THE NORTHERN VIRGINIA MINERAL CLUB INC

The Mineral Newsletter

Meeting: December 18   Time: 6:30 p.m.

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

Rhodonite

Chiurucu Mine, Peru

Smithsonian National Mineral Gallery   Photo: Chip Clark.

Volume 58, No. 10
December 2017
Explore our website!

December Program:

Holiday Party!

In this issue …

Mineral of the Month
Rhodonite

by Sue Marcus

The December Mineral of the Month is attractive, potentially useful rhodonite. Rhodonite and its mineral cousin rhodochrosite have several attributes in common.

Both owe their color to manganese; both can be minor manganese ores, and both form beautiful pink to red crystals. Both take their names from the Greek word ῥόδος (*rhodos),* which translates to “rose.”

Whereas rhodochrosite is a manganese carbonate, rhodonite is a manganese silicate, which makes it significantly harder than rhodochrosite. They are close cousins but rarely occur together.

Rhodonite was initially described in 1819 by Christoph F. Jasche from material found at the Kaiser Franz Mine (later called the König Wilhelm Mine) in the Harz Mountains of Saxony-Anhalt, Germany. The type locality seems to have produced only massive to subhedral rhodonite, so unfortunately Herr Jasche did not have the exquisite crystals that have since been found to help him identify this species.

Researching these articles is always a learning experience for me. This time, I learned about the varieties of rhodonite, which Mindat lists as dyssnite, fowlerite, hsihutsunite, and orlets. Wikipedia refers to fowlerite and bustamite as separate mineral species, whereas Mindat considers only bustamite a separate species. Since Mindat follows the International Mineralogical Association naming conventions, I defer to Mindat.

Dyssnite contains higher valences of iron and manganese but is still chemically rhodonite. Fowlerite adds some zinc and more calcium to the usual rhodonite crystal lattice. Hsihutsunite is unusually high in calcium and is deep red to purple in color.

Orlets—such an odd name in the mineral world!—is the type of rhodonite that is familiar to many people as a lapidary material. It is described as quartzlike, which I believe means fine-grained in this context. It is rich in manganese, though low in magnesium and iron. It forms at lower temperatures in skarns (where hotter fluids alter surrounding, usually calcium-rich, rock).

Merry Christmas!

Happy Hanukkah!

Rhodonite with manganese oxides (like this specimen from Humboldt County, NV) is often used in lapidary work. Source: Wikipedia; photo: Chris Ralph.

Orlets is familiar to many of us as the pink rock with black manganese oxide bands and blobs that can be slabbed and cut into lovely cabochons. Just as dendrites can be imagined as scenes in agate, these manganese features, in the hands of adept lapidaries, can create scenic landscapes.

With its lapidary uses, rhodonite is a semiprecious gemstone—in fact, it is the state gemstone of Massachusetts. The largest faceted rhodonite is an emerald-cut 3.6-carat stone from Broken Hill, New South Wales, Australia. This “large” gemstone is only 10.6 by 7.2 millimeters in size. The easy cleavage and rarity of flawless specimens of significant size usually preclude the use of rhodonite as a faceting material.

Rhodonite from the Ural Mountains, near Yekaterinburg, Russia, was carved (along with malachite and lapis) into fabulous vases for Russian royalty. Mineral deposits near Franklin, NJ, were primarily mined

The color of rhodonite can range from pink to reddish-brown. Photos: Bob Cooke.

for zinc, but the area is also noted for classic rhodonite crystals. Rhodonite was one of the most colorful minerals found there, although only rare, weak, deep-red fluorescence has been reported. The Franklin/Ogdensburg/Sterling Hill region was the best U.S. source of rhodonite specimens.

Maine, Massachusetts, Montana, and New Hampshire are also prominent producers of rhodonite specimens, although localities are reported in many other states, including Virginia. Most localities produce massive material rather than crystals. Mindat doesn't include any photographs of rhodonite from Virginia, so if you have a nice piece, you could share it there.

Pajsbergite is the local name for rhodonite from Värmland, Sweden. The manganese mines there produced massive pink rhodonite and rare, small, deep-pink or red crystals.

The most spectacular rhodonite crystals have been found at the Broken Hill Mine in New South Wales, Australia, and the Morro da Mina in Minas Gerais, Brazil. The Broken Hill specimens were found many years ago. Mindat shows one translucent crystal that is 20 millimeters long! The Australian specimens tend to be fractured, commonly on galena matrix, and are usually on the darker purple-red end of the rhodonite color spectrum. The best Brazilian specimens are more cherry red, transparent to translucent, and gemmy; others may be pink and opaque.

Peru is another source of lovely pink rhodonite crystals, like the specimen on the cover (found in a silver and tungsten mine). The Peruvian material usually forms opaque clusters, though Mindat shows some aesthetic translucent pink crystals.

Rhodonite can be mined as a manganese ore. Manganese is used in steel production to remove sulfur from the iron ore and as an alloy in the final steel products. The United States does not produce any manganese. Our primary import sources are Gabon and South Africa. Rhodonite is not a primary manganese ore—as a silicate, it would be difficult to process, and there isn't a lot of rhodonite to mine.

Technical details (source mostly Mindat):

- Chemical formula...... $CaMn_3Mn(Si_5O_{15})$
- Crystal form............... Triclinic
- Hardness.................... 5.5 to 6.5
- Density .... 3.57–3.76 g/cm^3 (measured); 3.726 g/cm^3 (calculated)
- Color.......................... Red, pink; with more iron, can be red-brown
- Streak......................... White

Rhodonite from Franklin, NJ (in the James Madison University collection). Photo: Tom Tucker.

