



The Mineral Newsletter

Meeting: October 29 Time: 7:45 p.m.

Long Branch Nature Center, 625 S. Carlin Springs Rd., Arlington, VA 22204



Cinnabar on Dolomite

Source: [Wikipedia](#).

Photo: J.J. Harrison.

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Explore our [website](#)!

October Meeting Program:

Geology of Iceland

(Show-and-Tell moved to November)

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Deadline for Submissions

October 20

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



Mineral of the Month Cinnabar

by Sue Marcus

Bright red cinnabar looks nothing like the metal it contains, mercury (Hg). The two minerals, cinnabar and native mercury, sometimes occur together. Mercury is an odd metallic element in that it is liquid at atmospheric temperatures and pressures. Cinnabar is a beautiful, chemically simple (HgS), and very toxic mineral. Wash your hands after handling it.

Cinnabar is a mineral and material known to the ancients, and its name is shrouded in that history. Most sources believe the name is derived from the ancient Greek κιννάβαρ *(kinnabari)*, alluding to the red color. Mindat suggests that the origin is from the Persian “zinjifrah,” meaning dragon’s blood. The color *vermillion* is associated with cinnabar.

Cinnabar is often used as an indicator for certain types of gold deposits. It forms in warm though not hot (in geologic terms) environments. Hydrothermal settings (hot springs or hot water) or epithermal settings (shallow, just below the surface) are most common for cinnabar formation. The mineral may form as vein fillings when thermal waters deposit metals as they push through cracks in the host rocks and cool.

Although cinnabar is not rare, most occurrences are massive or disseminated, so perfect crystals are unusual. They often form an attractive contrast of red and white (the matrix color) and are therefore prized by collectors. However, cinnabar darkens with exposure to light. If you have a specimen, protect its bright red color by covering it or keeping it from direct light.

The oldest known producer of collector-quality cinnabar is southern Spain. The Almadén District has been producing mercury for two millennia, although the mines are now closed. Much more recently, stunning Chinese specimens have come onto the collectors’ market.

Start with an ogle at the photos shown here, then move on to the Mindat photo gallery or do a web search and see what’s for sale. The newer cinnabar crystals from China can be gemmy and very lustrous. So can some of the older pieces from the Almadén District in southern Spain. The contrast of the red cinnabar and white matrix in the best of these specimens is superb.

Happy Halloween!



Northern Virginia Mineral Club members,

Please join your club officers for dinner at the Olive Garden on October 29 at 6 p.m.

Olive Garden, Baileys Cross Roads (across from Skyline Towers), 3548 South Jefferson St. (intersecting Leesburg Pike), Falls Church, VA
Phone: 703-671-7507

Reservations are under Ti Meredith, Vice-President, NVMC. Please RSVP to me at ti.meredith@aol.com.



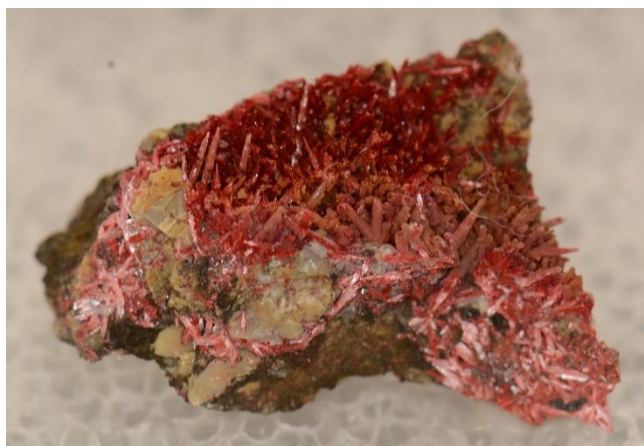
Cinnabar on dolomite, Tongren Mine, Guizhou Province, China. Photo: Bob Cooke.

Adding to the beauty (and rarity as well as value), a few specimens show multiple twinning. One from China and one from Ukraine show what is called “drillbit” twinning: they twin around in a circle, with the tips forming the “bit.” The Redbird Mine in Nevada produced attractive specimens, though not of the same caliber or quantity as the foreign sources.

Cinnabar has been used since ancient, possibly even prehistoric, times. It was probably initially used as a pigment, providing us with the terms vermillion and Chinese red lacquer. Ritual use of mercury, possibly from cinnabar, dates to at least 1500 BC. The ancient Egyptians and Romans used cinnabar in cosmetics,



Cinnabar, Fenghuang County, Xiangxi Prefecture, Hunan Province, China. Photo: Bob Cooke.



Cinnabar, Actua Mine, Sonoma County, California. Photo: Bob Cooke.

while the ancient Greeks used it as an ingredient in ointments. In the New World, mercury was used by the ancient Olmec and Mayan cultures. Cinnabar has been used in Chinese lacquerware and consumed in traditional Chinese medicines. Qín Shǐ Huáng Dì, the first Emperor of China, may have succumbed to mercury poisoning when he was given a potion intended to give him eternal life (always read the warnings on the package—just kidding!).

Manufacturing chlorine and caustic soda are the main consumers of mercury in 2018 in the United States, followed by dental amalgam use, electronics, and fluorescent lighting.

The Spanish mines in Almadén produced cinnabar that was required for the processing of silver from Spain's New World colonies. Peru and Mexico were also significant producers. In the United States, the McDermitt Mine in northern Nevada was the largest primary mercury producer until it closed in 1992. The United States still produces some mercury as a by-product of gold production in Nevada.

Currently, cinnabar remains the primary mercury ore, mined in China. U.S. imports from China far exceed those from Mexico, which is the next largest producer of mercury ore. Much of the Mexican production comes from reprocessing the mines dating to the Spanish colonial period.

Due to its toxicity, cinnabar should not be cut or worn as a gemstone. It would be hazardous to the cutter and to the wearer. Remember that “mad as a hatter” refers to the mental condition of hatters after they used mercury in creating their products. ↗

Technical details (source mostly Mindat):

Chemical formula.....	HgS
Crystal form	Trigonal
Hardness.....	2 to 2.5
Density	8 to 8.2
Color.....	Shades of red
Streak.....	Red
Cleavage.....	One perfect
Fracture	Irregular to subconchoidal
Luster.....	Adamantine

Sources

- Geology.com. 2018. [Cinnabar](#).
- Minerals.net. 2018. [The mineral cinnabar](#).
- Rapp, G. 2009. Archaeomineralogy. In: Natural science in archeology. 2nd ed. Springer: 120.
- U.S. Geological Survey. 2018. Mercury. In: Mineral commodity summaries, USGS, Reston, VA: 106–107.
- Webmineral.com. N.d. [Cinnabar mineral data](#).
- Wikipedia. 2018. [Almadén](#).
- Wikipedia. 2018. [Mercury \(element\)](#).

Chinese carved cinnabar lacquerware, late Qing dynasty. Adilnor Collection, Sweden. Source: Wikipedia.



Sarah Christensen
Geology of Iceland
October 29 Program

Sarah Christensen, a career geologist and recent club member, is happy to give a presentation on her amazing trip to Iceland in 2016!



