The Mineral Newsletter

Meeting: December 19 Time: 7:00 p.m.

In-person holiday party. Details on page 7.

Volume 62, No. 10
December 2022
Explore our website!

Diaspore with margarite
Muğla Province, Aegean Region, Turkey

Source: Wikipedia Photo: Rob Lavinsky.

December Meeting:

Holiday Party

Details on page 7

In this issue …

Mineral of the Month
Diaspore

by Sue Marcus

Diaspore, our December Mineral of the Month, is rare and attractive. Like our November mineral, euclase, diaspore was described by French mineralogist and crystallographer René Just Haüy. He named it in 1801, basing the name on the Greek word for disperse. The name derives from diaspore's distinctive characteristic when heated by blowpipe: it decrepitates (audibly disintegrates) into flakes—not something you want to try if you want to preserve your specimen.

Twinned crystals of diaspore are common. Euhedral (well-formed) crystals usually have striations parallel to the c-axis (long axis) of the crystal.

Diaspore can be part of relatively uncommon rocks. For example, diasporite is a metamorphic rock composed of diaspore, hematite, margite, and choloritoid. It derives from metamorphosed bauxite, which in turn forms from the weathering of certain clays, usually in a tropical environment. Emery is a granular metamorphic rock composed of corundum, iron-bearing minerals, and sometimes rutile. In some emery deposits, corundum is altered to diaspore.

In a different geologic setting, limestone erosion creates sunken areas or caves underground; diaspore forms in these depressions from the weathering of alumina-rich source rocks. Diaspore can also form when hydrothermal forces create the right conditions for its precipitation along fractures in some pegmatites.

The official type locality for diaspore is in Russia, René Just Haüy obtained material thought to be from Mramorskii (Mramorskoye) Zavod, in Sverdlovsk Oblast, from a Parisian dealer. A marble deposit was the likely source of the original type specimens.

The only Mindat photo of diaspore from this locality can be best described as historic, not as attractive. The pictured specimen features iron-stained, white to gray, platy, almost fibrous diaspore crystals. The Saranovskii Mine in Russia's Perm Krai region is an underground chromite mine in which diaspore occurs sparsely with uvarovite (a species of green garnet).

In the United States, the Chester emery mines cluster around Chester, MA. The mines in this classic locality produced some lovely, well-crystallized diaspore specimens. Colors range from white through off-white to

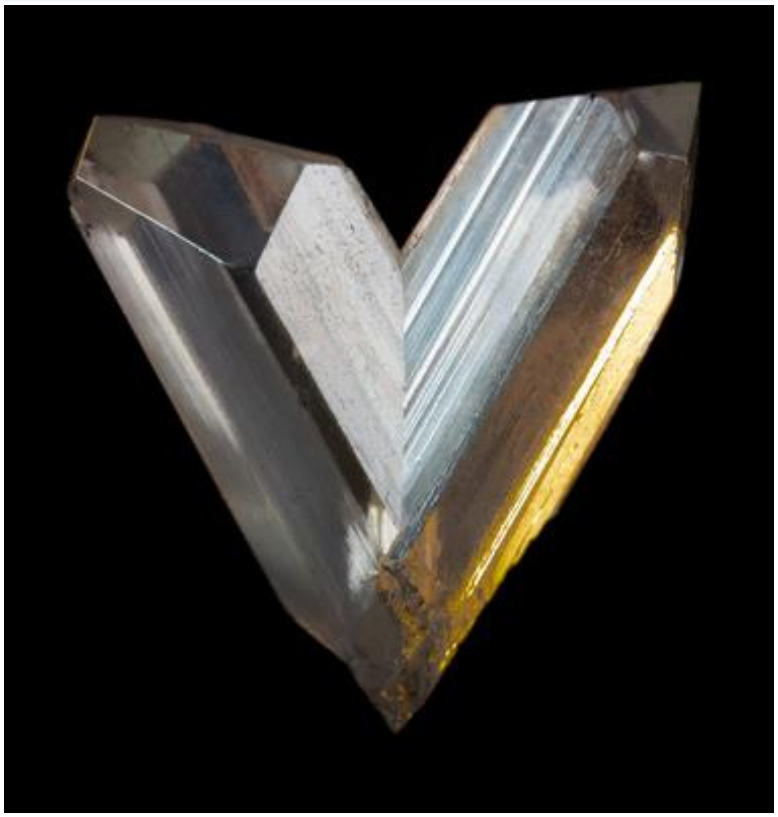
Merry Christmas!

Happy Hanukkah!

Northern Virginia Mineral Club members,

Happy holidays! President Tom Kim has graciously invited us to celebrate the season at his home on **December 19, 7:00 p.m.** (2301 Stokes Lane, Alexandria, VA).

See details on page 7.



Diaspore twin, Muğla Province, Turkey. Source: Mindat; photo: Ru Smith.

Diaspore, Chester, MA.
Source: Mindat; photo: Jeff Krueger.

pink and lilac. Crystals from vugs were collected into the 1970s. Granular diaspore hosted other minerals, such as clinochlore. Microscopic diaspore crystals, flattened macroscopic crystals, and upright crystals were all found here, though never abundantly.

Corundum Hill, near Embreeville, PA, was the site of corundum production in the 1800s. Steve Chamberlain reports finding large but ugly diaspore crystals there. Ron Sloto writes of farmers in the early 1800s hauling small and dense corundum-bearing rocks out of their fields; they dug holes to bury large masses. He shows a 2.5 centimeter (1-in) well-formed, lustrous diaspore crystal.

Other U.S. locations where diaspore has been reported include the Culsagee Mine near Franklin, NC, where corundum was also found; Swiss in Gasconade County, MO; Rosita Hills in Custer County, CO; and the Champion Mine in Mono County, CA.

In Norway, transparent purple, green, and colorless crystals have come from the Saga 1 Quarry near Tvedalen. Vugs of small diaspore crystals display a colorful contrast to the hosting massive white natrolite. The best of these specimens show tiny purple diaspore with colorless to white natrolite needles. Specimens from this locality would be prized micromounts; larger specimens would be colorful and unusual additions for any collector.

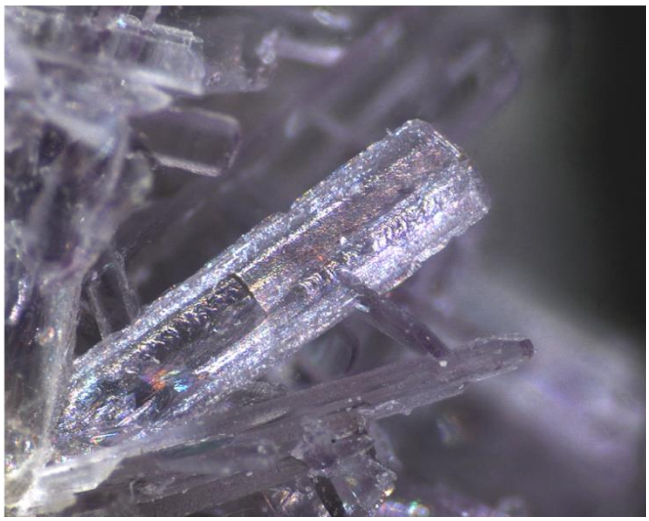
In Slovakia, transparent pink to lavender diaspore crystals came from the Ferdinand Shaft in the Banská Štiavnica ore district, Banská Bystrica Region, in the 1800s. As shown on Mindat, these rare specimens are small, with diaspore crystals only up to 0.6 centimeters (0.2 in) in size. The rocks and minerals have stayed the same, though the political boundaries have changed. The mine location was known as Schemnitz in German and Selmecbánya in Hungarian.

Several sources include Silesia, Poland, in lists of diaspore localities, but I could not find any information confirming or describing any of these sites.

