The Northern Virginia Mineral Club Inc

The Mineral Newsletter

Next meeting: February 2   Time: 7:30 p.m.

Dunn Loring Fire Station, 2148 Gallows Road, Dunn Loring, VA

Sphalerite

on chert breccia

from the Picher area in Oklahoma
(2 by 4 inches)

Photo: Tom Tucker.

Volume 66, No. 2
February 2026
Explore our website!

Meeting Program:

Mars Rovers Over 20-plus Years

Speaker biography on page 5

In this issue …

Deadline for Submissions, March Newsletter

February 20

Please make your submission by the 20th of the month! Submissions received later might go into a later newsletter.

Mineral of the Month
Sphalerite

by Sue Marcus

Editor's note: *The article is a slightly modified reprint of the original from September 2017. It won first prize in the national newsletter contest for 2017.*

Sphalerite (zinc sulfide, or ZnS) is relatively common, simple, and collectible, whether by silver pick (money), self-collecting, or even trading.

Chemical Affiliations

By simple, I mean that it has few chemical complications. Admittedly, sphalerite does have several varieties: marmatite is the iron-rich, usually opaque black variety; cleiophane is the light yellow variety; and ruby blende is the orange to red variety. In decades of collecting, however, I've come across the term "marmatite" only from mineral dealers and other collectors. Also, sphalerite is most commonly brown or cinnamon-colored, so these special varietal terms aren't used frequently.

If manganese was abundant and available during its formation, sphalerite might grade into alabandite (MnS). If there was sufficient iron, it might have become wurtzite (Zn,Fe)S. There seems to be some debate about another potential polymorph, matraite (also ZnS). From what I could find, that name was discredited by the International Mineralogical Association in 2006, so matraite is not an approved mineral name or species.

Sphalerite is frequently found with the ore minerals galena (PbS) and chalcopyrite ($CuFeS_2$). They often occur together due to the chemical affinity of their main cations—zinc, lead, and copper.

Etymology

The affinity in geological environments may have led to the naming of sphalerite, for the word is derived from the Greek term for "mistaken" or "treacherous." Miners thought that sphalerite was lead ore (galena) and then found that it lacked the lead they sought.

The name was finally bestowed by Ernst F. Glocker after earlier references to the material as "zincum" or "blende" (derived from German *blenden*, "to blind," an apparent allusion to the mineral's deceptiveness). "Blende" is still a miner's term for sphalerite.

Happy Valentine's Day!

Northern Virginia Mineral Club members,

Our next club meeting will be on February 2, 7:30 p.m., in person at our usual meeting place, the Dunn Loring Fire Station in Fairfax. We will join our speaker, Dr. John Grant, for dinner beforehand at 5:30 p.m. at:

BJ's Restaurant & Brewhouse
8027 Leesburg Pike, Suite 100, Vienna, VA
Phone: 703-356-7305

Reservations are under Craig Moore, Vice President, NVMC. If you plan to attend, please email Craig at vicepresident@novamineral.club by noon on the day of the meeting.

Sphalerite from Penfield, Monroe County, NY.
Photo: Bob Cooke.

Occurrence and Uses

Sphalerite most commonly occurs in hydrothermal deposits, where heated fluids have percolated through the host rocks and deposited the ore minerals. Sphalerite is the main ore for zinc; most of this mineral is

Sphalerite (black crystals) with chalcopyrite and calcite. Creede, Mineral County, Colorado. Source: Wikipedia; photo: Ivar Leidus.

extracted for industrial use. The United States has 12 zinc mines in 5 states (2016 data, USGS).

Most zinc is used for galvanizing (coating steel or iron to prevent rust). Sphalerite is also an important source of byproduct cadmium, gallium, germanium, and indium.

Personal Connection

Now a digression.

This is a mineral that helped inspire my career in geology. As a kid, I was given a hand-me-down mineral collection, and someone suggested that I contact Dr. Edwin Roedder to identify what was what. I later learned that Dr. Roedder was a very eminent mineralogist. He was the pioneer investigator of fluid inclusions in minerals, discerning that the inclusions held information about the geologic history of the surrounding mineral and rocks.

At the time, I was too young to know enough to be awed by Dr. Roedder. Every few weeks, we'd visit his home in Bethesda, MD, and he'd quiz me. Often, if I could identify the specimen, I could keep it! I learned that the specimens were frequently sphalerite from the Tri-State Mining District (Missouri/Kansas/Oklahoma). So I learned to detect and admire many variations of sphalerite.

Localities

Along with specimens from the tristate region, the United States is known for stunning specimens from the Elmwood Mine and similar localities in Tennessee. These sites produce lustrous, sometimes translucent rich-brown-toned, well-formed crystals, some with equally beautiful calcite and galena crystals.

Everyone should have a sparkling specimen of midwestern sphalerite in her or his collection. My best collecting trip was led by Barry Remer, with Frank Hissong and me along for comic relief, to a limestone quarry in Danville, KY. For one short day, we collected some very nice fluorite, sphalerite, and calcite specimens—lovely and *heavy!*

The United States doesn't have all the best sphalerite. The Mandan ore fields of Bulgaria produce unusual green sphalerite crystals that can be translucent in the best specimens. Traces of cobalt cause the green color. Peru is the source of many lovely sphalerite specimens, notably rare lustrous red crystals. Similar brilliant specimens have also come from China.

Schalenblende is a rock with bands of massive sphalerite and wurtzite, usually with galena or pyrite. It is sold in attractive polished slabs. Germany, Poland, and

Schalenblende, Olkusz District, Poland. This 2-inch-high slab of schalenblende probably consists of layers of galena (bottom), sphalerite and wurtzite, and marcasite (top). The marcasite formed last and is slowly disintegrating. Photo: Tom Tucker.

Sphalerite on dolostone. Millersville Quarry, Sandusky County, Ohio. Source: Wikipedia; photo: James St. John.

other parts of central Europe are the most common sources.

Mindat includes more than 5,300 photos of sphalerite, indicating that this is a photogenic as well as familiar mineral. Many apparently brown sphalerite crystals benefit from strong backlighting when photographed—they may then show their reds or yellows.

The Franklin-Sterling Hill, NJ, deposits are noted for fluorescent specimens. Before becoming famous mineral-collecting localities, they were huge zinc orebodies that were mined by the New Jersey Zinc Company. The sphalerite found there fluoresces either in blue or in orange-to-yellow colors; some specimens also phosphoresce.

