THE NORTHERN VIRGINIA MINERAL CLUB INC

The Mineral Newsletter

Meeting: June 25 Time: 7:45 p.m.

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

Muscovite

with beryl

from Paprok, Afghanistan

Wikipedia. Photo: Rob Lavinsky.

Volume 59, No. 6
June 2018
Explore our website!

June Meeting Program:

Namibia Adventure

In this issue …

Deadline for Submissions

August 20

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

Mineral of the Month
Muscovite

by Sue Marcus

Once again, we choose a mineral of the month that most of us might have in our collections, common yet interesting. From my perspective, I figured it would be easy. And once again, I am learning more about minerals.

Mica Sheets

Muscovite, our June 2018 Mineral of the Month, is indeed common and interesting, even though it is a complex phyllosilicate. That means that that there are many elements along with silicon in the chemical formula, and the structure of the mineral occurs as thin sheets stacked upon each other. The sheets, which are characteristic of all micas and some other minerals like chlorite, form from rings of molecules that lock together.

The mica group, of which muscovite is a part, is typified by brittle single sheets that form durable, tough "books," as the stacked sheets are called. Individual sheets of muscovite may be flexed gently and are usually completely transparent. Muscovite crystals are thicker and usually translucent to opaque, like the specimen on the previous page. So the crystals are usually opaque in all dimensions unless they are separated into thinner sheets.

Name

What do a type of duck, a mineral, and a Russian province have in common? A name—based on the medieval Principality of Muscovy—and, for our purposes, the mineral muscovite.

The mineral was originally used as window coverings, perhaps not totally transparent but translucent enough to transmit light and still protect those inside from the weather. The name apparently predates the 1794 usage by the German mineralogist Johann Gottfried Schmeisser. According to sources, muscovite has also been called cat's silver and stone mirror, though I've never heard those terms; they may be either obsolete or used in other countries. Isinglass and glimmer have been used for muscovite but also for other minerals.

Summer break ahead!

Northern Virginia Mineral Club members,

Please join our June speaker, Casper Voogt, for dinner at the Olive Garden on June 25 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.

Muscovite window from Russia.
Source: Wikipedia.

Formation

Muscovite occurs in all three major rock types. The largest crystals, up to 5 by 3 meters in size (reported from Nellore, India), are found in pegmatites. The relatively slow crystallization of the magma into rock allowed the mica and other mineral crystals to grow as the layers of molecules built up.

Mica, whether muscovite, biotite, or another member of the mica group, is an integral component of granite, pegmatite's smaller grained cousin. The breakdown of feldspar, mica, and other minerals leads to mica in sedimentary rocks. Muscovite is also common in metamorphic rocks like schists and gneisses. Heat and pressure change clay into mica and the surrounding minerals.

Muscovite is usually an attractive costar in most mineral specimens, with a beryl (such as aquamarine or emerald) grabbing the limelight, like in the specimen on the first page. We should all have a lovely muscovite crystal or a group of them in our collections.

Sources

Look at the beautiful star muscovite crystals from localities like Minas Gerais, Brazil. These are delicate because the edges flex and therefore deform. Still, as with many other delicate minerals, a nice specimen is worth having. Brazil is the major producer of nice muscovite specimens, although South Dakota is another good source, as is (more rarely) New England.

Muscovite from Minas Gerais, Brazil.
Source: Mindat; photo: Rob Lavinsky.

Erongo, Namibia, may be better known for producing aquamarine, although small yellow rosettes of muscovite crystals are pretty, too—and probably not as expensive. Muscovite pseudomorphs after tourmaline are reported by Minerals.net from Pinal County, AZ. Gemmy green crystals are reported from North Calrolina by the same source, although I could find no confirmation. Wherever there are pegmatites, muscovite crystals are possible.

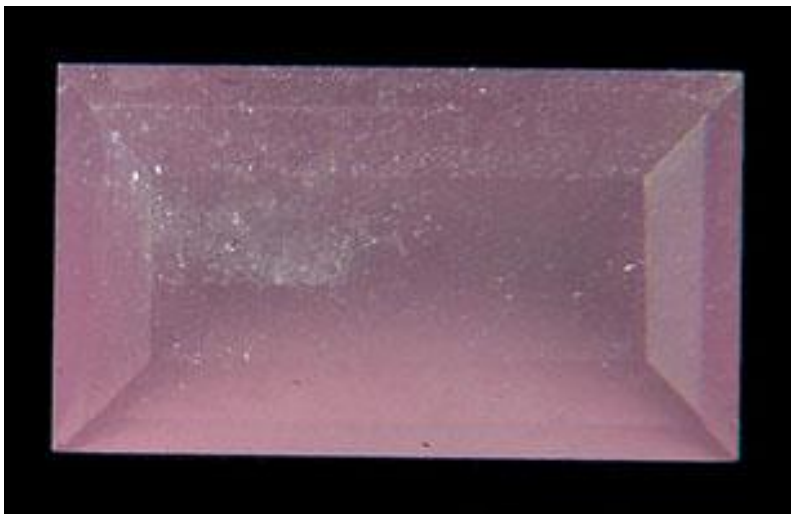
For eye-catching photos, as usual, see the Mindat reference below. Mindat lists varieties of muscovite from A to Z, literally—although some of these appear to have only tangential links to muscovite. The only ones with which I am familiar are sericite, simply a fine-grained variety, and fuchsite. Fuchsite is a green variety of muscovite, with chromium replacing some of the aluminum in the crystal structure.

Why aren't fuchsite or other varieties a separate species? I don't know.

Uses

Muscovite may be attractive, but it is not a gemstone. It is almost always too brittle to cut, but experience has taught me to check my assumptions. I had assumed that muscovite was never faceted until I found that the Gemdat.org website showed a pink faceted and a dark cabbed muscovite.

Muscovite is a common mineral; the portrayal of only two cut stones by Gemdat indicates how unusual it is as a lapidary material. I suppose muscovite could be used for a unique wire-wrapped piece.



Faceted muscovite from Brazil, 1.94 carats.
Source: Gemdat.