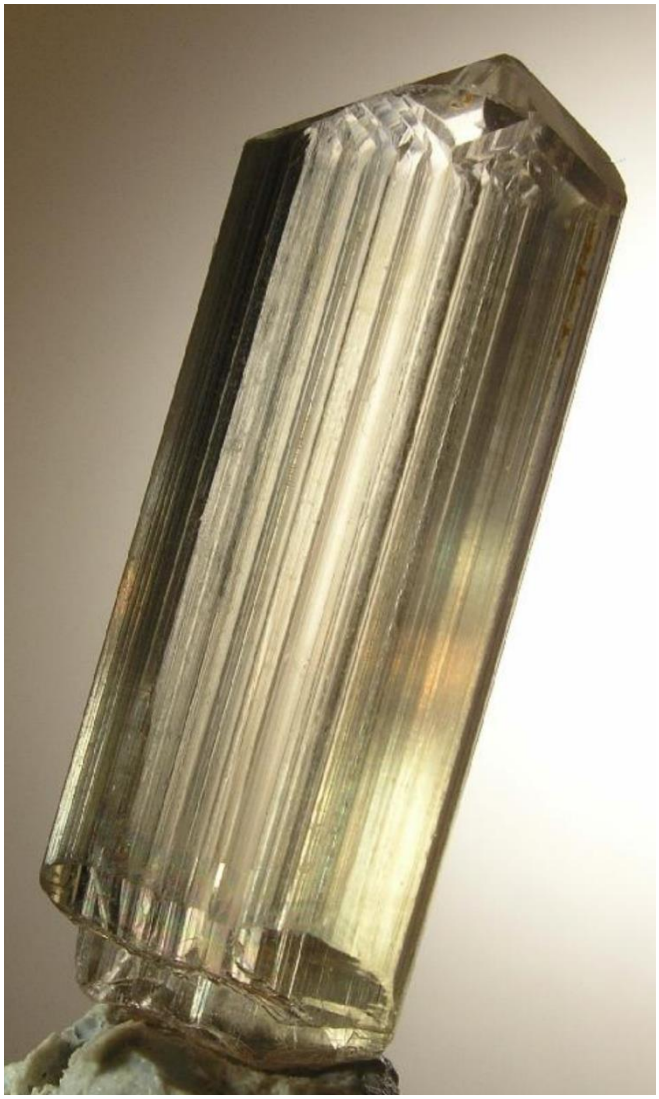
Dolomitic marble in the Prilep area of North Macedonian (formerly Macedonia) forms a geologic environment ripe for diaspore formation. The corundum crystals contain diaspore oriented within them, giving them a silvery sheen that the authors of a paper on this locality dubbed "diasporescence." They noted that all corundum from this location contains inclusions, usually of diaspore. The phenomenon of diaspore in corundum has not been described elsewhere, at least not that I could find. Diasporescence is most intense when the diaspore inclusions are perpendicular to the rhomboid corundum faces, although the inclusions can also have other orientations.

Corundum and diaspore in dolomitic marbles make cutting the rock difficult due to the difference between marble (relatively soft) and corundum (relatively hard). In addition to forming inclusions, diaspore coats some corundum crystals. Rarely, individual diaspore crystals occur in the marble, but the crystals are small, with one photo showing a 0.5-centimeter (0.2-in) honey-yellow crystal.

Switzerland is not usually thought of as a source of rubies, but that form of corundum, along with other minerals that form at high temperatures and pressures—including kyanite and diaspore—were found near



Diaspore, Saga 1 Quarry, Sagåsen, Telemark, Norway.
Source: Mindat; photo: Luigi Chiappino.



Diaspore, Muğla Province, Turkey.
Source: Mindat; photo: Rob Lavinsky.

Campolongo. The minerals formed due to the tectonic environment that created the Alps.

Diaspore is reported from the Greek islands of Samos and Naxos, with unconfirmed reports of it from other parts of Greece. The one image of Greek diaspore on Mindat, from Samos, might only be interesting to diaspore locality collectors. For the best diaspore, let's look to the east.

Turkey (or Turkiye) is the source of the world's finest gemmy diaspore crystals. They are reported from two provinces, Muğla in the southwest and İzmir in the west. The Muğla deposits formed from the recrystallization of metabauxite concentrated in tectonically mobilized zones in faults cutting marble. Some diaspore crystals have been deformed by tectonism that occurred after the initial crystal formation. The Muğla deposits cover about 3 square miles. Gem diaspore mining probably began in the late 1970s, probably as illegal high-grading of aluminum ore from the deposits.

Crystals from Muğla are lustrous, ranging in color from colorless to green or yellow-brown. Chromophores (coloring agents) are likely Fe_2O_3 and Cr_2O_3. Darker colors can be due to included goethite. Some specimens are the color of champagne in incandescent light. In other incandescent wavelengths, specimens or cut stones appear lavender or orange. Specimens tend to show richer colors in longer wavelengths.

A 10-centimeter (3.9-in) twinned crystal from Muğla is pictured on Mindat. A 7-centimeter (4.7-in) fragment of an opaque single crystal is shown in *Rocks & Minerals* (2011). Both are translucent. A 35-centimeter (14-in) diaspore crystal was reported by Hatipoğlu (2010). The Muğla deposit was originally mined for bauxite, with fine diaspore crystals probably processed for their aluminum value. They were worth much more as gemstones or specimens.

Later, about 10 tons of diaspore crystals from Muğla were produced. Bauxite with associated diaspore was mined from 1972 to 1982, resuming in 2010. The resumption of mining was guided by interest in gemstones and specimens rather than industrial recovery of bauxite.

For Mindat specimens showing Izmir as the source, I could not find descriptions of their locations. Izmir is not far from Muğla, so the location information might have been an attempt to disguise the true source.

Diaspore was reported from Henan Province and the Tianyang bauxite deposit in Guangxi Province, China, and less reliably from the Shuiximiao Mine, also in Guangxi Province.

The sole photo of Australian diaspore on Mindat is massive and unimpressive.

Lovely platy orange diaspore specimens have been found at South Africa's Lohatlha Mine in the Northern Cape Province. The diaspore crystals are probably colored by manganese. Diaspore from this mine looks almost micaceous. The irocks website shows a similarly colored specimen from the Wessels Mine in the Kalahari manganese fields, labeled as mangan-diaspore.

I found no references to diaspore in Canada or Brazil, large countries with diverse geologic settings and mineral species, where our mineral might be expected. Perhaps new diaspore sources await us.

Diaspore is reported, without any other information, from a few other places, such as a kyanite occurrence in Namibia and the South African Postmasburg manganese field. Diaspore hunters may want to examine places with high temperature and pressure settings where kyanite, corundum, and related minerals have been found.

Most diaspore is not crystalline and of no interest to most mineral collectors. Along with boehmite and gibbsite, it forms bauxite, the major ore of aluminum. Diaspore, boehmite, and gibbsite are all aluminum hydroxides. Aluminum is used in transportation and packaging industries, with lesser amounts used in construction, electrical, machinery, and consumer products.

As an attractive rare gemstone, diaspore has found a following in the gem trade. However, diaspore is difficult to facet due to its easy cleavability. One source noted that diaspore gems were not marketed until 1980s.

Turkey is the largest source of gem diaspore, which is marketed under the names Zultanite®, Csarite™, ottomanite, and Turkizite. Zultanite®® is a name coined by a Turkish gem producer for color-changing stones from his mine in Muğla, Turkiye.

Banská Štiavnica, Slovenia, has also produced lovely color-changing stones. As with alexandrite, the color of some gem diaspore changes, depending on the light source. The Slovenian material is reported to change from pale green in natural light to orange in incandescent light. One gemstone website mentions color-changing faceted diaspore costing $1,000 per carat.