Iceland's geology is both unique and interesting, much like Sarah herself. She enjoyed the waterfalls and rainbows too! Come hear her talk about the Mid-Atlantic Ridge, hydrothermal venting, and (of course) the most amazing phenomenon of them all, the aurora borealis. ♪

Holiday Party. I am not comfortable asking people to do the things I don't want to do myself, but Holly and Marie came through with smiles. Thank you!

And another special thanks has to go to Sue Marcus. She has agreed to save me from myself. I have enjoyed leading the NVMC for the last 3 years, but it has taken its toll and I need a break. Sue has agreed to allow her name to be placed in nomination for President so I can go into retirement. Thank you, Sue!

That probably leaves the rest of you wondering where you can volunteer to also get my thanks. Luckily for you, the NVMC/GMU Mineral Show is just around the corner. There will be lots of opportunity there. Tom Taafe does an exceptional job organizing the event, preparing contracts for all the dealers, and finding a polite way to turn away all the dealers who want to participate when we've run out of room.

But we need lots of volunteers to make everything happen on the day of reckoning. At the October club meeting, I will have a volunteer schedule. Your cooperation in filling out the volunteer slots will be greatly appreciated. ♪

Bob

The Prez Sez

by Bob Cooke, President



Star Trek transporter technology is alive and well. How do I know this?

Well, just before we convened the September meeting, I was at the front of room when someone called me. I turned and took a step in that direction. That's when the transporter beam moved a 2-foot tree section directly into my path.

The result was not pretty; I proceeded to rearrange my body on the floor with a considerable lack of grace. Ouch! That transporter beam had to be an act of desperation on the part of aliens who wanted to attend the auction but were stuck in orbit around Mars.

Once past my gymnastics exhibition, the auction proceeded with great success. Our younger generation of mineral collectors certainly knows how to spend their parents' money. Quite a few bidding wars were in evidence. I haven't seen a tally yet from our Treasurer, but it would appear that the Fred Schaefermeyer Scholarship Fund got a significant boost from the night's activity.

I would like to give special thanks to a couple of our club members. Holly Perlick and Marie Johnston have agreed to cochair the committee to organize our

Meeting Minutes
September 24, 2018

by Bob Cooke (filling in for Secretary David MacLean)

President Bob Cooke called the meeting to order at 7:45 p.m. Guests included Dave Carlson from the Boy Scouts and Sharvani Mahesh with her son, who was celebrating his 6th birthday.

Holly Perlick and Marie Johnston agreed to cochair the committee for the joint NVMC/MNCA Holiday Party on December 17. They will use an online service to coordinate volunteer signups. Details will be in the next newsletter.

Bob Cooke announced nominations for NVMC officers in 2019. Ti Meredith, Dave MacLean, and Roger Haskins have agreed to continue next year as Vice-president, Secretary, and Treasurer, respectively. Sue Marcus has agreed to run for President. Additional nominations are requested; nominations should be sent to Bob at rdotcooke@gmail.com.

Tom Taafe discussed preparations for the annual mineral show at George Mason University.

Ti Meredith announced that the program for October's meeting would be "Show and Tell." Members are encouraged to bring a recent mineral, fossil, or lapidary acquisition and tell the audience what makes that item special.

Bob apologized for losing the list of members who requested new nametags at the June meeting. A new form was provided for signups. The club will subsidize the first nametag for each member at \$5. Subsequent nametags will be at cost (\$10 to \$15).

Dave Carlson described the Cub Scout Camporall at Camp Snyder (Haymarket, VA) on the weekend of September 29–30 and asked for volunteers to help at the two geology exhibits, in addition to Mike Kaas and Kathy Hrechka. Over 1,500 Cub Scouts were expected at the event.

Pat Flavin was presented with an award from the EFMLS Bulletin Editors' Contest for her article on Flag Pond fossil collecting at Calvert Cliffs, MD.

The schedule of upcoming mineral shows and club auctions was announced, and the business meeting was adjourned at 8:15 p.m. so the auction could start.

λ.



Nominations for the 2019 Club Officer Elections

by Bob Cooke, President

At the December club meeting, we will elect club officers for 2019. I will be stepping down as club president, and Sue

Marcus has agreed to throw her hat into the ring.

So far, the nominations are:

President Sue Marcus
Vice-President Ti Meredith
Secretary David MacLean
Treasurer Roger Haskins

I encourage you to make additional nominations! We need both long-term club members and newer members in officer positions for the leadership we will need in the future. Former club officers are willing to mentor new officers as needed.

Holiday Party



Please join us for a fun-filled evening on Monday, December 17, at 6:30 p.m. to celebrate the holiday season. The NVMC and the Micromineralogists of the National Capital Area will provide fried chicken, honey-baked ham, and drinks for our holiday party.

Please help round out our menu by bringing a side dish. We would appreciate salads, sides, desserts, and more.

Please click on the URL below for the app to sign up if you are coming—and to sign up for a bringing a dish. It really is very easy! Just click and follow the directions!

Thank you. Looking forward to seeing everyone at this wonderful holiday celebration!

Holly Perlick

P.S.: If you would like to participate in the gift exchange, please remember to bring a gift valued between \$5 and \$20.

<https://www.signupgenius.com/go/20F094AADAF2AA46-northern>

Please send your nomination(s) to me (Bob Cooke) at rdotcooke@gmail.com. λ.

Nametags

by Bob Cooke, President

The first batch of the new NVMC nametags (depicted below) has been received and is available for pickup. We are collecting requests for a second order. The cost will be \$5, payable on delivery.

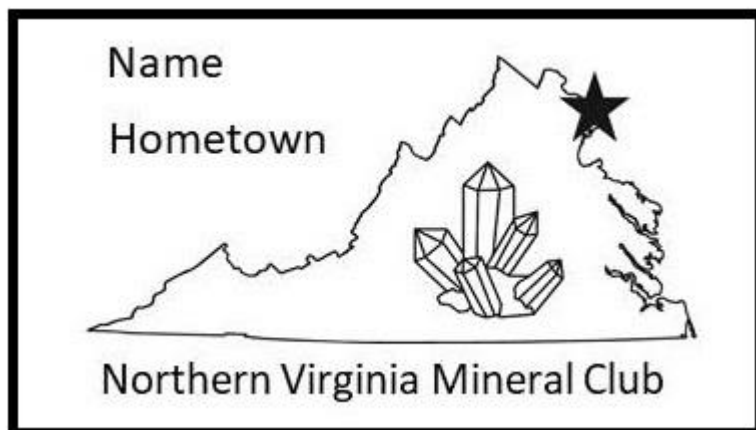
Unfortunately, the list of those who signed up at the June meeting has been misplaced. Please sign up again.

Requests for nametags should include your name and home town, as you want it to appear on the nametag. Please send your requests to me (Bob Cooke) at rdotcooke@gmail.com.

Nametags from the first order still waiting to be picked up are for Hutch Brown, Dave MacLean, Randy Webb, Jeanne Webb, and Lauriell Webb. The following names are on the list for the second order:

Kathy Hrechka	Alexandria, VA
Holly Perlick	Mason Neck, VA
Beth Smith	Vienna, VA

↗



27th Annual Show Back at the Hub! November 17-18, 2018

by Tom Taaffe, Show Chair

The NVMC holds its 27th Annual Gem, Mineral, and Fossil Show on November 17 and 18 at George Mason University. This event is cosponsored by GMU's Dept of Atmospheric,

Oceanic and Earth Sciences.