Cleavage ....One very good cleavage; cleaves easily

Fracture ....Conchoidal

Luster ....Vitreous, sometimes pearly on cleavages

Sources

Bathelmy, D. 2014. Rhodonite mineral data.

Corathers, L.A. 2017. Manganese. In: 2014 minerals yearbook: Manganese [advance release]. Reston, VA: U.S. Geological Survey: 47.1–47.19.

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Gemdat.org. 2017. Rhodonite.

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U.S. Geological Survey. 2017.

Wikipedia. 2017. Rhodonite.

Holiday Party

December 18, 6:30–9:30 p.m.

The NVMC and the Micromineralogists of the National Capital Area are jointly hosting this year's holiday party at the Long Branch Nature Center (our usual club meeting place).

The NVMC will provide barbeque, baked beans, and cole slaw. The MNCA will provide beverages—ice tea, lemonade, soda, water bottles, and ice.

We need you to help fill out the menu with your own contributions. So this is critical—

Please click on the link below and sign up to let us know how many in your party will attend and what you might be able to contribute.

http://www.signupgenius.com/go/20f094aadaf2aa46-holiday

If you'd like to participate in the gift exchange, please bring a hobby-related gift. The gift you bring should have a value of no more than $20 and no less than $5.

Thank you for helping to make our holiday party fun! Please come and enjoy!

The Prez Sez

by Bob Cooke

Thank you all for your valiant efforts in making the mineral show a success!

The online signup never got to the 50-percent level, and I just knew the show was going to fail miserably. However, volunteers stuck around for extra shifts and members showed up unannounced. Everyone pulled together, and somehow it all worked. I counted about 30 club members working the show. I thank you all!

Several dealers at the show expressed their surprise that the NVMC was able to run the mineral show with so few members participating. Their rule-of-thumb for their own shows is that 80-percent participation is needed. We had about 25 percent. I guess our participants just work harder.

As most of you know, Carolyn and I will be leaving for England soon to attend our son's wedding and then house-sit, dog-sit, and snail-sit while they're on honeymoon. (That's right, they have a pet African land snail—I hope I can master the intricacies of a snail's lifestyle.) In any event, we will miss the December and January meetings. I would like to be here for those meetings, but for some silly reason I have been told that I will be at the wedding.

Enjoy the Holidays. May visions of beautiful crystals dance in your head.

Bob

Club Elections Committee Report

The NVMC will elect club officers for 2018 at the December meeting before the holiday party. Nominated are:

President .... *Vacant*
Vice-President .... Ti Meredith
Secretary .... David MacLean
Treasurer .... Roger Haskins

Meeting Minutes
November 13, 2017

by David MacLean, Secretary

President Bob Cooke called the meeting to order at 7:45 p.m. at the Long Branch Nature Center in Arlington, VA.

The minutes of the October club meeting were approved as published in *The Mineral Newsletter*.

The president recognized the two past presidents in attendance, Rick Reiber and Barry Remer.

Door Prize Drawing

The following people won door prizes: Linda Benedict, Tom Benedict, Carolyn Cooke, and Rick Reiber.

Committee Reports

The Nominating Committee collected names of nominees for club officers in 2018, to be elected at the December 18 club meeting and Christmas party. Vice President Ti Meredith and Secretary David MacLean self-nominated for their present positions, and Bob Cooke offered to serve as treasurer unless another nominee is forthcoming. There was no nominee for president.

Old Business

Show Chair Tom Taaffe outlined plans for the club show at the Johnson Center at George Mason University on November 18–19. He showed a map of the floor layout, including tables for 20 dealers, the minerals and fossils for the silent auction and door prizes, the micromineral demonstration, and the physics demonstration. The fluorescent mineral demonstration and the kids' tables will be in a separate room across the hall.

Parking lot A will be available for free parking on Friday evening for the show setup and all day on Saturday and Sunday for the show itself.

The Christmas party, held jointly with the MNCA, will follow short club meetings at 6 p.m., December 18, at the Long Branch Nature Center.

Awards

Newsletter editor Hutch Brown announced awards from the annual newsletter contest. The club's newsletter took first place in the EFMLS and fourth place in the AFMS contest.

In addition, individual newsletter articles won awards in the EFMLS contest:

Educational/Technical Articles—

Sue Marcus, "Mineral of the Month: Vanadinite"—***Sixth place***

Sue Marcus, "Mineral of the Month: Stibnite"—***Seventh place***

Sheryl Sims, "Let's Go Crazy With Purple Gemstones!"—***Honorable mention***

Nontechnical Articles—

Mike Kaas, "Getting the Big [Geologic] Picture"—***Fourth place***

Sheryl Sims, "It's All in the Name: The Controversy Over Negro Mountain"—***Fifth place***

David MacLean, "Two Student Presentations"—***Eighth place***

Written Features—

Hutch Brown, "Book Review: *The River and the Rocks*"—***Fourth place***

Kathy Hrechka, "2016 NFMS/AFMS Show: Treasures of the Northwest"—***Ninth place***

Sheryl Sims, "2016 EFMLS Conference: Why You Should Attend Federation Conventions"—***Tenth place***

Hutch will mail the award certificates to the individual authors.

Announcements

The MSDC and MNCA will jointly celebrate, respectively, their 75th and 50th anniversaries at 6 p.m. on Saturday, December 9, at the Holiday Inn on Eisenhower Avenue in Alexandria. NVMC members are encouraged to attend. The banquet cost is $30, due by November 22. For more information, see page 21.

