THE NORTHERN VIRGINIA MINERAL CLUB INC

The Mineral Newsletter

Meeting: October 24 Time: 7:30 p.m.

Virtual meeting via Zoom

Volume 61, No. 8
October 2022
Explore our website!

October Meeting Program:

GMU Club Show

details on page 8

Pyrargyrite

Fresnillo, Zacatecas, Mexico

Source: Wikipedia. Photo: Rob Lavinsky.

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Mineral of the Month
Pyrargyrite

by Sue Marcus

I chose pyrargyrite as October's Mineral of the Month because it is attractive and unusual. It is red when backlit and in many microphotographs. I had not realized how difficult it was to photograph until I looked through the more than 650 photos on Mindat. The metallic luster reflects light and masks the deep red color of the mineral. Pyrargyrite, or "ruby silver," occurs in deposits rich in silver and minerals containing silver. It occurs in different crystal habits (shapes), often within the same deposit.

The easy part of pyrargyrite's name is what it means: Greek *pyr* = fire and *argyros* = silver. The name seems to have been coined by G.F. Glocker, a German mineralogist, in 1831. Glocker described an argentiferous antimony sulfide.

"Argyrythrose" was another early name for pyrargyrite, bestowed by Francois Sulpice Beaudant in 1832. Beaudant described four types of argyrythrose: crystalline, dendritic, botryoidal, and amorphous. Though the name was discarded, Beaudant identified and named the arsenic analog of pyrargyrite, also in 1832, calling it proustite.

Chemically, pyrargyrite is Ag_3SbS_3; proustite is Ag_3AsS_3. The two minerals form a solid solution series, with one containing antimony (Sb) and the other arsenic (As). A quick reminder: a solid solution series occurs when the chemical composition of minerals changes very slightly along a spectrum form one element dominating to another element dominating. For pyrargyrite and proustite, no minerals form towards the middle of the spectrum; pyrargyrite and proustite alone constitute the entire spectrum.

Silver is mined in many locations that have not reported pyrargyrite; at other localities, however, pyrargyrite is a major silver ore. Pyrargyrite is surprisingly lacking from the silver mines in Idaho. Canadian multimetallic mines from which silver is extracted have minor amounts of pyrargyrite. When pyrargyrite occurs in many silver mines within a locality, it is either unattractive, forming masses or small grains; or very rare, forming unusually microscopic crystals.

I found no reports or images of collectible pyrargyrite from Africa—a huge, mineral-rich continent. Australia

Happy Halloween!

Northern Virginia Mineral Club members,

No in-person meeting in October!

***** Zoom meeting this month *****

See details on page XX.

Pyrargyrite, Schneeberg, Erzgebirgskreis, Saxony, Germany. Source: Mindat; photo: Terry Burtzlaff.

also seems to lack the known geologic conditions for pyrargyrite crystals. Russia and China, also well endowed with mineral resources (including silver) are not known for pyrargyrite.

Mindat lists pyrargyrite from many localities, but it is simply a mineral on a list, with no additional information readily available. For example, Inner Mongolia, part of China, has silver mines where pyrargyrite is reported on one such list. Russia's Ducat Mine features a similar list. The Julietta Mine (Russia) contains rare pyrargyrite, and no crystals are mentioned in the geological report I read. Perhaps future collectors will report pyrargyrite crystals from some of these localities.

Pyrargyrite also occurs in many deposits throughout the world with only brief mentions; in some places, however, it is a major ore and occurs in crystals. My assessment of why pyrargyrite is only briefly reported (though not by mineral collectors) is that the reports are written by geologists or mining engineers who are focused on economic mineral extraction.

The United States has few notable pyrargyrite localities. The Zaca (or Advance) Mine is a deposit in Alpine County, CA, that was developed, probably for silver, from 1862 until at least 1983. The property, on national forest land managed by the U.S. Forest Service, might be held as mining claims. The mines, which went through various names, produced silver along with base metals (copper, lead, and zinc) and tungsten.

The pyrargyrite deposits in Alpine County originated from hydrothermal fluids, probably related to local intrusive rocks, that penetrated metasedimentary rocks. The fluids deposited silver minerals, quartz, rhodochrosite, and other minerals in cavities in rhyolite (a silica-rich intrusive rock). Pyrargyrite in the locality appears in aesthetic microcrystals and occasional well-formed macrocrystals. Unfortunately, most pyrargyrite, whether crystals or not, went through the crusher as valuable silver ore. Crystallized minerals were seldom valued by early miners at this locality or anywhere else.

Nice, relatively large and well-crystalized pyrargyrite specimens come from several Mexican localities. At the San Juan de Rayas Mine in Guanajuato, specimens more than 10 centimeters (4 in) in size were extracted, showing off crystals up to 1 centimeters (0.4 in) in size.

Pyrargyrite, St. Andreasberg, Braunlage, Goslar, Lower Saxony, Germany. Source: Mindat; photo: Rock Currier.

Rarely, pyrargyrite crystals could reach 2.5 centimeters (~1 in). The crystals can be elongated or tabletlike, sharp or roughly rounded.

Fresnillo, in Zacatecas, hosts highly lustrous, well-formed crystals. Mindat shows a magnificent single 4-centimeter (1.6-in) crystal from the San Luis Shaft. The finest specimens seem to have come from the San Luis shaft in the 1990s and early 2000s. The deposit is

Pyrargyrite, Colquechaca, Chayanta Province, Potosí, Bolivia. Source: Mindat; photo: Rock Currier.

zoned, with silver-bearing minerals like pyrargyrite increasing in abundance farther from the quartz monzonite stock that intruded metasedimentary rocks. The silver minerals formed at relatively low temperatures and pressures, perhaps no more than 350 meters (1,150 ft) from the original surface.