Please note: The show site will again be the HUB's Ballroom, as it was in 2016. Sorry for any confusion. We plan to return the show to the Johnson Center in

Show volunteers needed!!

2019. Show Setup is Friday evening, November 16, starting at 5:30 p.m.

We will need a host of club volunteers to help with Friday night setup as well to fill various positions over the course of Saturday and Sunday. We encourage volunteers to sign up for shifts of at least 2 hours—more, if you can manage it. We are very grateful to all the volunteers who have so generously

Annual Gem, Mineral, and Fossil Show Participating Dealers

Alan's Quality Minerals, Mount Laurel, NJ
The Mineral House, Tom & Pam Kottyan, Bucyrus, OH
The Prospector Shop, Marianne Cannon, Ligonier, PA
KBT Minerals & Fossils, Tom Taaffe, Vienna, VA
Williams Minerals, Keith Williams, Rio, WV
Hartstein Fossils, Gene Hartstein, Newark, DE
Arrowwood Minerals, Dick Ertel, Lexington, VA
Dave Hennessey, Woodbridge, VA
Jonathan Ertman, Rockville, MD
Bob Farrar, Bowie, MD
Geosol Imports, Rob Evans, Hawley, PA
Yinan Wang, Fossils, Arlington, VA
Jan Minerals, Jehan Sher, Stafford, VA
Zembla Minerals, Casper Voogt, Sterling, VA
Don Soechting, Agates, Charlottesville, VA
Victor Yount, Minerals
Barry Remer, Reston, VA
Crystal Luxe Lighting, Aldeane Josephs, Bethesda, MD

helped out at past shows, and we hope that many of you return to help us again at our 2018 show.

We need volunteers for the tasks and activities summarized below. If you can volunteer or have any questions, please feel free to contact me (Tom Taaffe) at rockcllctr@gmail.com or call me at 703-281-3767; you can also text me at 571-345-5310. In addition, you can volunteer by contacting NVMC President Bob Cooke at rdotcooke@gmail.com. Bob will be taking the lead on keeping track of who volunteers for what.

Friday Night Setup (A): Volunteers bring materials from the club's storage unit to the Hub, arriving by 5–5:30 p.m. Materials include exhibit cases, heavy-duty electrical cords, table coverings, and miscellaneous supplies; mineral specimens for the auction and for the Kids' Mini-mines, plus materials for the kids' activity rooms; and campus directional signs. This task typically requires 2 to 3 vehicles and their drivers, depending on the size of the vehicles. The club storage unit is conveniently located a few miles from GMU. Materials are brought into the kids' rooms (3, 4, and 5) and the Hub Ballroom.

Friday Night Setup (B): Starting at about 5:30 p.m. at the Hub Ballroom, volunteers help arrange the exhibit room layout and assemble the exhibit cases. They also help set up the kids' activity room with all the tables, quizzes, Mini-mines, and workstations. Other tasks include arranging and securing heavy-duty electrical cords in the Ballroom and helping make sure that the table floor plan is accurate.

Friday night volunteers should use the parking garage; please do not not park vehicles in front of the Hub. Of course, volunteers who are bringing and unloading club materials may park in front of the Hub while unloading. Once unloaded, they should promptly move their vehicles to the parking garage. This is to make more parking spots available for dealers who would like to unload Friday night. The NVMC typically reimburses volunteers for the amount of Friday parking ticket.

Saturday Morning Setup: GMU won't give us access to rooms 1 and 2 until Saturday morning. We will need to have a few volunteers arrive at 8 a.m. to finish setting up what we couldn't set up Friday night. The exhibit cases, Micromounters, Touch Minerals, and "Science Table" will all be in rooms 1 and 2.



*Display at the annual club show in November 2015.
Photo: Sheryl Sims.*

This double room is directly across from the kids activities in rooms 3, 4, and 5.

Admission Desk: Volunteers greet show attendees, collect admission, and issue door prize tickets. You can sign up for slots on Saturday from 10 a.m. to 5:30 p.m. and Sunday from 10 a.m. to 3:30 p.m. Admissions volunteers could possibly help with picking and announcing door prize winners!

Kids' Activities: Volunteers administer mineral- and fossil-related quizzes, manage the Kids' Mini-mines, and do what they can to help kids learn. Hours are Saturday from 10 a.m. to 6 p.m. and Sunday from 10 a.m. to 4 p.m. Peak times, when help is needed most, are Saturday from 11 a.m. to 5 p.m. and Sunday from 12 p.m. to 3 p.m.

Silent Auction: One or two designated volunteers organize donated specimens and create bid slips. Several volunteers monitor 1 or 1-1/2 hours of the actual auction, collect winning bids, and distribute specimens. The auction is held on Sunday from about 12:30 to 2 p.m. We usually need three to four volunteers.

Floater: Volunteers attend the show and help as the need arises. Often, the kids' activity tables or admission tables get overwhelmed, and our floaters step in to help out during the rush. When things calm down, they go back to enjoying the mineral show.

Door Prize Announcer-Manager: A volunteer pulls hourly winning door prize tickets for kids as well as

for adults, announces the winners, escorts winners to the door prize table, and supervises prize selection. It's important to locate each door prize winner make sure each winner successfully selects a prize.

Floater/Security: Volunteers attend the show and rotate from room to room to make sure everything is running smoothly and that exhibits, activities, and demonstrations are not being overrun and volunteers are not overstressed. We ask for up to 4-hour shifts (half a day) for these trouble-shooting positions. For example, you might work on Saturday from 10 a.m. to 2 p.m. or from 2 to 6 p.m., but we will happily accept whatever a volunteer can do.

Sunday Takedown: This is the reverse of the Friday night setup, starting at 4 p.m. at the show's close on Sunday. Volunteers carefully take apart exhibit cases (after the owners have collected their display materials) and pack them for the next year. They also gather up all club materials: the Mini-mines and kids' specimens, the heavy-duty electrical cords, and everything else. Volunteers deliver these items to the club's storage unit and put them away. Additionally, we need someone with a vehicle to gather all the campus directional and shuttle signs and make them ready for returning to the club's storage unit. Sunday night takedown goes pretty fast if numerous people help and volunteer their vehicles for the return trip to the storage unit. You don't need a vehicle to help out, but a few (perhaps three) people with vehicles will be needed. ↗



Scam Targets Club Members

by Hutch Brown, Editor

A scam artist is posing as president of mineral clubs and asking club members to transmit club funds. How do I know? It happened to me.

The officers of the NVMC all have their names listed on the last page of *The Mineral Newsletter*, along with their email addresses. So do other office holders, including me as club editor.

On July 31, someone posing as President Bob Cooke sent me the following email message:

Hello Hutch,

Are you available? I need you to make a payment to a vendor on behalf of the club. I just got a mail reminder about the payment today.

You will be reimbursed. Let me know if you can handle this right away so i can send you the details.

Thanks,

Bob Cooke

That was strange because the editor of our newsletter never, ever handles club funds! But I was in a hurry, so I sent a brief acknowledgment, not realizing that it was a scam.

"Bob Cooke" then followed up, asking me to send \$870 by Western Union to cover "professional dues and insurance expenses." So "payment to a vendor" had somehow morphed into something else?