The president said that NVMC needs an active "show-and-tell" table.

Adjournment

By motion duly made and seconded, the members adjourned the meeting. Hutch Brown then gave a PowerPoint presentation on the geology of Natural Bridge in Rockbridge County, VA.

October 23 Program, Dale Greenwalt

The Middle Eocene Kishenehn Formation: A New Insect Konservat-Lagerstätte in Montana

by David MacLean, Secretary

Dale Greenwalt, curator of fossil insect collections at the Smithsonian National Museum of Natural History, delivered an outstanding presentation on fossil insects of the Eocene Period in what is now Montana.

Dale showed slides of fossilized insects from shale in the Kishenehn Formation along the Flathead River, which forms the southwest boundary of Glacier National Park. The formation has been designated as a Konservat-Lagerstätte—German for "conservation storage site"—for its deposits of exceptionally well-preserved insect fossils.

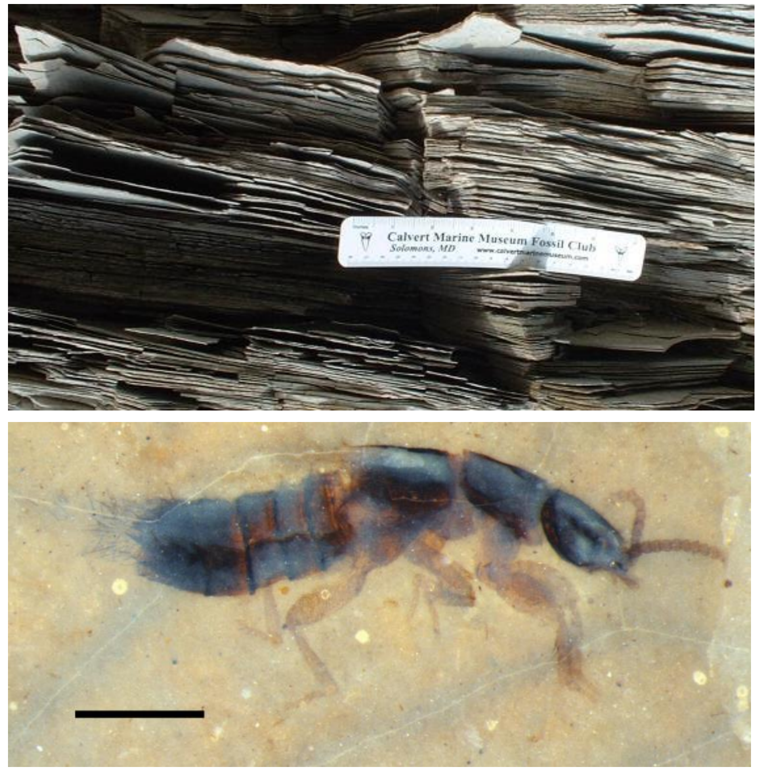
The Kishenehn Formation was laid down in a freshwater lake 1 meter deep about 46 million years ago. After deposition, the formation was tilted 45 degrees, with glacial gravel on top of it.

The climate 46 million years ago was mild, with temperatures averaging about 17 °C. The formation contains fossilized seeds, leaves, spiders, and small insects. The insect fossils are very well preserved; they include the orders Diptera (flies—55 percent) and Hemiptera (true bugs—26 percent).

Collecting the fossilized insects required bushwhacking to the exposed shale sites along the river, splitting the shale into layers 1–2 millimeters thick, and wetting the layers to see the insect fossils inside. A thin silicate layer was removed with a pointed pencil eraser. Fossils were examined with a 7–10x loupe. Insect fossils were nondestructively analyzed for porphyrins and iron, indicators of hemoglobin, and zinc in the sharp edges of ant and rove beetle mandibles.

This locality contains some of the best preserved fossilized insects in the world. Much of the fine structural anatomy of the insects, such as beetle mandibles, is clearly visible.

Insect species found include rove beetles, diapriid wasps, and a family of aquatic flies called Dixidae. Fossils include insects emerging from pupae and both male and female mosquitos, some filled with blood. Also found were katydid wings with files for making sound; flies in the genus *Aenigmatias*, a predator of ant pupae; and chironamid flies, an indicator species for "ecologically healthy waters." The Kishenehn Formation has yielded 6,000 species of insects in all.



Top: *Kishenehn "oil/paper shale."* ***Bottom:*** *Fossilized rove beetle trapped in the shale. Source: Dale Greenwalt.*

The Kishenehn Formation at the site is an oil shale with 2-millimeter layers of silicate from dust deposition; black organic layers from summer life, including blue-green cyanobacteria; and white layers of calcium carbonate deposited in summer.

The fossilization process began with summer deposition of calcium carbonate and summer growth of sticky mats of algal cyanobacteria. The insect landed on the sticky algal mat and could not escape. The insect died and was engulfed by the algae. Small aquatic flies predominate in the fossil finds.

Other localities for well-preserved fossils include British Colombia's Cambrian Burgess shale, the Cretaceous Araripe Basin in northeastern Brazil, and the Eocene Green River Formation in southwestern Wyoming.