In the late 1980s, well-known collector and minerals writer Bob Jones was in Mexico. At the Fresnillo Mine, an engineer gave him a tour and told him about proustite and pyrargyrite crystals from the mine. The engineer said that he and others plucked those pieces from the conveyor belts. Bob, of course, hoped to buy some of these select pieces. He was dismayed when the man told him that when silver production values dropped, they put the beautiful specimens on the belt again to "sweeten the pot."

Bolivia is renowned for its silver mines. Deposits are thermally and compositionally zoned, a geologic environment caused by multiple phases of fluid emplacement into igneous rocks. The fluids cooled and reacted separately to the metasedimentary host rocks, with minerals forming zones as the emplacement conditions passed through their physical and temperature crystallization requirements. Silver minerals crystallized in the later phases as the fluids cooled.

The silver mines of Potosí fueled and funded the Spanish conquests, exploration, and exploitation of the New World. Since silver minerals like pyrargyrite are found in silver mines, these deposits also produced (and continue to produce) collectible crystals—once people realized that crystals were worth collecting.

Due to quirks of geochemistry or collecting, pyrargyrite has not been reported from Bolivia's most famous silver deposits (at Cerro de Potosí). At the Colquechaca deposit, pyrargyrite forms stout, elongated crystals. Some are lustrous; all are very dark, appearing black unless held in front of a very bright light. Specimens extracted in the late 1800s are up to 9.5 centimeters (3.8 in) in size, with individual pyrargyrite crystals of up to 2.5 centimeters (1 in). These are some of the world's finest pyrargyrite specimens.

The Porco Mine in the Colquechaca District was a notable silver producer. For the Porco deposit, dacitic magma provided the heat source and some of the mineralized fluids that altered the host tuff. The deposit is zoned, with thin pyrargyrite-bearing veins more distant from the stock. According to a mine website, Porco is an active mine that has been worked for at least 500 years.

Bolivia's San Cristobal District and the mine with that name have produced silver intermittently from ores including pyrargyrite. Vugs are reported there, although I could not find any images of specimens. Maybe worth a field trip!

Pyrargyrite crystals from the San Genaro Mine in the Castrovirreyna Province, Huancavelica, Peru, occur in a variety of forms. Elongated reddish crystals up to almost 2 centimeters (0.8 in) in size, wedge-shaped crystals that appear black, and more complexly modified crystal habits all have been found here. Silver mining began here in the late 16th century. Ore deposits in the Castrovirreyna Mining District are dominated by lead, zinc, and copper mineralization, with more silver in the eastern part of the district near San Genaro.

In this locality, mineralizing fluids concentrated silver and moved it up through the geological plumbing system. The deposit formed close to the surface, perhaps no deeper that 350 meters (1,150 ft). Proximity to the

surface and natural concentrations of minerals aided mining by making valuable silver ore easy to extract. One ore shoot in the district yielded 3 million ounces of silver.

Pyrargyrite was the primary ore mineral at the San Genaro Mine; it is sad to think of the pyrargyrite crystals that went through the crusher. Massive pyrargyrite filled spaces in quartz veins and formed bands in coliform quartz. Pyrargyrite also crystallized in cavities in the quartz veins and acted as cement for quartz fragments.

Another Peruvian locality, the famous Uchucchacua Mine in Oyon Province, has yielded well-crystalized deep red pyrargyrite specimens. Beautiful crystals of many mineral species have come from this mine, including stunning rhodochrosite in shades from red to pink, wire silver, acanthite and other silver minerals, and rare species like alabandite and manganoquadratite.

Ore at the Uchucchacua Mine formed as fissure fillings and as replacement on the metasedimentary host rocks. The predominant deposit type occurred when mineralized fluids related to tectonic forces replaced the limestone host rocks by brecciation and skarn development. Skarns form when limestone or dolomite is permeated by hot, silica-rich, acidic fluids driven by the cooling of an igneous intrusion. The fluids cook the calcareous rocks (limestone/dolomite), changing their chemistry and recrystallizing them while forming new minerals. Silver, both native silver and silver-bearing minerals like pyrargyrite, came late to the mineralization party at the Uchucchacua locality.

The Copiapó Province in Chile's Atacama Desert was considered the world's premier silver lode in the mid-1800s. An author who visited the region then wrote of "mines of native and other silvers of such wonderous richness, that a narrative of their produce would almost rival a tale from the Arabian Nights." According to the author, the first silver was found here in 1832 by a guanaco hunter while resting on a block of silver!

These mines brought us some fine clusters of pyrargyrite up to 4.7 centimeters (~2 in) in size, though most beautiful specimens were considered mere ore and crushed. Based on the early descriptions of the rich silver ores and the large numbers of mines and prospects in this area, more pyrargyrite specimens are probably around.

Pyrargyrite on quartz, San Guillermo Vein, San Luis Shaft, Fresnillo, Zacatecas, Mexico. Source: Mindat; photo: Allan Young.

Readers may be familiar with this mining district, where 33 miners were rescued after being trapped 700 meters (2,300 ft) underground for 63 days when part of the mine collapsed. The disaster site was the San José Mine, which exploited a copper-gold deposit.

Rich silver deposits in the Tres Puntas were mined from about 1848 to 1922. Silver chloride minerals, derived from silver sulfides, were discovered closest to surface. Again, no pyrargyrite specimens are reported, although the geologic environment makes them likely to have occurred in these deposits. The silver discoveries in remote locations when communications were poor may account for our lack of knowledge of the minerals found there.

Norway is known to collectors for beautiful native silver specimens. Pyrargyrite, though a silver ore, is exceedingly rare there, with no notable pyrargyrite localities or specimens. Beaudant mentioned it as occurring with silver ores in Konigsberg, though I could find no more than his passing reference. We will move on.

