Roanoke Valley Astronomical Society

News About Amateur Astronomy
in Southwestern Virginia

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RVAS Elects New Officers at June Meeting...

Meet the New RVAS Officers

By Clark M. Thomas

June is when the Roanoke Valley Astronomical Society says good-bye to a group of hard working volunteers, and votes hello to another group. Some of them are serving for the first time, and some are re-upping from the past. All are critical to making our astronomy club one of the finest for its size in America.

The full list of the newly elected Executive Committee is as follows:

President - Paul Caffrey
Vice President - Michael Good
Treasurer - Jeff Suhr
Secretary - Mark Poore
Past President - Randy Sowden
Past Past President - Mark Hodges
Member at Large - Carol Mesimer

Your newsletter editor is never a member of the RVAS Executive Committee.

Here are some biographical profiles of our new leaders in the Executive Commitee. Paragraphs in quotes were provided by each officer:

Paul Caffrey
President

"Paul was born in Ireland where he first became interested in astronomy as a young teenager using a 60mm refractor to peek through the murky Irish skies. After immigrating to the United States in 1989 Paul re-kindled his interest in astronomy in 1998 and joined the RVAS.

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"Paul first served on the executive committee as Vice President in 2000, and served as President from 2002-2004 and has been a member of the executive committee since.

"Paul is the Technical Leader for the Plant Controls and Interfaces business at GE Energy.

"Paul's other interests include solar energy and in particular high efficiency photovoltaic solar cells, and is pursuing a Ph.D. in Electrical Engineering from UVA."

Michael Good

Vice-President

"Michael was born in Roanoke in 1955, and raised in Salem, Virginia. He created an astronomy club at the then Andrew Lewis High School in the early 1970's. He used a 6" RV-6 Criterion to study the stars, and wanted to become an astronomer. At UVa he received a degree in Astronomy and Physics, worked at Leander McCormick Observatory, and did his Senior Thesis using UBV aperture photometry of galaxies with the Fan Mountain 30".

"Michael completed 15 hours of graduate astronomy at UVa before taking a job at Goddard Spaceflight Center in Greenbelt Md, where his entry position involved calculating the spacecraft attitude (spin axis direction) for a number of different astronomy-based satellites. He was a member of Goddard's astronomy club, using their roll-off observatory amid the corn fields of the Agricultural Research facility between Washington D.C. and Baltimore Md. He remembers the large radar that would start up whenever Goddard scientists would conduct laser ranging experiments with the moon, pulsing a high-power laser out of a dome near the amateur observatory.

"Michael returned to Roanoke in 1987, where he has been employed for GE in Salem. He taught astronomy in the evenings for five years at Virginia Western Community College and Radford University, teaching NAS-131 (Solar System) and NAS-132 (galactic) astronomy based on Michael Seed's Horizons textbook, and offering an observing lab.

"He returned to UVa to compete another graduate level astronomy course (ASTR 995 independent research) where he created course material for a course in astrophotography, based on "The Handbook of Astronomical Image Processing" by Richard Berry and James Burnell.

"Michael designed and led a group of GE and RVAS members in the construction of the Apple Ridge Farm GE Dark Sky Observatory in Copper Hill, Virginia (Bent Mountain), which houses a 12'x24' roll off observatory with twin telescope piers, and 8" and 12" Meade SCT's.

"Michael states that he has been the recipient of many years of wonderful, patient leadership by many of the RVAS club members, and has taken a back seat to active leadership. He now wants to help the club keep the excellent balance between amateur and semi-professional presentations that he has been enjoying as a member.

"As Vice President, he will be planning programs for the upcoming year, and hopes to strike a balance between the diverse interests

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of our club members. He is interested in almost all aspects of astronomy, which should lend itself to a varied monthly program. He will of course remain open to your suggestions, but barring those, will forge ahead with some ideas for club meetings."

Mark Poore
Secretary

"A native of Pulaski, Virginia, Mark has lived in Roanoke for 15 years and has been a member of the RVAS for two years. After graduating from Roanoke College, he attended Baylor University and was a Fulbright Scholar to Germany. Before moving to Roanoke, he lived in South Dakota where he worked as a software trainer. Mark is currently Director of Instructional Technology at Roanoke College and enjoys helping faculty use technology to enhance their teaching.

