know, I have been into astronomy and observing since I was 14. During my teen years, I pursued astronomy with a few friends in school although we didn't have a formal astronomy club. I also pursued my observations of the Moon and planets as a loner, by myself, out under the stars. Later, I coerced my family into coming out into the yard and looking at the Moon, planets, and assorted star clusters and galaxies with my now vintage Meade 10" 2120 LX5 Schmidt-Cassegrain telescope. Although it wasn't *always* a tough sell, in the wintertime it certainly was. So, from the time I was 14 until I was 50, I performed my observations by myself, very rarely sharing with those outside my immediate family.

Welcome to New RAClub Members (Aug–Oct)

❖ Rana & Scott Strickland



In December 2010 that changed when I ran across the RAClub website. I had known for at least 20 years that Fredericksburg had an astronomy club called the Triangulum Astronomy Club. I was never much interested in joining for some unknown reason. But this time around, I wanted to share some of the work I had been doing and also learn from those more experienced than I was in the more technical realm of astrophotography. So I joined.

The intrepid amateur astronomer (Source: Jedediah Hubbell)

I had spent the better part of 2 years (at that point) learning all about the new technology available, I thought it important to contribute what I knew to the rest of the membership. I also committed myself to talking with beginners about my experiences and encouraging them to get involved with astronomy. I joined the club for both selfish and selfless reasons.

I found that I enjoyed hearing everyone's stories of their experiences at star parties (I had not been to one before...maybe once a long time ago...I don't remember) and looked forward to going to them. Because

Recently, I have been concerned about getting more members involved not only with club activities but also in doing their own observations. I know that up to half our membership likely does not own any astronomy equipment, but we do have loaner equipment. Also, the club's activities involve a lot more than observing—there are all sorts of ways a member can get involved without owning equipment. Those of us who do have equipment are always open to sharing it at star parties, and I, for one, enjoy explaining (to anyone who cares to listen) the best way to use the equipment I take to events.

I encourage all of you to think about what you would like to do for yourself as it pertains to astronomy and bring your questions to the club meetings. Also, if you see a need in the club that is not being met, speak up and be prepared to volunteer with the help of others to fulfill that need. When we all work together, it makes it easier on all of us as individuals. We all share a great sense of accomplishment when we come together to reach a common goal that improves our outreach capabilities and makes the Rappahannock Astronomy Club an organization to which we want to belong.

Linda Billard has done a great job putting together a variety of articles and items for this issue. You will learn what David Abbou does when he visits schools throughout the Fredericksburg area. You will read about the time and effort he has expended in the 15 years he has been active in his personal astronomy and space outreach activities. Also you will read how Ben Ashley took it upon him to get to the bottom of the problems of a recalcitrant scope that was recently donated to the club. Finally, you will find out how I did at the UMW concert of Gustav Holst's "The Planets." There are myriad ways to contribute and learn at the same time in our club. Make the most of it as our fellow members have demonstrated over the years. Thanks to all our members for their commitment and continued support of the club. —*Jerry Hubbell*

“Pro-Am” Astronomy—Lowell Amateur Research Initiative

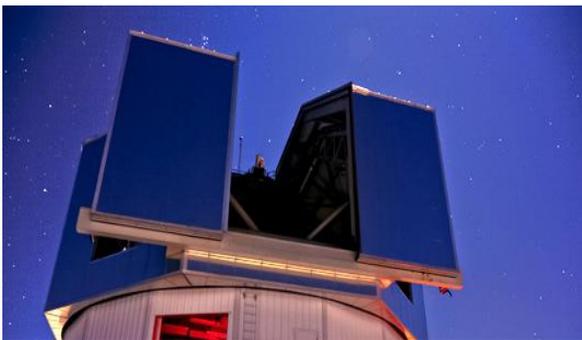
by Linda Billard

The [Lowell Amateur Research Initiative \(LARI\)](#) is a “Pro-Am” collaborative effort sponsored by [Lowell Observatory](#), a private, nonprofit research institution. The mission of LARI is to engage the growing, technically savvy amateur astronomy community in research projects with Lowell astronomers.