Curious, I took a good look at "Bob's" fancy email address, which was <clubpresident22@yandix.com>. (Compare that to the real one on the last page.) That's when I realized that I'd been had. No harm done, I suppose, but I never should have responded at all.

The real Bob Cooke told me that some of our club officers have also been hit up for money. Maybe this criminal is working his (or her) way down the list? ↗

GeoWord of the Day

(from the *American Geoscience Institute*)

peat-to-anthracite theory

A theory of coal formation as a process in which the progressive ranks of coal are indicative of the degree of coalification and, by inference, of the relative geologic age of the deposit. Peat, as the initial stage of coalification, is of recent geologic age; lignite, as an intermediate stage, is usually Tertiary or Mesozoic; and bituminous coal and anthracite, as the more advanced stages of coalification, are usually Carboniferous.

(from the [Glossary of Geology, 5th edition, revised](#))



AFMS Code of Ethics



A large measure of the enjoyment of our hobby consists of collecting in the field. For that reason, the members are proud to endorse the following:

1. I will respect both private and public property and will do no collecting on privately owned land without permission from the owner.
2. I will keep informed of all laws, regulations, or rules governing collecting on public lands and will observe them.
3. I will, to the best of my ability, ascertain the boundary lines of property on which I plan to collect.
4. I will use no firearms or blasting material in collecting areas.
5. I will cause no willful damage to property of any kind, such as fences, signs, buildings, etc.
6. I will leave all gates as found.
7. I will build fires only in designated or safe places and will be certain they are completely extinguished before leaving the area.
8. I will discard no burning material—matches, cigarettes, etc.
9. I will fill all excavation holes that might be dangerous to livestock.
10. I will not contaminate wells, creeks, or other water supplies.
11. I will cause no willful damage to collecting material and will take home only what I can reasonably use.
12. I will practice conservation and undertake to utilize fully and well the materials I have collected and will recycle my surplus for the pleasure and benefit of others.
13. I will support the rockhound project H.E.L.P. (Help Eliminate Litter Please) and will leave all collecting areas devoid of litter, regardless of how found.
14. I will cooperate with field trip leaders and those in designated authority in all collecting areas.
15. I will report to my club or federation officers, the Bureau of Land Management, or other authorities any deposit of petrified wood or other materials on public lands that should be protected for the enjoyment of future generations or for public educational and scientific purposes.
16. I will appreciate and protect our heritage of natural resources.
17. I will observe the Golden Rule, will use good outdoor manners, and will at all times conduct myself in a manner that will add to the stature and public image of rockhounds everywhere.



Safety First Ticks, Chiggers, Mosquitoes—Oh My!

by Ellery Borow, EFMLS Safety Chair

Editor's note: The article is adapted from EFMLS News (October 2018), p. 3.

Ticks, chiggers, mosquitoes, fire ants, black flies, scorpions, venomous snakes, poison ivy, earthquakes, volcanos, flash floods, and excessive heat—oh my!

Pretty much anywhere you go as a rock collector, you will find something that needs special attention. That something can be little or big, but it's still something that, for safety's sake, should be addressed and not ignored.

We collectors check maps, monitor tire pressure, bring water, update medical aid kits, and research what minerals might be found where we go. We might also be advised to check into the things that might bug us on our trips ... like bugs and bears and storms and snakes.

Fire ant bites are not fun. Mosquitoes and ticks are vectors for more and more diseases. Weather patterns are changing.

For these and other conditions to be aware of, you can find numerous sources of data. NOAA (the National Oceanic and Atmospheric Administration) has weather services, state and local health services monitors area insect populations, and even the USGS (U.S. Geological Survey) has websites on earthquake and volcanic activity.

A rain in the mountains and the resulting flash flood 6 miles away could isolate your vehicle. Knowing how long a tick takes to transmit Lyme disease, how to prepare for a venomous snake in the trail, how to recognize fresh bear tracks in the area—all this takes time to research and understand. But the well-prepared collector is the safe collector. In this age of the Internet, it's far easier and less time consuming than ever to be prepared and be safe.

When traveling, most rock collectors bring at least the basics—maps, water, food, a medical kit, personal protective equipment, and so on. Besides the basics, it is wise to prepare for any additional hazards. Additional precautions might be as simple as bringing an extra strong mosquito repellent.

Please don't let little flying things bug you. Your safety matters! ➤

When the Smithsonian Wants Your Rocks, You Don't Say No

by Chrystian Tejedor

Thanks to Sue Marcus for the reference!

The Smithsonian Institution wanted Stephen Haggerty's rock collection.

"Who in their right mind would say no?" was the Florida International University geologist's response. ...

The rocks Haggerty shipped are a peek into Earth's history—something that otherwise might not have been available to future geologists. Many rocks come from diamond mines all over Africa, ones that are either closed, are inaccessible to researchers or that are difficult to reach due to civil unrest. [Read more.](#)



Eclogite from the Haggerty collection.

The USGS Is Now Mapping Space To Mine Extraterrestrial Resources

by Trevor Nace (Forbes, 4 September)

Thanks to Sue Marcus for the reference!

The United States Geological Survey (USGS) is expert in mapping natural resources here on Earth. Recently, however, the agency began large-scale mapping of space resources for mining. [Read more.](#)

Save the dates!

Field Trip Opportunities

Northern Virginia Community College

NOVA's campus in Annandale offers 1-day week-end courses—essentially, field trips—related to our hobby. You can register and get more information at [Field Studies in Geology—GOL 135](#).

Building Stones of the National Mall

October 13, 9 a.m.–6:30 p.m. Visit over 20 National Mall sites, examining the geologic history and architecture and the rocks used to construct the federal buildings and monuments there.

Audubon Naturalist Society

ANS (located in Maryland) offers programs in our area, including field trips related to our hobby.

Geology at Long Branch

December 1, 1–4 p.m. (rain date: December 9), led by Joe Marx; members \$26, nonmembers \$36; [register here](#).

Arlington's Long Branch Nature Center overlooks a misnamed tributary of Four Mile Run. We will hike a mile or so along Long Branch and Four Mile Run, returning by the same route. A variety of rock units are exposed along the trail, including an undersea landslide frozen in time, long-vanished seaside flats, and the bottommost layer of the coastal plain. To add botanical icing to our geological cake, we will traverse an old-growth upland forest and a quicker changing floodplain forest. ↗

Crushing Rock or Crushing Rocks

*Online post by Bronzella
Cleveland, 23 August 2018*

*Thanks to Wayne Lee for the
reference!*

From the perspective of any quarry owner, crushing rock is what it's all about. To the guy or gal operating something like the Cat 349F L hydraulic excavator, hey, crushing rocks—it's kind of fun to move a handle that transmits so much power to a set of jaws that

can reduce a big boulder to little rubble in a matter of seconds—fun coupled with serious responsibility and acute operator skills. [Read more.](#) ↗

Gemming at Leisure

by Linda Benedict

When we go gemming
My husband and I
We like to do it under a blue
September sky

We used to go looking
For rocks in a mine
Now we do buckets of stones
And that is just fine

We get to play in the water
And the mud
Talk with our neighbors
And get coated with crud

Excuse me,
that is not what I mean
We love all the colored stones
And gems that we glean

We learn something new
Every day that we live
About ourselves, our friends
And what this world has to give

This is a great activity
For all to do
It will make you happy
When you do it too



*Gemming at
Morefield
Mine in
Virginia.*

Virginia Gold Mining and Hornet Balls

by Mike Kaas

Gold mining was happening in the eastern states in the 1820s, long before the 49ers began the California Gold Rush, followed by the subsequent mining rushes in the West. About an hour's drive west of Washington, DC, in Goldvein, VA, is one of the nicest small mining museums. It portrays the nearly forgotten gold mining heritage in our area.