"While somewhat new to astronomy, he has enjoyed club outings to Cahas and attended Tri-Star in Greensboro. He and his two sons, also RVAS members, are headed with their camper to Green Bank Star Quest. He owns an 80mm refractor and an 8" Dobsonian plus a variety of eye pieces and astronomy paraphanelia and books.

"Besides astronomy, Mark enjoys camping; home-roasting organic, fair-trade coffees; and running a pet supply Internet side business. He plays the piano and cello and is currently

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The Roanoke Valley Astronomical Society is a membership organization of amateur astronomers dedicated to the pursuit of astronomical observational and photographic activities. **Meetings are held at 7:30 p.m. on the third Monday of each month, at the Center in the Square in downtown Roanoke, Virginia. Meetings are open to the public.** Observing sessions are held one or two weekends a month at a dark-sky site. Yearly individual dues are $20.00. Family dues are $25.00. Student dues are $10.00. Articles, quotes, etc. published in the newsletter do not necessarily reflect the views of the RVAS or its editor.

RVAS web page: *http://rvasclub.org*

Officers/Executive Committee/Editor

Paul Caffrey, President (*president@rvasclub.org*)
Michael Good, Vice President (*vicepresident@rvasclub.org*)
Mark Poore, Secretary (*secretary@rvasclub.org*)
Jeff Suhr, Treasurer (*treasurer@rvasclub.org*)
Randy Sowden, Immediate Past President (*immediatepastpresident@rvasclub.org*)
Mark Hodges, Past President (*pastpresident@rvasclub.org*)
Carol Mesimer, Member at Large (*memberatlarge@rvasclub.org*)
Clark M. Thomas, RVAS Newsletter Editor (*cmtastronomy@hotmail.com*)

teaching himself banjo. He and his wife, Sheri, will celebrate their silver wedding anniversary in August. They have two sons, Luke and Seth."

Carol Mesimer

Member at Large

"Decisions" ©2005 Carol Mesimer

"I joined RVAS back when my now adult son was just starting to be Home Educated. While I have no formal education in Astronomy, I do have an unquenchable thirst for knowledge of nearly any kind. In my normal day to day life, I teach Needle arts at a mental health facility in Roanoke. I love the work, and it gives me great satisfaction to see the clients bloom with new skills. Giving back to the community I live and work in is important to me, and I always enjoy the public outreach programs RVAS provides."

Randy Sowden

Immediate Past President

"I lived most of my life near Akron, Ohio and then spent a year working in Knoxville, TN before moving to Roanoke. I've been in Roanoke for the past 11 years and I love it here. I love the climate, the mountains, the lack of traffic jams, and the friendly people. My line of work is within the realm of Supply Chain Management (purchasing, forecasting, planning, etc) and I've held several positions in the area practicing my craft. I've been married to my wife Vivian for 4 years and we have 2 sons: Benjamin will be 2 on July 23rd and Nicolas will be 4 months old on July 22nd. Vivian is a member of the RVAS (as are my sons I suppose since we have a family membership), but she has not been to a meeting for a while for obvious reasons.

"I enjoy learning about astronomy from the incredible knowledge base our club has to offer. I very much like getting together with other club members to share the night sky be it at Cahas or at an outreach event somewhere else in the greater Roanoke area. I have also been on a few astronomical road trips and enjoyed them immensely. My two favorites so far were VAAS 2009 in Charlottesville last October and Greenbank 2009 last July. Several of our members attended these events as well.

"Aside from Astronomy, and before kids, I used Hang Glide and Scuba Dive. At some point the wife may let me scuba dive again, but I'm afraid my days of floating above Tobacco Row Mountain might be over! We also like to visit her family in Panama City, Panama, usually over Christmas time. The skies outside the city are remarkably clear and it is amazing to watch Orion slowly rise to the zenith each night. Sometimes there are so many stars visible that it is hard to pick Orion out of the multitude.