From micros to macros, sphalerite can appeal to everyone, even lapidarists. Bulgaria, China, Peru, and Spain are sources of sphalerite suitable for faceting. Although sphalerite can be styled into jewelry, its relative softness and brittleness make it a poor choice for normal wear. Some faceted stones exhibit a range of hues, for example from yellow to orange-red, making them attractive despite their delicacy.

Technical Details

Chemical formula ....ZnS or (Zn,Fe)S

Crystal form ....Isometric

Hardness 3.4-5

Specific gravity.......................3.9-4.1

Color ....Brown, black, cinnamon, green, yellow

Sphalerite, Carmaleño, Cantabria, Spain. Source: Wikipedia; photo: Bergminer.

Streak.....................................White for pure material, browner if material contains more iron

Cleavage ....Perfect in at least three directions (depends on source)

Fracture ....Uneven to conchoidal

Luster.....................................Resinous, adamantine

Fluorescence...........................Sometimes. When fluorescent, typically orange, sometimes blue

Sources

Amethyst Galleries. 2014. The mineral sphalerite.

Betts, J. N.d. Sphalerite mineral data. Fine Minerals.

Gemdat. 2017. Sphalerite.

Mindat. 2017. Sphalerite.

Minerals.net. 2017. The mineral sphalerite.

The Sterling Hill Mining Museum. 2012. Fluorescent minerals of Franklin and Sterling Hill, N.J.

Tolcin, A.C. 2017. Zinc. U.S. Geological Survey, Mineral Commodity Summaries. January.

Wikipedia. 2017. Sphalerite.

John Grant

20-plus Years of Roving Across Mars: Missions of the Spirit, Opportunity, and Curiosity Rovers

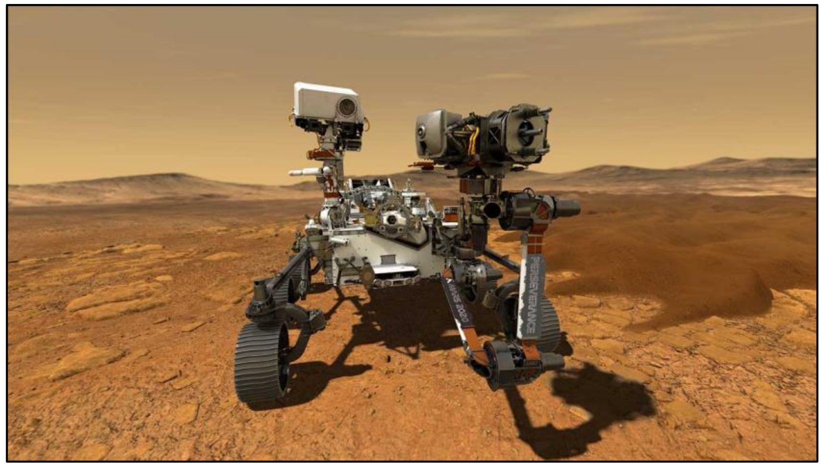
February 2 Program

Our presenter for the February NVMC meeting is Dr. John A. Grant, who joined the Smithsonian in the fall of 2000 as a geologist at the Center for Earth and Planetary Studies, National Air and Space Museum. He is a member of the science teams for the Mars Science Laboratory Curiosity and the High Resolution Imaging Science Experiment camera aboard the Mars Reconnaissance Orbiter. He was also a member of the science team for the Mars Exploration Rovers Spirit and Opportunity and the InSight Mars lander.

On Curiosity, Dr. Grant is a long-term planner focused on achieving strategic goals for the mission, whereas on Spirit and Opportunity he was a Science Operations Working Group chair responsible for leading day-to-day science planning of the rovers. On HiRISE, he is a co-investigator and the science theme lead for Landscape Evolution and Future Landing Sites. He also served as cochair for the science community process for selecting the landing sites on Mars for the Spirit, Opportunity, Curiosity, and Perseverance Rovers. He has been interested in Mars ever since reading Ray Bradbury's *The Martian Chronicles* as a child.

Dr. Grant attended the State University of New York (SUNY) College at Plattsburgh and received his bachelor's degree, magna cum laude, in geology in 1982. He earned a master's and a doctorate in geology at the University of Rhode Island (1986) and Brown University (1990), respectively. His dissertation focused on the degradation of meteorite impact craters on Earth and Mars. He remains interested in understanding processes responsible for shaping planetary landscapes.

Dr. Grant was an associate professor at SUNY College at Buffalo before joining the Smithsonian. He received an honorary Ph.D. from the SUNY Board of Trustees in 2006 and the Dean's Award from the College of the Environment and Life Sciences at the University of Rhode Island in 2015. He is the 2017 recipient of the G.K. Gilbert award from the Planetary Geology Division of the Geological Society of America (GSA) for outstanding contributions to the solution of fundamental problems in planetary geology. He was elected a GSA fellow in 2018.



GeoWord of the Day

(from the American Geoscience Institute)

Stone Age

In archaeology, a cultural level that was originally the first division of the three-age system and was subsequently divided into the Paleolithic (Old Stone Age), Mesolithic, and Neolithic (New Stone Age). It is characterized by the use of materials other than metal, e.g., stone, wood, or bone, for technical purposes. Correlation of relative cultural levels with actual age (and, therefore, with the time-stratigraphic units of geology) varies from region to region; e.g., this oldest cultural level has been discovered to exist in recent times.

(from the *Glossary of Geology*, 5th edition, revised)

President's Message

by Jason Zeibel, President

Greetings, NVMC members, and welcome to February! It is hard to deal with how fast time moves these days. Within our household, we are in the middle of wrapping up first semester and getting ready for college visits. We are headed to visit Georgia and Georgia Tech in very early February and then off to Tucson over Presidents' Day weekend to take in the amazing Tucson mineral show and tour the University of Arizona. It seems like college decisions today are fraught with so much more pressure and anxiety compared to my journey through this process 30 years ago.

Perhaps with that in mind, I am very pleased to announce that the board has selected Maria Nopo and Celia Zeibel as Co-Youth Coordinators. We are blessed to have a vibrant youth program in the club, and we have tasked them with reaching out to the rest of the youth in the club to make sure that we are doing a good job of connecting with their interests, as well as helping the club with our social media presence. They will both be invited to board meetings, and hopefully this will be a positive experience for all involved. So, if you are a youth member or are the parent of a youth member, please reach out to Maria and Celia and let them hear from you. Your opinion matters—likely even more than the opinions of retirees out there because you are the future of our hobby and our club!