Many beautiful pyrargyrite specimens were found in in Germany. These deposits include the famous Clara Mine in the Black Forest. The Clara Mine is famous for the large numbers of minerals found there. The wide variety of minerals were formed thanks to four

Pyrargyrite, Schneeberg, Erzgebirgskreis, Saxony, Germany. Source: Mindat; photo: Rock Currier.

separate episodes of mineralization. Younger pulses could react to earlier minerals, enhancing mineral diversity. Although pyrargyrite was known in the Middle Ages, exploitation began in the 18th century, with only sporadic mining.

The Clara is an active mine; the latest company extracts fluorite, barite, and byproduct silver. The deposit occurs in gneiss and Triassic sandstone. Pyrargyrite forms microscopic perfect crystals in different crystal habits. Collecting, for a fee, is allowed on some of the dumps.

At the Sampson Mine in Saxony, pyrargyrite forms macroscopic crystals in specimens up to more than 4 centimeters (1.6 in) in size. Crystal faces may be sharp or slightly rounded (possibly retrograded?). They typically look black in larger specimens, although sometimes hints of red show through.

The German state of Saxony is the source of several silver mines that produced a few lovely pyrargyrite specimens. A complexly twinned single crystal from the Beschert Glück Mine is 1.5 centimeters (0.6 in) in its greatest dimension. A chunky crystal from an unspecified mine is 2.9 centimeters (1.1 in) in size. The Alte Hoffnung Gottes Mine, Himmelfahrt Fundgrube Mine, Churprinz Friedrich August Erbstolln Mine, other properties, and the general Freiberg region all produced some lovely pyrargyrite crystals.

Pyrargyrite was found, rarely, in the region of Bohemia in the Czech Republic. Most crystals are micromounts, although Mindat shows two Lill Mine specimens, each with a single dark red crystal up to 1.1 centimeters (0.4 in) in size, embedded in matrix. Uranium-bearing minerals also occurred in this deposit.

Kutná Hora, a town in the Czech Republic, was the site of silver mining since medieval times, with mining-related artifacts (slag) dating to the 1st century. In 1300, King Wenceslaus II (not the "Good King" of Christmas carol fame) established mining laws for this area. Old mine dumps still grace part of the town itself.

The Anthony of Padua Mine was the most productive, extracting silver from ore, including pyrargyrite, probably starting in about 1300 and continuing to 1945, though with long periods of dormancy. One relatively recent author (from 2019) describes quartz veins hosting silver ores, with open cavities containing crystalized silver minerals. These crystals are most likely miargyrite, which seems to be the most abundant silver mineral in this deposit. Unfortunately for collectors, pyrargyrite is usually found as small grains forming aggregates of up to several centimeters in size, though crystals up to 5 millimeters (0.2 in) in size are

Pyrargyrite crystal in matrix, Lill Mine, Černojamské deposit, Příbram, central Bohemia, Czech Republic. Source: Mindat; photo: Rob Lavinsky.

also reported. Pyrargyrite replaces galena at a microscopic level.

Another significant pyrargyrite locality in the Czech Republic is the Jáchymov mining district, where silver was mined in the 1800s. Lovely crystals come from here, including lustrous reds; silvery red crystal aggregates; and a magnificent, somewhat iridescent 2-centimeter (0.8-in) monster. Specimens for micromounters were found here, too.

Collectors may want to investigate the Háje Deposit in the Czech Republic's Příbram uranium–base metals ore district. Although Mindat and other mineral-collecting courses do not mention this locality, a scientific paper reports that "[p]yrargyrite forms massive aggregates in calcite and well-developed crystals up to 1 cm in size" in association with other silver-bearing minerals.

Spanish silver mines in the Hiendelaencina district in Guadalajara produced pyrargyrite specimens, with single crystals up to 2.4 centimeters (~1 in) in size. The largest crystals came from the Santa Cecilia Mine, though the San Carlos, La Fuerza, and La Suerte Mines and possibly the Verdad de los Artistas Mine also produced crystals. Some of the microcrystals are red and gemmy. Mining ceased in the 1920s, and the dumps were reprocessed in the 1980s. The best specimens were collected long ago, although collectors were finding nice micros until at least as recently as 2005. A local museum pays tribute to the mines. The geologic setting is like most other pyrargyrite occurrences, with this mineral forming from late-stage, near-surface fluids related to igneous intrusions.

Pyrargyrite on quartz, San Carlos Mine, Hiendelaencina, Guadelajara, Castile-La Mancha, Spain. Source: Mindat; photo: Borja Sainz de Baranda Graf.

Pyrargyrite, Le Rivet Quarry, Peyrebrune, Montredon-Labessonnié, Occitanie, France. Source: Mindat; photo: Guy Bernadi.

Pyrargyrite is one of the silver ore minerals, and silver has many uses. In 2021, the U.S. Geological Survey estimated that 26 percent of silver use was as a "physical investment." Electronic uses of silver include batteries and silver membrane switches in computers. Coins, medals, and jewelry are significant consumptive uses too. Although film-based photography is becoming less common, silver is still used in photographic processes. Silver is highly reflective, so it is used in mirrors. It is also used in catalytic oxidation reactions, for example formaldehyde production. Its antimicrobial properties are put to use in bandages, medicines, and even clothing.

Pyrargyrite has been shaped into cabochons, although the photos I saw made it an unappealing gemstone to me. A cab pictured on the Gem Society's website was black, showing no flashes of red, perhaps due to poor lighting. According to another website, pyrargyrite is not a practical cut stone because it is light sensitive, becoming darker with lengthy exposure to light. A 3.77-carat rectangular step-cut (faceted) pyrargyrite is shown on the Gem Society's pyrargyrite webpage. Deep red color and metallic reflections are apparent; again, however, the cut stone seems unattractive, merely a novelty. A 40-carat. "shield-cut" gem is also reported.