Muscovite has numerous uses because it is water resistant, light, inert, an electrical insulator, heat resistant, and reflective. It is also relatively common; therefore, because it is also lightweight, it is inexpensive to transport. Georgia, North Carolina, and South Dakota, along with foreign sources, have produced "scrap mica," small flakes that are used for joint compound, paint, oilwell-drilling materials, and possibly cosmetics.

Large muscovite sheets are imported, primarily from India, although North Carolina (the Spruce Pine area) has produced small amounts. Sheet mica is mostly used for electrical applications.

Muscovite provides the sparkle in kids' toothpaste and in many cosmetics. Muscovite was used for the window in wood or coal stoves due to its heat-resistance.

Some of our older readers may remember formica. It was a synthetic product used for countertops and other purposes where a durable, heat-resistant surface was desired. The name comes from "formulated mica." When the synthetic material was invented in 1912, the manufacturer used it in electrical insulation as a substitute for mica. Uses subsequently expanded to include kitchen counters.

Technical Details

Chemical formula .....$KAl_2(AlSi_3O_{10})(OH)_2$

Crystal form.....Monoclinic (pseudo-hexagonal)

Hardness .....2.5–2.8 (sources vary)

Density.....2.7–3 (sources vary)

Color.....Clear, white, yellow, silvery

Streak.....White

Cleavage .....One perfect cleavage

Fracture.....Uneven

Luster.....Vitreous, pearly

Hand carved from mica, Hopewell Culture (100 BC–500 AD), Hopewell Mound Group, Ross County, OH. Source: National Park Service.

Sources

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Casper Voogt

Namibia Adventure

June 25 Program

My presentation will be about my recent trip to Namibia. It was, of course, about animals but also about minerals.

Highlights (aside from the animals) included visiting Tsumeb, Hohenstein (for aquamarines), the T Junction (a mineral market), a Brandberg mining village, and a Himba village.

I am a part-time mineral dealer, lifelong mineral collector, and avid traveler. My academic background is in architecture (Princeton and Georgia Tech). I have lived in Aruba, the Netherlands, Switzerland, and the United States.

I run a Web development company and serve as webmaster for the NVMC, the Mineralogical Society of the District of Columbia, and the Gem and Mineral Society of Lynchburg, VA.

The Prez Sez

by Bob Cooke, President

I'm running out of things to say about the way we run the club. So I'm just going to ad lib about some personal stuff.

Last week, the Chesapeake Gem and Mineral Society held its annual show in Parkville, MD. The lighting was much better than last year, that is, the electricity stayed on.

I found many of the dealers from whom I've bought in the past, and I did my part to perpetuate their cash flow. I did realize, however, that it's both a blessing and a curse to maintain a relationship with the dealers.

For instance, Alan Benson (Alan's Quality Minerals) recognized me right off and immediately apologized for failing to bring two flats of thumbnails that I'd be interested in. To correct the situation, he promised to email photos of the two flats so I can purchase via mail order.

Do I like the recognition and service—YES. Do I need even more temptation in my life—NO. This certainly validates that old adage, "Be careful what you ask for."

So how do I escape the demands of the NVMC?

I go to a meeting of a different mineral club, of course. The fourth Wednesday of every month is the day for the Micromineralogists of the National Capital Area to meet. After listening to stories of great mineral finds at the Big Dig in Franklin, NJ, and observing the ultraviolet fluorescence of various minerals, we had an opportunity to peruse microspecimens.

Dave Hennessey had two flats of micromounts he got from Barbara Sky. Well, a 2-hour meeting is not enough time to peruse them all. Dave then decides to let me take the two flats home and study them at my leisure. So much for reducing my backlog of unfinished mineral business!

At least I should have a chance to catch up during this coming week. Carolyn will be off on a cruise with Amanda Parker and I'll have the house to myself.

However, Steve and I will both be unsupervised for a week. Next weekend, we'll use the opportunity for a road trip to Charlottesville and a visit to Excalibur Minerals. Might even go see Andy Dietz's mineral warehouse in Ashton while we're on the road (haven't decided on that part yet).

The saving grace for this trip is that Dave Hennessey has agree to tag along and keep us from going berserk in unexplored mineral stores.

What could possibly go wrong? ↗.

Meeting Minutes
May 21, 2017

by David MacLean, Secretary

President Bob Cooke called the meeting to order at 8:00 p.m. at the Long Branch Nature Center, Arlington, VA.

The minutes of the April 23 meeting were approved as published in *The Mineral Newsletter*.

The president recognized the past presidents in attendants, Sue Marcus and Barry Remer. Bob also recognized guest Sarah Christensen; Gary Christmas, who was a guest at the April meeting, actually joined the NVMC at that time.

Door Prizes

This month's door prize winners were Tom Benedict, Hutch Brown, Gary Christmas, Carolyn Cooke, Logan Cutshall, Jeff Guerber, Amanda Parker, and Tom Taaffe.

New Business

Tom Taaffe, show chair, announced that the NVMC show will be held on November 16–17 in The Hub at George Mason University. Setup will be on Friday, November 15.

The Kids Mini-Mines needs both volunteers and attractive specimens for giveaways.

Awards

Each year, the NVMC newsletter editor participates on behalf of the club in the annual Bulletin Editors' Advisory Committee newsletter contest. Because the club won the trophy for the newsletter in 2017, it is not eligible for newsletter submissions this year. However, the club submitted nine articles in four categories for this year's contest, the results of which were announced.

Regional results:

Educational/Technical Articles—

2nd place ..... Sue Marcus

8th place ..... Mike Kaas

Educational/Technical Articles, Advanced—

1st place..... Hutch Brown

Nontechnical Articles—

4th place ..... Ken Rock

8th place (tie)..... Bob Cooke

8th place (tie)..... Sheryl Sims

Written Features—

1st place..... Hutch Brown

8th place ..... Pat Flavin

9th place ..... Amanda Parker

National results:

Adult Articles—

1st place..... Sue Marcus

Adult Articles, Advanced—

6th place ..... Hutch Brown

Special Publications—

1st place..... Hutch Brown

In addition, Matt Charsky announced that two NVMC members who are newsletter editors had been inducted into the EFMLS Editors' Hall of Fame:

Hutch Brown, *The Mineral Newsletter*

Kathy Hrechka, *The Mineral Mite* (for the Micromineralogists of the National Capitol Area)

Announcements

The Mineralogical Society of the District of Colombia will feature Lance Kearns, retired Professor of Geology at James Madison University, at its monthly club meeting on June 6. The title of his presentation is, "Forty Years of Building the Mineral Museum." The MSDC meets at the Museum of Natural History, Smithsonian Institution (enter on the Constitution Avenue side of the museum).