A unique type of diaspore gemstone comes from the North Macedonian site. Faceted gems from this source were advertised in the 1995 Tucson Show guide and sold at that show. Diaspore inclusions yielded concentric oval diaspore rings in pink corundum (called ruby in the report and photo caption), forming a lovely cabochon set in silver. These stones are unlike chatoyant cat's eyes or star corundum. Intergrown corundum and diaspore lowers the hardness by about 10 percent and the density/specific gravity of corundum from this location. Diaspore lightens the corundum color, shifting the shade from redder to more pink. Gem-quality

Diaspore with braunite and bixbyite, Lohatlha Mine, Western Belt, North Cape, South Africa. Source: Mindat; photo: Bruce Cairncross.

diaspore, presumably transparent and sufficiently large to facet, came from the Sivec, North Macedonia.

For those with an unlimited budget, a stunning 96.20-carat Turkish color-change diaspore, set in a necklace with small diamonds in a custom designed setting, was valued at more than $1.5 million! Probably the world's largest cut diaspore, it is dubbed the "Sultans Shield." Stephen Kotlowski wrote an excellent (and promotional) article on this and other faceted diaspore from Turkey.

On December 2, 2022, I found a tiny 1.5-centimeter (0.6-in) colorless and transparent diaspore crystal fragment from Turkey is offered online for sale for about $16. Twinned crystals 9 centimeters (3.5 in) long were listed for just over $1,000. An orange (mangan?) 7.1-centimeter (2.8-in) specimen from South Africa with no visible crystal terminations was priced at $72.

Note from Mindat: Beware! Certain dealers (especially on eBay) have been offering samples of a whitish-metallic feathery material as "diaspore." It appears to be metallic aluminum plumes formed from metal dripping from smelters and is neither diaspore nor a mineral.

Technical Details

Chemical formula	AlO(OH)
Crystal form	Orthorhombic
Hardness	6.5-7
Specific gravity	3.2-3.5

Color .....Colorless, light yellow/champagne, green, light purple, orange

Streak .....White

Cleavage.....1 perfect, 1 distinct

Fracture .....Conchoidal

Luster .....Vitreous, pearly

Acknowledgments

This column benefits from the graciously shared knowledge of Steve Chamberlain, Dean Misantoni, Robert Sloto, Bruce Cairncross, and Mal Southwood. Each of these people responded promptly and helpfully to my requests for information on the Turkish and Pennsylvanian diaspore deposits. They have visited and, in some cases, conducted geologic studies on these properties. The reports they provided made this article more robust. Any errors are the responsibility of this author. Additionally, several collectors kindly gave permission for use of their images.

Sources

Anthony, J.W.; Bideaux, R.A.; Bladh, K.W.; Nichols, M.C. (eds.). Diaspore. In: Handbook of Mineralogy. Chantilly, VA: Mineralogical Society of America.

The Bauxite Index. N.d. (no date). Bauxite 101.

Chamberlain, S.. 2022. Personal comm. 26 November.

Gemporia. N.d. Diaspore gemstone.

Haas, H. 1972. Diaspore-corundum equilibrium determined by epitaxis of diaspore on corundum. American Mineralogist 57: 1375-1385.

Hatipoğlu, M. 2010. Gem-quality diaspore crystals as an important element of the geoheritage of Turkey. Geoheritage 2: 1-13.

Hatipoğlu, M.; Babalik, H. ; Chamberlain, S.C. 2010. Gemstone deposits in Turkey. Rocks & Minerals 85(2): 124-133.

Hatipoğlu, M.; Chamberlain, S.C. 2011. A gem diaspore occurrence near Pinarcik, Mugla, Turkey. Rocks & Minerals 86(3): 242–49.

Hatipoglu, M.; Chamberlain, S.C. 2013. Zultanite, Rocks & Minerals, 88:1, 11-11 http://dx.doi.org/10.1080/00357529.2013

International Gem Society. N.d. Diaspore.

Jeršek, M.; Mirtič, B. 1999. Corundum from Prilep dolomitic marble (Macedonia). Journal of the Slovenian Museum of Natural History 41: 1–22.

Gemmy diaspore, Selçuk District, Izmir Province, Turkey. Source: Mindat; photo: Rob Lavinsky.

Jeršek, M.; Jovanovski, G.; Boev, B.; Makreski, P. 2021. Intriguing minerals: corundum in the world of rubies and sapphires with special attention to Macedonian rubies. ChemTexts 7(19). https://doi.org/10.1007/s40828-021-00143-0

Mindat. N.d. Diaspore.

Minerals.net. N.d. The mineral diaspore.

Rosen, L. N.d. A short history of diaspore and its trade names Zultanite and Csarite.

Sloto, R. 2009. The mines and minerals of Chester County, Pennsylvania: 98-99.

USGS. 2022. Mineral commodity summaries: aluminum.

Wikipedia. N.d. Diaspore.

Word Sense Dictionary. N.d. Diasporites.

Holiday Party
December 19, 7–9 p.m.

The NVMC and the Micromineralogists of the National Capital Area are jointly hosting a holiday party again this year. Due to COVID-19, we're making it a low-key affair, with snacks and good company.

We're holding the party at the home of NVMC president Tom Kim, at 2301 Stokes Lane in Alexandria. The NVMC will provide a main course of barbeque, with the Micromounters providing soft drinks. We will also furnish coffee and paper plates, cups, and so on. Please volunteer to bring a dessert, side dish, or other food. The digital sign up form is available here. We need to know how many people are attending by December 15 to order the necessary food. The digital signup lets you RSVP.

As in the past, please bring a wrapped gift valued at $10 to $20 if you want to receive one. It is helpful to note whether it is a mineral, micromount, fossil, and so forth. If you don't have anything to exchange, please let Sue Marcus know. Some of the longer term collectors will bring extras. We want everyone to participate and have fun.

President's Collected Thoughts

by Tom Kim

Happy holidays!

It is tradition in my family to celebrate the season with Advent rituals—the calendar, the candles, and nightly readings and prayers. I must admit that I'm one of those people who look forward to pulling out the Christmas music mix in December. To me, it's a reminder that, as nature seems to power down for the winter, there's always persistent hope and the anticipation of new beginnings and unexpected surprises.

I look forward to celebrating the end of the year with our club at our holiday party. It'll be a last hurrah for me because I'll pass the baton to someone else, and I'm happy to say that the club doesn't seem too worse for wear.

We successfully pulled off another show, thanks to the tireless work of Julia Nord at GMU, along with Tom Taaffe, Germaine Broussard, and a list of other volunteers as long as my kids' wish lists. We've also had a number of field trips, made inroads with organizational partners, had in-person meetings, and—most importantly, in my book—managed to stay clear of the rancor and ugliness that's been so prevalent these days.

I'm looking forward to having you over to my home once more to share food, raise a toast, and welcome in the new year.

Tom

2023 Club Officer Elections

by Hutch Brown, Editor

Our December 19 holiday party will include a short business meeting to elect club officers for 2022. We have many club officers (see the list on the last page of this newsletter), but only four positions are elected each year:

- The ***president*** presides over club meetings and helps to coordinate club activities, ranging from auctions and the annual club show to field trips and the club newsletter. The president formally represents the club and, together with others, responds to external inquiries. Other club members often lead activities under the president's guidance.
- The ***vice president*** assists the president, coordinates programs and speakers for the monthly club meetings, and helps with club auctions.
- The ***secretary*** takes minutes at club meetings for the newsletter and summarizes presentations at club meetings, again for the newsletter.

What Happens Without a Club President?

We violate our bylaws, and our insurance might no longer cover us. Do we dissolve the club? If not, do we change the bylaws? According to our constitution and bylaws, the executive board must have 60 days to consider any proposed changes to the constitution or bylaws before putting them to a membership vote.

- The ***treasurer*** collects club dues, keeps records of club members, and handles all club financial transactions.

Roger Haskins has agreed to stand again as treasurer, but Tom Kim and Sue Marcus will be stepping down, respectively, as president and vice president. So will David MacLean as club secretary after many years of outstanding service, though he is more than willing to support and mentor his successor.

So we need volunteers!