In January, we were unfortunately evicted from our meeting space due to the construction going on at the Dunn Loring Fire Station. I am told that the construction should be done by our February meeting and that we will like the newly improved feel of the meeting hall. As a result, we pivoted to a virtual Zoom meeting in January. I tried my best to notify everyone, but if you didn't get the word, then we clearly need to update your email address in our system.

At the meeting, we had another interesting program from Thomas Hale, this time on Virginia's mining heritage (fig. 1). We learned about the five physiographic provinces in Virginia and the long history of mining activity here in our Commonwealth. It is my sincere hope that by February, all construction at our meeting place will be completed, the winter weather will be

Figure 1—*Thomas Hale (top) speaking about Virginia mining history and showing an outline of his presentation (center). He based his presentation on Virginia's five physiographic provinces (bottom).*

kind to us, and we can once again meet in person back at the Dunn Loring Fire Station's newly refurbished meeting hall.

February is associated with Valentine's Day. I put out a couple lighted cupids and some red lights to celebrate. Of course, that got me to thinking about what would be a geologically appropriate way to celebrate Valentine's Day. I found a nice image with a lot of choices for some red gemstones that you could pick from to be seasonally appropriate (fig. 2). Some were obvious choices, like garnets and ruby. Others were less familiar to me, like bixbite and proustite. I was,

Figure 2—*Suggestions for Valentine's-Day-themed minerals for those you love! Note how some mineral names are misspelled, likely due to AI translation or talk-to-text errors.*

however, amused to see that the image must have been put together via AI or through some translation program because several of the mineral names were misspelled.

I often use this column to describe donations that come our way. As president, I have received one or two e-mails per month offering to donate (or sometimes sell) collections of rocks, minerals, fossils, and related equipment to the club. At least half the time, I wind up advising people to gift their "collections" back to nature because they are made up of river rocks or non-crystalline quartz.

This month yielded the opposite experience. I had a chance to meet a lovely lady, Mrs. Martha McNichol. Martha and her late husband David were avid rockhounds who were originally from Montana. They spent a lot of time out West before moving to the East several decades ago.

David was into lapidary work, with several saws and polishing setups. Unfortunately, David succumbed to

Figure 3—*Some of the rocks and lapidary equipment donated to NVMC by the McNichol family. All photos: Jason Zeibel.*

Parkinson's, so Martha decided to let the lapidary tools and many decades of accumulated rocks and fossils go to new families. She reached out to me, and I went over and picked up quite a load of stuff that will now make its way into our club auctions and our 2026 mineral show (fig. 3).

Figure 4—*Lapidary saw donated by Mrs. Martha McNichol to the NVMC.*

I am debating whether the club would have any interest in keeping one of the saws as a club asset that could be checked out for use by members (fig. 4). Martha thoroughly checked out all the equipment before I picked it up to make sure it was all in working order. The largest of the rock saws even has a brandnew blade.

I also got to tour Martha's display cases with museum-quality specimens that she intends to donate to the University of Montana (fig. 5).

One other item for consideration: we all need more NVMC-branded stuff!

Since we had to pivot to virtual for January, I will be doing yet another NVMC name tag order right after the February meeting. So if you want one, then please send me an email at president@novamineralclub.org.

We will also hopefully be doing a hoodie order with the new logos that Almas put together for us, so look for details about that. The club also has both patches and decals that can be purchased for a small fee. Consider getting some new swag with our name on it!

Figure 5—*Mrs. Martha McNichol and a couple of her mineral display cabinets, with specimens intended for donation to the University of Montana.*

In the meantime, go find a garnet, or sunstone, or rhodonite for your main squeeze!

Jason

Club Meeting Notes
January 5

by Almas Eftekhari, Secretary

President Jason Zeibel welcomed everyone to our first (and fully virtual) meeting of 2026. We could not meet in person due to ongoing construction at our usual meeting place.

Jason reminded everyone that 2026 club dues are due. Please send your payment to Treasurer Roger Haskins or bring payment to the February meeting, as described on page XX of this newsletter. Anyone wondering whether their payment was received should contact Roger at treasurer@novamineralclub.org.

Field Trip Co-Coordinator Katy Johnson reminded people to register with the Bull Run Mountain Conservancy for our geology walk at Leopold Preserve on January 29. The bedrock there is sedimentary. Pieces of it were carried downstream by ancient rivers to make up our local Tertiary Terraces. You can find them on gravel bars along Holmes Run and other local creeks—a cool connection to our area.

Katy said she has been working with Hutch Brown on a date and location for a spring geology walk. We will hopefully also have an early-spring visit to the National Limestone Quarry.

Jason said that the geology walk in November 2024 along upper Accotink Creek near the city of Fairfax was really amazing (see the description in the December 2024 newsletter). He encouraged everyone to take advantage of these walks. Jason also noted that he is preparing another order for name tags. If you want one, send him an email at president@novamineralclub.org and pay him $15 when you pick it up.

Jason congratulated our two newly appointed Youth Coordinators, Celia Zeibel and Maria Nopo. They will help find ways to engage young club members, help with social media, report on their activities at club meetings, and write newsletter articles. Jason also introduced newly elected Vice President Jennifer Grimes.

Jason introduced Hutch Brown, editor of our award-winning newsletter. He encouraged members to check out our newsletter (posted on our website). Hutch has invited everyone to submit a few paragraphs on how they got started in our hobby to editor@novamineralclub.org. (See Katy's article in the January newsletter.)

Hutch mentioned his article in our January newsletter explaining the national contest for newsletters and why we're not participating right now. Jason said that it's a lot of work and he likes our newsletter the way it is but that we can participate in the contest again if members want (for example, if they submit an article and want it included in the contest).

Jason gave a shoutout to Jake Broughton, our AV coordinator, for the impressive new AV system he's put together for our in-person meetings. Hopefully, we'll see the whole system come together at our February meeting. If you at our December holiday party, you saw some of the equipment being debuted. We're going to have a new projector and sound system.

In Jennifer Grimes's absence, Jason announced that our program for March will be youth presentations—10- to 15-minute talks by members who have not yet graduated from college. We're looking for three to four volunteers.

Craig Moore, our former vice president, announced that our spring club auction will be in April. Jason explained the auction rules for the benefit of new members. To sell anything, you must be a dues-paying club member, but all are welcome to come and buy.

Jason reminded members that students can apply for a $250 club stipend to spend on travel to any national or international mineral-related event, such as a show. The applicant must write a paragraph outlining the event and their travel plans.