"I really enjoyed my time as VP, and then as President. Although I know less about astronomy than many folks in our club, I found that giving back to the club in these administrative roles was a great way for me to contribute to the RVAS while I continued to learn about astronomy from our members. Now that

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I'm no longer President I hope to support and help the new President and Officers as much or as little as they would like."

Mark Hodges
Past President

If you haven't met Mark Hodges yet, you will. He has been for several years one of the most loyal and helpful members of our club. He is often at public events with his excellent 11" SCT, and he is most happy when strangers are lined up to look at a splashy subject such as the Moon or Saturn. He has been in charge of the Science Museum's planetarium, and he has spoken to the media on astronomy. Mark will be a very valuable participant in the Executive Committee.

Jeff Suhr
Treasurer

"I was born and raised in Pennsylvania, have a Bachelors in Mathematics from Grove City College, PA, and a Masters in Hydrology from the University of NH. I served as an officer in the USAF for five years, being stationed in Florida, Turkey and NH. Then it was off to the Department of Agriculture for eight years as a soil conservationist. That's what I was when we moved to VA in 1980. I used the math in the USAF in satellite/space systems (looking up was purely business), then the hydrology in the Dept. of Ag. But what really caught my interest was teaching and coaching young people, so I've thoroughly enjoyed being involved at Roanoke Valley Christian Schools for the past 28 years.

"I've been with the RVAS since 1999. In all of my time outdoors hiking, camping, and climbing, mostly with groups of teens, I had never paid much attention to the night sky for enjoyment. I'm not sure what piqued my interest, but once I decided to learn more about it and astronomy, I learned of RVAS and joined. I often think about what could have been during a year in remote southeastern Turkey with the USAF, and all of the remote places in this country that my outdoor interests have taken me.... no lights made for incredible night skies.

"My primary interest in astronomy is observing and continuing to add to my knowledge base. I do especially like the outreach opportunities and sharing with others. I stay alert to opportunities to share with my students where I teach, getting what most of us do...a great deal of satisfaction from watching people see things through a telescope for the first time. And, as we discuss distance and time and the apparent infiniteness of the universe, it's enjoyable to see the students connect this with the infiniteness of God. I would like to see RVAS continue a strong outreach program in our communities and to have organized observing sessions specifically for those in our membership who are just beginning in astronomy."

Exponential Increase in Exoplanets

By Clark Thomas

When the great Kepler space telescope was launched several months ago there were expectations that many new planets would be discovered, due to its much wider field of view than the Hubble. Those optimistic expectations are starting to be met.

Kepler's technique for finding exoplanets involves changes in light from the home star as a planet passes in front. This phenomenon is called a minieclipse.

Extrasolar planets found by the Kepler spacecraft are those that pass in front of (transit) their parent star. Recordings of starlight show a characteristic decrease, or minieclipse, each time a planet passes in front of the star.

The Kepler has a 55-inch mirror, somewhat smaller than the Hubble's, but larger than many of the planet hunting scopes on Earth — along with the critical advantage of being above our atmosphere. Perfect seeing enables the Kepler to detect the signature of tiny variations in light which smaller, "Earthlike," planets would exhibit.

Recently released data from *Science* magazine shows that in the spring of 2009 Kepler examined 156,000 stars, finding 706 candidate planets, many much smaller than the easy-to-catch gas giant planets orbiting near a star. About half seem to be candidates for Earth-like size. The Keck and other giant land-based scopes are analyzing all the key Kepler data.

Adding the 700+ new planets to the 400+ already identified, and subtracting the gas giants, that still leaves a huge number of NEARBY candidate planets, with likely some having environments that could support life.

Frank Baratta's Astro-Quiz

Question: **Which of the first magnitude stars can be occulted by the Moon?**

<u>Answer to Last Month's Astro-Quiz</u>: Too often for night sky observers the twilight is just an interval we want to end so we can get to our scopes. But the twilight sky is a stage of recurring color phases that can be fascinating to watch. Blues become pale and blend into white above yellow-greens that sink into orange-purple reds atop a dark grey blues. The dark grey-blue band is seen just above the eastern horizon when the Sun is from one to five degrees below it, and is actually the earth's shadow. We can see the shadow because our eastward view immediately after sunset is directly along the boundary between the illuminated and nonilluminated parts of the atmosphere. As time passes, we view this boundary with an ever-steepening angle and it soon disappears.