As an enthusiastic researcher, Percival Lowell sought to communicate new ideas and the joy of astronomy research to the public. In that spirit, LARI brings together professional and amateur astronomers to participate in cutting-edge research and potentially make significant contributions to science. Amateurs can help Lowell astronomers in their work and become part of dedicated research teams. LARI expands Lowell Observatory's education and public outreach missions, and promotes greater awareness of astronomy and related sciences.

Lowell Observatory

Founded in 1894 by American astronomer Percival Lowell, the organization's original observatory, located in Flagstaff, Arizona, is among the oldest in the United States and a Registered National Historic Landmark. The organization currently operates eight telescopes at several locations. The most recently completed is the 4.28 meter Discovery Channel Telescope (DCT), in partnership with Discovery Communications. It is described as Lowell's new “flagship research telescope.”



Lowell's newest telescope, DCT, whose “first light” was just this past July—(Source: www.lowell.edu)

Currently, Lowell astronomers are conducting several projects that can benefit from the participation of amateur astronomers. They span a range of technical skills and knowledge, from taking very deep images of galaxies, to monitoring small stars for transient events, to data mining.

To join this exciting Pro-Am endeavor, first check out the [amateur research options](#). When you find ones that interest you, [create your LARI account](#) and then use your [LARI profile](#) to tell them about yourself and what you would like to do. After getting a sense of your skills and interests, LARI will do its best to match you with the appropriate researcher and project and contact you with potential opportunities for actively participating in research with a Lowell astronomer.

RAClub members Bart Billard and Jerry Hubbell have both joined the LARI effort. Jerry is signed up for KBNC (create asteroid lightcurves for slow rotators) and has already had one opportunity to participate. On September 13–14, he observed and imaged a near-Earth asteroid, 2012 QG42, which passed within 1.7 million miles of us. That's far enough away that we didn't need to worry, but 2012 QG42, about 800 feet across, is classified as a PHA (potentially hazardous asteroid) because there's a small chance it could hit Earth in the distant future. At 14.5 magnitude at its closest approach, it required some skill to find but once located, its movement was easily seen and followed with the right equipment. Jerry provided his data to both the IAU Minor Planet Center and the Lowell project. He is looking forward to additional opportunities to contribute.

Because his telescope is not suitable for the observing projects, Bart chose to contribute his data analysis skills. He expressed interest in KBLR (look for asteroids in archived images), BGBF (data mining for photometry of selected stars), MGED (discover extrasolar transients), and two others that assume an upgrade to his current equipment. In early October, Bart was contacted regarding the MGED project. The initial assignment concerns analysis of lightcurve and spectrum data for a newly discovered variable star. Lowell astronomers collected data for MGED as part of their participation in the Trans Atlantic Exoplanet Survey ([TrES](#)), which used three 4-inch telescopes—one at Lowell, one at Palomar Observatory, and one in the Canary Islands. All participants in the analysis effort will use the recommended software tools and compare notes to ask questions and reach preliminary conclusions regarding a variety of characteristics. Examples of the sort of information they will

assess using the lightcurve data include brightness variations and shape of the lightcurve. Examples for the spectrum data include luminosity class (e.g., dwarf star), temperature, changes in spectrum, and dependence between variance in brightness and variance in spectrum. LARI is the perfect opportunity for you to get involved in astronomy outside the club. Visit the [site](#) to learn how you can participate in this worthwhile effort.

What's in a Name...or How the Moon's Mountains Got Their Names

Our Moon is covered with numerous striking features, including mountain ranges, many of which are named for familiar ones on Earth—Alps, Apennines, Caucasus, Cordilleras, Jura, Leibnitz, and Pyrenees Mountains. But do you know who gave them those names?

Johannes Hevelius (1611–1687), a Polish brewer and councilor turned astronomer, was an expert in constructing telescopes and observing the heavens. He began his exhaustive study of the Moon in about 1643. Because he could not view the entire Moon at once using his refracting telescope, he examined a small portion at a time, patiently recording his observations before moving on. Over a period of 4 years, he repeated his observations over and over, improving his maps until their detail surpassed anything previously recorded. He even calculated the height of Moon mountains by studying the shadows they made on the Moon's surface. The result of Hevelius's work was the first atlas of the Moon, the *Selenographia*, published in 1647, less than 40 years after the telescope was invented.