Craig introduced our speaker, Thomas Hale, who was at our November club show on behalf of the organization he founded, Minerals in Context. Thomas is a Ph.D. candidate at the Department of Geology and Spatial Sciences at the University of Delaware. You can find out more about him in our January newsletter.

Thomas's presentation on the geology and mineral resources of Virginia included a history of mining in Virginia, an account of mining in Virginia today, and an overview of Virginia's mineral resources by its five physiographic provinces, from the Appalachian Plateau to the Coastal Plain.

American Indians mined for flint, but official mining history started in 1619 in Jamestown. Coal mining started in 1758. Gold was mined in Virginia's Gold/Pyrite Belt in the 19th century. Salts came from Saltville during the Civil War, and mining for construction materials started in the late 19th century.

Gold nugget from the Whitehall Mine, on display at the Smithsonian National Museum of Natural History. Photo: Hershel Friedman.

Crystallized turquoise from the Bishop Mine, Campbell County, Virginia. Source: Thomas Hale Collection.

Garnet from the Bedford County pegmatites in Virginia. Source: Thomas Hale Collection.

Virginia is no longer a big mining state. In 1958, Virginia still had large-scale manganese production, in addition to producing barite and titanium. Today, the production of aggregates (crushed rock) for construction, valued at $1.8 billion in 2024, amounts to 80 percent of the total rock-and-mineral production in Virginia. Kyanite mining at Willis Mountain was valued at $36.1 million in 2024, and Virginia's vermiculite production was valued at $11.2 million.

According to Mindat, Virginia has 454 valid mineral species. Nelsonite is the state rock. Virginia has no state mineral.

Each of Virginia's five geologic provinces has unique mineral resources, starting with coal on the Appalachian Plateau in southwestern Virginia. The Piedmont is great for collectors, with finds that can include pyrite, copper, amethyst, smoky quartz, gold, malachite, muscovite, amazonite, and—Thomas's favorite from this region—garnet. Thomas showed a photo of a beautiful garnet from his collection, probably the best mineral he's ever collected himself.

The Triassic rift basins, part of the Piedmont, extend all the way up to New Jersey and Connecticut. So-called traprock in the rift basins—a fine-grained igneous rock called diabase—stems from magma intruding cracks in the sedimentary rock that was filling in the Triassic basins, caused by continental rifting as Pangaea broke up beginning about 230 million years ago. Traprock quarries in northern Virginia contain more than 85 mineral species, including zeolite minerals as well as (rarely) gold and silver.

After his talk, Thomas took questions, rounding out the meeting. ⛏

Sad News About Past President Wayne Sukow

December 9, 1936–September 23, 2025

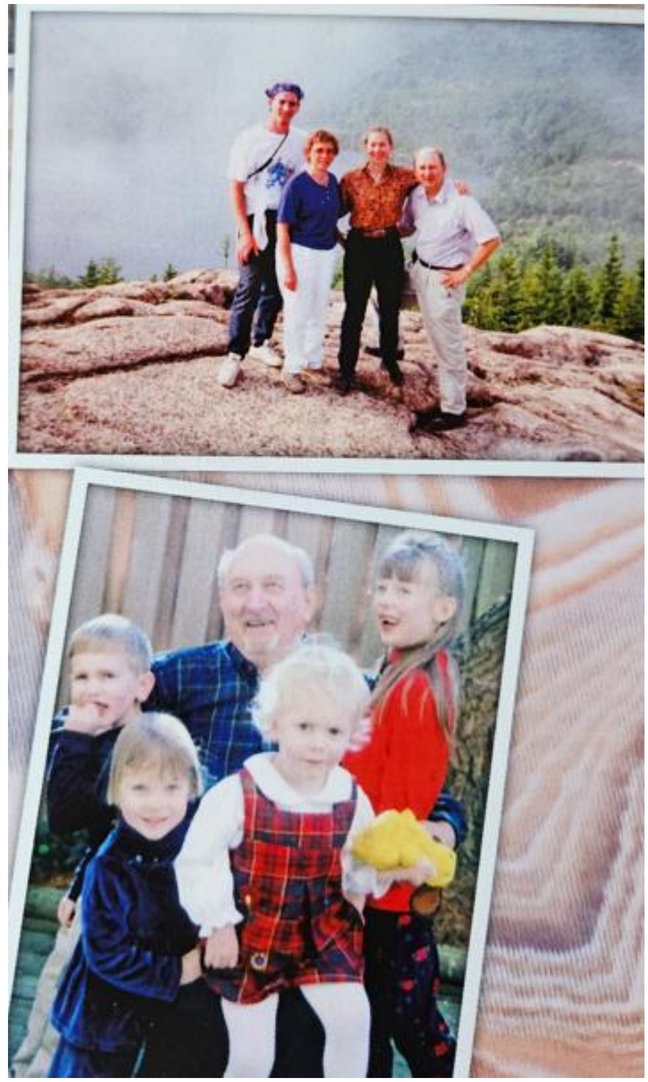
Editor's note: *The article is based on Wayne's official obituary and personal memories by Kathy Hrechka and John Kress.*

We were saddened to learn that one of our legacy club members has passed away at the age of 88. Wayne W. Sukow was involved for years with our local geology clubs. We remember him for his extensive collection of datolites, copper-replacement agates, and iris agates. Wayne served as NVMC president for a total of 7 years (1998-99, 2007-09, and 2014-15). He was active in our club in other ways as well—in presenting programs to our members, for example, and as an occasional vendor at our annual club show. He was also involved with our regional club federation (the Eastern Federation of Mineral and Lapidary Societies), eventually becoming its president.

Wayne was born in Merrill, WI, where he grew up working on the family farm, exploring the local woods, competing in track and field, and filling his pockets with rocks. He graduated from Merrill High School and the University of Wisconsin at River Falls (UW-RF), where he earned his undergraduate degree in Physics and Biology. He met Carol Nelson in high school, and they were married after both had finished college. They moved to Cleveland, OH, where Wayne earned an M.S. in Low-Energy Nuclear Physics at Case Western Reserve University. He returned to UW-RF to teach physics, interspersed with more graduate study and the arrival of children, Catherine and David. Wayne earned a Ph.D. in Chemical Physics from the University of Washington at Pullman in 1973.

While teaching at UW-RF, Wayne enjoyed rock hunting for Lake Superior agates (often with family in tow). He developed an interest in science education. After visiting San Francisco's Exploratorium, he founded the UW-RF Exploreum on campus and established a mobile program to bring interactive science exhibits to area high school teachers.

