The Mineral Newsletter

Meeting: June 28 Time: 7:45 p.m.

The meeting will be remote due to the coronavirus pandemic. Details to come.

Staurolite

on muscovite schist

Pestsovye Keivy, Murmanskaja Oblast, Russia

Source: Wikipedia *Photo: Rob Lavinsky.*

Volume 62, No. 6

June 2021

Explore our website!

June meeting program:

Open

In this issue …

Deadline for Submissions

August 30

Please make your submission by the 30th of the month! Submissions received later might go into a later newsletter.

Mineral of the Month
Staurolite

by Sue Marcus

Our Mineral of the Month is a well-known Virginia mineral, staurolite. Its name comes from its crystal habit because this mineral occurs more often twinned in various crossed forms than as single crystals. In ancient Greek, *lithos* (or *lite*) means stone while *stauros* (or *stauro*) means cross. Crystals that intersect each other are known as penetration twins.

The first description of staurolite was in 1792 by Torbern Olaf Bergman in the second volume of his *Manual of Mineralogy*. Bergman was a pioneering Swedish chemist and mineralogist. I was unable to find a copy of this rare volume, so I do not know the source of his original specimen.

For history buffs, an alternative history of staurolite is that it was originally described by Christophe-Paul G. de Robien in 1751. I could find a plate from the 1851 book, though no text.

Staurolite originates in sandy sediments that are metamorphosed into gneiss or schist at intermediate to high temperatures and relatively low pressures. It is frequently coated with fine scales of muscovite, biotite, or other micas from the schist in which it is usually found. It is commonly associated with almandine garnet, micas, and kyanite.

You can find staurolite in multiple states, including Virginia. Georgia named staurolite as its state mineral; Virginia does not have one.

Some club members have enjoyed collecting staurolite at and near Virginia's Fairy Stone State Park, and I'm sure others would enjoy the chance to venture out to collect again. The Virginia Department of Parks even sells and ships them, with a note that their darker ones are treated with linseed oil. According to an article on the park's website, the best place to find staurolite crystals might be outside the park, near a gas station on Route 57 in Bassett, VA.

Fairy Stone State Park and Bassett, in Patrick and Henry Counties, respectively, are about 260 to 270 miles from northern Virginia, with the drive taking more than 4 hours each way. Virginia parks charge a small entrance fee; collecting at the Bassett site is free, based on the last available information.

Summer break ahead!

Northern Virginia Mineral Club members,

No in-person social events for now!

Staurolite, 60-degree penetration twin, Antsirabe, Malagasy Republic. Photo: Bob Cooke.

Collecting tips include looking around tree roots, preferably after rain washes the crystals to the surface and makes spotting them easier. Like looking for shark's teeth, it may take a while to get your eyes and

Staurolite with almandine, Taos County, NM.
Photo: Bob Cooke.

brain adjusted to identifying the right shapes and colors. Using a geologic map or other sources, you can look for staurolite crystals in other parts of Patrick and Henry Counties, where they are found in the host schist.

Several localities in Fannin County are sources of nice staurolite crystals, with Mindat showing a photo of one presumably happy collector sieving for them in a stream at a fee-to-collect site. An interesting crystal shown on that website is diamond shaped—perhaps it is an odd twin. The Fannin County staurolite occurrence was mentioned by Lacroix in his 1848 *Mineralogie de la France et de ses Colonies.*

Taos County, NM, is a source of terrific staurolite crystals, including complex twins (multiple twinning). The Picuris District within that county produced crystals recently, although specimens do not seem to be abundant. As usual, they are easier to spot when wet (after rain); however, collectors should beware of flash flooding in places like Hondo Canyon, where staurolite crystals are found.

In Windham, ME, reddish-brown staurolite crystals, some with translucent areas, were found in 2005. New Hampshire, Minnesota, and Idaho also host notable staurolite localities.

Idaho wasn't on most lists of fine staurolite crystals, but while looking for another locality, I came across Big Carpenter Creek. There, you can pan or sieve for staurolite crystals, usually twinned, in the cool waters of the creek. Beware of bears and cougars!

Crystals ranging in size up to 2 inches were found near the post office in Fernleigh, Ontario. That locality is now reported to be inaccessible. The geologic structure hosting staurolite extends for 25 miles, but it is only 100 feet wide; somewhere along its length, perhaps in a stream, crystals might still be found.

Single and twinned crystals in diverse forms were found at a locality near Gondomar, Portugal. However, the site might now be depleted.

France claims to be the source of the world's finest staurolite crystals—from Cordray and Baud in the Finistère department of Brittany. With crystals up to about 8 inches in size, that does seem accurate. Their place of origin calls them *Croisettes de Bretagne* (crosses of Brittany). Many are found in alluvium, and some are lovely, red-brown and translucent; I expect those are relatively rare. These still-active localities have produced crystals since the Middle Ages.