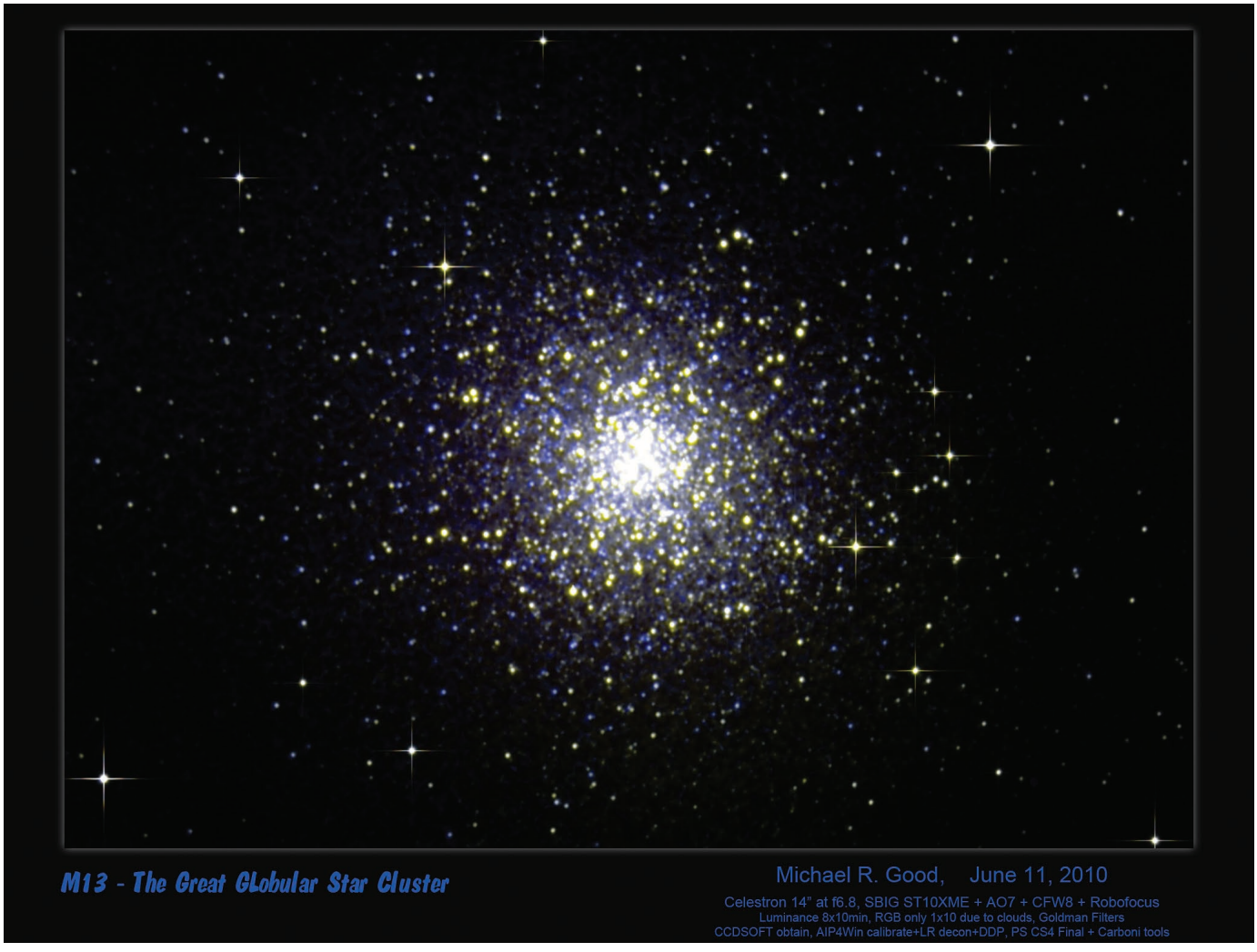
M13: A Jewel in Any Telescope

By Michael Good

For our July newsletter, what better object than the venerable Great Globular Star Cluster in Hercules: Messier 13. For an astrophotography buff such as myself, M13 presents a deceptively easy target that in truth can benefit from capturing far more photons than many photographers attempt (and more than I was permitted due to clouds).