Minerals Come From Mines
Tsumeb Followup

by Mike Kaas

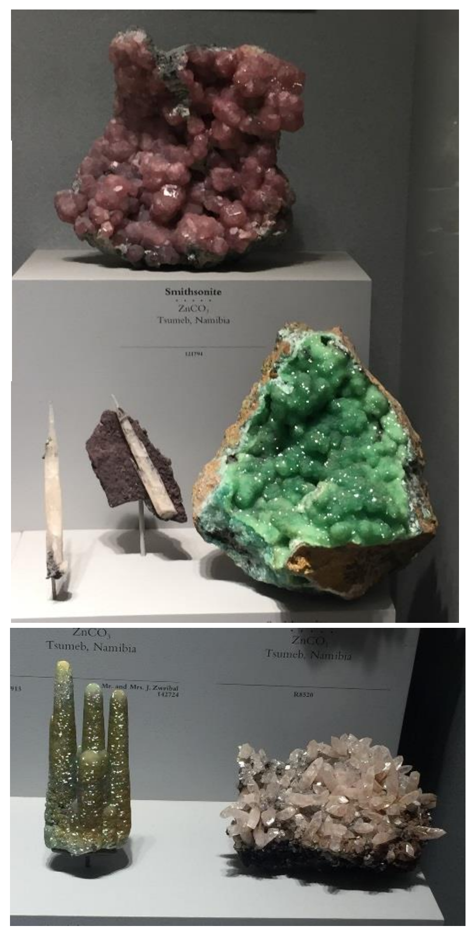
In the November newsletter, our club began a series of occasional articles highlighting some of the famous "historic" mines and the minerals they produced. We started with Namibia's Tsumeb (pronounced SOO-meb) Mine, which is famous for its specimens of cerussite, the Mineral of the Month in the November newsletter.

Historians might argue that Tsumeb is not "historic" because of its relatively recent mining history—the mine closed only in 1996. However, there is no question that it is a world-famous locality in the eyes of mineral collectors. Still, in my own future articles in this series I will try to stick to U.S. mines.

No sooner had we gone to press than I realized that, in searching for photos to illustrate the article, I had ignored the "diamonds in our own backyard," namely the Geology, Gem, and Mineral Galleries at the Smithsonian National Museum of Natural History in Washington, DC. An example of a "backyard gem" at the museum is its entire case of mineral specimens from Tsumeb (shown at right). Of particular note are five specimens of smithsonite, named for James Smithson, the Englishman who grubstaked the Smithsonian Institution.

If you haven't visited the museum lately, it's well worth a return trip soon. Several spectacular new acquisitions were recently put on display in the Minerals Gallery. ⚒

Above: *The Tsumeb mineral display case at the Smithsonian National Museum of Natural History. Photo: Mike Kaas.*



Right: *Closeups of smithsonite specimens from Tsumeb in the Smithsonian display. Photos: Mike Kaas.*

Left: *A cerussite specimen from Tsumeb in the Smithsonian display. Photo: Mike Kaas.*

Save the dates!
Field Trip Opportunities

Penn/MD Quarry, Lancaster County, PA
December 2

The GLMSMC invites NVMC members on a field trip to the Penn/MD Materials Quarry in Fulton Township, Lancaster County, Pennsylvania. The address is 303 Quarry Road, Peach Bottom, PA. The quarry is in serpentinite, featuring minerals such as antigorite, magnesite, mcguinessite, and quartz. More information about the site is at MinDat.com.

You must have proper safety gear and be at least 18 years old. If attending, please RSVP to Bob Cooke at rdotcooke@gmail.com no later than Wednesday, November 29, and be at the quarry by 8 a.m..

Northern Virginia Community College
Geology Field Trips

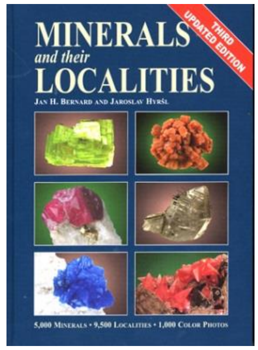
NOVA's Annandale campus offers 1-day weekend courses—essentially, field trips—related to our hobby. You can get more information at the Field Studies in Geology—GOL 135 Website.

Cretaceous Geology of Maryland/Fossil Hunt

January 10, 2018, start at 10 a.m. Well-known dinosaur expert and paleontologist Dr. Peter M. Kranz will lead this fun outdoor expedition to nearby fossil sites, where you can discover many exciting fossils to take home. Must have own transportation.

Paleozoic Geology of Virginia/West Virginia

April 7, 2018, 7 a.m.–9 p.m. This field trip will let you explore the late Silurian and Devonian geology of western Virginia and West Virginia, considering ancient depositional settings (tropical marine reefs, lagoons, shelves, deep basins, and terrestrial flood plains) and fossils, as well as later deformation (faulting and folding) associated with the Valley and Ridge Province.



Book Review
Minerals and Their Localities

Editor's note: *Adapted from* M.R. News *(September 2017). Thanks to Sue Marcus for the reference!*

Minerals and Their Localities (3rd edition), by Jan H. Bernard and Jaroslav Hyrsl

This edition provides basic data (formula, crystal system, cleavage, cell dimensions, color, hardness, optical constants, geological environment, associations, and so on) for about 5,000 mineral species, along with the locality or localities. Many entries have a reference to articles in technical mineralogical journals.

The edition includes about 1,000 photos of specimens (typically study-grade examples), each photo printed about 2.7 inches wide. There are no crystal drawings. At the back is a useful alphabetical list of 9,500 mineral locality names with a (sometimes abbreviated) list of species for each.

You can order it at:
http://mineralogicalrecord.com/bookdetail.asp?id=132

First-Place Article

Tektite/Gold: The Making of a Pendant

by Craig Hazelton

Editor's note: *The article is adapted from* Mineral Minutes *(newsletter of the Colorado Mineral Society), January 2016, pp. 7–10. It won first place in the 2017 AFMS contest in the category "Advanced Adult Articles."*

Ever wonder how hand-crafted jewelry is designed and fabricated?