In the Alps, lustrous staurolite crystals occur with blue, sometimes translucent kyanite crystals. The

Staurolite cross, Taos County, NM.
Photo: Bob Cooke.

Staurolite with kyanite, Pizzo Forno, Switzerland. Photo: Bob Cooke.

name of the locality is Pizzo Forno, in Ticino, Switzerland. Some staurolites are single crystals, others twinned. The images of specimens I've seen from this locality are particularly attractive because of their luster, due to the lack of overgrowth or clinging mica or schist. Matrix specimens with both staurolite and kyanite show nice color contrast.

Large staurolite crystals, again associated with kyanite, are found on Russia's Kola Peninsula in the Keivy Mountains (see the cover). Many different twin forms are found—including a unique Mindat image of a heart-shaped twin (probably due to the angle of the photo) adjacent to a 90-degree twin. Specimens from this locality have to be cleaned out of their schistose matrix (sandblasted?), but when that is done, they are some of most interesting I have seen.

I don't remember a column that hasn't included beautiful specimens of our monthly mineral from Minas Gerais, Brazil, and staurolite is no exception. Single and twinned staurolite crystals come from the Gramais Farm in Brazilian state. I found reference to staurolite from another Minas Gerais locality, Salobro, though I could find no confirmation of photos.

Staurolite from the Cattle Creek area, Rosebud Station—which is near Mount Isa, Queensland, Australia—occurs as small single crystals, twins, and specimens with smalls garnets in mica schist. Loose specimens are scattered along a dirt road.

If you are adding to your collection of staurolite crystals of the world, single and twinned staurolite crystals are found in Antananolofotsy, Antananarivo Province, Madagascar. Attractive twins with unusually high luster have been found at the now abandoned Gorob metals mine in the Erongo region of Namibia.

Staurolite double twin. Photo: Bob Cooke.

Cobalt-bearing forms of staurolite have been reported on Mindat's main staurolite page. The International Mineralogical Association (IMA) is the officially accepted worldwide mineral naming authority. The cobalt-bearing version, unofficially called "lusakite," is found in Zambia. With a slightly different chemical formula—$(Fe,Mg,Co)_2Al_9Si_4O_{23}OH$—it was originally described in 1934 and named for the capital of what was then Northern Rhodesia

The IMA has not recognized "lusakite" as a separate mineral despite its difference in chemistry from staurolite. Yet the *American Mineralogist* published the original paper naming it and published another paper on it in 1986. The original location was given as 80 miles east of Lusaka, with a relatively nonspecific longitude and latitude, so finding the type locality may be difficult. It has also been reported in microscopic grains from the Khizovara kyanite deposit in Karelia, Russia.

In both Zambia and Russia, the "lusakite" is reported to be a lovely blue. Sadly for most collectors, it is visible only in sliced thin sections of the host rocks, with rare crystals up to 5 millimeters in size, according to the original authors.

Manganese- and zinc-rich staurolites have been reported, but these are not recognized as separate varieties and are unlikely to be identifiable in hand samples (that is, without laboratory analysis).

Staurolite twin. Photo: Bob Cooke.

Since staurolite forms in relatively common geologic environments, the localities described above are not a comprehensive account of all known localities. I have tried to include many important ones; there are others that have produced nice specimens.

A unique small zinc-bearing staurolite locality was found at what is now named Piestewa Peak, near Phoenix, AZ. The zinc source was apparently the country rock, and the authors of the research paper on the discovery noted that the temperature and pressure conditions were not high enough for normal staurolite to form. Like other types of staurolite, zincian staurolite is not a recognized variety. The occurrence is in a park and collecting is *strictly* not allowed.

Staurolite is primarily used in jewelry or as a collectible mineral. It can be used for some abrasives, although it is seldom found in deposits that are enriched enough for this use to be economically viable.

When used in jewelry, staurolite is usually seen in its raw or semiraw form as natural crosses, often with a hole drilled in the end of one cross arm for a pin and loop. So the staurolite cross may be strung on a simple chain. Better quality, rarer translucent crystals may be faceted, although this is seldom done and doesn't result in remarkably attractive gems.

Buyer beware: some staurolite crosses are fakes. A "staurolite cross" can be *carved* or *ground* from some other material, like brown soapstone. The seller probably won't allow you to take a knife to test the hardness of the much softer nonstaurolite.

When staurolite crystals are embedded in matrix, they can be removed with a small drill (Dremel tools or similar). Unfortunately, this can become a slippery slope of "improving" specimens. Unless you found the specimen, bought it from a dealer you trust, or know the locality, be very careful.