The May 23 meeting of the Micromineralogists of the National Capitol Area was also announced; the

Logan Cutshall presenting his program on African gemstones. Right: Logan's sheets of rough-cut gemstones such as garnet, tourmaline, and aquamarine. Photos: Ti Meredith.

presentation in May was on fluorescent minerals from Franklin, NJ. The MNCA meets on the fourth Wednesday of each month except for July and August.

Presentation

Logan Cutshall, gemologist and jewelry cutting business owner, gave a slide talk on African gemstones. On the display table, Logan laid out sheets of uncut gems from Africa, including tanzanite, tourmaline, zircon, beryl (aquamarine), corundum, and garnet (grossular, spessartine, rhodolite, almandine, and color-altered garnet—malange, malaia, and "red garnet" almandine).

Making Specimen Labels

by Sue Marcus

Did you know that Webmineral.com has a specimen label that you can customize and print, to use for your own collection?

Type http://webmineral.com/ into a search engine (I use Firefox), then use the search box on the Webmineral.com website (upper right), and type in the name of your mineral. Click on (Mineral Name) Data, then scroll to the bottom.

GeoWord of the Day

(from the American Geoscience Institute)

periglacial

(a) Said of the processes, conditions, areas, climates, and topographic features at the immediate margins of former and existing glaciers and ice sheets, and influenced by the cold temperature of the ice. (b) By extension, said of an environment in which frost action is an important factor, or of phenomena induced by a periglacial climate beyond the periphery of the ice. *Syn:* cryergic; cryonival; paraglacial; subnival.

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

A Very Cool (and Easy-to-Access) Maryland Copper Mineral Locality!

by Noah Fleischer

Editor's note: *Noah Fleischer, a student at James Madison University, received a Fred Schaefermeyer scholarship award from NVMC in 2017. In gratitude, he submitted this article to our newsletter.*

Noah Fleischer with instructor Cindy Kearns and Professor Lance Kearns (now retired) at James Madison University on January 28, 2017. Noah was one of three students to receive a Fred Schaefermeyer scholarship award from NVMC in 2017. Photo: Kathy Hrechka.

Hidden in the woods of Carroll County, MD, the Mineral Hill Mine, a pre-Revolutionary War copper mine, boasts an incredible array of copper minerals that can easily be collected.

Background

I first heard about this locality when, at a local rock shop, I bought a specimen that was collected there. I decided to look into it and came across some really interesting information on the web.

According to the Maryland Department of the Environment, the mine was opened in 1742 by John Diggs to mine a 2-½ foot thick hematite vein for copper ore. During its peak operation in the mid-1800s, the mine employed around 100 people, but it finally ceased operation by the end of the 19th century.

Collecting Opportunities

Mindat.com has a fantastic page about the Mineral Hill Mine that lists the 37 minerals that can be found at the locality. Some of the most visible and easy to find are malachite, chrysacolla, magnetite, hematite, and chalcopyrite. Actinolite crystals are also common.

Collecting is easy because much of the good material can be found simply by examining the surface. A small hand shovel or rock hammer is useful for digging into the tailings piles, but no heavy equipment is truly needed (or allowed, for that matter). At most, a small shovel may be useful to expose hidden specimens within the piles.

Access

Access to the mine is relatively easy for those willing to take the moderately level 2-mile round-trip hike. The trail is wide, likely a former logging road; you can find it directly off of Maryland Route 32 North. As you head north of Sykesville, MD, on Route 32, you will cross over Liberty Reservoir. On the bridge, if you look to the right, you will notice a large pile of

Trail leading up to the mine. All photos: Noah Fleischer.

gray rock that appears to fall directly into the reservoir. That is the lower of the two tailings piles for the mine.

Directly north of the bridge, you will find a small parking area; you can access the trail there. About a mile up the trail, you will walk up a hill, and at the top you will notice mounds in the woods: those are remnant piles from the mine.

When you see the mounds, head off the trail to the left to reach the upper tailings pile. To the right, towards the water, you can reach the lower tailings pile.

Safety Precautions

I have found the lower pile to have the best specimens, likely due to the fact that it is much more difficult to reach and collect at than the upper pile. The route down to the lower pile is incredibly steep; once on the pile, it is easy to slip, so having sturdy boots is a must!

One more note of caution: the Maryland Department of the Environment has marked this location as a site with naturally occurring asbestos. Although the amounts there are minimal, a face mask is always a good precaution when collecting on windy days.

This locality has a wide variety of interesting specimens—and, due to its ease of access, it is a great place to collect! I have gone a handful of times and have always found it worthwhile!

Happy hunting!

Top: The lower pile of mine tailings seems to drop directly into Liberty Reservoir. Bottom: The upper pile of mine tailings.

Above: Malachite and chrysocolla.

Left: Malachite and chrysocolla on schist.

Left, top: Chrysocolla vein in schist.
Left, bottom: Malachite on schist.

Save the dates!

June/July Field Trip Opportunities

Northern Virginia Community College

NOVA's Annandale campus offers 1-day weekend courses—essentially, field trips—related to our hobby. You can get more information at the Field Studies in Geology—GOL 135 Website.

Geology of Great Falls Park, VA

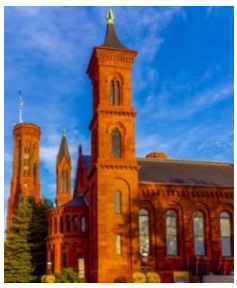
June 2, 9 a.m.–6 p.m. Study the modern and ancient forces that created Great Falls National Park, including some easy to moderate hiking. Meet in front of NOVA's main Bisdorf entrance at 9:00 a.m.