Even on Etsy, pyrargyrite specimens can list for up to $2,500, although a thumbnail-size, crystallized specimen can be bought for about $11. A 4-centimeter (1.6-in) specimen from a classic German locality with excellent crystals was selling for $6,000 from a high-end dealer. (Online prices are from September 8, 2022.)

Technical Details

Chemical formula.....Ag_3SbS_3

Crystal form .....Trigonal

Hardness.....2.5

Specific gravity 5.82

Color .....Deep to dark red, red-black, black (when light has darkened it)

Streak .....Purplish red

Cleavage.....1 perfect

Fracture .....Conchoidal, irregular

Luster ..... Adamantine; often so lustrous it looks metallic

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Pyrargyrite, San Luis Shaft, Proano Mine, Fresnillo, Mexico. Source: Mindat; photo: Terry Wallace, Jr.

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Upcoming Club Show
October 24 Program

For on **October 24, 7:30 p.m.** Please join us on Zoom at https://us06web.zoom.us/j/87218557010?pwd=OU9IRzBXeFdCclR6ck5tTEVuT2NGUT09

Meeting ID: 872 1855 7010
Passcode: 400784

We will discuss the upcoming club show on November 19-20. It has been a few years (since before the pandemic in 2019) since the NVMC has joined George Mason University in hosting a mineral show, so we will take some time to discuss what's involved. Show Chair Tom Taaffe will lead the discussion; see his article on page 12.

We will need volunteers to play various roles needed for a successful show. You can sign up here.

Support Our Club Show!

by Tom Kim

This will be a short exhortation, folks. Support the November show! See the article by Show Chair Tom Taaffe on page 12 and volunteer to help out by signing up here: NVMC 2022 Show Volunteers.

This is our 30th show as a club, and it's our first one since the pandemic. I see this show as our way to reassert our presence and enthusiasm—to let people know that we are here *and* that we are here for dealers, collectors, and newcomers alike.

It would be especially heartening if we had a good mill of volunteers for the kids' part of the show since it's often the energy you find there that lets you gauge the vibrancy of a club and its commitment to its educational purpose. It would be lovely to see kids pull their parents into the room with urgent whispers. It's certainly what happened to me years ago when Elijah and I discovered NVMC.

It takes many hands to make the work light, and this is one year where we can definitely use yours.

Tom

West Virginia Quarry Field Trip

by Tom Kim

Sam Linton has worked assiduously all year to further relationships with quarry owners and managers throughout Virginia, West Virginia, Maryland, and Pennsylvania. It hasn't been easy. Many quarries had been wary of collectors, afraid that they'd overstep their bounds and create liabilities—and that this would be doubly true for young collectors. The pandemic lockdowns gave most of these quarries a convenient excuse to deflect any collecting expeditions, and many of them have not budged from that position.

However, because of the persistence of people like Sam, a few opportunities have opened up. On September 24, a group of parents and their kids—including Elijah Kim and me as well as Robert Koepcke and his son Linus—showed up at a quarry in West Virginia with hammers, chisels, and buckets for collecting minerals on its berms. We are refraining from being any more specific about the company or its location in order to manage the relationship with the quarry and

Field trip participants at a West Virginia quarry. Photo: Tom Kim.

Scenes from collecting at a West Virginia quarry. Photo: Tom Kim.

make sure these expeditions remain a positive experience for everyone involved.

It was a fun trip. Most of what was collected was calcite with occasional travertine. Even more will probably show up under a microscope, but a good deal of beautiful crystals were unveiled with some coaxing. More experienced collectors showed the less versed of us how to make educated guesses as to what to smash with a hammer based on evidence of a vein. Even without a hammer, a keen eye could pick out some lovely glimmers just lying around on the berms.

The minor miners among us were especially enthusiastic, and part of the real pleasure of the trip was seeing them connecting with one another and sharing their pure delight. Some of that enthusiasm even rubbed off on the quarry owner, who graciously supervised the trip but found himself taking a few specimens for his desk.

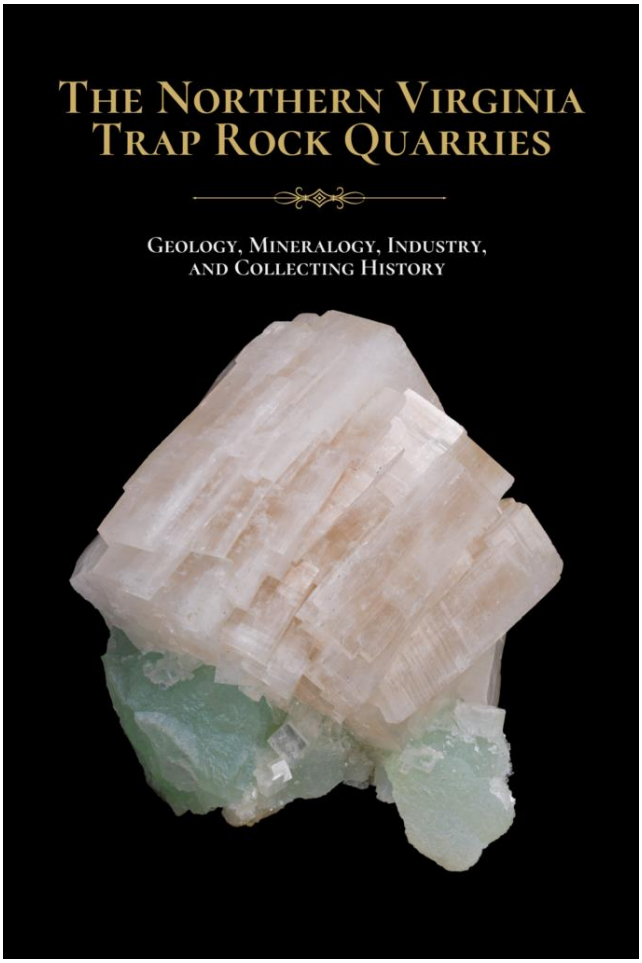
Let's hope these trips become more regular and available as we honor the gems (figuratively and literally) that dot our region.