A positive feature of adding one or more staurolite specimens to your collection is that they are not expensive. Even lovely (though small) twinned specimens in matrix from Russia are selling for less than $20 on Etsy, and even larger ones from Russia's Kola Peninsula are going for similar prices on eBay. There are many options from worldwide localities for less than $100—or collect your own at Virginia's Fairy Stone State Park or in Bassett, VA.

Technical Details

Chemical formula ...... $Fe^{2+}_2Al_9Si_4O_{23}(OH)$ (Source IMA)

Crystal form............... Monoclinic

Hardness 7.-7.5

Density .... 3.74–3.83g/cm^3 (measured) 3.67 g/cm^3 (calculated)

Color.......................... Dark brown to black, dark red; rarely yellow or blue

Streak......................... White

Cleavage .... 1 distinct on {010}

Fracture .... Splinters

Luster......................... Resinous

Staurolite, Hyatt Creek Marble, Cherokee County, NC. Photo: Bob Cooke.

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President's Collected Thoughts

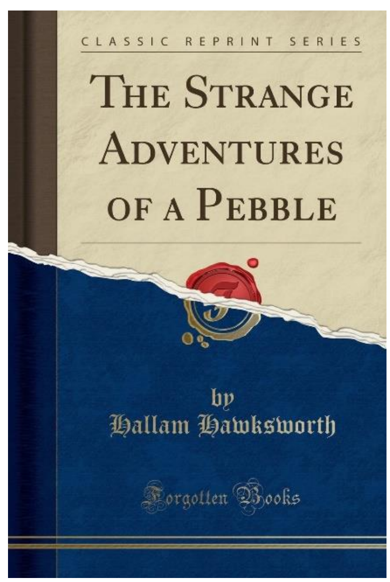
by Tom Kim

*T*his month, I just want to share this little gem from a book for children from 1921. *The Strange Adventures of a Pebble* was part of a series of science books by Hallam Hawksworth, née Francis Blake Atkinson. In this book, the author writes from the first-person point of view of a pebble to explore and explain the Earth sciences. Though major advances have been made in the field since then, the book itself remains both charming and impressively informative.

Here's a sample passage:

> Did you notice those scratches on my face? The ice did that. But, of course, that's nothing in itself. And, besides, I'm not one to complain, as you know. I only speak of it to show what big things may be back of little ones, how much you can learn from the study of so common a thing as a little pebble. For the very same ice fields that scratched the faces of little pebbles like me deepened the gorges and canyons among the mountains and shaved the crowns of the old ones—Bald Mountain, in the Adirondacks, for example. They carried off good farming soil by the thousands of acres from one place and piled it in another; they shoved the Mississippi River back and forth; in fact, turned many streams out of their courses—some of them the other end to, so that they now flow south where they used to flow north. They took old river systems apart, and with the pieces made new ones—the big Missouri for one. They set Niagara Falls up in business; got all the waterfalls ready that are now turning the wheels of New England factories, and even put in great water storage systems that remind one of the Salt River irrigation works, with their big Roosevelt dam in Arizona, or of the reservoirs which England built in the Nile. Lakes in river systems act as reservoirs, you know, and make them flow more evenly, thus keeping the power of falls more uniform, as in the case of Niagara, and making a uniform depth of water for vessels, as in the case of the St. Lawrence River. The Great Lakes do both of these useful things.

The whole book is in the public domain and is available at https://publicdomainreview.org/collection/the-strange-adventures-of-a-pebble-1921.



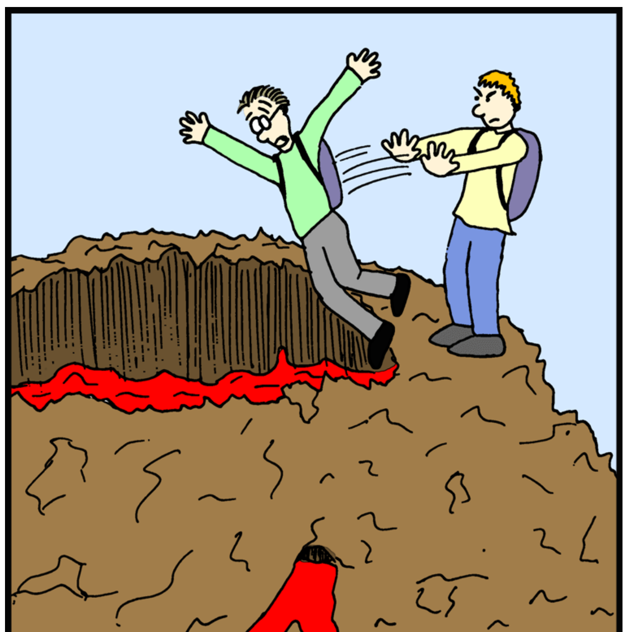
Tom

Natural History Museum To Reopen

Closed since March 2020 due to the coronavirus pandemic, the Smithsonian Institution National Museum of Natural History will reopen on June 18. It will open initially at about 25-percent capacity, with reduced hours and social distancing measures.