President..... **Your Name HERE!**
Vice President ..... **Your Name HERE!**
Secretary ..... **Your Name HERE!**
Treasurer ..... Roger Haskins

Tom Kim and Sue Marcus will always be there to support the next president and vice president, as will other previous presidents. If you might be interested in volunteering—or just finding out more—please contact Tom Kim at president@novamineralclub.org or Sue Marcus at vicepresident@novamineralclub.org.

The NVMC has a long history, led by dozens of elected club officers over many decades (since the 1960s). The most recent club officers are shown below. Why not add your name to the list?

Moana Loa Erupts in Hawaii

by Caleb Jones and Jennifer Sinco Kelleher

Editor's note: *The article is from the Associated Press, 30 November 2022.*

The first eruption in 38 years of the world's largest active volcano is attracting onlookers to a national park for "spectacular" views of the event.

Officials were initially concerned that lava flowing down the side of the volcano would head toward South Kona, but scientists later assured the public that the eruption migrated to a rift zone on Mauna Loa's northeast flank and wasn't threatening any communities.

Ken Hon, scientist-in-charge at the Hawaiian Volcano Observatory, said that the lava was flowing "not super fast" at less than 1 mile per hour. The flow was likely to slow down about 4 miles from the road when it hit flatter ground.

Historically, each Mauna Loa eruption has lasted a few weeks. Hon expects the current eruption to follow this pattern. The eruption was preceded by a swarm of at least 50 small-magnitude earthquakes on the Big Island in Hawaii. All of the quakes were below 3.0 in magnitude, geologists said.

NVMC Hall of Fame: Elected Club Officers, 2012–2021

Year	President	Vice President	Secretary	Treasurer
2021	Tom Kim	Sue Marcus	David MacLean	Roger Haskins
2020	Tom Burke	Ti Meredith	David MacLean	Roger Haskins
2019	Sue Marcus	Ti Meredith	David MacLean	Roger Haskins
2018	Bob Cooke	Ti Meredith	David MacLean	Roger Haskins
2017	Bob Cooke	Ti Meredith	David MacLean	Rick Reiber
2016	Bob Cooke	Ti Meredith	David MacLean	Rick Reiber
2015	Wayne Sukow	Kathy Hrechka	David MacLean	Rick Reiber
2014	Wayne Sukow	Kathy Hrechka	Ti Meredith/ Laurie Steiger	Kenny Loveless/ Rick Reiber
2013	Rick Reiber	Kathy Hrechka	David MacLean	Kenny Loveless
2012	Sue Marcus	Barry Remer	Kathy Hrechka	Rick Reiber

Sad News: Barbara Sky's Passing

by Sue Marcus

Long-time members of the NVMC will recall Barbara Sky. We are saddened to hear the news that she died on October 22 in Chesterfield, MO. Roger and I saw Barbara at the main Denver Show in September, where she was helping to judge the competitive cases. Barbara had been a judge at American, Eastern, and Midwestern Federation shows for more than a decade.

Most recently, Barbara had decided to scale back her activities a bit, so she was "just" assisting the judges—at age 92! She was a member of the American Federation's Uniform Rules Committee for many years, up until her death. In some years, she also served her fellow collectors as the American Federation's historian or photographer. In 2022, she was vice president of the Greater Saint Louis Association of Earth Science Clubs—again, at 92!

Like St. Nick in "Night Before Christmas," Barbara's eyes twinkled and her face lit up when she was talking about minerals. She was an early member of the NVMC. She often exhibited the trees decorated with small tumbled stones that she had created. She collected and exhibited pyrite and carved stone pigs. The pigs were sometime exhibited on a matching slab of the mineral from which they were carved.

Barbara had her usual can-do attitude when we saw her last. Though in a wheelchair and aided by a cousin, she was upbeat and fully engaged, eager to talk about mineral clubs and interested in people. She told us that she was planning to come to our November show, a fact confirmed in her official obituary.

For many years, Barbara and her husband William lived in Virginia, where they were active mineral club members. She finally returned to her home state of Missouri. Barbara is survived by four children, five grandchildren, and one great-grandchild. The family asked that memorial donations be made to Parkinson's Research Foundation or the Michael J. Fox Foundation for Parkinson's Research.

You can find Barbara's obituary here.

Barbara Sky (sitting) with Sue Marcus and Roger Haskins.

Gold in Virginia

Editor's note: *A new book by the National Academies of Science,* The Potential Impacts of God Mining in Virginia, *was released in 2022. Thanks to Sue Marcus for the reference!*

Virginia was one of the first major gold-producing states (see articles in this newsletter from June to November 2018), but it has seen only limited gold mining activity in the last 70 years. Recent increases in gold prices and other factors have brought renewed attention to mining gold in Virginia. This report evaluates gold deposits in Virginia, the modern mining techniques that could be used, and whether regulations would protect air and water quality and human health from potential impacts. The report concludes that the regulatory framework of Virginia appears to have been designed for operations like crushed stone quarrying and sand and gravel operations, not gold mining. Accordingly, gold mining projects would pose considerable risks. You can download the report for free online.

The NVMC's 30th Annual Gem, Mineral, and Fossil Show

by Tom Taaffe, Show Chair

The NVMC held our 30th Annual Gem, Mineral, and Fossil show at George Mason University (GMU) on November 19-20. After 2 years of show cancellations due to COVID, some of us were unsure of our footing.

Other mineral clubs had successfully restarted their annual events, but we saw potential risk from new GMU COVID protocols. Additionally, the NVMC hadn't held many in-person meetings over that difficult 2-year period, relying mostly on Zoom meetings to stay connected. That sense of uncertainty and shorthandedness at lightly attended meetings seemed a handicap and contributed to our slow start.

Longstanding Tradition

For 22 years, our event has been cosponsored by mineralogy professor Dr. Julia Nord and GMU's Department of Atmospheric, Oceanic and Earth Sciences. Starting in 1999, theirs has been an incredible run of sponsorship and support for our club.

Julia again arranged most of the GMU components of our show and lobbied hard for our priorities. She hired campus police for our overnight security, negotiated for nearly free parking for all show attendees, and recruited volunteers from her classes to help out during the show, including Addy, Colin, Jack, Valentina, Liz, and Owen, just to name a few. All of our student volunteers are real gems, and we greatly appreciated their help!

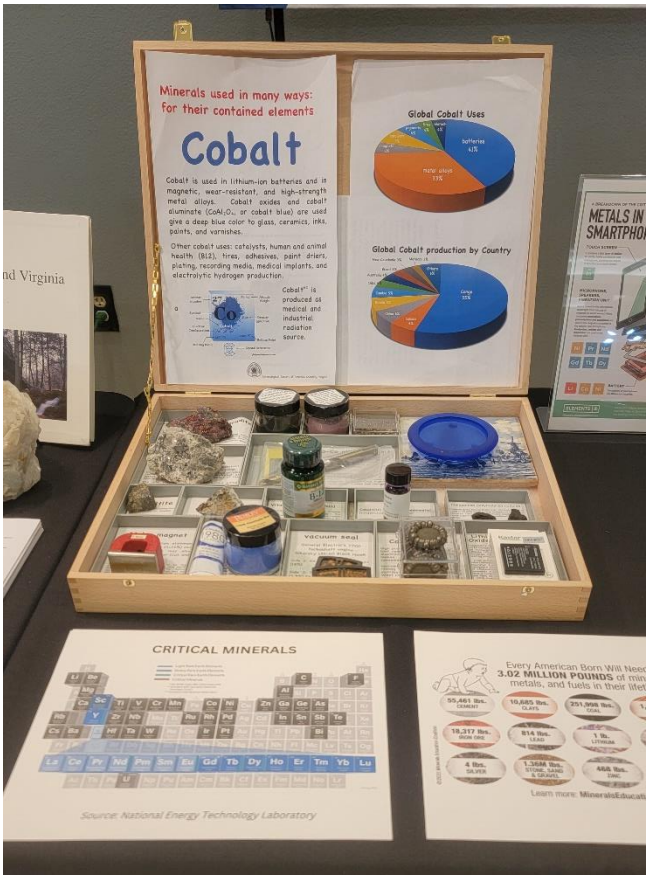
The help from our sponsor doesn't stop there. Julia and her volunteers place our signs all over campus, directing show goers to the nearest show parking. Julia rented a minivan to serve as a courtesy shuttle for our event. She and fellow professor Tom Wood did most of the driving on both days.