Miocene Geology of Calvert Cliffs, MD

June 9, 9 a.m.–6:30 p.m. Learn how the Miocene seas spread across Chesapeake Bay region about 10 to 20 million years ago. We will visit the Calvert Marine Museum collections and study ancient sediments, stratigraphy, and paleoenvironments preserved in world-famous Calvert Cliffs, MD, collecting fossils along the way.

Triassic-Jurassic Rift Valley of Northern VA

June 23, 9 a.m.–7 p.m. Explore the geologic history of the famous Mesozoic rift basin, specifically across the Manassas, Leesburg, and Haymarket areas. Field stops will include quarry and roadside outcroppings of all rock types, dinosaur tracks, rift basin stratigraphy, and tectonic structures.



Building Stones of the National Mall, Washington, DC

June 30, 9 a.m.–6:30 p.m. We will visit over 20 sites on the Washington Mall, examining the geologic history and architecture, including the rocks used to construct the federal buildings and monuments.

Building Stones of the National Mall

July 21, 9 a.m.–6:30 p.m. We will visit over 20 sites on the Washington Mall, examining the geologic history and architecture, including the rocks used to construct the federal buildings and monuments.

Bench Tip

Marking Your Tools

Brad Smith

It makes sense to mark your tools if you ever lend them to friends or take them out to classes or workshops. For metal tools, I use a very small ball bur running fast in the dremel or foredom to "engrave" my initials. Other times, I'll form the initials with a number of hits with a center punch.

But for hammer handles and other wooden tools, the country boy in me came back and thought, "Why not make a branding iron?" If you'd like to try one, all you need is a little scrap copper or nickel about 22 to 24 gauge, a piece of heavy brass or copper for a base, about 6 inches of metal rod, and a piece of wood for the handle.

I formed my initials from a couple of 4-mm-wide strips of sheet nickel. The "S" was one piece, but the "B" was three pieces soldered together with hard. (Remember to form the letters backwards). I then soldered the letters with medium onto a piece of 1/8-inch-thick brass bar to act as a heat sink. Finally, I soldered a piece of 1/8 round rod on the back of the brass bar as a shaft to join to a wooden handle.

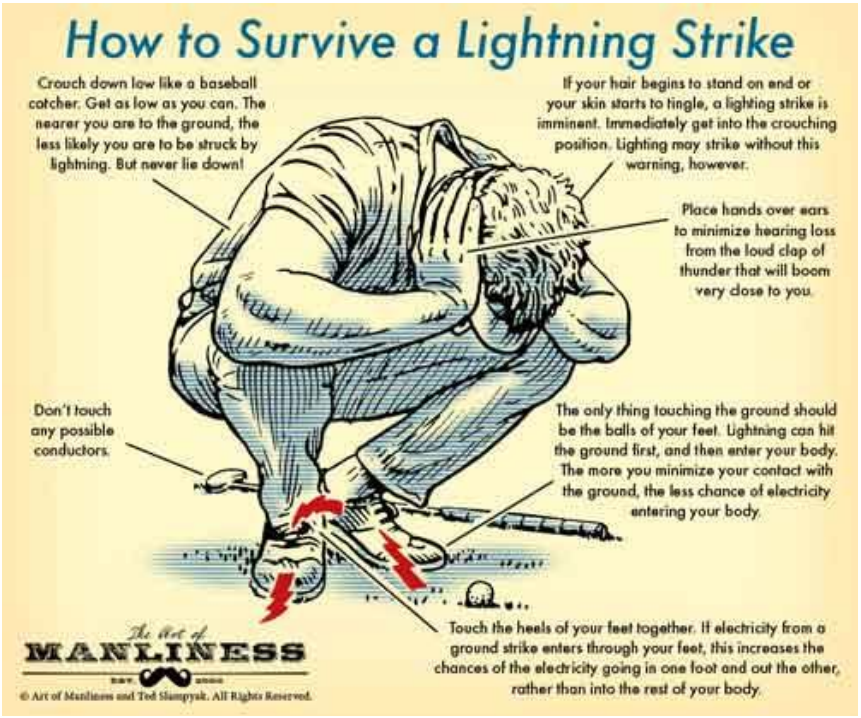
See Brad's jewelry books at
amazon.com/author/bradfordsmith

Safety Matters

Lightning Position

by Ray McPadden

Editor's note: *The story is adapted from* Mineral Newsletter *(newsletter of the Colorado Mineral Society), October 2017, pp. 7–8. The events happened in the Colorado Front Range southwest of Denver.*



They say if lightning is close, you shouldn't lie on the ground. You should assume the lightning position: you squat down, balancing on your toes, with heels pressed together and hands over the ears. It's supposed to minimize your exposure to lightning.

The position feels more like medieval torture than science.

I used to be convinced it wouldn't matter anyway; if lightning struck close, you'd be cooked, whatever position you were in. Wouldn't it be better to die comfortable?

Then one day my wife, Elizabeth, and I were collecting at 13,300 feet on Mt. White, under the cobalt sky of summer. We were chasing a seam of beryl, 3 feet below the overburden.

In my hole, hammer blows had sharpened the rock edges. My blood dripped from the rocks, for I'd forgotten to don my gloves, a recurring problem when I was excited. With my hammer, I aimed and struck again. Sparks jumped while more rock fragments fell away. The blood was now flowing from my hands.

I paused and finally pulled on my gloves and looked west. On the horizon, a storm was taking shape, billowing into a beautiful gray battleship.

In short order, the storm raced toward us and slammed into the mountain, dropping black tendrils of rain. Lightning forked across the sky while fog wreathed the nearby summits of Mt. Antero and Carbonate.

It had all happened so fast. The heart of the storm was upon us. Elizabeth and I jumped from our holes and ran downslope, plunge-stepping, the scree parting and reforming around our boots like water.

Now lightning danced across the south knob of Antero. Rain came in slants. I heard the crackle of hail hitting granite. About then, lightning struck a gendarme just above.