The museum will require free timed passes for entry. Passes will become available a week before the scheduled reopenings at si.edu/visit or by calling 800-514-3849, ext. 1. Each visitor, regardless of age, must have a pass; up to six can be reserved by one individual for a specific location. Groups larger than six will be prohibited.

Visitors will enter on the National Mall side and exit on Constitution Avenue to help minimize crowding at the entry points. All first-floor galleries will be open—including the dinosaurs—as will the second-floor galleries containing the Hope diamond (but not yet the minerals).



Niel chose the wrong time to make another "Geology Rocks" pun

Determining the Hardness of a Mineral

by Donald B. Peck

Editor's note: *The article is adapted from* Mindat *(last updated August 18, 2019).*

Mineral hardness is defined as the relative ability of a mineral to resist scratching or abrasion. The first recorded attempt to quantify the hardness of a mineral was in 1812 by Friedrich Mohs, a German geologist and mineralogist. He chose 10 relatively common minerals that ranged in hardness from the softest known mineral, talc, to the hardest, diamond.

Metallurgists use a penetration hardness obtained by pressing a diamond point into a flat surface under a known load and measuring the area of indentation (the Vickers Scale, Knoop Scale, and so on). Professional papers often report such hardness measures applied to minerals, in which case it is considered to be the hardness of crystal deformation.

By contrast, the Mohs Scale is used by amateur and professional mineralogists, geologists, and collectors. Mohs invented an ordinal scale (one through ten), with each numeral defined by the hardness of a specified mineral species. Although they are good approximations, the absolute differences in hardness between ordinal values are not equal. When compared to the Knoop Scale, for example, each successive Mohs index mineral is 1.2 to 2.7 times harder than the previous one (see the table on the right). The single major exception is between the hardness of corundum and diamond: diamond is almost five times harder than corundum.

No Intermediate Values

The Mohs Scale is an ordinal scale—there are no intermediate values. That said, you will often see values like 3½. That does not mean that the hardness is halfway between 3 and 4 but rather that the hardness is greater than 3 but less than 4; any finer measurement is meaningless. It is a fine point, but a hardness between 8 and 9 should be written as 8½ and not as 8.5. The decimal fraction implies a continuous range rather than the discrete ordinal values.

Tools You Will Need

You can purchase a hardness set of index minerals, but most are so common that you can build your own set. Ideally, each piece should be about 2 by 2 by 3

Mohs Scale of mineral hardness—testing box. Source: Wikipedia; photo: Hannes Grobe.

Hardness	Index mineral	Actual difference[a]
1	Talc	--
2	Gypsum	2.7
3	Calcite	2.3
4	Fluorite	1.4
5	Apatite	2.5
6	Feldspar	1.4
7	Quartz	1.4
8	Topaz	2.1
9	Corundum	1.2
10	Diamond	4.9

a. Based on the Knoop Scale.

centimeters in size. Cleavage faces are ideal to scratch and corners are good to produce scratches, so cleavage blocks are excellent, when possible. When they are not, choose a crystal.

Only the first nine index minerals are necessary for you to know that a diamond will scratch all other minerals (so you don't need a diamond). A small box divided into nine compartments provides useful storage.

A set of pencil-like holders with sharp tips, each with one of the Mohs minerals, can be purchased. They are excellent for test scratching an unknown; but you also need to discover whether the unknown mineral can scratch the index mineral, and that is not possible with some sets of points.

A MineralLabs set of hardness points and test surfaces permit the complete protocol. The points' mounts are steel pencil-type holders, and a carborundum sharpening stone is supplied for sharpening the points, as required. None of the points are mineral. Gypsum is replaced by a plastic of the same hardness and calcite by copper. Index minerals 4 to 9 are all steel alloys designed to equal the hardness (H) of the minerals they replace.

The points are useful, particularly with small specimens. For close approximations, you can substitute:

- Your fingernail (H = 2 to 2½);
- a length of copper wire, along with a small piece of copper sheet metal (H = 3);
- a pocketknife (H = 5 to 5½) and a bright steel fender washer (H = 5); and
- a shard of quartz (H = 7) and a square if window glass (H = 6½).

You can use the substitutes before the points or hardness set to save wear and tear. The disadvantage is that in refining your estimate, turning to a hardness set requires making a second scratch.

Making and Observing a Scratch

When choosing a place to make a scratch on your valuable specimen, choose a fairly smooth but inconspicuous surface, preferably on the back or bottom of the piece. You do not want to mar a great crystal face with an ugly scar.

If you have no idea what the hardness might be, start in the middle: try 5. This is where a pocket knife, a small length of copper wire, and so forth come in handy. They allow you to find the approximate value without eroding your better tools.