But further, this object presents a delicious view to the telescopic eye. Starting with a cotton ball, easily visible in binoculars, this object has delighted us throughout our journey in our hobby. I remember each progressively larger aperture that I have used to gaze on this gem: My 40mm refractor; my 6" f/8 reflector; my 8" f/10 SCT; my 10" f/10 SCT; my 14" f/11 SCT; and my personal favorite was observing from Cahas Mountain overlook on the Blue Ridge Parkway using an 18" Dobsonian. Oh my. Each larger aperture improves the resolving power and stars revealed, and given our eye's response, this is one gem that remains unique being viewed visually instead of photographically. Each of those brighter stars remain as pin points over a granular seething mass of fainter stars that pop in and out of view as you use averted vision.

But then we add aperture to the astrophotography experience. This spring we have



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all been photon deprived. So it was on Friday evening, June 11, 2010, that I went ahead and opened the observatory, even though clouds were forecast. To my delight, the cool of the evening cleared out the clouds, and left me with a window on the heavens to which I turned my Celestron 14".

It was a very warm and humid evening. The camera could not be cooled below freezing. Who cares. The fans on my main glass struggled to cool down the primary mirror. I synced the telescope on target. I rotated the camera until I acquired the faint 10.6 magnitude guide star I had chosen. I was surprised to see reasonably tight star images after focusing at 1x1 full resolution. My Half Flux Diameter (HFD) and Full Width Half Maximum (FWHM) showed reasonably steady skies for our storm tossed east coast Blue Ridge Mountains.

And so the collection of photons commenced. I sat in the observatory and brought up ITunes. I chose a favorite radio station, as I started a series of longer 10 minute sub-exposures. All prior efforts on this globular used 5 minute sub-exposures to avoid any blooming on my Non-Anti-Blooming CCD, but tonight I wanted to capture more stars.

To my horror, exposure number five had a satellite tumbling from upper left, almost directly across M13's core, to the lower right of my CCD image. The satellite's trail across the frame got progressively thinner as it went into the middle of the Field of View, and then got larger as it headed back to the edge of the frame, which explicitly shows the loss of sharpness on a classical Schmidt-Cassegrain telescope at the edges.

At midnight, I saw my observatory was ringed by clouds. A thick bank to the south, west, and north. I switched to shoot a single ten minute exposure through each of my Astro-Don calibrated color filters, one each for Red, Green, and Blue. This is not typically enough color data, and yet the image still shows the two predominant colors of this globular: the yellowish giant stars and the smaller blue/white stars. In fact, this is one notable difference between my prior efforts at capturing this globular and my latest 14" telescope work. The larger aperture certainly captures more stars with better resolution, but also is able to capture much better color data in a short (10 minutes each) set of color data. My final images were also looking through a thin veneer of dew on my corrector plate, since I chose to not add the heavy heated AstroZap dew shield I use with the 14".

I have noticed difficulties in properly flat-fielding images shot through the focal reducer. I use Sky Flats, covering the scope with white cloth and shooting the sky at dusk or dawn. I took 30 sky flats, 30 darks for the sky flats, 20 darks for the ten minute lum, and 20 Bias frames. Instead of median combining, I averaged the darks and bias frames this time. I used CCDSoft to capture the data, and then used AIP4Win to calibrate and align the data. I applied several 10-pass iterations of Richardson-Lucy Deconvolution to the star data, and finished up with a DDP to compress the dynamic range, limiting the sharpening. I imported the luminance into Photoshop CS4, where I combined the color data, and carefully stretched the Levels to match the real data (preserves the real colors).