Now lightning split the valley below. Running between the folds and rills of the mountain, we came upon an overhanging rock. The ground beneath was dry. My wife curled up in this little oasis.

Pointing to my truck, I yelled, "We've got to keep going down." The vehicle, our island of safety, was a small red dot far below.

Crack went the sky. It sounded like the fabric of the universe had been torn. Crack!

In a trembling voice, Elizabeth asked, "Are we going to be okay?"

It was a simple question, a question that cut to the heart of everything there on the mountainside, the type of question people ask when scared out of their wits. I hadn't heard a question like that since a gunfight in the Afghan mountains in 2009.

I told Elizabeth, "We're fine," though I wasn't sure. "Keep going down. Hurry."

We ran again, making an undignified retreat. Twice, I fell headfirst and tumbled, the contents of my pack spilling. I did not return for them. It's a shame to lose good beef jerky.

Crack went the sky again. Thunder bowled through the valley between White and Antero. A white flash

touched a spine 300 feet above us. There was a shower of sparks. The boom was simultaneous.

We were caught, the storm swirling overhead, lightning crashing into everything. In my mind, there was no other choice.

Grabbing Elizabeth's shoulder, I said, "Get down."

We both took the lightning position in a train of boulders. Our form was textbook.

Then, as we squatted side by side, Elizabeth reached out and clutched my hand. You aren't supposed to stay together. They say you should spread out—to minimize the risk of a strike injuring multiple people. But there on the mountain, under the hungry jaws of a thunderstorm, we didn't spread out. We wanted to die holding hands.

We stayed like that for a long time. I don't know exactly how long we held on, but the strikes moved on, growing more vague as the storm barreled west. The Arkansas Valley disappeared behind the curtain of rain.

Breathe. Breathe.

When I stood, I saw I had squeezed all the blood from Elizabeth's hand. It was ghostly white.

"Sorry," I said. "That was a close one."

Elizabeth replied, "Not cool."

"I suppose I'll go look for that ⛏ jerky."

Humor
Birthstone Confusion

Editor's note: *The story is adapted from "No Sale: Not Always Right," a website about incidents that defy the maxim that the customer is always right.*

I work in a jewelry store, and one day a customer walked in.

Customer: "Hi. I'm looking for the birthstone for May."

Me: "Well, the birthstone for May is emerald, but we don't carry any emeralds."

(The customer walks over and looks in the case. She sees a green stone.)

Customer: "What about this green one?"

Me: "Oh! That's peridot. That's the birthstone for August."

Customer: "Who's August?"

Me: "Uh … May's husband?" ⛏

Peridot (left) and emerald (right), both in the Smithsonian gem collection. Source: Smithsonian Gem Gallery; photos: Chip Clark.

2018 Newsletter Contest Results

by Hutch Brown, Editor

Each year, the regional and national club federations hold a contest for newsletters. In the past, our club has submitted both sample newsletters and individual articles for judging in the contest.

NVMC Submissions

For this year's contest, we did not submit sample newsletters because we won the regional first-place trophy last year. First-place newsletters are disqualified from competing for 2 years.

However, we did enter articles in four categories:

- ***Technical/educational articles*** incorporate, for example, "historical or geological information." They are short research pieces.
- ***Technical/educational articles (advanced)*** are from professionals in fields related to our hobby and/or from previous first-place winners.
- ***Nontechnical articles*** are "informational rather than technical" in nature. How do you tell the difference? Got me! I flip a coin.
- ***Written features*** "add spice." For example, they might be a personal story or a book review.

The national federation also judges "Special Publications," such as commemorative posters or brochures on some hobby-related topic. For the first time that I can remember, we made a submission.

The regional federations are the first to judge the submissions. They send the top three winners in each category on to the AFMS for the national contest. You can find both sets of results in the EFMLS April newsletter and the AFMS April/May newsletter.

EFMLS Results

Our club did well at the regional level. Our submissions placed as follows:

Technical/educational—

Second place: Sue Marcus, "Mineral of the Month: Sphalerite" (September)

Eighth place: Mike Kaas, "Profile of the Tsumeb Mine, Namibia" (November)

Technical/educational, advanced—

First place: Hutch Brown, "Lake Drummond: A Carolina Bay?" (October)

Nontechnical—

Fourth place: Ken Rock, "Looking for Jade in Myanmar" (June)

Eighth place (tie): Bob Cooke, "History of the Fred Schaefermeyer Scholarship Fund" (January)

Eighth place (tie): Sheryl Sims, "Death Becomes It" (February)

Written features—

First place: Hutch Brown, "Book Review: Geology and the Gettysburg Campaign" (October)

Eighth place: Pat Flavin, "Flag Pond Fossil Collecting, Calvert Cliffs, MD" (May)

Ninth place: Amanda Parker, "My First Fossil Hunt!" (May)

AFMS Results

Our club's submissions did well enough to advance in some categories from the regionals to the nationals. (Articles submitted in the "Written Features" category do not seem to be judged in the AFMS contest.) In the national contest, we placed as follows:

First Place, technical/educational: Sue Marcus, "Mineral of the Month: Sphalerite" (September)

Sixth Place, advanced: Hutch Brown, "Lake Drummond: A Carolina Bay?" (October)

First Place, special publications: Hutch Brown, "Newsletter Editor's Handbook"

Congratulations, Sue! And congratulations to all our other authors! Thanks to your contributions, we can all continue to feel proud—not because of the awards, but because you make our newsletter so good!

Meet "Dracula," the Largest Pterosaur Found to Date

Thanks to Sue Marcus for the reference!

A reconstruction of the reptile, found in Transylvania, is on display in Germany. *Read more.*

The World's 10 Deadliest Minerals

Author unknown

Editor's note: *The piece is adapted from* The Dopstick *(newsletter of the Gem, Lapidary and Mineral Society of Washington, DC), February 2018, pp. 2–7. It originally came from* GeologyIn (2015).

Minerals make the world go 'round—they are used in everything from circuitboards to tableware. They're also some of the most toxic materials known to science, and excavating them has proven so dangerous over the years that some have been phased out of industrial production altogether. Listed below are the 10 most deadly.