Julia, as cosponsor, reserves Dewberry Hall (for dealers and exhibits) and the Gold Room (for kids' activities) for our annual event. Dewberry Hall is a definite upgrade from our previous GMU location (The Hub) because it has more convenient parking and a problem-free electrical capacity (we were constantly tripping circuit breakers in The Hub). The downside of Dewberry Hall is that it is located in the Johnson Center,

Scenes from Dewberry Hall during the NVMC/GMU show. Photos: Tom Taaffe (top two); Thomas Hale (bottom).

which uses an elevated loading dock, posing loading challenges for dealers and exhibitors.

Friday night setup went well, with 15 of 18 dealers getting into the building and settling into their spaces. GMU did an excellent job of setting up our preferred floor plan so that only minor tweaks were needed. Club members brought in our typical array of supplies Friday night, including exhibit cases, our club banner, the Kids' Mini-Mines, and an abundance of specimens for kids to earn while they learn. As the night went on, exhibit cases were assembled, our club banner went up,



Educational exhibits by Friends of Mineralogy, Virginia Chapter, Inc.
Photos: Tom Taaffe (right); Thomas Hale (the rest).

and the Kids' Room layout was perfected. New this year was a well-designed educational exhibit by Friends of Mineralogy, Virginia Chapter, Inc. The show was beginning to take shape.

Worries—Then Success!

Saturday morning found us wondering what kind of turnout we would see. Our previous club mailing list for sending out announcements was out of date and our other promotional efforts had unpredictable results. But we didn't have to wonder for long.

At about 9:45 a.m., long lines started forming at the admission desk. At 10 a.m., a sizable crowd started streaming into the hall.

And they didn't let up! Dealers were happy and busy all morning long and well into the afternoon. Our event was so successful, in fact, that all of the ATMs in the Johnson Center had no cash by 3 p.m.!

Over the course of the weekend, we were especially pleased to see so many old and new club members at the show. Volunteers, particularly club volunteers, make or break our annual event—and the lack of volunteers over the summer was worrisome.

Certain show duties require one or more club members to take responsibility and see them entirely through. The Silent Auction is one example. It takes the better part of an evening and morning to prepare for—and then there is the actual auction to oversee, including collecting and distributing the proceeds.

The admission desk is another duty that calls for constant attention. All day long, two or more people take fees, manage door prize tickets, and sell T-shirts. Even a relatively simple duty, such as announcing door prizes, can get difficult when the hall microphone fails.

The Kids' Room demands the full attention of two to four committed and knowledgeable club volunteers at all times. Children who enter the Kids' Room deserve all the fun and excitement that rock collecting can give. Germaine Broussard and John Weidner anchored the Kids' Room, and both were committed to giving kids an outstanding learning experience.

Our Kids' Room saw a lot of action from kids and their parents. By completing mineral and fossil challenges, the kids earned free picks in our well-stocked Mini-Mines and Fossil Dig. Kids were encouraged to take multiple quizzes to earn free specimens. At least 20 kids earned a free trilobite after completing an especially challenging trilobite quiz.

Kids' Room activities, including the Mini-Mines and Fossil Dig. Photos: Tom Taaffe.

Thanks to Our Volunteers!

Many thanks to our dedicated and hard-working team in the Kids' Room! Volunteers included Craig Moore, Jason and Celia Zeibel, Susie Weidner, and Tom and Elijah Kim.

Special thanks to Jeff Guerber for volunteering to run the Silent Auction, initially on his own—and thanks also to Diane and Jeff Nesmeyer for coming to his aid as the Silent Auction grew in size. Exhibitors in Dewberry Hall included Jeff Guerber (meteorites), Diane Nesmeyer (garnets), and Germaine Broussard (a mineral pool table), and we thank them all. Thanks also to Roger Haskins, Ken Reynolds, and others who brought club materials from storage on Friday night and made sure everything went safely back on Sunday.

On Saturday, Julia added to the excitement by inviting 60 Scouts to tour the Geology Labs, earn a merit badge, and attend our show—thanks to Julia and the Scouts! Sincere thanks also go to our long-time dealers and to everyone else who helped make our show such a success!

Kids' Room Rules

by John Weidner

For the Kids' Room at this year's club show, we had two rules:

1. Every kid who came into the room went out with a prize or two that they had earned.
2. Every kid went home thinking, "I went to a mineral show, and I had fun."

To earn a prize, a kid had to try a quiz, color a picture, work on a crossword puzzle, or find words in a word square. We tried to steer the older kids to the challenging quizzes, and the little kids loved coloring pictures.

We had quizzes that were almost too easy ("Name the three types of rock."). We also had quizzes that were too hard even for me ("Which of these four states has Miocene fossils?").

The best quizzes had the kids handling rocks or fossils. For example, Tom Taaffe provided a set of 15 fossils and a set of labeled bins. Okay, kid: put the fossil in the correct bin.

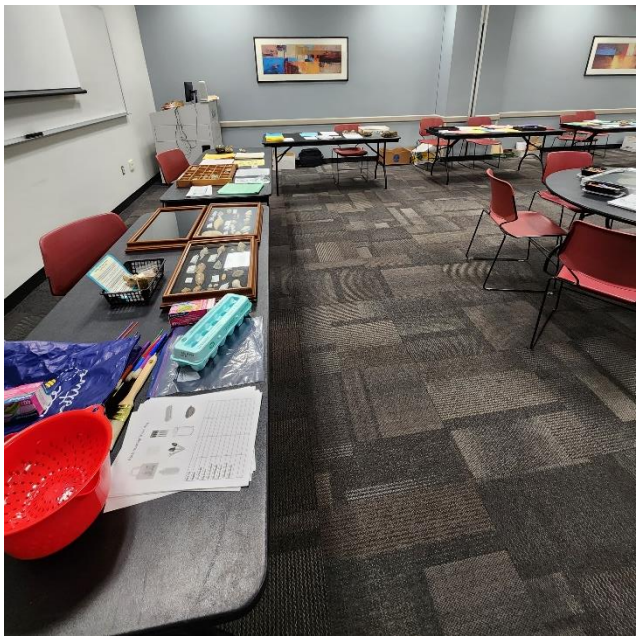
As for prizes, the polished rocks went fast, as did a box of Franklin rock chips. Herkimer diamonds ("You know, it's not really a diamond") were popular, as were fossils.

One of the quizzes was on trilobites, and the kids who completed it took it to Tom Taaffe out on the sales floor and got a trilobite. Next year, Tom is going to have to bring more trilobites.

Tom also provided a spectacular set of fluorescent minerals, and I added several Franklin pieces. We set up the fluorescents behind a curtain in an alcove in front of the room so the kids could view them with fluorescent lights (longwave and shortwave) provided by the university. The kids and their parents were duly impressed. We have got to add a quiz for that next year.

All in all, the Kids' Room seems to have been a success. It was filled with joyful kids, and several parents came back to the room to compliment us. The kids went home happy and with a prize or two.

And we volunteers had fun too, which was actually rule number three!



The Kids' Room setup. Photo: Tom Taaffe.

Kids' Room Fun at the Show

by Germaine Broussard

For this year's club show, John Weidner, Craig Moore, and I had a great time setting up the Kids' Room on Friday night. John and Craig were amazing to work with—it was more like fun than work!

Organizing the donations on Saturday night with Craig was so interesting! Watching Craig and other members identify not only the minerals but also the localities they came from was fascinating!