Book Review

Northern Virginia Traprock Quarries

Editor's note: *The piece is from* Bulletin of the Friends of Mineraloogy *(53(3): 8). Thanks to Sue Marcus for the reference!*

The Northern Virginia Trap Rock Quarries: Geology, Mineralogy, Industry, and Collecting History, by the Friends of Mineralogy Virginia Chapter, was put together by Thomas Hale, Darryl Powell, Tom Girton, August Dietz, Alex Venzke, Brandy Moore, and J. Alex. Speer. Sponsored by the Virginia Transportation Construction Alliance and published by Diamond Dan



Publications, Rochester, NY, the paperback copy has 144 pages and full-color photos.

This book lavishly illustrates the minerals that have come from our local traprock quarries, ideal for Virginia collectors. The book discusses safety precautions and the need for protective equipment for collecting in open-pit traprock quarries. It also gives an overview of Virginia's geology in relation to the Triassic Culpeper Basin, where traprock is mined for construction, along with a summary of Virginia aggregate industry. Included are the mineralogy of our local traprock quarries, a brief history of their operations, and a few personal collecting histories. The mineralogy section contains extensive color photographs of minerals found in the quarries.

The book will be for sale at the NVMC show in November. You can also purchase it online for $35 plus shipping through "Contact Us" at https://friendsofmineralogyvirginia.org/fmva-publication-series/.

Collector Joke

As people line up for admission at the Pearly Gates, St. Peter asks each one questions.

SP: What was your profession?

Man: I was a bricklayer.

SP: What were your interests?

Man: I rebuilt classic cars.

SP: Were you able to leave money to your heirs?

Man: Some. I saved a decent amount, and the cars are worth something.

SP: What was your profession?

Woman: I was a nurse.

SP: What were your interests?

Woman: I remodeled houses.

SP: Were you able to leave money to your heirs?

Woman: Yes. The houses are worth much more than I paid for them.

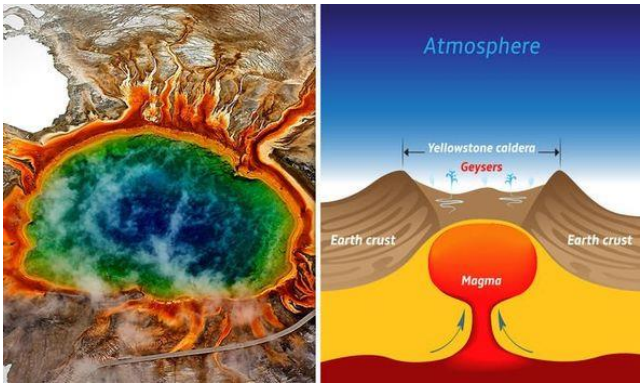
SP: What was your profession?

Man: I was a lawyer.

SP: What were your interests?

Man: I collected minerals.

SP: I have no further questions.



Why Drilling in Yellowstone To Stop Eruptions Is a Bad Idea

Editor's note: *The article is from Yellowstone Caldera Chronicles, a weekly column written by scientists and collaborators of the Yellowstone Volcano Observatory. Thanks to Sue Marcus for the reference!*

It's a common question: Why not just drill into Yellowstone to relieve the pressure—kind of like letting air out of a balloon—to reduce the threat of a supervolcanic eruption?

Magma reservoirs are much more complex than that. Instead of huge balls of liquid magma, they are a mushy mix of rock, melt, crystals, and various fluids and gases, with poor interconnectivity and often no sharp boundary between the reservoir and the surrounding rock.

At Yellowstone, seismic imaging techniques have revealed two huge magma reservoirs beneath the caldera system: one at 3 to 10.5 miles beneath the surface, and a deeper one at 12.5 to 31 miles. The speed of seismic waves through these reservoirs suggests that they are mostly solid (85 to 98 percent). ... *Read more*.

Club Show Coming Up!

November 19-20, 2022

by Tom Taaffe, Show Chair

After missing a couple of years due to the coronavirus pandemic, the NVMC is bringing back our annual gem, mineral, and fossil show. The show will be on November 19-20, 2022, in Dewberry Hall, Johnson Center Building, George Mason University (GMU), Fairfax, VA. After setup on November 18, show hours will be from 10 a.m. to 6 p.m. on Saturday, November 19, and from 10 a.m. to 4 p.m. on Sunday, November 20.

Here are various suggestions for ways that NVMC members can help with this year's show. Sign up here (SignUpGenius): NVMC 2022 Show Volunteers.

Staffing the Show

You can volunteer to help during actual show hours on Saturday and Sunday. For example, we need volunteers for the **Kids' Activity Room**. This job entails administering quizzes, helping with puzzles, and awarding free specimens to kids who earn them. It also includes fielding any questions the kids have as well as helping with mineral and fossil identification. The Kids' Activity Room can get a little crazy at times, but it's lots of fun and very worthwhile.

Show volunteers needed!!

We also need volunteers to help with **setting things up** on Friday, November 18. That includes bringing items from the club's storage unit to GMU, helping to set up the Kids' Activity Room, and helping dealers at the unloading dock so that process goes smoothly.

We need volunteer help at the **admissions table**. If several club members take a shift or two, it will make the process less chaotic and more efficient.