Hevelius's atlas helped other astronomers study the Moon. By referring to features on his maps, they could share and compare observations more easily. His maps were so good that they became the main Moon reference tool for the next 100 years. Subsequent work by Italian astronomers Riccoli and Grimaldi resulted in some name changes and naming of many additional features, including a crater named for Hevelius himself (see photo).

So, do we see the same thing Hevelius saw? In a word...yes. One major difference between mountains on the Moon and their counterparts here on Earth is that the latter are constantly worn away by weather. On the

Moon, there is no atmosphere to wear away the landscape. In addition, there is no plate tectonics on the Moon, which is "geologically dead." This means lunar features look essentially the same today as they did millions or even billions of years ago...so you see the same features Hevelius saw more than 350 years ago.



Hevelius Crater (Source: Jerry Hubbell)

What's Wrong With This Telescope?

by Ben Ashley with Linda Billard

Recently, a member of the Fredericksburg community donated a Meade ETX-60AT digital, computerized, go-to, 60-mm telescope to the club. The donor requested that we offer it for use by young people to broaden their education on astronomy. The only immediately apparent problem with it was that one of the tripod legs needed repair. I took on the task of repairing the tripod and giving the instrument a thorough checkout to become familiar with its operation and ensure it was in working order. That's when the "fun" began!

At the September 15 star party, I tried viewing Arcturus using the donated scope. I (and others present) observed the star in the center of the field and a large disc-shaped halo of light around it. When the observer looked through the lens straight on and centered, he/she saw a perfectly circular disc. When the observer shifted his/her eye to one side of the field, the disc began to indent on the side nearest the eye and progressed until there was a triangular or fan-shaped void in the disc that surrounded the center.

Bart Billard, Jerry Hubbell, and I exchanged various theories via e-mail about what could cause the problem other than just bad optics. The discussion led me to the notion that perhaps something had been taken apart and reassembled incorrectly. After some trial and error, I discovered the problem. The spacer ring that creates an air space between the crown and flint glass in the objective lens assembly had been misaligned and crushed. I believe the assembly had been taken apart and extremely over-tightened when it was put back together. I heated the ring with an iron and some aluminum foil on my workbench and put it in a press overnight to restore its shape. The scope now has new life and offers rather impressive views for its size. I was playing around with it when I put it back together to try to understand the optical defects we were seeing. The haziness and some of the strange colors were caused by the crown and flint being pushed up against each other without the necessary air space. I wasn't able to reproduce the double image or halo effect. Perhaps the spacer was creating an internal reflection—it was clear, but glossy.

By comparison, fixing the broken leg on the tripod was a snap—I added some hex nuts and a thumbscrew to imitate the leg grip on my Orion tripod and used high-strength resin. I doubt it will ever come apart.

Once I had it in good working order, I investigated the mount. I concluded that it worked well once it was configured and aligned properly, but is not a good choice for a young person or a beginner. Personally I was fortunate to be introduced to observational astronomy through better scopes that stirred me up and filled me with excitement! This scope won't inspire anyone. With its steep learning curve requiring pocketsful of patience, it may drive people away. The hand controls alone take a 30-minute introduction for the "quick setup" mode.

Given this assessment, Jerry suggested that the best use of this telescope would be for outreach purposes coupled to his Orion StarShoot Deep Space Video Camera II (SSDSVC II). This would allow the visitors to easily observe some of the brighter deep sky objects, including star clusters, closer (larger) galaxies, and bright nebulae such as the Orion Nebula. This webcam setup makes it easier to show these objects to multiple people while explaining the details of each. Jerry is working on testing this configuration and creating a procedure for using this telescope in the field.

Highlights of Recent RAClub Presentations

September 2012—Supernovae

Joe Francis presented on supernovae—stars that explode. These can sometimes be seen even in the most distant galaxies. In fact, they may outshine their entire galaxies for weeks or months. Supernovae include types Ia, Ib, Ic, and II, and also hypernovae—but not novae, which are not as bright.

A *nova* occurs when a white dwarf with a companion star builds up hydrogen from that companion. The buildup reaches a temperature that produces a flare-up into a fusion reaction and causes the binary system to brighten temporarily before dimming and beginning the buildup process again, allowing the nova to recur.



Meade EXT-60AT (Source: Instruction Manual, Meade Instruments Corp.)