The Monroe Park Gold Camp Museum is a hidden treasure for mineral and history buffs. It is also home to the most unusual pieces of gold mining equipment you will find anywhere, the Hornet Balls.

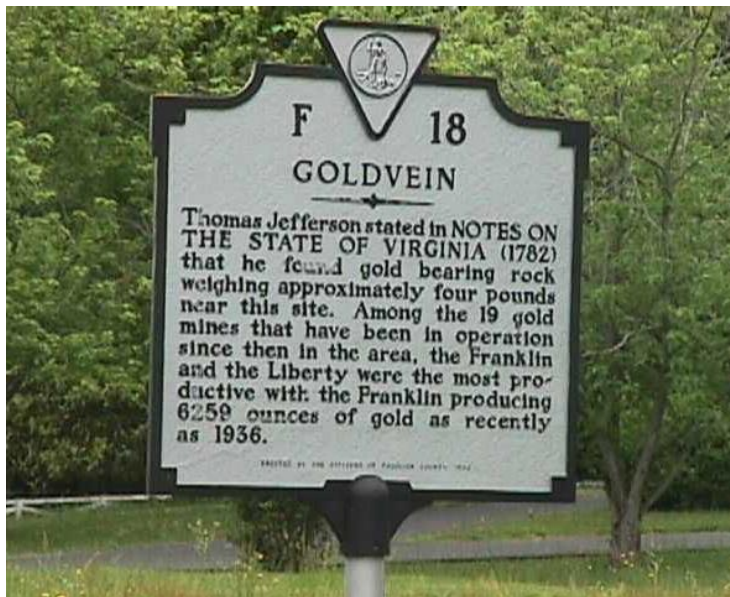
Goldvein is located in Fauquier County. Historically, there were 19 gold mines in the Virginia gold-pyrite belt that cuts through the county. Most of the mines were small, but the Franklin, Union, Liberty, and Randolph were among the larger operations.

The Franklin Mine, opened in 1825, had a 300-foot vertical shaft and a stamp mill. The mine produced \$1.2 million worth of gold before the Civil War.

In those days, Virginia was considered an important gold producer. In the 1840s, production was averaging 3,000 ounces per year. During and after the Civil War, production in the region declined sharply. After a short revival in the Great Depression years, the mines shut down for good.



Mess Hall Building, with the Hornet Balls in the distance.



Highway marker on Route 17 for Goldvein, Fauquier County, VA.

All photos: Mike Kaas.

Operated by the Fauquier County Parks and Recreation Department, the Monroe Park museum is patterned after the small mining camps that were once located at many of the mines. Three buildings, the Assay Office, the Mess Hall, and the Bunk House, contain excellent exhibits that describe the gold mining operations and the life of the miners. Outdoor displays contain pieces of mining equipment gathered from area mines and a sluice system to demonstrate gold panning. A headframe and a hoist house are envisioned for the future.



Mining equipment on display.

That brings us back to the Hornet Balls, which are displayed on the park grounds. They were found at the Liberty Mine.

Each ball is a sphere about 7 feet in diameter with iron-flanged circular openings on opposite sides. The hollow spheres are made of reinforced concrete. Not strong enough to be ball mills, the spheres are thought to have been mounted on a horizontal axle that enabled them to rotate around a central point, much like a gigantic Chilean mill used to grind ore in some of the western gold mines.

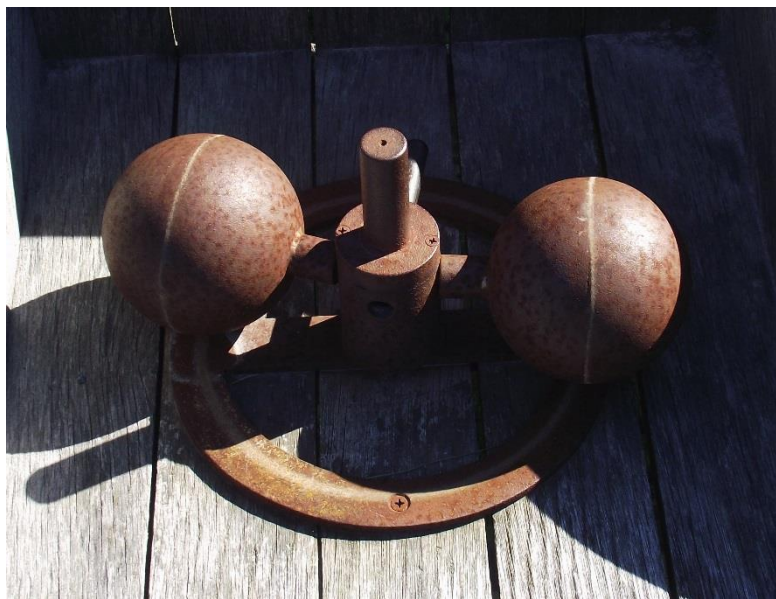
An exhibit model illustrates the operation of the Hornet Balls. They are likely a one-of-a-kind device, and they are a highlight of the museum.

The park is located at the intersection of Highway 17 and Rock Run Road (Route 615). Set your GPS for 14421 Gold Dust Parkway, Goldvein, VA 22720.

The [website for Monroe Park](#) is an excellent way to learn more about the Gold Camp Museum. Other useful references are shown below. The book by Bob Barron is for sale at the park. ➤

Sources

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Model of Hornet Balls in operation.



Hornet Balls.

Humor

Don't Lick the Rocks!

Editor's note: The piece is adapted from [Mindat Adventures: Humorous Mineral Stories](#). Thanks to Sue Marcus for the reference!

This happened a couple of years ago. A friend was learning to collect minerals and I was helping him with identifications.

One day, he emailed me about a nice blue translucent mineral he had found in a copper mine tunnel. I called to tell him not to lick it since he had a habit of licking things to get them wet so he could see them in a different way. Too late, he had already spent 10 minutes washing out his mouth. He had licked chalcantite, quite an awful taste.

The actual story is about a different day he came over with some specimens to identify. One he had broken from the top of a big rock at a mine. It was a crystalline brown material. I put it under the microscope and immediately knew what it was.

I asked him if he had licked this one and he said no, having learned his lesson from the chalcantite. I told him what he had found was a stone the coyotes used to mark their territory; the buildup was of their daily marking the rock.

He was very happy he hadn't licked that rock. ➤



The Rocks Beneath Our Feet Virginia's Gold–Pyrite Belt: Hydrothermal Processes

by Hutch Brown

Editor's note: The article is the third in a four-part series on the geology of Virginia's gold–pyrite belt. The first part is in the [June 2018 issue](#), the second part in the [September 2018 issue](#).