During the show, Dave MacLean and Dave Fryauff were in the front of the room with the microscope. Tom and Elijah Kim and Jason and Celia Zeibel were phenomenal with the kids!

There was also a young man helping out, maybe in middle or high school, and he was great, helping with quizzes and answering questions. His mom was also volunteering, though I'm not sure where. He told me he was really excited about working with us and wants to study mineralogy in college.

The best part about working (or playing) in the Kids' Room was watching the kids' eyes light up at the mention of rocks and dinosaurs. From an early age, kids

Kids using the microscope to study minerals in the Kids' Room. Photos: Germaine Broussard.

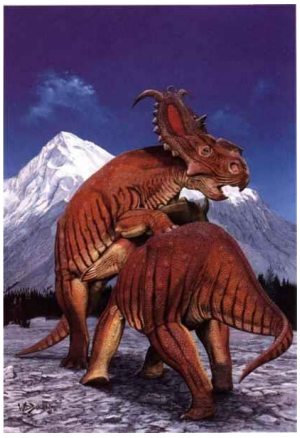
are fascinated by nature and everything around them. Without electronics, their imaginations take flight!

What was a T. rex really like? How did plants make designs between layers of rock? Is coprolite really poop—but it doesn't smell! Was a Dunkleosteus (a prehistoric fish) really the size of a bus?

A father brought his two kids from the other side of Bluemont! His daughter had received the show notice, taken it to her father, and asked how she was going to get there. She and Dave Fryauff inspected a geode under the microscope to figure out what the mineral deposits were. Her brother came over, and they showed it to him. He couldn't get the microscope to focus, but when he did, his eyes were the size of dinner plates!

So many parents thanked us for putting the show together. Geology, mineralogy, and paleontology, for the most part, were not subjects they knew much about, but their children had an interest. The parents enjoyed watching the kids participate as much as the kids enjoyed taking part! It was so nice learning along with them!

Dinosaurs in Alaska?



Editor's note: *Thanks to Sue Marcus for the reference!*

The Bureau of Land Management in the U.S. Department of the Interior has published a 15-page summary of archeological discoveries proving that dinosaurs once roamed parts of Alaska, including areas well above the Arctic Circle.

Titled *Dinosaurs on Alaska's North Slope*, the booklet contains easy-to-read descriptions of the dinosaurs found, including meat-eating relatives of T. rex as well as "duck-billed" hadrosaurs and other plant eaters. Many are depicted by drawings.

The fossilized bones and "trace fossils" (such as tracks preserved in stone) show that dinosaurs lived in Alaska as long ago as the Cretaceous Period (146-65 million years ago) and even the Jurassic Period (208-146 million years ago).

The Rocks Beneath Our Feet

The Potomac Water Gaps: Part 1

by Hutch Brown

Harpers Ferry, WV, is a picturesque town of historical and commercial importance because it straddles the confluence of the Potomac and Shenandoah Rivers where they join to cut through the Blue Ridge (fig. 1). The Potomac's three water gaps (at Harpers Ferry, South Mountain, and Catoctin Mountain) span the width of the Blue Ridge geologic province.

All three water gaps cut through parallel ridges trending from northeast to southwest (fig. 1). The ridges rise more than a thousand feet above the river that cuts through them, and they are made up of tough metamorphic rocks that include Weverton quartzite, one of the hardest rocks in our area.

How could a river cut through three ridges of solid rock?

Tectonic Cycles

The answer lies in the geologic history of our area, starting with the Grenville Orogeny (mountain-building event) more than a billion years ago. The Earth's crust is a relatively thin layer of solid rock overlying a much thicker layer of molten rock called the mantle. A common analogy is a raw egg with a cracked shell overlying a liquid interior. The Earth's crust is similarly cracked into so-called tectonic plates. Driven by convection currents in the mantle, the plates collide at their margins, with the heavier plate diving under the lighter one and melting into the mantle. The collisions typically cause volcanic eruptions and mountain building, resulting in great chains like the Himalayas.

More than a billion years ago, the proto-African plate collided with proto-North America, resulting in a chain of mountains called the Grenvilles in the middle of a supercontinent known as Rodinia. The resulting Grenville rocks, chiefly granitoids (granites and metamorphosed granitic rocks), still underlie much of our area. You can see the Grenville granitoids in many Blue Ridge outcrops, such as Old Rag Mountain.

Supercontinents eventually break up as the plates pull apart again. Rodinia started to break up about 730 million years ago but then stopped. Continental rifting began in earnest about 570 million years ago along the suture zones between proto-Africa and proto-North America as the continents pulled apart. Figure 2 shows the sequence of rock formation as the Iapetan Ocean, predecessor of the Atlantic, began to form between the separating continents.

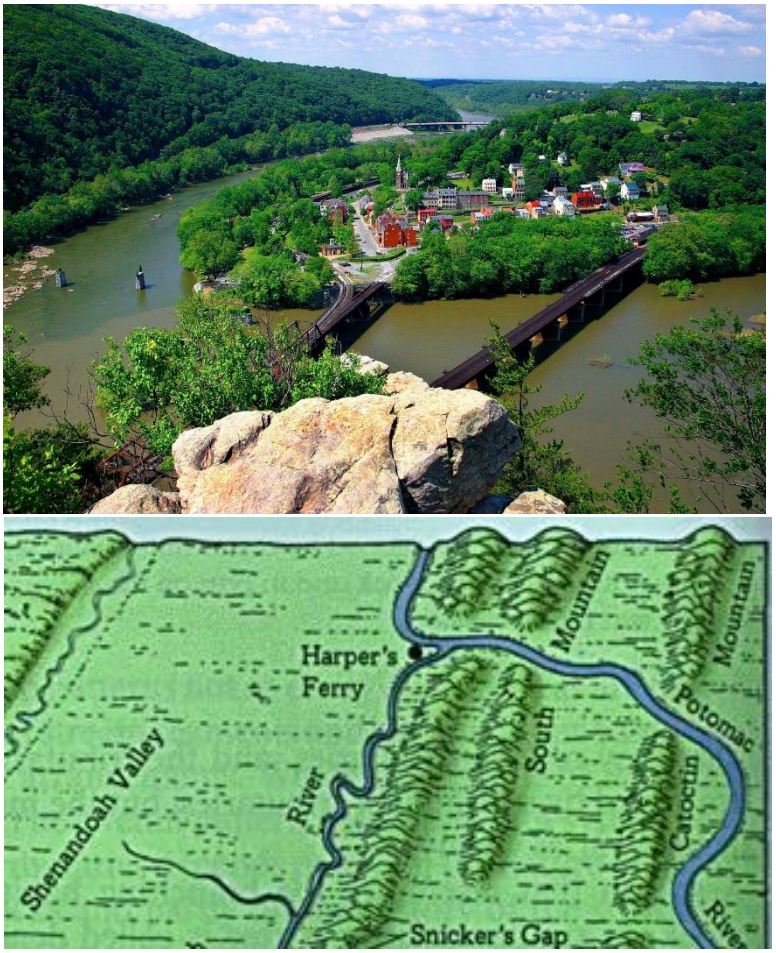


Figure 1—Top: *Harper's Ferry, WV, with the Shenandoah River (above) joining the Potomac River (right). The view is from Maryland Heights; Weverton quartzite is visible in the foreground.* **Bottom:** *Map of the three Potomac River water gaps. From left to right are the Blue Ridge, South Mountain, and Catoctin Mountain, which together span the width of the Blue Ridge Province. Sources: Lyne (2010), top; Judson and Kauffman (1990), bottom.*

Rifting took place at the edge of today's Blue Ridge Province—the line of ridges that stretches northeastward from Bull Run Mountain in Virginia to Catoctin Mountain in Maryland (the Piedmont and Coastal Plain did not yet exist). As the rock thinned and stretched, it broke along planes of weakness called faults; along the faults, great slabs of rock slid down to form basins with streams, and erosion gradually covered the granitic basement rock with the thin sands and

gravels of the Swift Run Formation (fig. 2, yellow). Magma welled up through the thinning crust, causing lava flows that hardened into basalt and later metamorphosed into Catoctin greenstone (fig. 2, green). Erosion of the basalt left another band of sediments now known as the Loudoun Formation.