Last fall, I was excited to be juried into the Boulder Open Studios Tour, where I displayed my jewelry art. The Boulder Open Studios Tour is an annual two-weekend art show where people can visit artists in their studios. I participated this year for the first time and displayed my jewelry at the BoMA (Boulder Metalsmithing Association) studio in North Boulder, CO. BoMA is a great organization where people can regularly see demos on metalsmithing, take classes, and affordably rent time in a fully equipped metalsmithing studio. Although my main studio is at home, I work at the BoMA studio from time to time and have taken several classes there, including basic prong setting for faceted stones. Check out BoMA if you want to learn to make your own jewelry!

As part of the education mission of the Boulder Open Studios Tour, we were asked to provide demonstrations on how our artwork is created. For this, I performed a live demonstration of embellishing a cabochon with a metal-lined lanyard hole using a diamond core drill, brass tubing, and plumbing tools that few people were able to see.

I decided that a virtual demonstration (pictures and descriptions on Facebook and in emails) of making a pendant would be a fun way to reach more people. During the first weekend of the tour, I displayed three stones that would be used in a pendant to be designed and fabricated during the following week.

On the following weekend, I displayed the completed pendant, titled "Tektite Gold" (fig. 1). This article is a collection of the posts and pictures from the virtual demonstration. Please enjoy!

Stone Selection and Pendant Design

Usually, my "pendant process" starts with the selection of the stone. Stones of significant beauty, rarity, and interesting genesis or origin are significant factors in my stone selection process. Additionally, the presence of three objects can create an intriguing visual array.

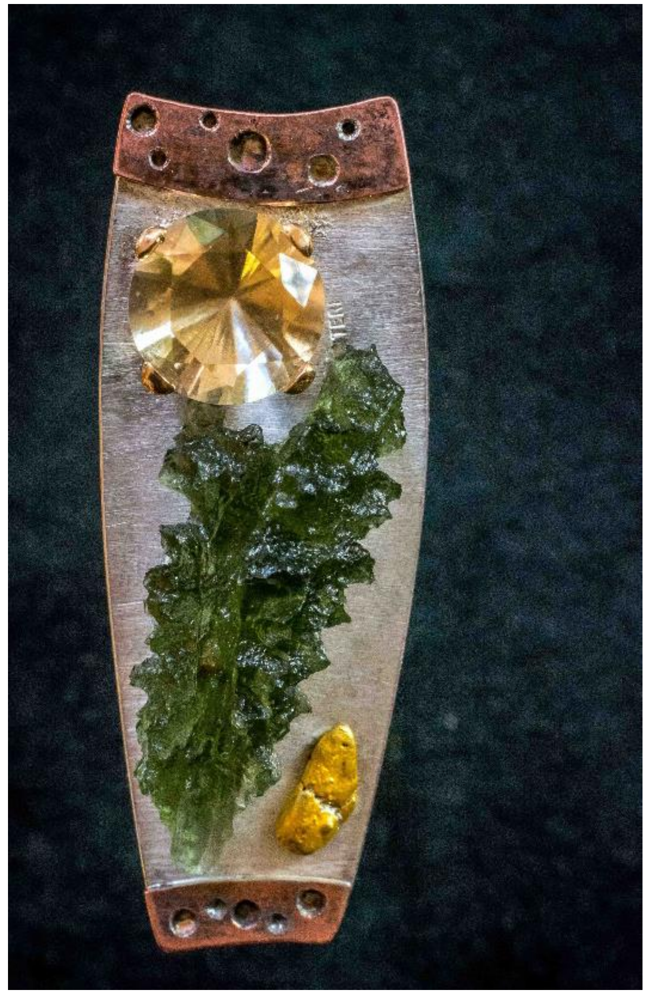


Figure 1—*Completed tektite/gold pendant.*

So … meet the choices: natural moldavite, faceted Libyan desert glass, and a gold nugget (fig. 2).

The moldavite and Libyan desert glass are classified as tektites due to their origin: the release of energy during the interaction of a large meteorite with the Earth. Terrestrial material (soil, sand, and rock) as well as extraterrestrial material (meteorite debris) were melted and blasted into the air, where the material congealed, cooled, and solidified, returning to the ground as tektite glass.

The high-grade moldavite from the Czech Republic (Besednice location) has a wonderful green color and form. Its deeply furrowed surface texture is a record of its travel through the air (airflow-induced grooves

Figure 2—*The stones: Libyan desert glass, California gold, and Czech Republic moldavite.*

Figure 3—*Pectoral piece from King Tut's tomb with a carved Libyan desert glass scarab with lots of gold and legendary enamel and inlay work.*

and folds) and differential stress (as the outside solidified before the core during the flight). The Besednice specimens have the best preserved surface texture of most moldavites due to being safely deposited in a mud formation some 15 million years ago when the meteorite (5,000 feet across) impacted in Germany. The stone was procured through a trade for some Mt. Antero phenakite.

The yellow-faceted tektite is Libyan desert glass from the Sahara Desert. This is a rare gem-grade (highly transparent and flaw-free) stone cut in Russia, obtained in an aquamarine pendant deal with Impaktica of Denver (an excellent local source of meteorites and tektites). The exact interaction between the large extraterrestrial body and the Earth some 26 million years ago is, interestingly, under debate. It is not clear whether the meteorite impacted the ground or exploded above the surface to create the yellow glass. *Jewelry legacy note:* A carved scarab beetle made of this material was found in King Tutankhaten's tomb (fig. 3).