Wayne began work at the National Science Foundation (NSF) in Washington, DC, as a program director in the Division of Elementary, Secondary, and Informal Education. He and Carol moved to Fairfax, VA, in 1991. A highlight of his time at NSF was his establishment of the Teachers Experiencing Antarctica and the Arctic program.



After retiring in 2004, Wayne and Carol traveled often, exploring Norway, Canada, and New Zealand, visiting family, and birdwatching as well as rockhounding. Wayne remained active in several rock and mineral clubs, and he published articles on Lake Superior agates, datolites, copper-replacement agates, and iris agates while building a fascinating and beautiful collection of specimens. One of Wayne's datolite specimens was pictured in a recent *Mineralogical Record* article, indicating the high quality of his collection.

While at home in Fairfax, Wayne and Carol were frequent and gracious hosts of family gatherings. In the last years of their lives, they lived closer to, first, David's family and then Catherine's, giving everyone the gift of more family time together.

You can read his entire obituary here.

Wildacres in Spring

Wildacres is a fantastic retreat located on Pompeys Knob just off the Blue Ridge Parkway about an hour north of Asheville, NC. Signing up for the May 12-18, 2025, session will give you the opportunity to take classes and hear excellent talks from the speaker-in-residence, Martin D. Fuller, a gemologist and renowned appraiser who will share his passion for gems and jewelry. You will also be able to participate in a variety of other activities.

You can register on the EFMLS Wildacres website. The speaker-in-residence and the courses listed below are firmly lined up for May.

Coming to Wildacres in May 2025 …

Cabochon Cutting (*Rick Marshall*): Learn the basics of creating a cabochon from a slab of rock! You will see a display showing each stage of the process. The class fee ($75) and material costs (up to $40) includes slabs, straight edge, super glue, marker, pen, notepad, instruction manual, polishing materials, and more. Bring an optivisor if you have it. You can bring your own slabs, plus I have slabs available for purchase.. No experience needed. 4-day class.

Chainmaille, beginner (*Jim Hird*): Learn the ancient art of chainmaille, creating fine jewelry using unsoldered links. Basic patterns will be taught using inexpensive copper rings as well as anodized aluminum and colored rubber. Printed handouts provided for all patterns. Lab fee of $20 for handouts. Project prices for base metal kits $20 or less each; total cost will depend on number of projects and type of materials you choose. Tools provided; bringing an optivisor suggested. No experience needed. 2-day class, semester 1.

Chainmaille, intermediate (*Jim Hird*): Build on the basics by doing more advanced patterns, working in more colors, or using gold-filled, argentum, and mixed-ring materials. Total cost will depend on number of projects and what materials you choose. Basic skills required. 2-day class, semester 2.

Faceting (*Bernie Emery*): Learn to cut and polish a 57-facet round brilliant quartz gemstone, how to identify well-cut stones, and select rough material. Materials fee $40. Bring optivisor or loupe. No experience needed. 4-day class.

Photography (*Michael Pabst*): Learn to photograph mineral specimens/lapidary objects at increasing levels of sophistication and magnification. Bring your favorite specimens, camera equipment, and memory sticks. Learn to fix problems using Adobe Photoshop, how to use digital cameras with detachable lenses, how to use Focus Stacking to increase depth-of-field, and how to use a digital camera attached to a stereo microscope. Push the limits of optical magnification using an automated focusing rail to take photos. Materials fee $25. 4-day class.

Metal Clay-Silver (*Susan Brooks*): Learn to use fine silver metal clay to create beautiful pieces of heirloom-quality jewelry. Learn basic skills (texturing, cutting, joining, stone setting, creating embellishments, and bail making). You will have project possibilities and techniques. Bring reading glasses or optivisor. Basic Class Kit fee $275; additional clay available for purchase. Lab fee $50. No previous experience required. 4-day class.

Silversmithing, basic (*Richard Meszler*): Learn to work silver sheet & wire to fabricate jewelry. You get a kit with metals/supplies & a step-by-step description of each project. Materials fee $100. Optivisor an Materials fee $100. Optivisor and apron recommended. d apron recommended. No experience needed. 2-day class, semester 1.

Silversmithing, intermediate (*Richard Meszler*): Learn to make a bezel setting & bail for setting a cabochon to make a pendant. You get a kit with all you need. Materials fee $100. Optivisor and apron recommended. Basic silversmithing experience, including soldering. 2-day class, semester 2.

Wirewrapping (*Jacolyn Campbell*): Use pliers/gold-filled or sterling silver wire/assorted beads or gemstones/ basic wire-craft techniques to create rings, bracelets, pendants, and earrings. All tools/materials provided.

Session I (beginner): Make an adjustable ring, 2 bracelets, pendant, 2 pairs of earrings. Estimated materials cost $100. 2-day class, semester 1.

Session II (intermediate): Make a fitted ring, 2 pairs earrings, cabochon pendant, and bracelet. Estimated materials cost $120. 2-day class, semester 2.

Geology of Travilah Serpentine Barrens in Maryland

by Hutch Brown

On last year's winter solstice (December 21), a group of 50-60 residents from across our area, led by plant experts, spent hours tramping through the woods in a globally rare ecosystem: Travilah Serpentine Barrens near Rockville, MD, part of which is now Montgomery County's 288-acre Serpentine Barrens Conservation Park. Told of the nature walk by NVMC Field Trip Co-Coordinator Katy Johnson, I joined the group with my son Alex, as did Katy herself.

For me, it was mainly an opportunity to see serpentinite, a kind of metamorphic rock that, like the barrens itself, is highly unusual in our area. Talc schist, a related rock, also appears in places. The serpentine soils are thin, with plenty of bedrock outcrops. Rich in iron and magnesium, the soils are low in nutrients like calcium and potassium and high in metals like nickel and chromium, toxic to many plants. The oak/hickory forest is therefore stunted, with trees that are visibly shorter than usual, even though the forest is "old growth" (never been logged). Trees that are common across our area, like tuliptree (*Liriodendron tulipifera*), are missing, whereas a rare shrub like leatherwood (*Dirca palustris*), perhaps for lack of competition, thrives in a habitat hostile to many plants.

Unlike other bedrock in our area, serpentinite originated in Earth's upper mantle. After metamorphism, it was uplifted onto our continent and emplaced in the Piedmont geologic province where we find it today.

How did that happen?

Bedrock Origins

A geologic map offers clues (fig. 1).