Chalcanthite ($CuSO_4 \cdot 5H_2O$)

Chalcanthite is a hydrated water-soluble copper sulfate. The mineral is a copper ore, but it's necessary to keep the environment of chalcanthite specimens dry because the mineral can easily dissolve and recrystallize in a wet environment. Chalcanthite is water soluble and will crystallize out again from solution. The copper in this mineral is very bio-available and is toxic to plants and in high quantities toxic to humans.

Chalcanthite, Canaveille Mine, Pyrénées Orientales, France. Source: Wikipedia; photo—Didier Descouens.

Stibnite (Sb_2S_3)

Stibnite is a toxic antimony sulfide mineral with an orthorhombic crystal lattice. It is a source of metalloid antimony. Stibnite paste has been used for thousands of years for cosmetics to darken eyebrows and lashes. The mineral was also used to make eating utensils, causing poisoning from antimony ingestion.

Stibnite, Ichinokawa Mine, Shikoku, Japan. Source: Smithsonian Mineral Gallery; photo—Chip Clark.

Asbestos (*various mineral species*)

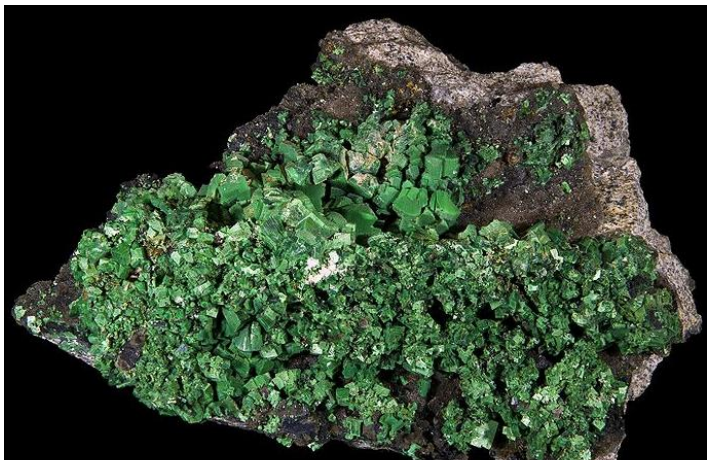
You have likely heard of the mineral asbestos and associated it with lung cancer. Asbestos is not one mineral but five or six separately defined minerals, unlike the other minerals in the top 10 deadliest.

This group of silicate minerals grows thin fibrous crystals that can easily break off and form dust particles. They were once widely used for a variety of commercial and industrial applications thanks to its strong, fire-resistant, and flexible nature—from ceiling tiles and roofing materials to flooring and thermal insulation. The fibers can cause lung cancer, mesothelioma, and asbestosis.

Chrysotile (white asbestos), Brazil. Source: Wikipedia; photo—Enrico Zimbres.

Torbernite ($Cu(UO_2)_2(PO_4)_2 \cdot 8–12\ H_2O$)

Torbernite and its uranium-bearing relatives can be toxic and must be handled carefully. Torbernite readily dehydrates to metatorbernite. Like its uranium-bearing mineral cousins, it degrades easily, a process that can be hazardous. Uranium toxicity from skin contact or inhalation of gases or dust can be dangerous. Torbernite is a lovely mineral. Just remember to always wash your hands after handling it, and don't try tasting it. Tornbernite crystals are usually thin and delicate, so careful handling is also required to preserve specimens.



Torbernite, Margabal Mine, Midi-Pyrénées, France. Source: Wikipedia; photo—Didier Descouens.

Cinnabar (HgS)

Cinnabar is a deep red mercury sulfide mineral that provides much of the world's elemental mercury. When oxidized, this element will produce methyl mercury and dimethyl mercury, two toxic compounds that cause irreparable harm to nervous systems. Hat makers once used mercury in their work, causing mad hatters. Deadly in small amounts, it can be absorbed through the respiratory tract, intestines, or skin.

Cinnabar, Hunan, China. Source: Smithsonian Mineral Gallery; photo—Dana Penland.

Galena (PbS)

Galena is one of the most abundant and widely distributed sulfide minerals. Galena, the principle ore of lead, forms glistening silver cubes with almost unnaturally perfect shapes. Although lead is normally extremely flexible, the sulfur content of galena makes it extraordinarily brittle and reactive to chemical treatment. Lead doesn't get flushed out of your system. It accumulates over the years, eventually reaching toxic levels. Once that happens, both you and your kids pay the price, because lead toxicity is both carcinogenic and teratogenic (causing severe birth defects).

Galena with chalcopyrite and sphalerite, Primorskiy Kray, Russia. Source: Smithsonian Mineral Gallery; photo—Chip Clark.

Hutchinsonite ($(Tl,Pb)_2As_5S_9$)

Hutchinsonite is a form of arsenic sulfide with thallium and lead that can be found in hydrothermal vents. Thallium salts are nearly tasteless and highly toxic;

Hutchinsonite, Quiruvilca Mine, Peru. Source: Wikipedia; photo—Rob Lavinsky.

they have been used in rat poison and insecticides. The thallium inclusion in this arsenic sulfide combines two extremely dangerous and deadly minerals. This mineral is another mineral to be handled carefully, if at all.

Orpiment (As_2S_3)

Orpiment is another arsenic sulfide mineral with a stunning orange-yellow color. The mineral is found naturally in hydrothermal vents, hot springs, and fumaroles.

Strangely, this mineral was once used medicinally in China despite its toxicity and in alchemy in search for a way to create gold. The arsenic, especially if it is allowed to oxidize, will lead to arsenic poisoning if handled incorrectly.

Orpiment, realgar, baryte, calcite. Quiruvilca Mine, Peru. Source: Wikipedia; photo—Géry Parent.

Riebeckite ($Na_2(Fe_2{+}3Fe_3{+}2)Si_8O_{22}(OH)_2$)

The finely fibrous variety, known as crocidolite, usually originates from altered metamorphic rocks. It was once widely used for a variety of commercial and industrial applications thanks to its strong, fire-resistant, and flexible nature—from ceiling tiles and roofing materials to flooring and thermal insulation. The fibers can cause lung cancer, mesothelioma, and asbestosis.