I processed this image multiple times, and decided against heavy use of Unsharp Masking, which creates an artificial darkening around sharpened images. Instead, I combined the color data with the luminance, sharpened, but then overlayed the luminance a second time. This technique is referred to as LLRGB, and is well described on Rob Gendler's website. I used Noel Carboni's Photoshop plugin to add diffraction spikes (eliminating a host of spikes from the center of M13 which detracted from the image), and his astro-frame tool, and saved as a PSD. Finally I changed from 16bit to 8bit to save as a Adobe PDF file.

How to Draw the Moon's Features

By John Goss

The June membership meeting had a presentation by me of how to capture details of the Moon's surface the old fashioned way, by sketching. Here is a brief summary:

We all too often find something that is interesting to observe, then quickly skip to something else. We take too little time to really look at an object and appreciate it. One way to slow us down in our race around the sky, and to increase our observational powers at the same time is to sketch what we see.

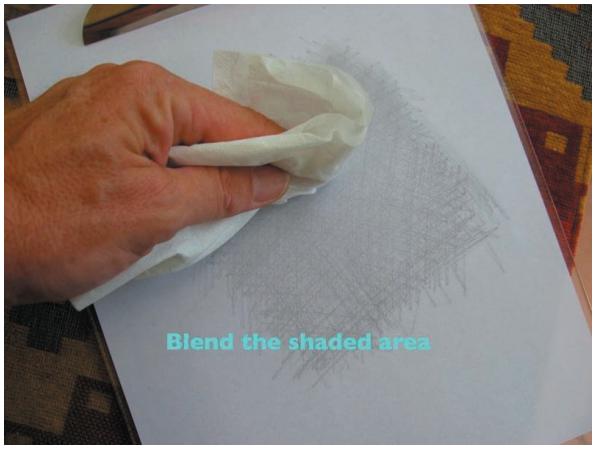
The moon is an object which at first glance appears to be nothing more than a jumble of craters and mountains piled on top of grayish plains. But if you pause, look closer, and sketch them, you will see much more.

Before you try sketching at the telescope, practice using lunar photographs. It really isn't very difficult!

The mechanics of sketching

Material needed: paper, pencils (2H, HB, 4B), blending stumps or tissue, and a clean eraser.

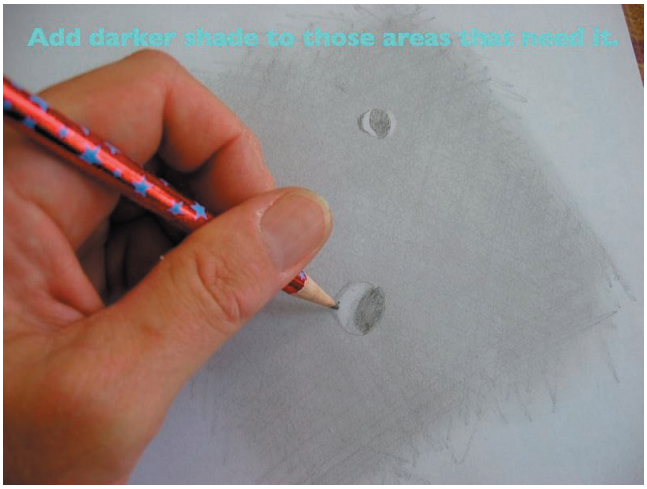
Step 1. Shade a 4 inch by 4 inch or larger area of paper with the side of a pencil. Smooth and blend with either a tissue or a large blending stump.



Step 2. Lightly trace the outline of desired feature.

Step 3. Take away/erase, shaded areas too dark.

Step 4. Darken and blend areas that need darkening.