When the show ends at 4 p.m. on Sunday, we need volunteers to help **teardown**. We will need volunteers to help pack up the Kids' Activity Room and gather all the club equipment and gear. We will need additional help with bringing it all back to our storage unit as well.

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

Donating Specimens for Kids

You can volunteer by donating mineral and fossil specimens for our kids' mines in the Kids' Activity Room. These should be suitable specimens for children, not too big or small (about 1 to 3 inches in size or weighing about 1 to 4 ounces). The specimens should be somewhat interesting and somewhat attractive and hopefully have some educational value.

Donated specimens should not be toxic, sharp, splintery, or otherwise dangerous. They would also be best in their natural unpolished state. Specimens from nearby localities are great choices, such as prehnite, amazonite, amethyst, and garnet. For this year's show, for example, I recently acquired a large quantity of less-than-perfect Herkimer diamonds and a lesser quantity of green muscovite mica books from New Hampshire.

Devising New Quizzes for Kids

You can volunteer to design or create a new mineral challenge, puzzle, or identification quiz for the Kids' Activity Room. Your new mineral quiz should not be too easy or too difficult; you want children to get some of the answers correct while still feeling challenged, and you want them to have learned something. If you have an idea and want feedback, please email me (Tom Taaffe) at rockcllctr@gmail.com.

For your newly designed quiz, you might want to use photos, line art, or even actual specimens. All of these ideas can work. Just remember that you want your quiz to be relatively uncomplicated and straightforward so

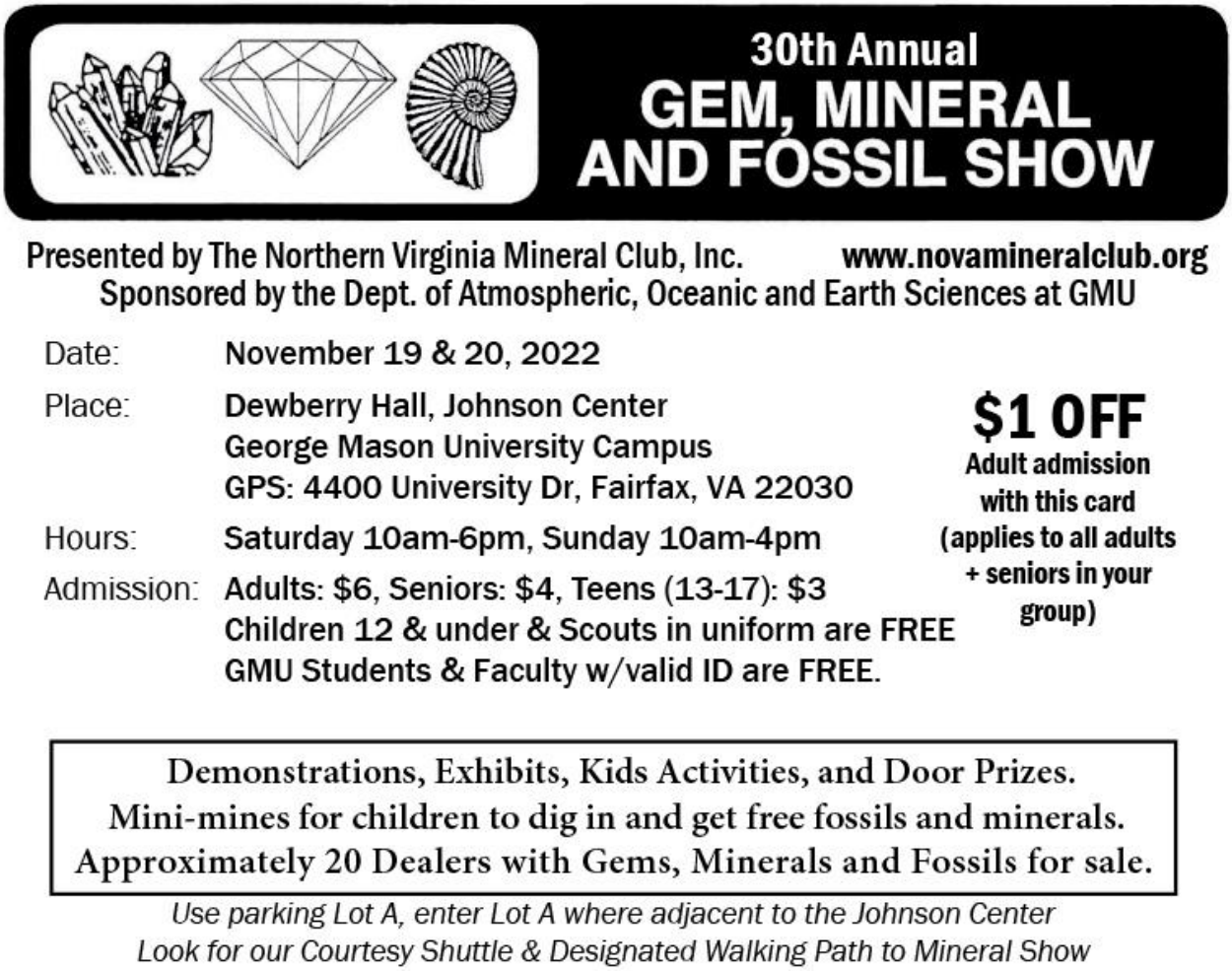
that it is easy enough to take and easy to grade. It's been a long time since anyone other than me designed a new quiz for the Kids' Activity Room, so please give it a try!

Getting the Word Out

You can volunteer to help promote our annual show and really get the word out. We always need help with show advertising and promotion. After years with no show, getting out the word will be more important than ever—one or two people taking it on won't be enough. We mail postcards to previous attendees, and we post our show on some rockhound show calendars; but we really could use much more help.