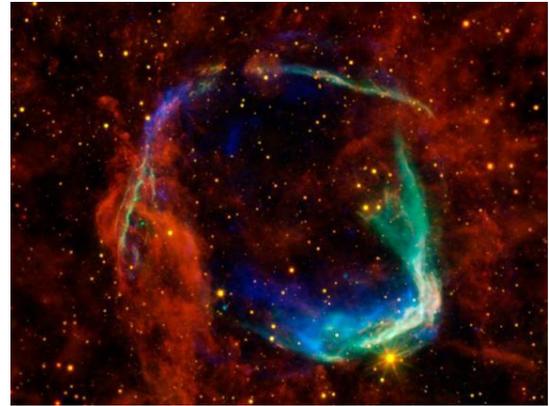


Orion StarShoot Deep Space Video Camera II (Source: Orion Telescopes (www.telescope.com))

Supernovae and *hypernovae* mark the death of a star. Types I and II are distinguished by the absence or presence, respectively, of broad hydrogen lines in the spectra. The type I subclasses are distinguished from each other by spectra with strong ionized silicon (Ia), helium with weak or no silicon (Ib), or both helium and silicon weak or absent (Ic). A stellar explosion brighter than an ordinary supernova is called a hypernova. These are 20 times brighter than type Ia supernovae and usually involve a gamma-ray burst.

Type Ia supernovae are distinct from the other types because they are believed to be the explosion of an entire white dwarf. This explosion results after accretion of material from a binary companion (as occurs with novae), but depends on the white dwarf being near a mass limit. Type Ia supernovae have been found to have a reliably predictable brightness (5 billion times brighter than our Sun). This regularity allows them to be used as “standard candles”—astronomers can determine their distance from us by observing how bright they appear while knowing the actual brightness is the standard candle value. Their predictability allows astronomers to measure great distances—all the way out to some of the most distant galaxies.

White dwarfs form from stars similar in mass to our Sun that have exhausted their fusion fuel. (The Sun lacks the binary companion star necessary to become a type Ia supernova.) Stars that become type II supernovae have significantly more mass than the Sun, and such stars do not become white dwarfs. These stars consume their hydrogen cores much more rapidly and then start fusing helium in the core along with more hydrogen just outside the core. Eventually they develop layers of successive fusion products. (For example, inside the outermost hydrogen layer is a helium layer, inside that a carbon layer, and so on.) A crisis occurs late in the massive star’s life if it reaches a point where iron builds up in the core. It takes energy for a star to make elements more massive than iron, so the fusion process in the core can no longer maintain the high temperature needed to balance gravity. The end is a sudden collapse of the core that produces the supernova. The result is a shock wave that blows off the outer part of the star and leaves, depending on the star’s mass, a neutron star, black hole, or possibly complete destruction. The energy released accounts for the production of all the elements more massive than iron. Joe described some of the supernovae identified in historical accounts. The first documented case, by the Chinese, dates to 185 AD and is believed to be the source of the supernova remnant SN185, also called RCW 86 (see photo). He said an event recorded in 774 AD in Britain might have been another supernova. A recent 1979 supernova, SN1979c, resulted in what is currently considered the youngest known black hole.



Remnants of RCW 86, the first documented supernova (185 AD)—NASA/ESA/JPL-Caltech/UCLA/CXC/SAO

October 2012—NASA Mercury MESSENGER Mission Update

Brenda Conway presented an update on the MESSENGER mission to Mercury. The mission has been extended another year as a result of successful conservation of fuel. The spacecraft has returned more than 125,000 images already. Brenda showed a diagram of MESSENGER with the sensors on board. She also passed around a sample of the Sun shield material. Brenda reviewed some of the questions about Mercury posed near the beginning of the mission. Why is Mercury so dense? What is the geologic history of Mercury? Why is the magnetic field so weak? What are the bright areas on the surface? She invited us to consider what has been learned as she showed images from the mission and videos by some members of the science team. The bright areas turn out to be areas of many coalescing depressions with flat bottoms. They have been dubbed “hollows” and are common all over the planet. They are sometimes near volcanic features, but are found at different

elevations and are not all consistent with volcanism. The hollows are suggestive of volatility or erosion. Scott said they reminded him of Devil's Golf Course in Death Valley, formed where salt eroded away.