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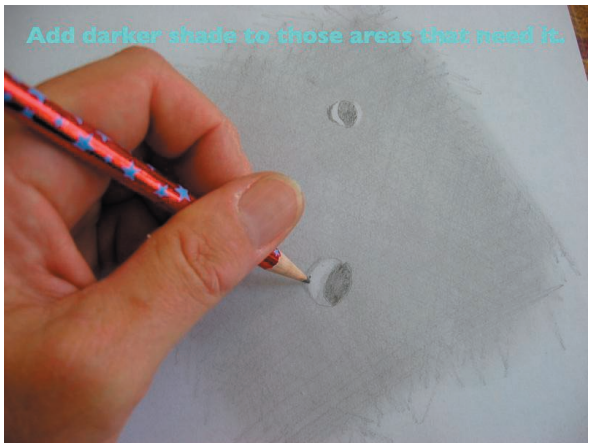
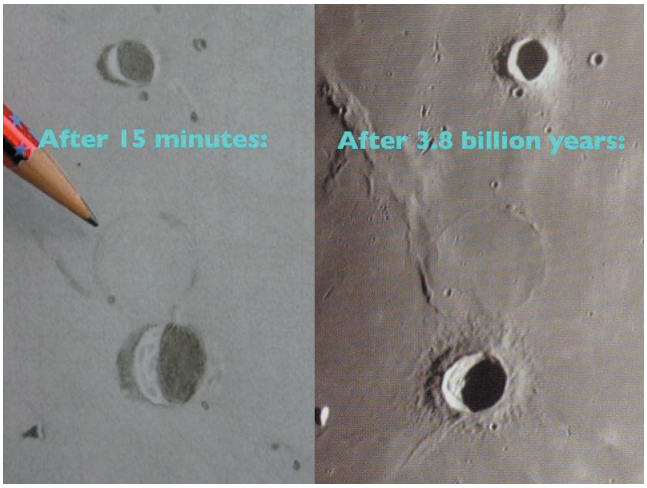
Step 5. Add needed detail such as crevasses and ridges, then blend.



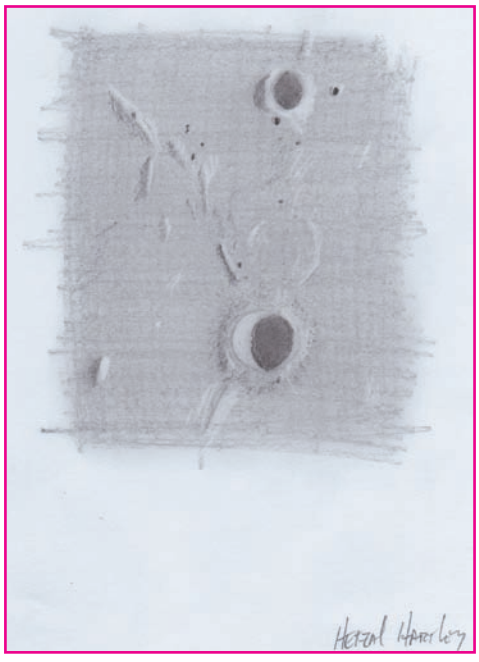
Repeat the steps as necessary.

After fifteen minutes of repeated shading, blending, and erasing, a reasonable likeness of the lunar feature is rendered. Your actual experience behind the telescope will be different,.



It certainly won't be as easy as sketching in a well lit room. It will be dark. You will be peering into the eyepiece, memorizing what you see. You will need some light to be able to sketch. You will need to examine your work. But, after practice it will become easier and your results will be more pleasing. In the end, your reward will be your own impression of a lunar feature, unlike any other done before.