The map shows the serpentinite bedrock (**CZu**, green) that underlies the barrens as a band slanting from northeast to southwest. The bedrock is embedded in a much broader band of schist (**CZms**, yellow) with the same orientation from northeast to southwest. Additional bands of metamorphic bedrock (metagraywacke (**CZmg**, dark orange) and migmatite (**CZmm**, light orange)) parallel the schist, all with the same orientation.

The parallel orientation points to ancient mountain-building events when other continents collided with proto-North America. Earth's crust is not solid but

Travilah Serpentine Barrens. ***Top:*** *Outcrops of serpentinite covered in lichens and moss.* ***Bottom:*** *Upland bog caused by water sitting on bedrock in the shallow serpentine soils. (The bog contains the rootwad of a toppled tree.) Photos: Dingwell (2015) (top); Hutch Brown (bottom).*

rather divided into tectonic plates driven by convection currents in the underlying viscous magma in Earth's mantle. About 500 million years ago, Earth's continental plates were slowly combining into a single supercontinent called Pangaea (pronounced pan-JEE-uh). An early collision, which took place about 474-450 million years ago, is called the Taconian (or Taconic) Orogeny. The timing comes from radiometric dating of associated intrusive igneous rocks, such as Occoquan granite (Bentley 2020).

About 490 million years ago, a microcontinent was slowly approaching proto-North America while closing the ancient Iapetus Ocean (fig. 2). The approaching plate formed an arc (curved line) of volcanic islands at

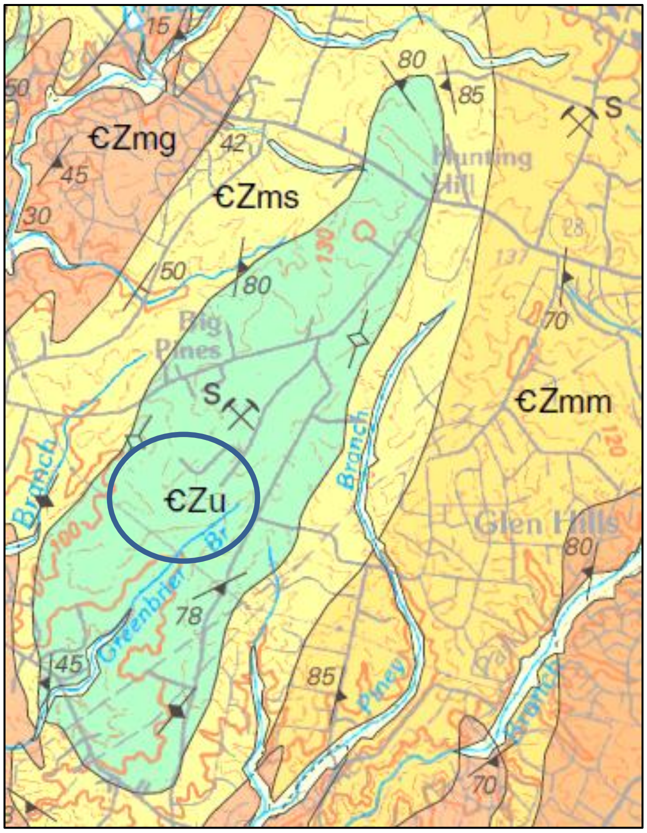


Figure 1—*Detail from a map showing the geologic environment of Serpentine Barrens Conservation Park (circled) in Montgomery County, MD.* **CZu** *= serpentinite (green);* **CZ** *= Cambrian/Proterozoic (reflecting uncertainty);* **u** *= ultramafic/mafic.* **CZms** *= Mather Gorge schist (yellow).* **CZmg** *= Mather Gorge metagraywacke (dark orange).* **CZmm** *= Mather Gorge migmatite (light orange).* **S** *= quarry for building stone. Source: Southworth and others (2007).*

the leading edge of the advancing plate, known as the Taconian Terrane.

As figure 3 suggests, the continental plate subducted (slid under) the advancing Taconian Terrane, melting into the asthenosphere underlying the oceanic crust (the lithosphere). The melt zone sent huge plumes of magma rising to the seafloor, where they erupted as lava to create the volcanic islands. Some plumes hardened underground, forming intrusive igneous rock like granite.

Even as the volcanic islands were rising over millions of years, they were weathering away, depositing erupting ash and sediments from erosion in what geologists call the forearc basin (fig. 3), a vast sea verging on the advancing island arc. The subducting continental plate formed a deep-sea trench ahead of the forearc basin, along with an accretionary wedge of sediments scraped up from the seafloor. The accumulating sediments in the trench and basin hardened into sedimentary seafloor rock, underlain in places by intrusive igneous rock. The advancing Taconian Terrane gradually slid onto the continental margin, pushing seafloor rock ahead of it, followed by the islands themselves.

Figure 2—*About 490 million years ago, the southern part (the Taconian Terrane) of a tectonic plate approaches proto-North America (red arrow), closing the remnant Iapetus Ocean. Source: Herman (2013).*

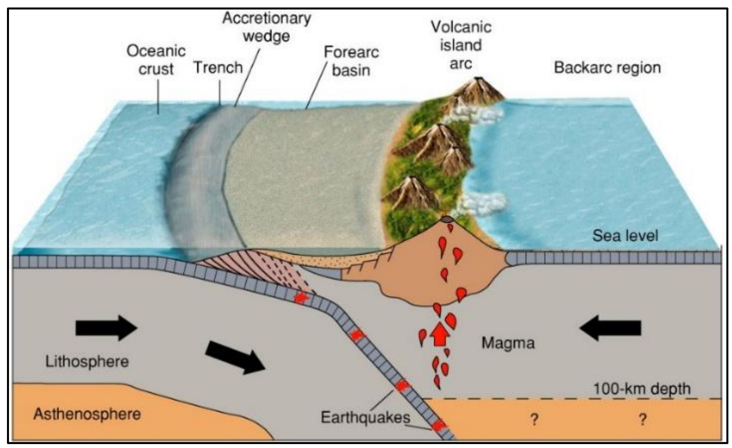


Figure 3—*Tectonic plate subduction. When plates collide head-on, one slides under the other in a subduction zone. As the subducting plate melts into the asthenosphere, it sends plumes of magma to the surface, where lava erupts in volcanoes, creating a volcanic island arc. Where the plates converge, they form a trench and forearc basin; they collect materials scraped up from the seafloor and emitted or eroded from the islands. Source: Herman (2013).*

Figure 4—*Mather Gorge metagraywacke, showing the bedding of silts and sands laid down following an ancient undersea debris flow. Later tectonic forces buckled the parallel layers and filled cracks with silica-rich hydrothermal fluids that left veins and nodes of milky quartz. Source: Bentley (2013).*

The collision ultimately raised mountains (long since gone) as high as the Alps are today. The intense heat and pressure associated with mountain building metamorphosed the underlying bedrock, including the ancient seafloor rock. The orogeny left the Taconian Terrane sutured onto the edge of proto-North America. We know it today as the Piedmont Province, with its ancient mountain roots exposed by erosion.