When using styli (points), hold the styli at about a 45-degree to 60-degree angle to the mineral surface and draw it towards yourself for only about 3 millimeters, using a magnifier. A 3-millimeter scratch is just as easy to see as a 3-centimeter scratch. At first, use light pressure, but if that produces no effect, increase to a firm pressure.

After making the scratch, wipe it with your finger or a cotton swab to make certain that the mark is in fact a scratch that incises the surface and not merely a chalky mark. If possible, draw your fingernail across the scratch to discover whether it is incised or merely a residual mark.

If a point on apatite (H = 5) does not scratch your specimen, try feldspar (H = 6). If feldspar does not scratch your sample, try quartz (H = 7). If quartz produces a scratch, then try to scratch your quartz surface with an inconspicuous point on your specimen.

Although the hardness of most minerals is very nearly the same in all directions, small differences exist. If you can without defacing your specimen, try scratching it in different directions (along the length of the crystal and crosswise).

The mineral best known for differential hardness is kyanite. Its hardness parallel to the length of the crystal is 5½, whereas perpendicular to the length, the hardness is 7. With diamonds, the octahedral surface is the hardest; without differences in directional hardness, a diamond could not be cut.

Interpreting the Results

Let's say that your specimen wasn't scratched by feldspar (H = 6) but was scratched by quartz (H = 7) and did itself scratch quartz. Then the unknown must have a hardness of 7.

If your specimen wasn't scratched by feldspar (H = 6), was scratched by quartz (H = 7), and did not itself scratch quartz, then its hardness must be less than quartz but greater than feldspar (6 < H < 7). This value is often expressed as 6½, meaning between 6 and 7.

If the index scratches the unknown, does the unknown scratch the index? It is important to test the scratching both ways. That is the only way you can determine whether the hardness of the unknown is equal to or less than the index mineral with the greater hardness.

Definitions

Metamorphic Rock

by Dave Woolley

Editor's note: *The article is adapted from the newsletter of the Gem and Mineral Society of Lynchburg, VA, September 2019, pp. 2–3.*

A metamorphic rock is a previously existing rock that has been altered by changes in heat and/or pressure.

Granite alters to granitic gneiss. The uniform texture of granite changes to gneissic layers of the same granite minerals: plagioclase feldspar, orthoclase feldspar, quartz, plus a little biotite or hornblende.

Granitic gneiss has a mineral content similar to granite but can also be metamorphosed from a sedimentary rock or other igneous rock similar to granite, such as tonalite or granodiorite.

Basalt alters to greenstone. Many metamorphosed basaltic minerals (such as epidote, serpentine, and talc) are colored green, giving metamorphosed basaltic rock its common name. Catoctin greenstone is a familiar example in our area.

Hornblende gneiss plus hornblende schist and biotite schist, all common in the Piedmont, can be the result of metamorphosed basaltic volcanic ash that was deposited in a marine environment. In a schist, the layers are fairly uniform; in gneiss, the layers are distinct and often irregular.

Quartz sandstone alters to quartzite. Quartz sandstone with impurities, such as clays or other minerals, alters to impure quartzite, like the kyanite-bearing quartzite from Willis Mountain in Virginia and Graves Mountain in Georgia.

Limestone metamorphoses to marble.

Shale metamorphoses to slate, to phyllite, to schist, to gneiss, and sometimes to granitic gneiss, depending on the degree of metamorphism.

All rock types can be buried, such as in a plate subduction zone; they can also be stressed by tectonic activity that raises mountains. In both cases, increasing heat and/or pressure metamorphoses the rock. Ultimately, all rocks can be melted into magma that can cool and crystallize into new igneous rock. Water, especially in an oceanic subduction zone, helps the melting as a solvent and in creating new minerals.

Gneiss, a metamorphic rock in our area.

In the Blue Ridge Mountains, unakite is a granite that was altered by a small change in heat or pressure, changing calcium-rich plagioclase feldspar in the granite into epidote.

In central and southwestern Virginia, staurolite is a metamorphic mineral formed from marine sedimentary rock, probably shale metamorphosed into mica schist. A "fairy stone" is a nickname for a twinned crystal of staurolite.

Andalusite is another metamorphic mineral formed from marine sedimentary rock, likely also a shale metamorphosed into mica schist. Andalusite formed from the aluminum and silica in some of the clays at higher temperatures and pressures. As temperatures and pressures increase, sillimanite, kyanite, mullite, and then corundum will crystalize from the elements in andalusite. Andalusite, sillimanite, and kyanite have the same chemical composition ($AlSiO_4$), but their crystal structures are different due to differences in pressure and temperature in the environment where they formed.