As the Iapetan Ocean formed, it gradually submerged the rocks along the continental margin. By about 540 million years ago, a widening sea was leaving a sequence of nearshore and offshore sediments associated with rising and falling sea levels (what geologists call marine transgressions and regressions). The sands that became Weverton quartzite (fig. 2, yellow-brown) were covered by the silts and muds that eventually turned into Harpers phyllite (fig. 2, brown), which in turn gave way to more sands, the origins of Antietam quartzite (fig. 2, gray). By about 480 million years ago, our area was entirely covered by shallow seas, giving rise to the Tomstown limestones (fig. 2, blue-gray).

Subsequent tectonic events raised mountains in our area more than once, laying the foundations for the Piedmont and Coastal Plain Provinces. The various tectonic events transformed the Weverton, Harpers, and Antietam sediments into metamorphic rock.

Alleghanian Mountain Building

Geologists call the Antietam, Harpers, Weverton, and Loudoun Formations the Chilhowee Group because they form a related sequence of rock layers overlying the Catoctin greenstone, Swift Run rocks, and granitic basement rocks of the Blue Ridge geologic province (fig. 2). Together, all of these rocks formed the great anticline (overturned hump) of the Blue Ridge (fig. 3), which took shape when proto-Africa closed the Iapetan Ocean and collided with proto-North America beginning about 320 million years ago. During the so-called Alleghanian Orogeny, the granitoid basement rocks broke free along a great thrust fault. Together with the overlying rocks—the Swift Run and Catoctin Formations and the Chilhowee Group—the basement rocks traveled westward to form the Blue Ridge Province (fig. 3, blue) behind the limestones and dolomites of the Valley and Ridge Province (fig. 3, green).

As figure 3 shows, the Chilhowee Group still forms the flanks of the anticline. It originally covered the entire anticline, which has long since been breached by erosion and worn away. In any case, all of the Blue Ridge rocks, including the phyllites and quartzites you can see near Harpers Ferry, are linked by the Iapetan rifting

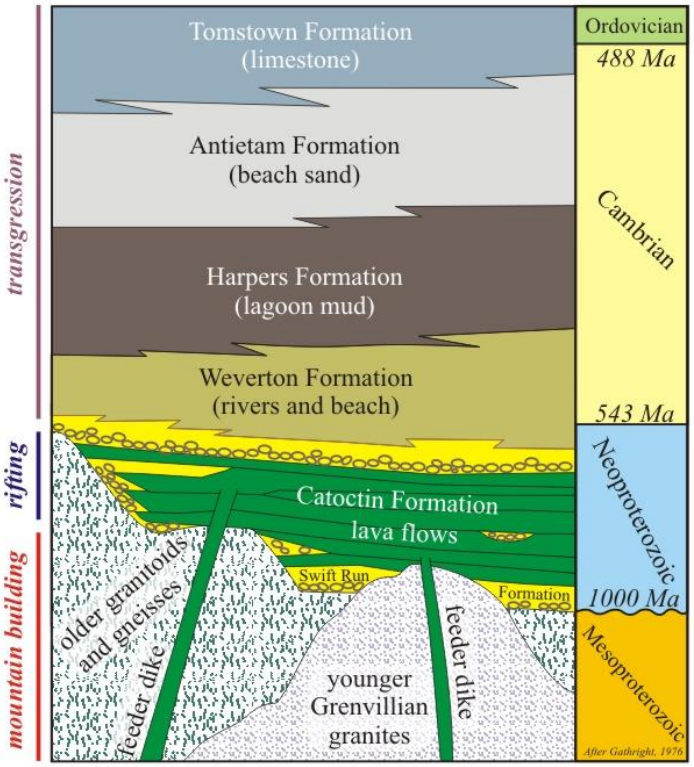


Figure 2—*Except for the granitic basement rocks, the rock formations associated with the Blue Ridge Province are tied to rifting as proto-North America and proto-Africa pulled apart, forming the Iapetan Ocean. Source: Bentley (2014).*

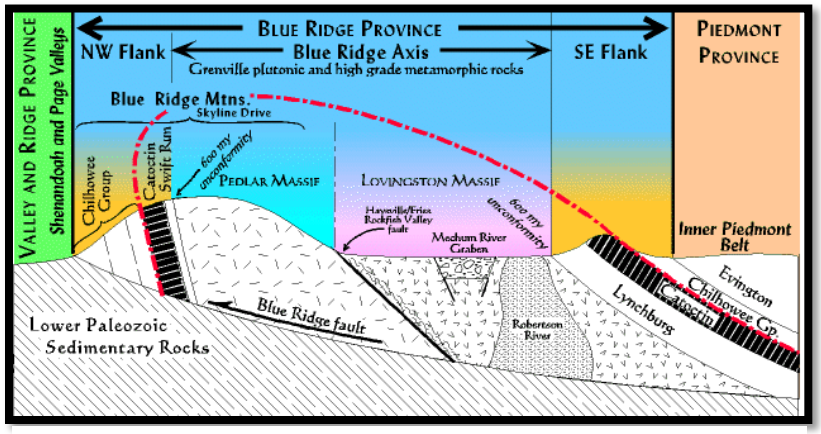


Figure 3—*The Blue Ridge thrust fault and anticline. The Blue Ridge Province includes a suite of associated rocks upthrust during the Alleghanian Orogeny. The Chilhowee group, including Weverton quartzite, forms the two flanks. Source: Fichter and Baedke (1999).*

that took place about 570 million years ago (fig. 2). They are also linked by the Blue Ridge thrust fault and anticline associated with mountain building some 320 million years ago (fig. 3). The Alleghanian Mountain chain, as high as the Himalayas today, was in the middle of another supercontinent, this one called Pangaea.

Mountain ranges never last for long in geologic time, and the Alleghanian Mountains were gone within a few tens of millions of years.

By about 220 million years ago, Pangaea was breaking up again, reactivating the ancient suture zones between the Piedmont and Blue Ridge Provinces. As the continents pulled apart to form the Atlantic Ocean, sediments filled great rift valleys at the edge of the Blue Ridge Province, forming the sedimentary rocks with diabase dikes that you can see today in the Culpeper and Gettysburg Basins. Rifting ended in our area about 180 million years ago. As the continents drifted apart and the Atlantic Ocean widened, the North American continent gained new sedimentary margins, including the Coastal Plain and continental shelf we see today. Erosion turned our area into a flat and featureless plain extending from the Allegheny Plateau across the Blue Ridge to the Piedmont and Coastal Plain.

Harpers Ferry Rocks

As figures 3 and 4 suggest, the rocks near Harpers Ferry were originally in a sequence typical for the entire Blue Ridge Province:

1. Grenville and related granitoids, including igneous plutons with diabase dikes, formed the basement.
2. Catoctin greenstone (metamorphosed basalt) and adjacent rocks with sedimentary origins topped the basement rocks.
3. The Chilhowee Group of quartzites and phyllites originating from onshore erosion and offshore sediments covered the Catoctin Formation.
4. The Tomstown limestones capped the entire sequence.

Near Harpers Ferry, you can find all of these rocks (fig. 6). To the east of town, the Blue Ridge is cut by the Potomac River into Maryland Heights to the north and Loudoun Heights to the south, with Harpers Ferry on a tongue of land between the Potomac and Shenandoah Rivers. The Blue Ridge rises to almost 1,500 feet at Maryland Heights, and the ridges on both sides of the river are made up of the erosion-resistant Weverton quartzite (fig. 6, green). Harpers Ferry itself lies on Harpers phyllite (fig. 6, orange), named for the town; Harpers phyllite is softer and more erodible than the Weverton rock, as is the band of Antietam quartzite (fig. 6, red) to the west. The Tomstown limestones (fig.