Elements heavier than oxygen were created during the death of a star much larger than our sun during a giant supernova explosion. This is the origin of all gold found on Earth. The California gold nugget was obtained in a trade for some old U.S. silver dollars.

The key to visual success with this three-stone design is finding an intriguing arrangement. Layout iterations are a fun process for me using the drawing feature on my smartphone. Figure 4 shows some of the sketches I used to decide on a configuration I liked. Digital sketching has proven to be a powerful tool with a customizable stylus, thousands of colors, great undo and delete commands, and digital files that allow easy manipulation and convenient use on any digital device.

Figure 4—*Digital design sketch from my Samsung Note 2 smartphone.*

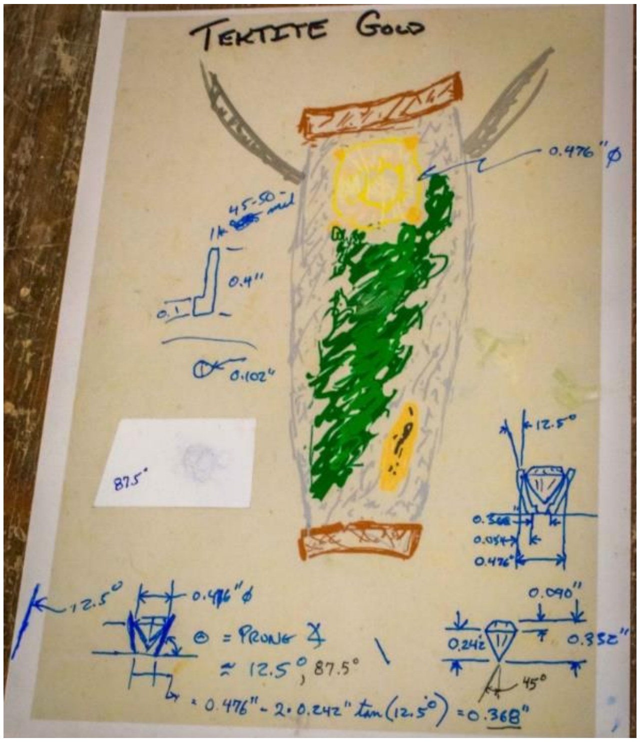


Figure 5—*Detailed design sketch with calculations for prong geometry for the faceted Libyan desert glass.*

Figure 6—*Drilling a blind hole in the moldavite with a plated diamond drill in a horizontal point carver.*

The arrangement process involved drawing and evaluating at least five versions of different positions and backing shapes. I'm happy with the final choice, but it took loads more time than I anticipated to come up with an arrangement that I really liked.

During the Open Studios show, I shared the BoMA studio space with four other artists whose work incorporated of lot of amazing metalwork that definitely inspired the final design of this pendant (thanks, guys!). The inspiration is manifested by a rough finish on the silver and curved copper end caps overlaying the silver to create vertical boundary and visual texture. The circular patterns on the copper are inspired by the universe that made the three stones.

Figure 5 shows the final design spec. Basic ingredients are seen with the design sketch, faceted Libyan desert glass dimensions, and, yes, trigonometry. Still an engineer, I work well when I can manipulate dimensions to know where I want to go.

Pendant Fabrication

The assembly and fabrication were performed at my personal studio in Lafayette. The stones and hidden-on-the-back bale (for the neck chain) are all mounted on 20-gage sterling silver sheet to provide a durable foundation for the settings. Each stone required a different setting technique. The gold nugget was soldered directly to the silver backing, a straightforward and easy technique.

To mount the moldavite, I soldered two pins to the silver and drilled blind holes in the stone that mated with the pins, allowing the stone to be placed on and supported by the pins (fig. 6). Epoxy was then used to permanently adhere the stone to the pins. This process I consider to be of medium difficulty.

The most difficult fabrication procedure by far was the construction of the prong setting for the Libyan tektite using 14/20 yellow-gold filled wire (wire with a center of brass and a thick cladding of gold over the brass, fig. 7). The basic approach was to model the geometry of a prefabricated prong finding and use the knowledge gained from the excellent prong setting class that I attended at BoMA a few months earlier.

Figure 7—*Roughed-out gold-filled wire prongs for the Libyan desert glass and the prefabricated prong finding that was used as a model.*

Figure 8—*Drilling the holes with a drill press at 87.5° for the prongs.*

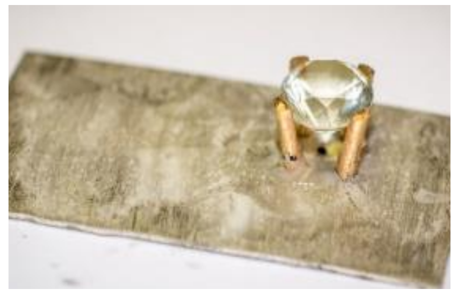


Figure 10—*Prongs polished and notched to catch the girdle of the stone. Stone temporarily set on the prongs.*

Figure 9—*Prongs just after soldering into position. Coloring is from melted flux and is chemically removed.*

Figure 11—*Fabrication and soldering of the metal components and gold nugget. Ready for the tektites.*

Using the results from my calculations and a drill press, I was able to drill four holes to position the prongs at the proper angle and location (fig. 8). The prongs fit tightly in the holes holding them in place during soldering. After the soldering (figs. 9 and 10), notches to hold the stone were created by filing, and then the prongs were polished on a buffing wheel with masking tape covering the silver backing to preserve its rough texture.