The Altavista, VA, andalusite locality is unique in that sillimanite paramorphs after andalusite and kyanite paramorphs after andalusite and sillimanite have been found near andalusite crystals. Each pseudomorph (or false form) maintained the shape of the original andalusite crystal. Wild things happened along this very unique vein!

Unlocking Geochronology Mysteries in the Grand Canyon

by Brianne Phillips

Editor's note: *The article is from* Boise State News *(May 18, 2020). Thanks to Sue Marcus for the reference!*

*F*or being silent, sedimentary rocks have a lot to say.

Take the Grand Canyon, for example. Carved by the Colorado River for at least 5 million years, the resulting cross-section reveals a chronological layer-cake record of Earth's history.

For Boise State geosciences professor Mark Schmitz and doctoral student Mike Mohr, the layers of the Cambrian time period are particularly rich.

The Cambrian Explosion is a popular term used to describe a biological shift chronicled in the sedimentary layers at the beginning of the Cambrian period, around 540 million years ago. In the base of this rock layer are a profusion of preserved fossils with shells, skeletons, and body plans that did not exist before, such as trilobites and brachiopods. At a glance, it would seem almost as if a single sudden event in Earth's history sparked this shift.

However, Schmitz and Mohr's research goes much deeper into the rock's history to reveal another story. … *Read more*.

Bench Tip

Drilling a Stone

Brad Smith

One of the things my students often ask to do is drill a hole through a gemstone. The usual thought is to get a diamond drill, but I've been disappointed with them because the tip of the drill is just pivoting in the hole and fails to cut well. When it looks like the drill isn't cutting, the tendency is to push with more force. The drill gets hot, and the diamond grit falls off.

A much better approach is to use a core drill—a small hollow tube with a coating of diamond grit at the business end. The diamonds easily carve out a circular arc without undue pressure or heat buildup.

Core drills are readily available from lapidary and jewelry supply companies. They come in sizes as small as 1 millimeter and are very reasonable in price. For instance, a 2-millimeter-diameter drill is about $7.

Chuck the core drill in a drill press, Dremel, or Foredom and be sure to keep the drilling zone wet to cool the tool and to flush out debris. Also, if you're drilling a through hole, go very easy on the pressure as the drill is about to cut through. Otherwise, you will usually chip off some of the stone surface around the hole.

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

Why Not?

by Charles Wooldridge

***Editor's note:** The article is adapted and abridged from the* AFMS Newsletter *(June 2021, p. 5), reprinted from* The Pick and Shovel *(newsletter of the Gem and Mineral Club of Lincoln, NE).*

I frequently walk local rivers and streams looking for agates, petrified wood, artifacts, and fossils. I live in north-central Nebraska in the heart of the Sandhills, where Morris Skinner, Nebraska's most renowned paleontologist, spent 5 decades digging for fossils. The area is rich in megafauna fossils.

In talking to a local fellow one day, I mentioned that I like to hunt for fossils. "I wish we had fossils like that around here," he told me.

It made me wonder how many people have grown up without fully experiencing the world around them. I have been searching for rocks, artifacts, and fossils for almost 60 years. Like others, I have amassed fossils, rocks, and other "thingamajigs."

Most fossils I find come from gravel bars or other alluvial deposits. I show them especially to kids, who are amazed to know that elephants, camels, and most other animals they know from zoos, books, or the internet once lived here—and that many were huge.

But not many people see my collections, so when that local fellow made his comment, it dawned on me that there was a museum in town. No one had thought to include prehistory, so I thought—why not?

The museum found an old gun cabinet and made a nice display case out of it. I gathered an assortment of fossils, freeing up room in my basement, and a friend made labels with information about and pictures of the various creatures.

Almost every town or county has a small museum. You might think about finding one and donating the things you have found.

Why not? It's a win-win!

Editor's note: With local libraries welcoming patrons inside again, think about offering to display some of your collection. Label your specimens and be sure to include information about our club—visitors and new members are always welcome! Make sure the case is well locked—or don't show your most prized possessions.

Local Fossil Hunting: Why Not?

by Hutch Brown

The article on the left got me to thinking: our own area has a certain fossil in abundance. I first found it near the nature center where our club meets, and I have since seen many more specimens on Arlington gravel bars.

It's a trace fossil, like a dinosaur track—in this case, the remains of holes in offshore sands bored half a billion years ago by small wormlike animals called phoronids. Anchored in the sand, they used tiny tentacles to filter food from ocean currents flowing overhead. The technical name for the fossils is *Skolithos linearis*; they were left in sands that hardened over many millions of years into a metamorphic rock called Antietam quartzite.

As the name suggests, the quartzite crops out along Antietam Creek in the Maryland Blue Ridge. It is part of a metamorphic rock sequence resulting from a mountain-building event about 300 million years ago called the Alleghanian Orogeny.