As you might know, myriad social media options and opportunities exist, including Facebook, neighborhood websites, the Patch, websites of regional mineral clubs, and so on. I am sure that several NVMC members are much more fluent in and comfortable with navigating and posting on the web than I am. So please volunteer to get the word out.

When you are ready, please send me (Tom Taaffe) an email at rockcllctr@gmail.com, and I will give you all the specifics you will need to post our show on your selected spots on the web (show dates, place, hours of operation, admission fees, and so on).



Physical Properties of Gems and Minerals
Crystal Growth

by Barbara Smigel

Editor's note: *Ever wonder how crystals form? As part of her online course on gemology, the author describes features of crystal growth, as adapted in this article.*

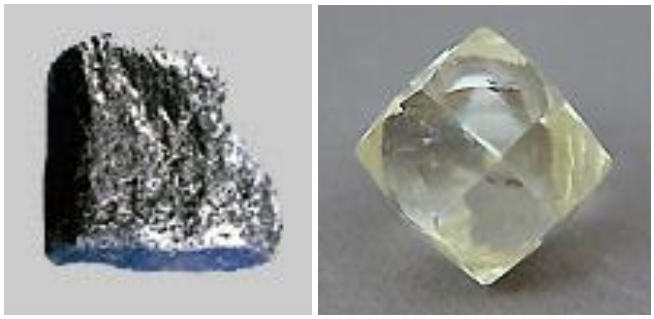
Although the crystal system of a particular gem species sets certain parameters for its formation, a number of environmental factors will determine precisely what size, shape, color, and clarity a particular crystal will have.

Polymorphs

The same solution or vapor of materials can crystallize differently, depending on the temperature and pressure where crystallization occurs. When two materials have the same chemical formula but have crystallized differently because they formed under different temperature/pressure conditions, they are called polymorphs.

The most famous examples are diamond and graphite. Both have the same chemical formula (just C, pure carbon), but the "lead" in your pencil and the diamond on your finger obviously have quite different properties. Graphite crystals are formed from sheets of tightly bonded carbon atoms in layers loosely bound to each other, allowing lots of slipping and sliding. By contrast, diamond crystals have each carbon atom bonded tightly to four others surrounding it in all directions, so the whole structure is very strong and durable.

Another interesting example is an aluminum silicate (Al_2SiO_5), which can crystallize in either the orthorhombic system as andalusite or in the triclinic system as kyanite.



Polymorphs of carbon: graphite and diamond.

Polymorphs of Al_2SiO_5: andalusite and kyanite.

Twinning

Crystals often form in cavities, cracks, bubbles, and other cramped places. Space constraints will limit crystal growth possibilities, with some directions of potential growth unavailable and others affording plenty of growing room. Moreover, two or more crystals that start growing independently can contact or interpenetrate each other, resulting in "twinning."

When growing crystals of the same mineral share one or more faces, the result is a crystal "twin." Depending on the nature of the twinning, the shape of the crystal might be dramatically affected or the material's properties could be noticeably altered. Sometimes, evidence of twinning can be seen in a crystal or cut gem due to unusual color or inclusion patterns.

Trace Elements

Each mineral species requires a particular set and proportion of chemical elements for its basic makeup, and crystals cannot grow without them. Nonrequired elements, however, can enter the growing crystal in trace

Twinned quartz crystals in "rabbit ear" form.

Twinning effects in quartz include the pattern of lepidocrocite platelets in a cabochon (left) and the alternating color sectors in a crystal slice (right).

amounts, with dramatic effects on the appearance (usually color) of the gem.

For example, a very small amount of the element chromium, when present along with the necessary aluminum and oxygen, turns what would otherwise have been colorless corundum into red ruby. Fluctuations in the amount or type of materials present during crystal growth can lead to color zoning.

Mineral Inclusions

Minerals do not usually form crystals in complete isolation. As a particular crystal is forming, other minerals, also in the process of crystallization, can be captured by it (showing up as inclusions). Exactly how this plays out will depend on the relative crystallization temperatures and pressures required by the materials in the group.

Phantoms and Negative Crystals

Due to changes in environmental conditions, starts and stops in crystal growth can occur. When other minerals favored under the new conditions start to grow, they sometimes crystallize on the "old" faces of the temporarily inert material. When conditions change and the host once again starts its growth, evidence of the pauses can be visibly captured as outlines of the temporary stopping points, called "phantoms."

Likewise, certain conditions can completely block the growth of an interior portion of a crystal, leaving a void that is bounded by the sides of the crystal around it. At first glance, this "negative" crystal looks like a solid crystal inclusion, but it is indeed empty.

Quartz with fluorite crystal inclusions (magnified on the right).

Pseudomorphs

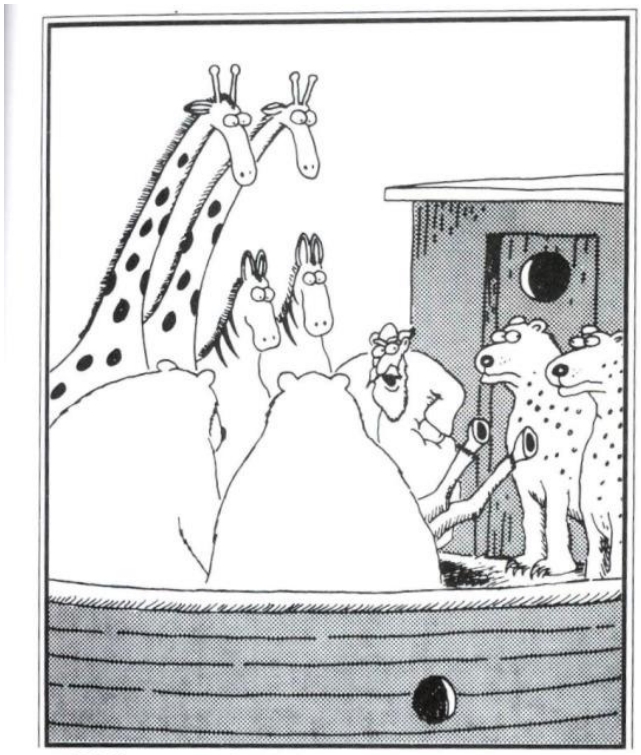
The term "pseudomorph" literally means false form. A pseudomorph is, in a way, the opposite of a polymorph. Whereas polymorphs are different crystal forms of the same chemical compound, a pseudomorph shows a crystal form that is not characteristic for its species. It's the case of one mineral taking on the outward form of another while keeping its chemistry unchanged.