Prospectors once panned and mined for gold from Maryland to Alabama. In Virginia, the gold-bearing rock was concentrated in a band ranging from Fairfax County southwest to Appomattox County (fig. 1). Known as the gold–pyrite belt, the rock produced not only gold but also pyrite, valuable for its iron content. You can still find traces of gold and pyrite in some of the streams within the gold–pyrite belt.

The gold–pyrite belt lies in the western part of Virginia's Piedmont Province. What geologists call the country rock (the native bedrock) in the Piedmont is largely metamorphic, but it also has intrusions of igneous rock. The igneous intrusions are clues to the origins of the gold and pyrite once mined there.

Half a billion years ago, the igneous intrusions were zones of rising magma deep underground. The magma drove superheated fluids rich in dissolved minerals into cracks and crevices in the country rock. When the liquids cooled, they left veins, lenses, and irregular bodies of quartz. Where the superheated fluids contained sulfides and metals, gold and pyrite sometimes precipitated out onto the quartz, leaving valuable ores.

But how exactly did the hydrothermal processes work? Where did the gold come from? For that matter, what *is* an ore?

Gold Ore

An ore is a host rock associated with a valuable mineral (often a metal) in sufficient quantities for mining. Quartz is a common host rock for gold.

Figure 1 shows a gold nugget from one of the earliest discoveries of gold in Virginia. The Whitehall lode in western Spotsylvania County (fig. 1, red arrow), discovered in 1806, was mined from 1848 to 1884, producing about \$1.8 million worth of gold. Veins of quartz in the Whitehall lode yielded native gold as well as gold-containing pyrite and galena.

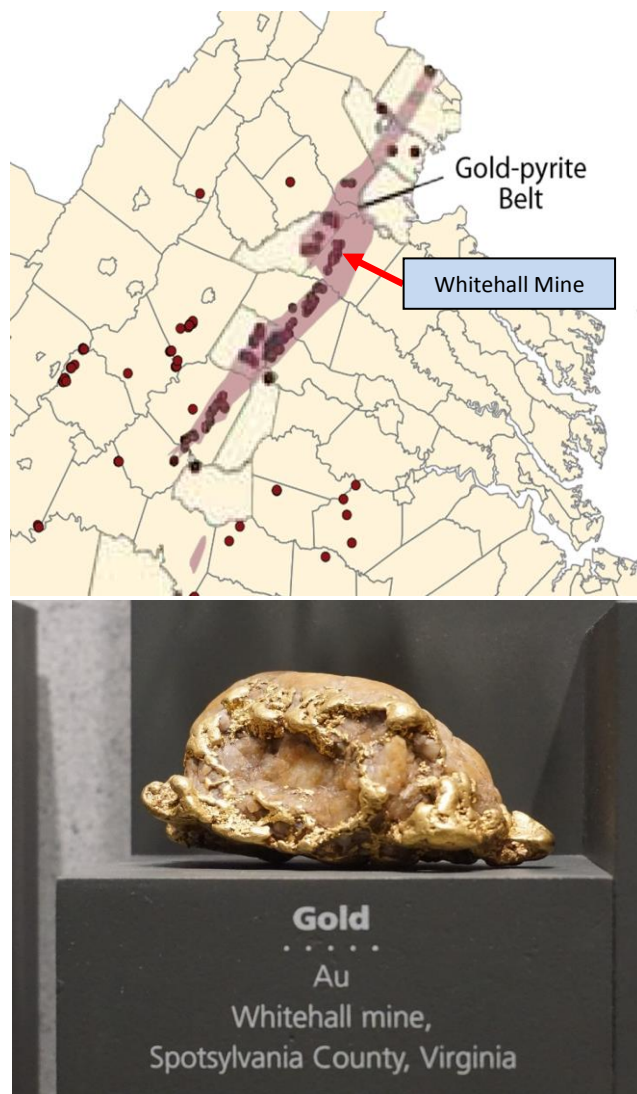


Figure 1—Top: The gold–pyrite belt in north-central Virginia (shaded area). Purple dots = gold mines and prospects; red arrow = approximate location of the Whitehall Mine in Spotsylvania County. Source: Sweet (2007). **Bottom:** Gold nugget from the Whitehall Mine, on display at the Smithsonian National Museum of Natural History. Source: Minerals.net (2015); photo—Hershel Friedman.

The Whitehall lode, like other lodes in the gold–pyrite belt, is embedded in metamorphic bedrock, in this case the Chopawamsic Formation to the southwest of Fredericksburg, VA. The Chopawamsic comprises ancient metasedimentary and metavolcanic rocks, such as schists and greenstones. Like most Piedmont bedrock, the Chopawamsic formed in a volcanic island arc known as the Taconic Terrane. The Taconic has a complex geologic history, including collision and consolidation with at least one other small land mass in the proto-Atlantic Ocean.

About 450 million years ago, the Taconic Terrane collided with proto-North America, riding up over the continental margin and remaining attached. The colliding land masses pushed up a mountain range known as the Taconic Mountains. After the mountains weathered away, their roots formed the basis for today's Piedmont Province.

Rising Magma

The approaching Taconic Terrane and the collision with proto-North America that followed generated tremendous geologic activity. Magma from deep in the Earth's mantle rose toward the surface, erupting in volcanos and spilling over in lava flows. The resulting basalts and rhyolites are still evident in the metavolcanic rocks found today in the Piedmont.

But most of the rising magma cooled and solidified deep underground, forming dikes, sills, and other intrusions of igneous rock (fig. 2). The deeply buried magma cooled only slowly, forming coarse-grained intrusive rocks like granite, diorite, and tonalite.

Weathering has exposed the igneous intrusions, which punctuate the metamorphic bedrock in the Piedmont today. Many of the intrusions are enormous; in large parts of the Piedmont in southern Virginia, for example, the country rock is predominately granite and gneiss.

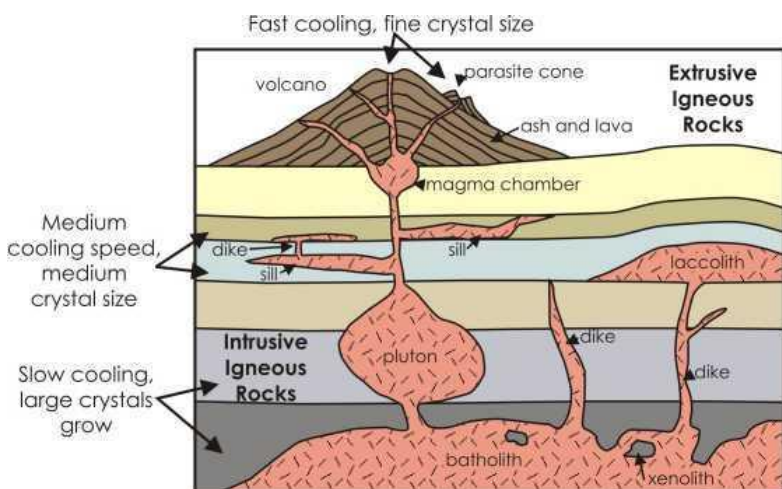


Figure 2—Schematic depiction of how igneous rock forms. Where rising magma erupts in volcanos, it rapidly cools into fine-grained extrusive igneous rock like basalt and rhyolite. Where the magma cools underground, it forms dikes, sills, plutons, and other bodies of intrusive igneous rock. The slowly cooling magma forms relatively large crystals in granite, gabbro, and other coarse-grained igneous rocks. Source: N.a. (2012).