Some Piedmont bedrock still shows signs of ancient seafloor silts and sands. In Mather Gorge metagraywacke, for example, you can see sedimentary layers laid down by seafloor turbidity currents (fig. 4). Mather Gorge schist, having undergone multiple metamorphic events, no longer shows evidence of its seafloor origins, nor does Mather Gorge migmatite, with its partially melted gneiss. All three Mather Gorge bedrock types shown in figure 1 (schist, migmatite, and metagraywacke) are what geologists call felsic rock (fel- comes from feldspar and -sic from the chemical symbol Si for silicon—that is, silicon dioxide, or quartz). Rich in feldspars and quartz, felsic rock is more than 55 percent quartz alone.

Serpentinization

By contrast, serpentinite is what geologists call an ultramafic rock, with very different origins from felsic bedrock types. Mafic rocks (ma- comes from magnesium and -fic from the chemical symbol Fe for iron) are much richer in iron and magnesium than are felsic rocks; they are also relatively poor in feldspars and quartz. Mafic rocks like basalt and gabbro are only 45-55 percent quartz, whereas ultramafic rocks like serpentinite and soapstone contain less than 45 percent quartz.

Continental bedrock like granite is felsic rock, whereas the heavier oceanic and mantle rock is typically mafic or ultramafic. Over eons, convection currents circulated dense ocean crust down into the mantle as part of plate tectonics (fig. 3); remelting concentrated silica in the rising magmas, which ended up in the continents. Granite, for example, is more than 70 percent silica.

Accordingly, the ultramafic rock underlying Travilah Serpentine Barrens—unlike the adjacent felsic bedrock types—did not start out as sediments on an ancient seafloor. Instead, the serpentinite originated from ultramafic rock in Earth's solid upper mantle. Its point of origin lay far below the seafloor origins of every bedrock type in the Mather Gorge Formation, and its metamorphism occurred during subduction, well before the metamorphism of schist and other Mather Gorge rocks during Taconian mountain building.

Earth's upper mantle is mainly peridotite, an ultramafic rock made up of olivine and pyroxene minerals. (Peridot, a collectible mineral and gemstone, comes from peridotite.) Serpentine minerals like antigorite and lizardite—components of serpentinite—originated in a process called serpentinization through the reaction of peridotite to superheated fluids rich in silicon dioxide (quartz). Serpentinization involves several ways in which superheated water rich in silica can react with the olivine and pyroxene minerals in peridotite to form serpentine and related minerals. For example, forsterite (an olivine mineral) can combine with quartz and water to yield the serpentine mineral lizardite:

$$3Mg_2SiO_4 + SiO_2 + 4H_2O \longrightarrow 2Mg_3Si_2O_5(OH)_4$$

Serpentinization involving enstatite (a pyroxene mineral) can yield talc:

$$3MgSiO_3 + SiO_2 + H_2O \longrightarrow Mg_3Si_4O_{10}(OH)_2$$

Such reactions can occur in various geologic settings, including subducting tectonic plates (fig. 5). As the proto-North-American plate slid under the Taconian plate during the Taconian Orogeny, the subducting oceanic crust heated up enough to release copious amounts of superheated water. The silica-rich water reacted with peridotite minerals in the upper mantle to form serpentinite. Less dense than its parent rock, the

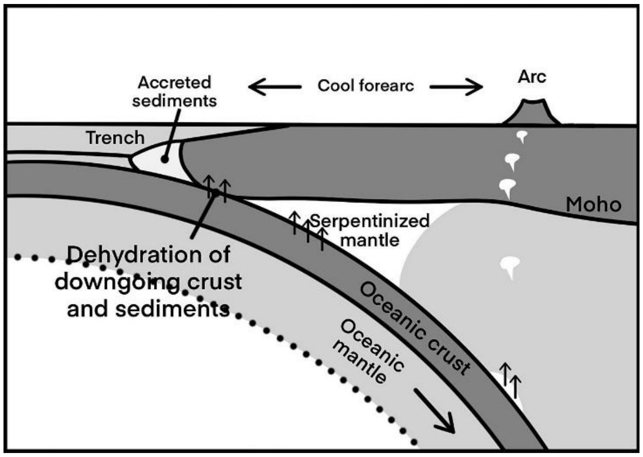


Figure 5—*Serpentinization of upper mantle rock during subduction. Superheated seawater released by the subducting crust reacts with peridotite to form serpentinite. Less dense than the ocean crust and mantle, serpentinite rises to underlie seafloor rock in the forearc basin. Source: Hyndman and Peacock (2003).*

serpentinite then rose above the melt zone to underlie seafloor rock in the forearc basin (fig. 5).

As the orogeny proceeded over millions of years, the serpentinite (serpentinized peridotite) was pushed, together with the seafloor rock, onto the continental margin. Bands of it are now embedded in the various bedrock types of the Mather Gorge Formation in both Maryland and Virginia. During a geology walk in Lake Fairfax County Park in spring 2024 (read about it here), a group of NVMC members found both serpentinite and talc (fig. 6), the latter in an old soapstone quarry. In fact, you can find isolated bands of serpentinite—and small serpentine barrens—along the Atlantic seaboard from Quebec to Georgia, although most of them are in Maryland and Pennsylvania.

Serpentinite Characteristics

The main serpentine minerals (serpentinite components) are antigorite, lizardite, and chrysotile. They are usually green or greenish in color, although specimens can range from white, yellow, and bluish-gray to brown and black. Serpentinite can also contain magnetite, usually black or dark gray in color.

A serpentinite specimen that NVMC members found in Virginia's Lake Fairfax County Park was a lovely greenish-black (fig. 6, top), perhaps from antigorite and magnetite. At Travilah Serpentine Barrens, pieces broken off from the weathered greenish-gray bedrock showed a bluish-green interior with dark gray (fig. 7),

Figure 6—*Serpentinite (top) and talc (bottom) in Virginia's Lake Fairfax County Park. The serpentinite shows green antigorite, possibly with black magnetite. (A weathered piece is shown for comparison.) The bluish talc was broken off with a rock hammer from a weathered soapstone boulder. Photos: Hutch Brown.*

probably from some combination of magnetite and the three major serpentine minerals.