Although volcanism was expected on Mercury, calderas are lacking. Volcanic plains cover 6 percent of the surface area, with lavas as thick as 2 km. It appears volcanoes "ate themselves."

The gamma-ray spectrometer has helped with remotely measuring the surface composition. Abundances found include $1,150 \pm 220$ parts per million (ppm) potassium and 220 ppm thorium. One surprise is the high levels of sulfur found in the x-ray spectrometer data.

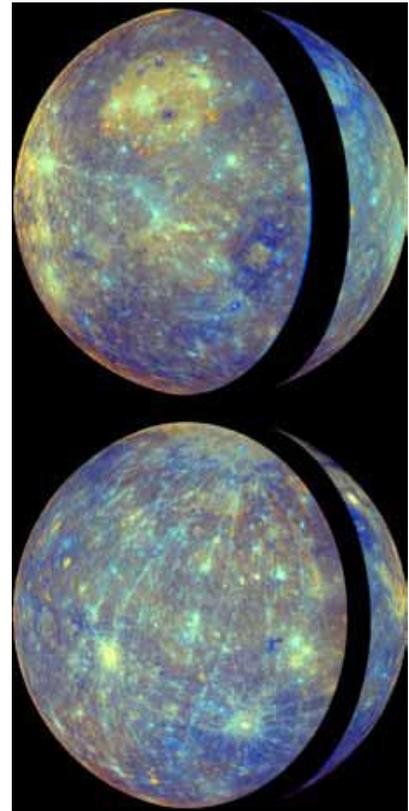
Brenda also discussed the fast-imaging plasma spectrometer (FIPS) data, which is characterizing the space environment of Mercury. The FIPS sensor has found particles from the surface are concentrated near the poles where the effects of the magnetic field are weakest. The particles now appear to result from a sputtering process caused by the Sun.

In closing, Brenda showed some webpages, including one for an iPhone app, ACT-REACT Quick Map. She is hoping a Droid version will be out soon. The NASA home page for the MESSENGER mission is [here](#).

Tips for Beginners from the "Pros"

Scott Busby and Myron Wasiuta, two of our most experienced members, offer the following tips for beginners:

1. If your new telescope is a reflector, it was probably delivered out of collimation, which leads to poor images and frustration. It's much easier to *show* you how to collimate than to *describe* the process. If you're having trouble using your telescope, bring it to a meeting or star party and ask someone more experienced to lend a hand.
2. Start with the lowest power ocular (the one with the biggest number on it). That way you have the widest field of view, which makes locating your target as easy as possible. One suggestion is to begin by observing in bright twilight with the Moon as a target. This way you get accustomed to using the knobs and dials on the telescope before it gets fully dark. Because the Moon is big and bright, it's easy to find and looks great in almost any telescope!
3. *Carry* an old blanket or plastic tarp with you to place under your tripod when setting up your scope. It will make it easy to find any dropped objects such as eyepiece set screws.
4. *Always* carry some small lint-free hand towels with you to star parties. They're great for wiping off a dew-covered telescope. A roll of paper towels works too.
5. Bring some small zip ties with you to star parties. You can use them to manage your mount and dew *preventer* or camera's cables. Also bring a small wire cutter to get the zip ties off later on.
6. *Bring* a small two-step folding ladder or footstool so the little ones can get to the eyepiece to see the wonders of the universe.
7. *Always* have plenty of extra batteries available in the sizes you typically use.
8. Make a "packing list" of your equipment. It helps you avoid leaving anything behind on your way to the next star party.



Global View of Mercury's Surface—orthographic map projections of wide-angle camera enhanced-color images (Source: [NASA MESSENGER](#))

(continued from page 1)...Stars in the Classroom

One of the letters I received in response to a 5th grade presentation I conducted in 2008 said, “Thank you, Mr. Abbou for teaching us about our fascinating universe and all the wonderful things about astronomy. I now have become more interested in space!” A letter I received after a 4th grade presentation in 2012 said, “Thank you very much for giving me an idea of what I want to be when I grow up. I am going to be an astronomer!”