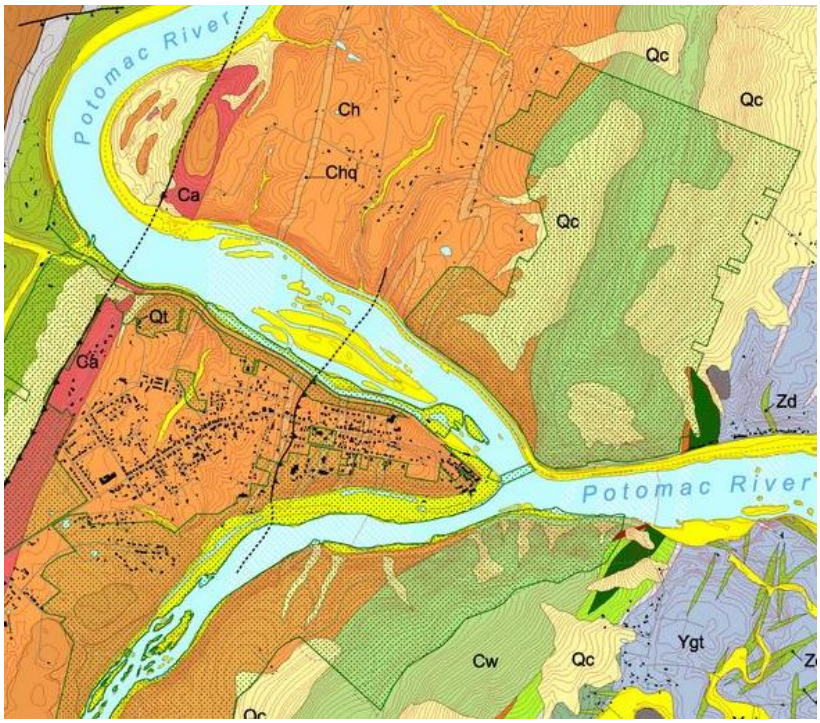


Figure 6—*Detail from a geologic map of the Harpers Ferry Quadrangle showing Harpers Ferry (black boxes) where the Shenandoah River flows from the southwest to join the Potomac coming from the northwest. The principal rock formations from right (oldest) to left (youngest) are Grenville granite (Ygt, gray); Catoctin greenstone (dark green); Weverton quartzite (Cw, green); colluvial quartzite boulders (Qc, light yellow); Harpers phyllite (Ch, orange); Antietam quartzite (Ca, red); and Tomstown limestone (olive-green). Source: Southworth and Brezinski (1997).*

Outcrop of Weverton quartzite on Maryland Heights, with Harpers Ferry in the background across the Potomac River. Loudoun Heights is across the Shenandoah River at upper left. Source: Summitpost.org.

6, olive-green) form the eastern edge of Shenandoah Valley, where the Valley and Ridge Province begins.

To the east of Maryland and Loudoun Heights are exposures of Catoctin greenstone (fig. 6, dark green), which is mostly covered by quartzite colluvial boulders (fig. 6, light yellow). Beyond the greenstone are the heavily weathered Grenville granitoids (fig. 6, gray). Fractured by multiple mountain-building events and freeze-thaw cycles over more than a billion years, the ancient Grenville rocks are (with exceptions like Old Rag granite) some of the most erodible in the Blue Ridge. The Potomac River cuts through them with relative ease, seeking faults and fissures in the rock for the easiest flows.

However, the river does not appear to flow along the faults or junctures between rock formations apparent from the geologic map of the Harpers Ferry Quadrangle (fig. 6). Instead, it appears to cut straight across the faults (the thin black lines in figure 6) and through a solid ridge formed by erosion-resistant members of the Chilhowee Group, especially Weverton quartzite.

How did the Potomac River do it? ⛏.

Next: *How the Potomac formed its water gaps through the Blue Ridge.*

Sources

Bentley, C. 2014. Personal communication, professor of geology, Northern Virginia Community College. 7 February. Annandale, VA.

Fichter, L.S.; Baedke, J.K. 1999. The geological evolution of Virginia and the mid-Atlantic region. Harrisonburg, VA: College of Science and Mathematics, James Madison University.

Grymes, C.A. 2013. Geography of Virginia: Wind gaps and stream piracy. George Mason University, Department of Geology, Fairfax, VA.

Judson, S.; Kauffman, M.E. 1990. Physical geology. 8th ed. Englewood Cliffs, NJ: Prentice Hall.

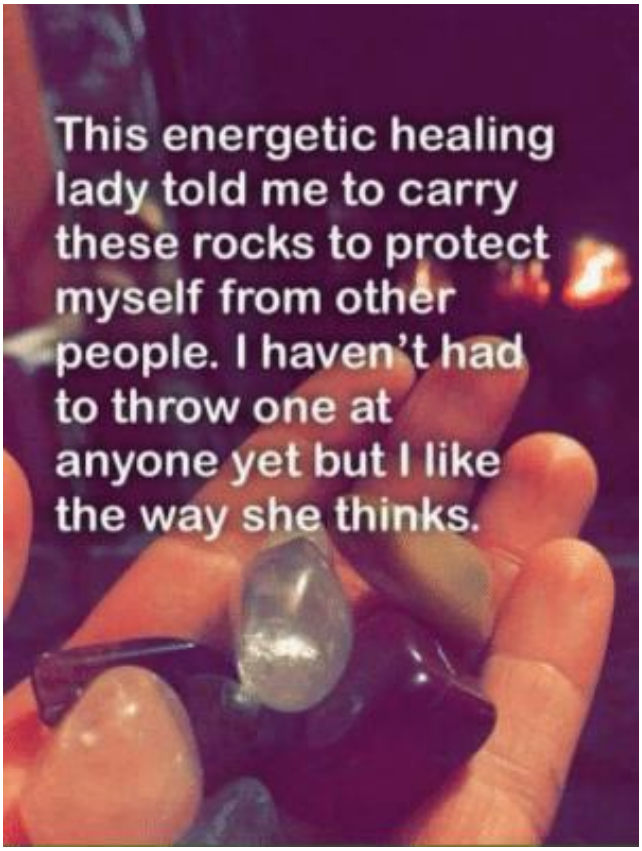
Lyne. 2010. Lyne's chronicles across North America: Harpers Ferry, West Virginia.

Marx, J. 2019. Making Sugarloaf. Presentation. 18 November. Northern Virginia Mineral Club, Arlington, VA.

Means, J. 2010. Roadside geology of Maryland, Delware, and Washington, DC. Missoula, MT: Mountain Press.

Southworth, S.; Brezinski, D.K. 1997. Geology of Harpers Ferry Quadrangle. USGS Bull. 2123. Reston, VA: U.S. Geological Survey.

Stairs in Harpers Ferry made from Harpers phyllite. Source: taylor catssss blogspot.



December 2022—Upcoming Events in Our Area/Region (see details below)

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	7 MSDC mtg, Washington, DC	8	9	10
11	12 GLMSMC holiday party	13	14	15	16	17
18	19 **NVMC/ MNCA holiday party**	20	21 **Winter begins**	22	23	24
25 **Christmas**	27	28	29	30	31	

Event Details

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

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

19: Arlington, VA—Northern Virginia Mineral Club/Micromineralogists of the National Capitol Area; holiday party (details on page 7).

THE NORTHERN VIRGINIA MINERAL CLUB INC

Crystals are the flowers of the Mineral Kingdom

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The Northern Virginia Mineral Club

Visitors are always welcome at our club meetings!

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SEND YOUR DUES TO:
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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 member).

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).

Meetings: At 7:45 p.m. on the fourth Monday of each month (except May and December).* (No meeting in July or August.)

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