After the prong job, I felt like I could do anything! A quick soldering of the gold nugget, pins for the moldavite, and copper end plates to the textured sterling silver (fig. 11) got me ready for stone setting (fig. 12).

Figure 12—*Capturing the Libyan desert glass in the prongs.*

Not exactly "boom, done," but it worked, and I will do it again. This custom prong technology/technique will allow me to use large faceted stones of any shape or size in my pendants, something I have been wanting to do.

Even though I do a lot of lapidary (jade carving, cab grinding, etc.), my faceted stones are all purchased from other artisans. Recently, I ran across some "had-to-buy" faceted stones at gem shows. They are going into pendants (fig. 13).

I hope this article will help other jewelry artists with technique and inspiration for their own creations. Possibly, everyone else at least found it interesting. Maybe it will even inspire someone to start learning how to make jewelry.

Jewelry art is a wonderful way to use, treasure, and appreciate the amazing stones that nature and the universe have produced. ⛏

Figure 13—*Red champagne topaz (upper left) from the Tribute Pocket near Pike's Peak, CO, obtained directly from the miner, Richard Federer. Ethiopian Welo opal (lower left) and Oregon sunstone (right), both cut by the legendary facetor Jim Barzee.*

Aquamarine Tidbits

by Mark Nelson

Editor's note: *The piece is adapted from* Rockhound Ramblings *(newsletter of the Pasadena Lapidary Society, Pasadena, CA), April 2017, p. 4.*

Natural aquamarine is a pleochroic form of beryl. It shows two different colors when viewed from different angles. Aquamarine can show blue from one angle and green or colorless from another.

Using only weight to assess value overlooks condition. Two aquamarine crystals, of equal size and weight, are not equal if one has deeper blue color and is in pristine condition while the other has an incomplete termination and abraded crystal faces due to being thrown in a bucket with similar specimens and brought down the mountain on a lame donkey.

And two equal crystals of aquamarine from different localities are not equal. An aquamarine found 100 years ago on Manhattan Island in New York City is worth 1,000 times more than a comparable crystal collected in 2012 from Brazil. ⛏

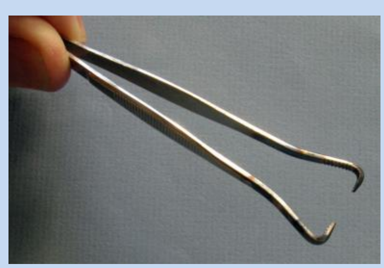
Bench Tip

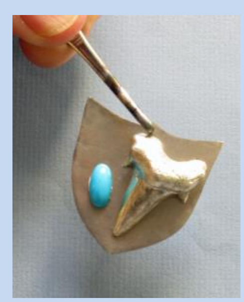
Find the Balance Point

Brad Smith

With odd-shaped pendants or earrings, it's often difficult to find the right place to attach a bail or loop so that the piece is balanced and hangs straight. A quick way to make a tool for this is to modify a set of tweezers. Any set of tweezers will work. Spread the tips, sharpen them with a file, and bend the tips at a right angle to point towards each other. To use the tool, suspend the pendant or earring between two sharp points to see how it will hang.

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





Federation News

2017 AFMS Recognition Award

by Matt Charsky, Past AFMS President

Editor's note: *The article is adapted from the* A.F.M.S. Newsletter *(September 2017, p. 1).*

The 2017 AFMS Recognition Award was presented at the AFMS/CMS Annual Banquet held in Ventura, CA, in June 2017. The award went to an individual who has been president of the California Federation and has worked long and hard in club leadership roles as a director, officer, and committee chair. This individual also received the prestigious California Federation's Golden Bear Award.

This individual is a member of the host club for the 2017 AFMS Convention, the Ventura Gem and Mineral Society. Our recipient served as president as well as 3rd VP–show chair; membership secretary; 1st VP–programs; past president/parliamentarian; scholarship chair; and educational outreach/museum chair.

Our recipient has also served on the AFMS Board of Directors, Scholarship Foundation, and Boundaries Committee, and he has been a judge for the AFMS Bulletin Contest.

This individual's biggest claim to fame, however, is as chair of the AFMS Junior Program since 2003 and as CFMS Junior Activity Chair since 1998. Our recipient constructed the AFMS program for juniors, updated the program every 4 years, and maintained a badge program called the Future Rockhounds of America Badge Program.

The badge program is one that all clubs can use to teach various age groups in myriad subjects, such as geology, mineralogy, and gemology, just to name a few. Students receive badges; a membership patch (with 3,946 distributed so far); and activity badges demonstrating their proficiency in a particular area (currently, there are 20 different areas). And, yes, our recipient designed all the badges.

To date, over 11,900 badges have been handed out. Students who master all the subjects are awarded an AFMS pin, a special mark of distinction (with 28 awarded to date). And the best part is that the program is free!

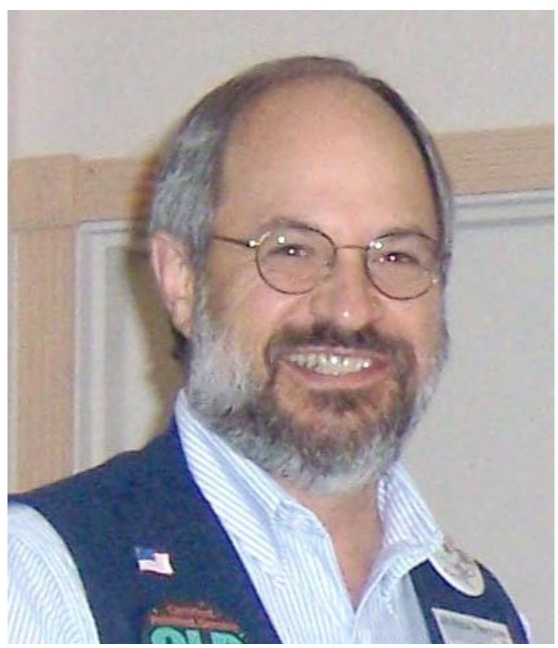
In addition to the badge program, our recipient uses other tools to help juniors in individual clubs, including:

- a menu of Kids Show Activity Suggestions;
- Earth Science Activity Presentations;
- the Patricia Egolf Rock Pals Program; and
- a Juniors category for article submissions in our own AFMS Bulletin Contest.