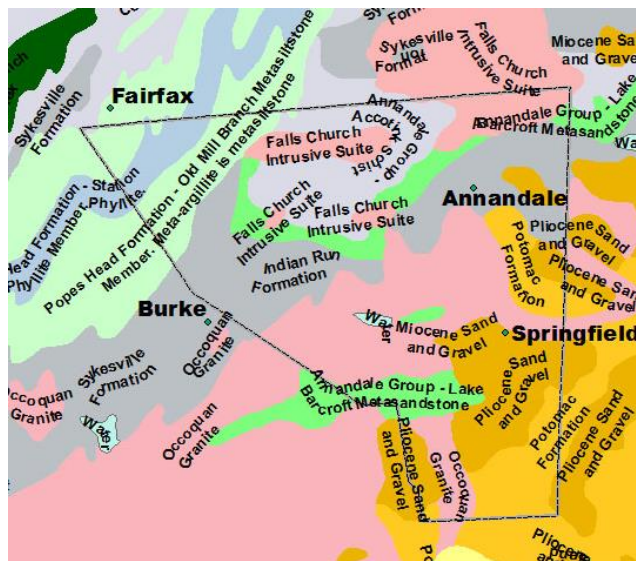


Figure 3—The geology in the area of the 17th-century Ravensworth Plantation (outlined) in Fairfax County, showing large areas of igneous bedrock. Pink = igneous rock (Falls Church intrusions and Occoquan batholith); gray/green = metamorphic bedrock; orange/brown = Cretaceous and younger sediments on the Coastal Plain. Source: N.a. (2017).

The same is true for parts of northern Virginia. The area has many small igneous intrusions, but some are gigantic (fig. 3). Igneous formations include a massive tonalite pluton near Falls Church and a huge granite batholith near Annandale.

In fact, the mines and prospects in Virginia's entire gold-pyrite belt are all relatively close to outcrops of igneous rock. And that is no coincidence.

Hydrothermal Processes

The Whitehall lode, like other ores in the gold-pyrite belt, intruded into the ancient Taconic bedrock. Like the intrusive igneous rock, the ores formed veins, lenses, and irregular bodies in the country rock (fig. 4). In fact, the ores were a byproduct of the igneous intrusions that took place at about the same time.

The igneous intrusions formed from magma rising from the Earth's mantle. The tremendous heat from the magma drove hydrothermal processes that infused gold- and pyrite-bearing veins and bodies of quartz into the country rock. The magma then cooled underground, solidifying into granite and other intrusive igneous rock. In Virginia's gold-pyrite belt, erosion has exposed the igneous intrusions that gave off the heat and contained the minerals needed to form gold-bearing ores.



Figure 4—Sketch of irregular gold-bearing quartz bodies (white) in the Piedmont bedrock (schist, dashed area) at the Laird Prospect in Orange County, to the west of Fredericksburg, VA. Source: Pardee and Park (1942).

Gold deposits can form in many different geologic environments, ranging from relatively shallow volcanic rock to deeply buried metamorphic rock (fig. 5). The gold-pyrite belt in our area, like the country rock containing it, formed in a deeply buried envi-

ronment of sedimentary or metamorphic rock (fig. 5, red circle). The igneous intrusions in the Piedmont indicate a geologic environment that was miles underground.

Adjacent metamorphic rock also suggests a deeply buried geologic environment. The Sykesville Formation underlying much of northern Virginia formed from sediments in a deepsea trench at the advancing edge of the Taconic Terrane. Thrust up onto the continental margin at the outset of the Taconic Orogeny, the Sykesville rocks were then buried under the rising Taconic Mountains. Today, the Sykesville is exposed by erosion alongside such igneous intrusions as the Occoquan batholith (fig. 3).

The igneous outcrops, half a billion years ago, were zones of rising magma deep underground. The magma generated superheated fluids, drawing water and minerals from the country rock and from the gold-

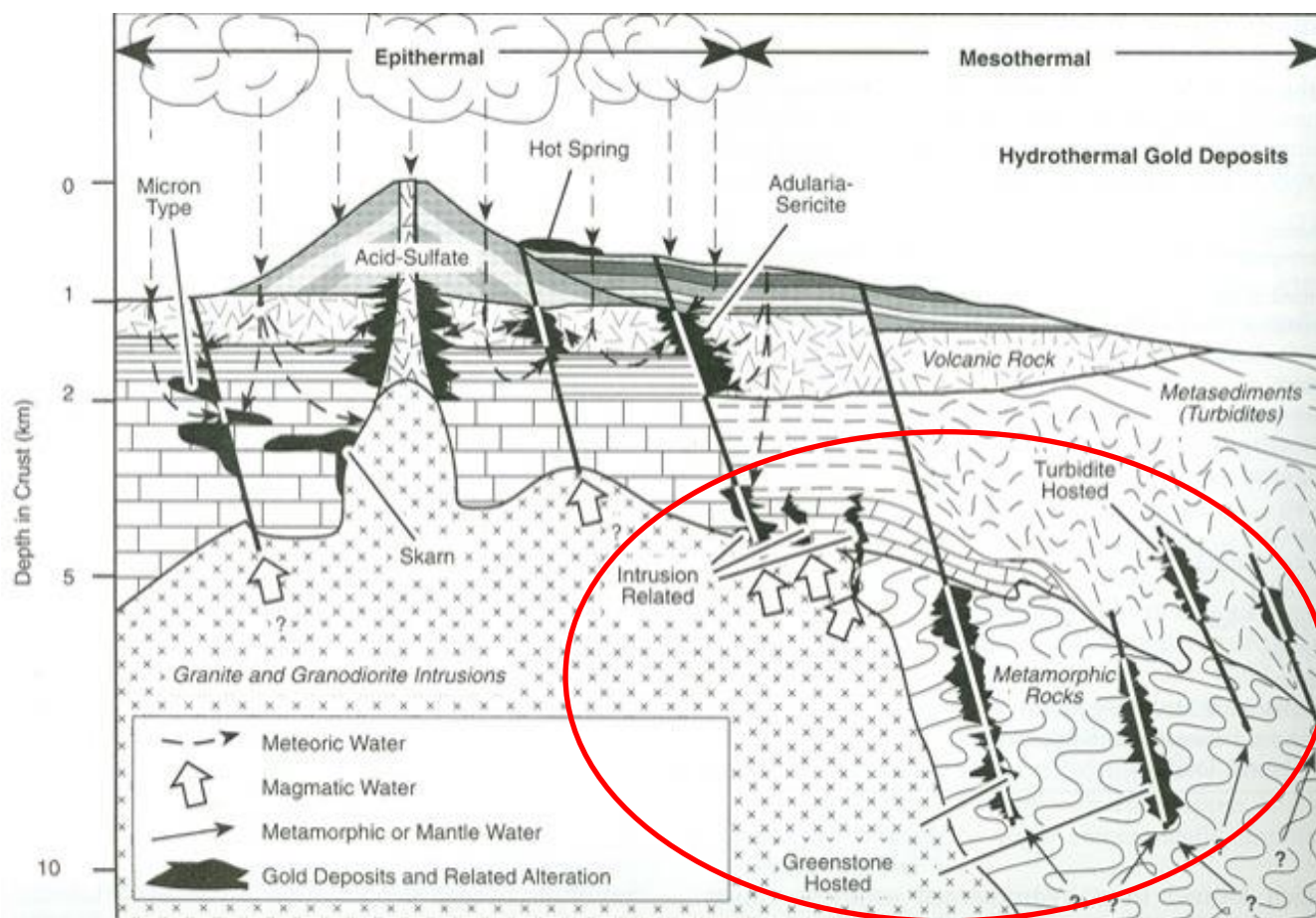


Figure 5—Schematic illustration of geologic environments in which hydrothermal gold deposits form. Arrows = various sources of the water involved in the hydrothermal processes (surface/ground water, magma, and water from rocks and the mantle); black = gold deposits and contact alteration of the country rock; red circle = hydrothermal processes likely at play in forming the gold-pyrite belt in the Virginia Piedmont. Source: Kesler and Simon (1994).