Crystals of dark riebeckite in pegmatite, Corsica, France. Source: Wikipedia; photo—Géry Parent.

Arsenopyrite, Hidalgo del Parral, Chihuahua, Mexico. Source: Wikipedia; photo—Rob Lavinsky.

Arsenopyrite (FeAsS)

Arsenopyrite is an iron arsenic sulfide with a brilliant steel metallic color. Arsenopyrite is usually found in metamorphic deposits related to granitic plutons or in pegmatites. When heated, arsenopyrite may release an arsenic vapor compound, toxic when inhaled. The sulfur released by heating produces toxic sulfur dioxide, also unhealthy. Erosion and degradation of arsenopyrite can cause environmental and health problems when increased arsenic levels pervade the water or food systems.

Source

GeologyIn. 2015. The world's 10 most deadly minerals.

The Rocks Beneath Our Feet

Virginia's Gold–Pyrite Belt: Cosmic Genesis

by Hutch Brown

In 1607, colonists founded Jamestown in Virginia, the first permanent English colony in North America (fig. 1, red diamond). The colonists and their commercial sponsors in England hoped to find gold. After all, Spain had become fabulously wealthy from gold and silver mines in its American colonies.

So why not England in its colony of Virginia?

But the colonists found no gold. The only metal used by American Indians in Virginia was copper acquired through trade from sources near Lake Superior. The local tribes had no precious metals, so the colonists gave up their dreams of finding gold.

Yet an undiscovered belt of gold-bearing rock lay just beyond the Fall Line zone to the west of Jamestown (fig. 1, green lines). Located in the Piedmont geologic province, the rock contained substantial quantities of both gold and pyrite. Today, we know the area as the gold–pyrite belt (fig. 1).

Like most landforms in our area, the gold–pyrite belt is oriented from southwest to northeast (roughly parallel to the Blue Ridge Mountains). After gold was finally discovered in Virginia in the late 18th century, hundreds of mines and prospects opened, mostly in the gold–pyrite belt (fig. 1). From 1804 to 1947, Virginia produced about 100,000 troy ounces of gold.

How did all that gold get there?

Gold in the Earth's Core

The gold really shouldn't be there—not according to the "core accretion model," the prevailing theory of the Earth's formation.

The solar system began about 4.6 billion years ago as a cloud of dust and gas. After the sun formed, gravity collapsed much of the remaining matter into growing clumps of rock. The rocky cores consolidated about 4.5 billion years ago into the Earth and other planets.

The Earth's first geologic period, known as the Hadean Eon, lasted from about 4.5 billion to 3.8 billion years ago, long before life evolved. The Hadean Eon was characterized by volcanism and by showers of meteorites and other celestial bodies, some of them

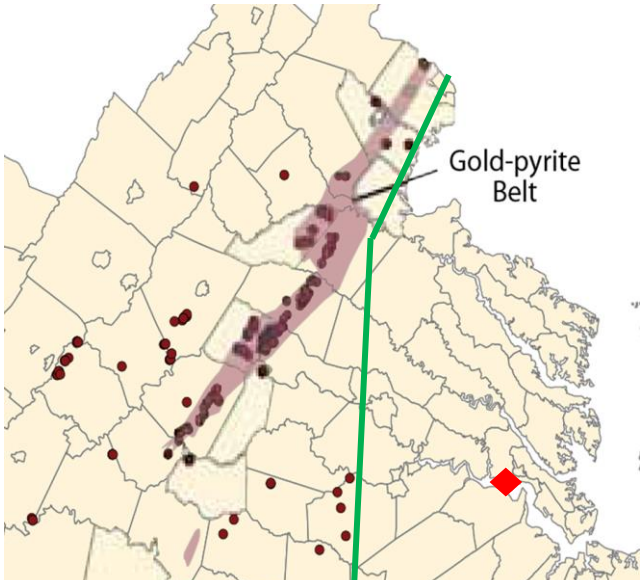


Figure 1—*The gold–pyrite belt in north-central Virginia (shaded area). Purple dots = gold mines and prospects; red diamond = location of Jamestown; green lines = approximate location of the Fall Line zone. Source: Sweet (2007).*

huge. One such collision about 4.48 billion years ago resulted in the formation of the moon.

As the Earth grew by accretion, its mounting mass created pressure and heat, melting its components. During the early Hadean Eon, the Earth was mainly molten matter circulating in convection currents, much like the Earth's molten mantle does today.

The molten rock gradually separated out into lighter and heavier materials. Less dense silicates rose toward the Earth's surface, whereas iron and other metals sank into the center of the Earth, forming its core.

Many elements readily attach to iron. Bonded onto the sinking iron, they too vanished into the center of the Earth. The five most widely used siderophile ("iron-loving") elements are iron, aluminum, gold, nickel, and platinum. In fact, the Earth's solid core has enough precious metals such as gold, silver, and platinum to cover the entire surface of the Earth with a layer 13 feet thick.

The scarcity of such metals on or near the Earth's surface is what makes them precious. Yet precious metals still occur in the Earth's crust at rates up to a thousand times greater than the core accretion model would predict. Rich deposits of gold, for example, are mined in China and Australia, the world's top two gold producers.

How can that be? Why isn't every ounce of siderophile, whether gold, silver, or iron itself, buried in the Earth's core?

Gold From Outer Space

Scientists believe that most of the siderophiles in the Earth's crust accreted to the planet about 200 million years *after* it first formed. By then, the Earth's original siderophiles had sunk into the planet's solid metallic core. With the accretion of siderophiles from the cosmos, however, the Earth began forming crust containing them. Scientists call it the "late veneer."

The siderophiles arrived in the form of meteor showers (fig. 2, left). About 4.3 billion years ago, the Earth was bombarded by what geologists call chondrites—rocky extraterrestrial bodies unmodified by melting and differentiation. The chondrites therefore contained plenty of siderophiles, including iron and gold.