Nothing is more rewarding and fulfilling than to know that I have played a part in inspiring a child to become interested in astronomy. Much as my elementary school teacher inspired us by turning on the television to watch the Apollo missions 40 years ago, I am doing my part to inspire new generations of children who will become the astronomers, scientists, and teachers of tomorrow. The stars in the classroom are definitely there, and it is our job to encourage those stars to shine brightly. To learn more about NASA’s SSA program, visit <http://www2.jpl.nasa.gov/ambassador/>.

Star Gazing—RAClub & University of Mary Washington Philharmonic

by Linda Billard



Jerry Hubbell, Kevin Bartram, Glenn Holiday, Linda Billard, Bart Billard (left to right) (Source: Michelle Hubbell)

On October 20, Jerry Hubbell, Glenn Holiday, Bart Billard, and I were pleased to support the University of Mary Washington Philharmonic Orchestra in its opening concert of the season, entitled “Star Gazing.”

Several months ago, inspired by the *Free-Lance Star* report on our Venus Transit outreach event, Kevin Bartram, director of the Philharmonic, contacted the club. He asked whether we would be willing to provide a pre-concert presentation on the planets featured in Gustav Holst’s suite “The Planets,” which was planned as the major work performed at the concert. Bartram also offered us the opportunity to set up a display of telescopes in the foyer of Dodd Auditorium, where the concert was to be held. Recognizing it as wonderful opportunity to make new contacts in the Fredericksburg community, we accepted his offer. Subsequently, we also were asked to provide some images of the four planets

that were included in the performance. These were shown during the performance.

Jerry prepared a half-hour slide [presentation](#) entitled “Holst’s Planets,” describing the seven planets of the suite, Mars, Venus, Mercury, Jupiter, Saturn, Uranus, and Neptune. The approach was based on Holst’s use of astrological beliefs of his time as the basis for the themes and moods expressed in the music. For each planet, Jerry presented these beliefs and then presented additional information about what we know today about each planet. We all learned later that this was the first time that the Philharmonic had included a pre-concert presentation on the program—certainly an honor—but perhaps it was just as well that Jerry didn’t know this in advance. It just would have added to the understandable pre-presentation nerves.

The orchestra had hung an impressive mobile of the planets from the ceiling of the auditorium. They began to rotate it during playing of “The Planets. One of the large balloons passed in front of our video projection of Jupiter, giving a great illusion of the motion of clouds across the sphere of the planet.

Our logistics contact with the Philharmonic, Operations Manager Rita Snyder, reported that attendance was about 700. We had hundreds of people pass our display, and dozens stopped to speak with us and look at our telescopes and other gear and books on display. We handed out all of the club newsletters and calendars we had printed, as well as many of our flyers on who we are and how to join the club. In her thank you to Jerry, Rita

said that she had heard many laudatory comments about the presentation, our pictures, and our display. All of us who attended thoroughly enjoyed ourselves. What better way to spend an evening—talking about astronomy and listening to good music....

Image of the Quarter



168P/Hergenrother, a periodic comet in the solar system. This comet, originally named P/1998 W2, returned in 2005 and received the temporary name P/2005 N2. It came to perihelion on 1 October 2012 and was expected to reach apparent magnitude 15.2, but because of an outburst, the comet reached apparent magnitude 8—Scott Busby

Equipment and Comment: I stayed up last night [12 October 2012] and tried to capture 168P—Hergenrother with some success. It was in Pegasus in the extreme corner toward Andromeda. I knew roughly where it was, so I tried my SBIG ST 11K out because of its huge chip. With the large FOV of the TAK TOA150 and the clear dark night, I was able to nail it in just a few search frames. I made 17 exposures at 100 sec each, and even at this short exposure time, the comet was moving too quickly for me to come up with a stackable sequence. Nonetheless, this photo is one of the 17 shots, processed with FITS Liberator and Photoshop CS2.

[Scientific Astrophotography: How Amateurs Can Generate and Use Professional Imaging Data](#)

As most of you probably know, Jerry Hubbell has been working on his first book. After more than a year of research and writing, he and Linda Billard completed the final page proof edits on October 10 and returned them to the publisher, Springer, the next day. In the book, Jerry starts by guiding the beginner through the entire imaging system, component by component. The second part teaches the reader how to acquire and calibrate the images. Once you have mastered the basics, the third part of the book introduces you to all the ways today's amateur astronomer can obtain scientifically useful data and share it with the professional and amateur astronomy community. Springer plans to release at the end of November 2012.