bearing magma itself (fig. 4, red circle). The superheated fluids rose through the country rock, forming convection currents as cooler fluids rushed in to replace them. In some places, the superheated fluids altered the adjacent country rock by contact, infusing it with gold and other minerals. The superheated mineral solutions also forced their way into faults and other openings in the country rock.

As the liquids cooled, minerals precipitated out, including quartz-forming silicates. Where the fluids contained sulfides and iron-associated metals, they deposited gold, pyrite, and other minerals in the country rock, usually in association with quartz. In addition to gold and pyrite, minerals found in the gold-pyrite belt (usually in small quantities) include garnet, galena, sphalerite, pyrrhotite, chalcopyrite, tourmaline, and more.

Figure 1 shows the orientation of the gold-pyrite belt from southwest to northeast. The zone of mineralization mirrors the orientation of most landforms in our area, including the bands of Piedmont bedrock, Bull Run Mountain, the Blue Ridge Mountains, and the valleys and ridges west of the Blue Ridge.

The Taconic Terrane struck proto-North America at an oblique angle from what today would be the southeast. So did proto-Africa when it collided with proto-North America during the Alleghanian Orogeny beginning about 320 million years ago. Both tectonic events helped to give the underlying geology in our area the orientation we see today.

Deposition of Gold in Virginia

In short, gold deposition in Virginia is a story of hydrothermal processes triggered by rising magma in conjunction with tectonic events. The magma contained gold, iron, and other metals borne to Earth by showers of meteors and asteroids about 4.3 billion years ago. The magma plumes drove superheated fluids containing dissolved minerals into cracks and crevices in the country rock, depositing quartz that was, in places, rich in gold and pyrite.

The magma plumes in turn were associated with colliding tectonic plates and the advancing Taconic Terrane in the early Ordovician Period about 470–485 million years ago. Accordingly, an ancient volcanic island arc formed most of the bedrock for today's Piedmont Province, including its gold-pyrite belt.

So what's the upshot? How did the geology of the gold-pyrite belt play out at specific gold mines?

Next: The story of the Kirk Mines (long since closed) in Fairfax County, VA.

Acknowledgment

The author thanks NVMC members Roger Haskins and Sue Marcus for furnishing materials and reviewing the article. Any errors are the author's alone.

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October 2018—Upcoming Events in Our Area/Region (see details below)

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	3 MSDC mtg, Washington, DC	4	5	6 Show: Macungie, PA
7	8 Columbus Day GLMSMC, Rockville, MD	9	10	11	12 Auction, Oella, MD	13 NOVA field trip
14	15	16	17	18	19 Symposium: Baltimore, MD	20 Show: S Charleston, WV; Sympo- sium: MD
21 Show: S Charleston, WV; Sympo- sium: MD	22	23	24 MNCA mtg, Arlington, VA	25	26	27
28	29 NVMC mtg, Arlington, VA	30	31 Halloween			

Event Details

3: Washington, DC—Monthly meeting; Mineralogical Society of the District of Columbia; 7:45–10; Smithsonian Natural History Museum, Constitution Avenue lobby.

6: Macungie, PA—2017 Autumn Mineralfest Show; Pennsylvania Earth Sciences Association; Macungie Memorial Park; \$2 adults, under 12 free; info: www.mineralfest.com.

8: Rockville, MD—Monthly meeting; Gem, Lapidary, and Mineral Society of Montgomery County; 7:30–10; Rockville Senior Center, 1150 Carnation Drive.

12: Oella, MD—Chesapeake Gem & Mineral Society Auction; 2414 Winchester Ave; preview 7, auction 7:30; info: chesapeakegemandmineral.org.

19–21: Baltimore, MD—Annual Desautels Micro-mount Symposium; The Friends School of Baltimore, 5114 N Charles St; info: www.baltimoremineralsociety.org/desautels-symposium.html.

13: Washington, DC—Geology field trip, National Mall bldgs; 9–6:30; NOVA; info, reg: [GOL 135](#).

20–21: S Charleston, WV—45th Annual Jewelry, Gem, Mineral & Fossil Show and Sale; Kanawha

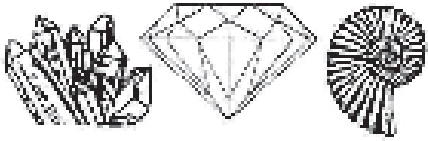
Rock & Gem Club; S Charleston Community Center, 601 Jefferson Rd; info: Facebook.com/Kanawha Rock and Gem Club.

24: Arlington, VA—Monthly meeting; Micromineralogists of the National Capital Area; 7:45–10; Long Branch Nature Center, 625 S Carlin Springs Rd.

29: Arlington, VA—Monthly meeting; Northern Virginia Mineral Club; 7:45–10; Long Branch Nature Center, 625 S Carlin Springs Rd.



*Cinnabar mercury ore, Nevada.
Source: Wikipedia; photo: Chris Ralph.*



27th Annual GEM, MINERAL AND FOSSIL SHOW

Presented by The Northern Virginia Club, Inc.

www.novamineralclub.org

Sponsored by the Dept. of Atmospheric, Oceanic and Earth Sciences at GMU

Date: November 17 & 18, 2018

Place: The Hub Ballroom
George Mason University Campus
Braddock Rd. & Route 123, Fairfax, VA

Hours: Saturday 10am-6pm, Sunday 10am-4pm

Admission: Adults: \$6, Seniors: \$4, Teens (13-17): \$3
Children 12 & under, Scouts in uniform,
and GMU Students w/valid ID are FREE.

\$1 OFF

Adult admission
with this card
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Use Parking lot A, enter Lot A from Nottaway River Lane.

Look for our Courtesy Shuttle to Mineral Show

Please help get the word out!
Print out and distribute the flyer!

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**Mineral of
the Month:
Cinnabar**

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The Northern Virginia Mineral Club

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Please send your newsletter articles to:
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RENEW YOUR MEMBERSHIP!

SEND YOUR DUES TO:

Roger Haskins, Treasurer, NVMC
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OR

Bring your dues to the next meeting.

Dues: Due by January 1 of each year;
\$15 individual, \$20 family, \$6 junior (under 16,
sponsored by an adult member).

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)* at **Long Branch Nature Center**, 625 Carlin Springs Road, Arlington, VA. (No meeting in July or August.)

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

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