The chondritic meteorites and asteroids not only cratered the moon but also broke through the Earth's thin crust, adding their mass to the planet's molten mantle. The "late veneer" meteor showers were heavy enough to account for 0.5–1 percent of the Earth's entire mass today, enough to alter the chemical composition of the Earth's mantle. The chondrites enriched the mantle with iron, nickel, cobalt, tungsten, and other siderophiles, including gold (fig. 2, right).

Driven by convection currents, the ocean of magma in the Earth's mantle is still sorting itself out. In the process, it forms solid crust at the Earth's surface, moving it around in vast plates and occasionally breaking through it in volcanic eruptions and lava flows. When undifferentiated magma enriched with siderophiles rises in plumes that cool underground, the cooling process can separate out the siderophiles, leaving rock rich in precious metals.

But how exactly does gold-bearing rock form? And why did it form in what is now Virginia?

Next: How tectonic processes about half a billion years ago contributed to gold deposits in Virginia.

Acknowledgment

The author thanks NVMC member Sue Marcus for reviewing and improving the article. Any errors are the author's alone.

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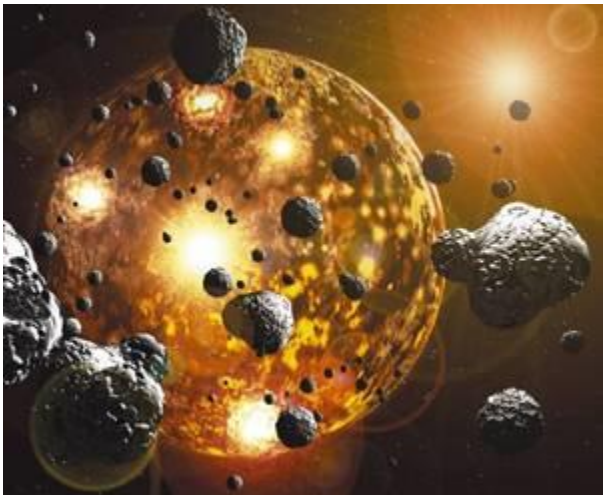

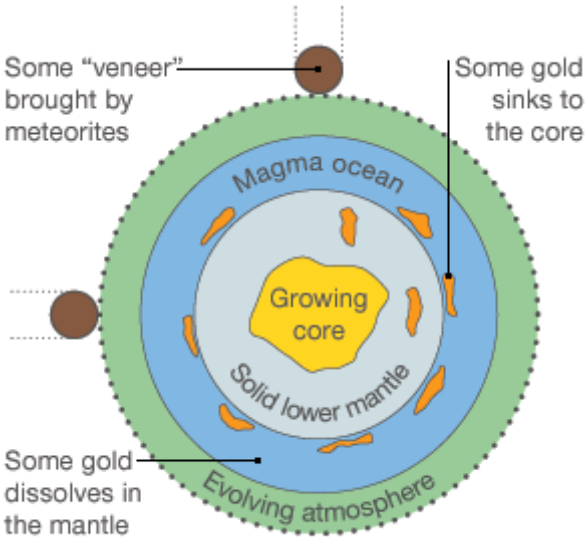

Figure 2—*The "late veneer" event, a bombardment of the Earth by meteorites and asteroids about 4.3 billion years ago. The extraterrestrial bodies added their mass to the Earth's liquid mantle, enriching it with gold, silver, iron, and other metals, some of which eventually went into forming ores in the Earth's crust. Sources: Kremer (2013); Smith (2011).*

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

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2 NOVA field trip
3	4	5	6 MSDC mtg, Washington, DC	7	8	9 NOVA field trip
10	11 GLMSMC mtg, Rockville, MD	12	13	14	15	16
17 Father's Day	18	19	20	21 Summer begins	22	23 NOVA field trip
24	25 NVMC mtg, Arlington, VA	26	27 MNCA mtg, Arlington, VA	28	29	30 NOVA field trip

Event Details

2: Great Falls, VA—Geology field trip; 9–6; NOVA; info, reg: GOL 135 Website.

3: Macungie, PA—Spring Mineralfest Show; Pennsylvania Earth Sciences Association; Macungie Memorial Park; 8:30–3; adults $2, kids under 12 free; info: www.mineralfest.com.

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

9: Calvert Cliffs, MD—Geology field trip; 9–6:30; NOVA; info, reg: GOL 135 Website.

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

16–17: Quarryville, PA—Annual show; Lancaster County Fossil and Mineral Club; Solanco Fairgrounds, Hoffman Bldg, 172 South Lime St; Fri 12–8, Sat 10–5; adults $3; info: Eric Miller, admin@millersmineralmine.com.

17: Gilbert Run Park, MD—Region IV EFMLS Annual Picnic/Swap and Sale/Auction; Southern Maryland Rock and Mineral Club; Brookside Pavillion; 9–5; $5 per car; info: SMRMC.org.

17: Stafford, VA—Vulcan Materials Quarry field trip; Gem, Lapidary, and Mineral Society of Montgomery County (host); 100 Vulcan Quarry Rd; 8–12; RSVP: Sam Linton, cooldragonshirts@yahoo.com.

23: Rift Valley, Northern VA—Geology field trip; 9–7; NOVA; info, reg: GOL 135 Website.

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

27: Arlington, VA—Monthly meeting; Micromineralogists of the National Capital Area; 4th Wednesday of the month, 7:45–10; Long Branch Nature Center, 625 S Carlin Springs Rd.

30: National Mall building stones—Geology field trip; 9–6:30; NOVA; info, reg: GOL 135 Website.

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THE NORTHERN VIRGINIA MINERAL CLUB INC
Crystals are the flowers of the Mineral Kingdom

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Mineral of the Month: Muscovite

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The Northern Virginia Mineral Club

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SEND YOUR DUES TO:
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4411 Marsala Glen Way, Fairfax, VA 22033-3136

OR

Bring your dues to the next meeting.

Dues: Due by January 1 of each year; $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).

You may reprint NVMC materials in this newsletter.
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 22204. (No meeting in July or August.)

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