Let's take goethite, for example. Goethite is an iron oxide mineral that crystallizes in the orthorhombic system. Orthorhombic gems do not form in perfect cubes. Pyrite, however, is an iron sulfide mineral in the cubic system that frequently forms crystals shaped like perfect cubes.

Top: *Hematite phantoms in calcite.*
Bottom: *A negative crystal in quartz.*

Figure 1—*Goethite ps. after pyrite (left); copper ps. after aragonite (right).*

Figure 1 (left) shows what appears to be a twinned pyrite crystal; chemically and physically, however, it tests not as pyrite but as goethite. Figure 1 (right) shows what appears to be a hexagonal crystal, but it is made up entirely of the cubic system mineral copper. Pseudomorphs occur when environmental conditions cause the replacement of one chemical compound with another without altering the preexisting three-dimensional structure. Mineralogically, the item is named as an "x" pseudomorph (ps.) after a "y" mineral (fig. 1). Similarly, petrified fossils are technically chalcedony pseudomorphs after bone or opal pseudomorphs after wood.



"Well, so much for the unicorns . . . But from now on, all carnivores will be confined to 'C' deck."

Bench Tip

Cutting Molds

Brad Smith

Cutting molds is easier and more precise with a sharp blade. A new Xacto blade is sufficient for cutting RTV molds but is usually not sharp enough for vulcanized rubber. For that, it's best to use scalpel blades available from most jewelry supply companies. The #11 blade is triangle shaped, and the #12 is hawksbill shaped. I find the hawksbill particularly nice for cutting the registration keys of the mold.

Smart Solutions for Your Jewelry Making Problems
amazon.com/author/bradfordsmith

How to Write Good

It behooves you to avoid archaic expressions. Avoid archaeic spellings too, especially in archaeology.

Don't repeat yourself or say again what you have said before.

No sentence fragments.

Proofread carefully to see if you any words out.

(From plainlanguage.gov, a federal website about plain writing.)

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

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2	3 GLMSMC mtg, Rockville, MD	4	5 MSDC mtg, Washington, DC	6	7	8 Show, Mont Clare, PA
9	10 **Columbus Day**	11	12	13	14	15 Show, S Charleston, WV
16 Show, S Charleston, WV	17	18	19	20	21 Show, Franklin, NC	22 Shows, Franklin, NC, Mt Bethel, PA
23 Shows, Franklin, NC, Mt Bethel, PA	24 **NVMC mtg, Arlington, VA**	25	26 MNCA mtg, Arlington, VA	27	28	29
30	31 **Halloween**					

Disclaimer: All events are tentative during the coronavirus pandemic, and club meetings might be remote. Check the website for each organization for more information.

Event Details

3: Rockville, MD—Gem, Lapidary, and Mineral Society of Montgomery County; meetings via Zoom until further notice; https://www.glmsmc.com/.

5: Washington, DC—Mineralogical Society of the District of Columbia; meetings via Zoom until further notice; http://www.mineralogicalsocietyofdc.org/.

7-9: Virginia Beach, VA—Annual show; Treasures of the Earth, Inc; Virginia Beach Conv Ctr, 1000 19th St; Fri 12-6, Sat 10-5, Sun 10-5; adults $8, 16 & under free; info: www.TreasuresOfTheEarth.

8: Mont Clare, PA—Annual show; Philadelphia Mineral Society; St Michaels Grove, 400 Jacobs St; Sat 10-6; adults $5, under 13 free; info: www.philly-rocks.org.

15-16: S Charleston, WV—Annual show; Kanawha Rock and Gem Club; S Charleston Comm Ctr, 601 Jefferson Rd; Sat 10-5, Sun 10-5; adults $3.50, kids free; info: www.kanawharockandgemclub.org.

21-23: Franklin, NC—Show and sale; Franklin NC Gem & Mineral Society; Robert C Carpenter Comm Bldg, 1288 Georgia Rd; Fri 10-6, Sat 10-6, Sun 10-4; $3 adults, 12&under free; info: www.visitfranklinnc.com.

22-23: Mt Bethel, PA—Mt. Bethel Gem, Mineral & Fossil Show; Mt. Bethel Firehouse, 2341 Rt 611; Sat 9-5, Sun 9-4; adults $5, kids free; info: dianatasco@yahoo.com.

24: Arlington, VA—Northern Virginia Mineral Club; meetings via Zoom until further notice; https://www.novamineralclub.org/.

26: Arlington, VA—Micromineralogists of the National Capital Area; meetings via Zoom until further notice; http://www.dcmicrominerals.org/.

THE NORTHERN VIRGINIA MINERAL CLUB INC

Crystals are the flowers of the Mineral Kingdom

2022 Club Officers

President: Tom Kim
president@novamineral.club
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Secretary: David MacLean
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Webmaster: Casper Voogt
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The Northern Virginia Mineral Club

Visitors are always welcome at our club meetings!

PLEASE VISIT OUR WEBSITE AT:
http://www.novamineralclub

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

RENEW YOUR MEMBERSHIP!

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

OR

Bring your dues to the next meeting.

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