Beginning about 140 million years ago, ancient rivers carried pieces of Antietam quartzite and other rocks downstream, tumbling and rounding them in the process. Deposited on the Coastal Plain, the cobbles, sands, and silts formed a tight-packed layer of sediments called the Potomac Formation. Erosion later exposed the rounded river rocks, adding them to gravel bars.

It's easy to find Skolithos fossils along our local creeks if you keep your eyes peeled. What better way to interest kids of any age in our local rocks and minerals?

Growth Resembling Cotton Candy Sprouting From Rocks in Carlsbad Caverns National Park

by Mark Price

Editor's note: *The article is adapted from the* Miami Herald, *19 October 2020. Thanks to Sue Marcus for the reference!*

Mysteries are often found inside Carlsbad Caverns National Park. The latest suggests that some rocks inside New Mexico's extensive cave system are alive. Specifically, they appear to be sprouting hair—big, fluffy white tufts of it. Some resemble balls of cotton.

"No, it's not cotton candy!" park officials wrote. "This fluffy material is a mineral that appears during the colder and dryer parts of the year."

It's called thenardite and it's temporary, developing only after humidity drops in the winter, then vanishing when it rises again. In layman's terms, it's the "salt form of sulfuric acid," according to the National Center for Biotechnical Information.

"The elements for it are present in the cave but will only crystallize through a process known as efflorescence on certain surfaces when the air is dry enough," park officials reported.

Experts say that most formations in the park's 175 miles of cave system are dormant.

"There are still areas that are active," park officials said. "Anywhere you see water dripping, the cave is growing."

Among the many oddities in the caves are fossils that date to when "the Guadalupe Mountains used to be a large reef system in the Permian Sea," according to the park. That's more than 265 million years ago.

"After the sea dried up, so did the reef, leaving behind many different fossils to appreciate in the cave."

In June, scientists revealed that a "virgin" cave passage in the park was found to contain an isolated pool never before been seen by humans. The shallow pool is 700 feet under the entrance of Lechuguilla Cave in the backcountry of Carlsbad Caverns National Park. (The Lechuguilla Cave, though in the park, is not part of Carlsbad Caverns.) ⛏

Thenardite (sodium sulfate) in Carlsbad Caverns. Photo: National Park Service.

Wildacres in Fall

Wildacres is a retreat located on Pompey's Knob just off the Blue Ridge Parkway about an hour north of Asheville, NC. Registering for the September 6–12 session will give you the opportunity to take one or two classes, hear excellent talks from the guest speaker, and join in other activities.

Guest speaker Wolfgang Mueller has rockhounded around the country and is famous for his hand-cut spheres and eggs and his rare-gem cabochons and one-of-a-kind beads. He received a best-of-class award at the 2019 Tucson Gem and Mineral Show for his self-collected wulfenite specimens. His talks range from mineral collecting to lapidary, and he has a wealth of knowledge to share.

Wolfgang has degrees in geology from the University of California at Riverside. He worked at Magma Copper in San Manuel, AZ, and at their corporate entity, Newmont Exploration, in Danbury, CT. Wolfgang moved to Oracle in Arizona some 22 years ago and loves rockhounding.

His wife Diana will accompany him. Diana is also a lapidary and jewelry artist, and together they are the lapidary and jewelry forces behind their company, DiWolf, exhibiting at multiple gem and mineral shows.

Registration will be open soon. You will be able to find a registration form on the Wildacres website (keep checking back). Some classes fill quickly, so register early! You will be able to choose from the courses listed on the next page. ⛏

Coming to Wildacres in September 2021

Chainmaille, beginner *(Jim Hird)*: Learn the ancient art of chainmaille while creating jewelry using unsoldered links. Basic patterns use inexpensive copper rings; basic tools supplied along with printed handouts for all patterns. Optivisors or other magnification devises advised. No prior experience needed. Number of projects done will depend on your abilities in manipulating the rings. 2-day class, 1st semester.*

Chainmaille, intermediate *(Jim Hird)*: Build on your abilities learned in the first class to do more advanced and additional patterns as well as working in colors and mixed-material rings. The number of projects completed will depend upon your mastery of the rings. 2-day class, 2nd semester.*

Wirewrapping, beginner (*Jacolyn Campbell*): Using pliers, gold-filled or sterling silver wire, assorted beads or gemstones, and a few basic wirecraft techniques, learn how to create your own fashion rings, bracelets, pendants, and earrings. All tools and materials provided. Make an adjustable ring, two bracelets, a pendant, and two pairs of earrings. 2-day class, 1st semester.

Wirewrapping, intermediate (*Jacolyn Campbell*): Make a fitted ring, two pairs of earrings, a cabochon pendant, and a bracelet. Previous experience recommended. 2-day class, 2nd semester.