Chrysotile (also known as white asbestos) has the fibrous habit typical of asbestos. As the most prevalent form of asbestos used in building materials worldwide, chrysotile poses significant health risks. By contrast, antigorite and lizardite have platy habits, which might account for the name serpentinite. The name apparently comes from the mottled or platy "snakeskin" appearance of some specimens. However, none of the serpentinite I saw in Maryland and Virginia looked mottled or platy.

Figure 7—*Serpentinite in Travilah Serpentine Barrens. The bluish-green exposures came from pieces of weathered bedrock broken off with a rock hammer. They seem to show serpentine minerals mixed with magnetite. Photos: Hutch Brown.*

Rare Bedrock

Much of the bedrock in our area stems from orogenies during the Ordovician and Carboniforous Periods, when Earth's continents joined together over hundreds of millions of years to form the supercontinent Pangaea. Tremendous heat and pressure generated by the Taconian Orogeny metamorphosed sedimentary seafloor rock into our local schists, phyllites, gneisses, sedimentary melanges, and more.

Long before the seas closed and Taconian uplift began, subduction of the colliding tectonic plates serpentinized peridotite in Earth's upper mantle. Less dense than its parent rock, the newly hydrated altered rock rose above the melt zone. The buoyancy of serpentinite resembled that of the magma that rose from the melt zone and cooled underground into intrusive igneous rock like granite.

Maybe that's why Mindat refers to a "pluton" of ultramafic rock in the quarry—excavated for building materials since the 1950s (fig. 1, **S**)—that lies just north of Serpentine Barrens Conservation Park. Mineral clubs in our area have long visited the quarry to find serpentine and other minerals. But that's another story.

Next: *Serpentinite, rodingite, and serpentine minerals from the Hunting Hill Quarry.*

Sources

Bentley, C. 2013. Friday fold: metagraywacke from the Billy Goat Trail. Blog. 22 November.

Bentley, C. 2020. Historical geology: a free online textbook for historical geology courses.

Dingwell, S. 2015. Take a walk on the wild side: Travilah Serpentine Barrens. Virginia Native Plant Society. Blog. 28 December.

Herman, G.C. 2013. Geology of the mid-Atlantic margin of the North American continent. TCNJ Phy120 2013 Gcherman.

Hyndman, R.D.; Peacock, S.M. 2003. Serpentinization of the forearc mantle. Earth and Planetary Science Letters 212(3-4): 417–432.

Johnson, K. 2022. 2022 winter solstice walk. Potowmack News. Winter: 1, 3-4.

Larrabee, D.M. 1969. Serpentinite and rodingite in the Hunting Hill Quarry, Montgomery County, Maryland. Geol. Surv. Bull. 1283. Washington, DC: U.S. Government Printing Office.

No author. 2016. A look at serpentinization. Oakland Geology. Blog. 13 June.

Southworth, S.; Brezinski, D.K.; Drake, A.A.; [and others]. 2007. Geologic map of the Frederick 30 × 60 Quadrangle, Maryland, Virginia, and West Virginia. Sci. Inv. Map SIC 2889. Reston, VA: USGS.

February 2026—Upcoming Events in Our Area/Region (see details below)

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2 NVMC meeting	3	4 MSDC mtg	5	6	7
8	9 GLMSMC mtg	10	11	12	13	14 Valentine's Day
15	16 Presidents Day	17	18	19	20	21
22	23	24	25 MNCA mtg	26	27	28

Event Details

2: Dunn Loring, VA—Northern Virginia Mineral Club; https://www.novamineralclub.org/.

4: Washington, DC—Mineralogical Society of the District of Columbia; info: http://www.mineralogicalsocietyofdc.org/.

9: Rockville, MD—Gem, Lapidary, and Mineral Society of Montgomery County; info: https://www.glmsmc.com/.

25: Arlington, VA—Micromineralogists of the National Capital Area; info: http://www.dcmicrominerals.org/.

No known shows in the mid-Atlantic region this month.

(But stay tuned for March—more than usual coming up! At least four in NC, two in PA, and one each in DE and MD.)

The Northern Virginia Mineral Club, Inc.

Visitors are always welcome at our club meetings!

EXPLORE OUR WEBSITE! FIND US ON FACEBOOK!

Club purpose: To encourage interest in and learning about geology, mineralogy, lapidary arts, and related sciences. The club is a member of the Eastern Federation of Mineralogical and Lapidary Societies (EFMLS—at http://www.amfed.org/efmls) and the American Federation of Mineralogical Societies (AFMS—at http://www.amfed.org).

Please send your newsletter articles to:
Hutch Brown, editor
4814 3rd Street North
Arlington, VA 22203
hutchbrown41@gmail.com

RENEW YOUR MEMBERSHIP!

SEND YOUR DUES TO:
Roger Haskins, Treasurer, NVMC
4411 Marsala Glen Way, Fairfax, VA 22033-3136

OR

Bring your dues to the next meeting.

Dues: Due by January 1 of each year; $20 individual, $25 family, $6 junior (under 16, sponsored by an adult club member).

2026 Club Officers

President: Jason Zeibel
president@novamineralclub.org
Vice President:
vicepresident@novamineralclub.org
Secretary: Almas Eftekhari
secretary@novamineralclub.org
Treasurer: Roger Haskins
treasurer@novamineralclub.org
AV Coordinator: Jake Broughton
cjbrot10@gmail.com
Editor: Hutch Brown
editor@novamineralclub.org
Field Trip Co-Chairs: Katy/Mickey Johnson
fieldtrips@novamineralclub.org
Greeter/Door Prizes: Vacant
Historian: Kathy Hrechka
historian@novamineralclub.org
Show Chair: Tom Taaffe
show@novamineralclub.org
Tech Support: Tom Burke
tech@novamineralclub.org
Webmaster: Casper Voogt
webmaster@novamineralclub.org

Meetings: At 7:30 p.m. on the first Monday of each month at the Dunn Loring Fire Station, 2148 Gallows Rd., Dunn Loring, VA.* (No meeting in July or August.) September meeting (Labor Day) is Zoom only.

**Changes are announced in the newsletter; we follow the snow schedule of Fairfax County schools.*