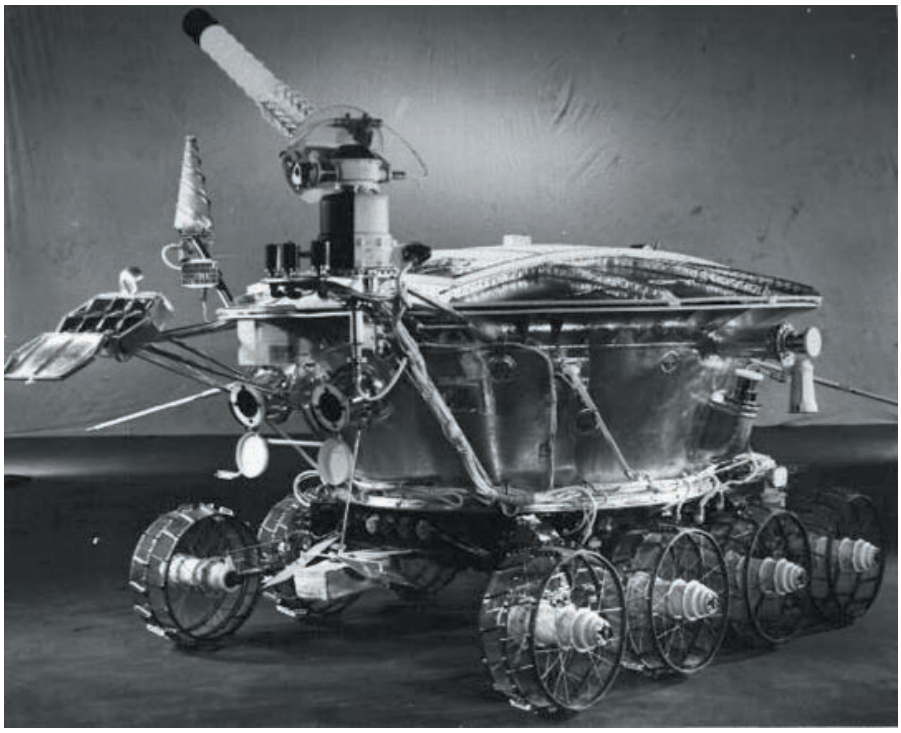
Here are two very excellent sketches by folks at the meeting. The sketch on the left is by Gregg Shadel. The sketch on the right was done by guest Hetzel Harley:



Soviet Debris on the Moon

By Dave Thomas

There are many manmade objects on the lunar surface. Most of these were placed there by the United States and the Soviet Union. While the hardware left by the United States has been from Lunar missions that captured the public imagination, the Soviets have contributed more to the robotic exploration of the Moon than other nations.



The first remotely controlled lunar rover, Lunokhod1 was placed on the Moon by the Soviets during November of 1970. It performed well until mission's end in November of 1971. Lunokhod1 was lifted into Earth orbit by the Soviet Proton rocket, the workhorse of the Russian space program. The Proton system is still is use to this day. Carried by the Luna 17 lander, Lunokhod1 was placed of the Moon's surface in the Sea of Rains.

Fast forward 40 years: The Lunokhod1 was discovered in April 2010 by the NASA Lunar Reconnaissance Orbiter in the Sea of Rains where it had been resting for the past 40 years after traveling almost seven miles across the lunar surface.

The precise location of the rover was determined by reflecting a laser beam from Earth from a special mirror designed for that purpose. Even after 40 years of exposure to the airless and dusty lunar environment the mirror reflected more than enough light to be distinguishable by the detectors on Earth.

Calendar of Events

by Frank Baratta

MONTHLY MEETING: **Monday, July 19th, 7:30 p.m., Center in the Square, Roanoke. The evening's program will feature several highly entertaining elements devised by our new Vice President. Plus some amazing trip and viewing reports.**

RVAS WEEKEND OBSERVING SESSIONS: Observing sessions are held at Cahas Mountain Overlook, milepost 139 on the Blue Ridge Parkway.

- **Friday and Saturday, 2nd and 3rd. Sunset is at 8:44 p.m. Astronomical twilight ends at 10:36 p.m. The Moon rises at 12:02 and 12:27 a.m., respectively.**

- **Friday and Saturday, 9th and 10th. Sunset is at 8:43 p.m. Astronomical twilight ends at 10:36 p.m. The Moon sets at 6:58 and 7:54 p.m., respectively.**

- **August Sessions: 6th and 7th.**

ROANOKE CITY PARKS and RECREATION PUBLIC STARGAZE: Saturday, July 10th, 9:30 p.m., Cahas 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: August 7th, 9:00 p.m., Cahas Overlook.)

FRANKLIN COUNTY PARKS DEPT. PUBLIC STARGAZE: Saturday, July 31st, 9:30 p.m., Franklin Co. Recreational Park. For Franklin County residents, who must register with Parks & Rec. at 540-483-9293. RVAS members can call 540-774-5651 for information. (Next session: TBA.)