Beading basics (*Bonnie Hird*): Learn basic beading, two-strand design, and finishing off with clasps. Bring an optivisor and any cutters, crimpers, and flatnose pliers you have. No experience needed. 2-day class, 1st semester.

Beading a Kumihimo (Japanese braiding) (*Bonnie Hird*): Learn to use a disc to set up thread for braiding, finishing off with caps and clasps. Bring optivisor and pliers. No experience needed. 2-day class, 2nd semester.

Electro Etching I (*Micah Kirby*): Learn to use multiple masking techniques, oil-based marker, and vinyl resists on copper or bronze. Initiate etching using electrolyte solutions with a low-voltage power source. Produce two pendants and two pairs of earrings. 2-day class, 1st semester.

Electro Etching II (*Micah Kirby*): Learn to use multiple masking techniques, P-n-P, and photosensitive paper as resists on copper and bronze; add a second noncaustic solution for silver. Produce a pendant and cuff form. 2-day class, 2nd semester.

Loop n Loop, beginner (*Chuck Bruce*): Learn how to fuse fine silver jump rings and link them together into a chain using two different patterns; finish a bracelet and pair of earrings in each. No experience needed. 2-day class, 1st semester.

Loop n Loop, advanced (*Chuck Bruce*): Learn how to fuse fine silver jump rings and link them together into a chain using two different patterns; finish a bracelet and pair of earrings in each. No experience needed, but semester 1 is helpful. 2-day class, 2nd semester.

Cabochons, beginner (*Bernie Emery*): Learn to use the trim saw as well as the basics of grinding, sanding, and polishing. Slabs provided or students can use their own with instructor approval. Bring apron and safety glasses. No experience needed. 2-day class, 1st semester.

Cabochons, advanced (*Bernie Emery*): Learn to cut different shapes. Slabs provided or students can use their own with instructor approval. Bring apron and safety glasses. Prerequisite: prior experience with cabbing and trim saw. 2-day class, 2nd semester.

Micromounting *(K.C. Foster)*: Learn how to prepare minerals for viewing under a microscope, including how to clean your specimens and then mount them on corks or pedestals, such as toothpicks or bristles. Learn how to display the tiny minerals with labels in a microbox. Bring a microscope if you have one. No experience needed. 2-day class, both semesters.

Gemology (*Tim Morgan*): Information forthcoming online.

*1st semester = Monday/Tuesday; 2nd semester = Thursday/Friday. (Wednesday is free.)

September 2021—Upcoming Events in Our Area/Region (see details below)

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1 MSDC mtg	2	3	4
5	6 Wildacres **Labor Day**	7 Wildacres	8 Wildacres	9 Wildacres	10 Wildacres	11 Show, N Milford, CT
12 Show, N Milford, CT	13 GLMSMC mtg	14	15	16	17 Show, Arden, NC	18 Show, Arden, NC
19 Show, Arden, NC	20	21	22 MNCA mtg **Summer begins**	23	24	25
26	27 **NVMC mtg**	28	29	30		

Event Details

1: Mineralogical Society of the District of Columbia—meetings via Zoom until further notice; info: http://www.mineralogicalsocietyofdc.org/.

6–12: Wildacres—Pompey's Knob, NC (see pages 9–10 for more information); proof of COVID vaccination required on registering or upon arrival.

11–12: New Milford, CT—Annual show, Danbury Mineralogical Society; New Milford High School cafeteria, 388 Danbury Rd; Sat 10–5, Sun 10–4; adults $5, students/seniors $4, kids under 11/Scouts in uniformfree; info: Elizabeth Triano, 845-319-6089, email lizziewriter@comcast.net; https://www.facebook.com/events/192286412696317.

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

17–19: Arden, NC—Annual show; MAGMA, Jacquot & Son Mining; Camp Stephens, 263 Clayton Rd; Fri 9–6, Sat 9–6, Sun. 10–4; admission free; info: Richard Jacquot 828-779-4501, email rick@wncrocks.com; www.AmericanRockhound.com.

22: Micromineralogists of the National Capital Area—meetings via Zoom until further notice; info: http://www.dcmicrominerals.org/.

27: Northern Virginia Mineral Club—meetings via Zoom until further notice; info: https://www.novamineralclub.org/.

Disclaimer

All scheduled events are tentative during the coronavirus pandemic, and meetings might be remote. With rising levels of vaccination, meetings might again be in person. Check the organization's website for details.

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2021 Club Officers

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Tech Support: Tom Burke
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Webmaster: Casper Voogt
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Mineral of the Month: Staurolite

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

The Northern Virginia Mineral Club

Please send your newsletter articles to:
hutchbrown41@gmail.com

RENEW YOUR MEMBERSHIP!

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

Dues: Due by January 1 of each year; $20 individual, $25 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 22204. (No meeting in July or August.)

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