In his spare time, our recipient is also a regular contributor to Rock and Gem Magazine, the publication that continually supports the mission of the AFMS. Our recipient writes general-interest articles for adult readers and monthly articles aimed at kids. His articles explore different minerals, fossils, and special topics, and he has amassed about 200 articles.

I continuously hear members of the AFMS ask how we can best help our hobby survive. What better way than to educate our youth and instill a lifelong knowledge of and appreciation for all the aspects of our hobby?

Therefore, I was pleased to present Jim Brace-Thompson with the 2017 AFMS Recognition Award for his outstanding service to the AFMS.



Jim Brace-Thompson, winner of the 2017 AFMS Recognition Award.

AFMS Code of Ethics

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

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

Safety Matters
What Do You Know?

by Ellery Borow, EFMLS Safety Chair

Editor's note: *The article is adapted from* EFMLS News *(September 2017), p. 6.*

What do you know?

The brain has a remarkable ability to forget things. I've often thought that ability to be very useful for quite a number of reasons. One is to clear out the clutter that accumulates and in so doing make room for new stuff.

So what do you know?

What new information are you stuffing into the places where information has been forgotten? Are you filling the newfound storage in your head with good and useful information?

May I offer the following quote: "Human beings are perhaps never more frightening than when they are convinced beyond doubt that they are right" (Laurens VanDerPost). Over the years, I have heard many variations of the same, such as, "It's not what one knows but what one doesn't know that's the problem" and "It's not what one knows, it's what one knows that isn't so."

Please permit me to mention some examples related to rockhound safety:

- ***Oxalic acid***—There is a common understanding that oxalic acid is relatively safe. Compared to many acids, oxalic is indeed relatively weak. An acid's strength is measured by how readily hydrogen is given up in water—its Ka value. Oxalic acid has a Ka of 0.0054 (primary) and 0.0000523 (tertiary); so, when compared to hydrochloric acid's Ka of 1.0 or nitric acid's Ka of 27.79, oxalic is relatively weak.

  However, there is no correlation between an acid's strength and its toxicity. Although the rockhound community understands that oxalic acid is relatively weak, less well known is the fact that, gram for gram, oxalic acid is highly toxic. Its toxic potential can be inhaled or readily absorbed through the skin. Very strict safety measures must be followed to safeguard against oxalic acid's toxicity.

- ***Grindstone safety***—I can't tell you how many times I have seen lapidary workers standing or sitting in front of rapidly rotating grindstones while doing their work. Each time I see that body position, chills run down my spine. You should not sit or stand directly in front of a grindstone when starting the machine or shutting it down. Nor is it wise to position yourself in front of a grindstone while it is running. The reason is that grindstones have the potential to break apart.

  Admittedly, the risk is small, but it nevertheless exists. Equipment guards mitigate some of the risk but not all, according to machine instructions. I have personally seen a self-destroyed grindstone and been in the shop when one was self-destructing.

  Needless to say, such an event can do a great deal of damage. So I highly recommend not standing in the path of anything that can injure you. Diamond and belted wheels are considerably less problematic.

- ***Eye protection***—Goggles are great, but there is more to the story. Have you ever noticed, when digging for minerals, hammering on boulders, or doing extensive lapidary work, all the dust accumulating on the inside of your goggles? I have!

  Most goggles are ventilated to prevent fogging. That venting, in addition to some mysterious force, lets dust accumulate on the inside of your goggles.

  Here's the thing: You protect your eyes with goggles, yet those very same goggles let you know that you are breathing lots of dust. You might not be mitigating the risk by wearing a dust mask. It might not always be immediately obvious, but dust protection is advisable.

So now you know.

When filling your head with new information, please make sure to take all safety issues into account! Let's put our newfound memory space to its highest and best use.

Please be safe out there!

The Rocks Beneath Our Feet

Lake Drummond: A Carolina Bay? Part 2

by Hutch Brown

Editor's note: *This is the fifth in a five-part series of articles on Virginia's Lake Drummond and its origins. The previous four articles are in the April, June, September, and October 2017 newsletters.*

Lake Drummond is a huge hole in the Great Dismal Swamp, which straddles the border between Virginia and North Carolina on the Coastal Plain. About 2-1/2 miles across and no more than 7 feet deep, the lake is one of many large and shallow depressions on the mid-Atlantic Coastal Plain. About 500,000 such depressions dot the Atlantic seaboard from Florida to New Jersey. Most are ellipses pointing in the same direction, from southeast to northwest (fig. 1).

Most are wetlands, and some have round lakes in them like Lake Drummond. They are called Carolina bays for such wetland trees as sweetbay and redbay—and for their particular abundance in the Carolinas.

Is Lake Drummond a Carolina bay? What created the Carolina bays in the first place?

Alternative Theories

No one knows for sure, but one theory is that a comet struck the Laurentide ice sheet towards the end of the last Ice Age. The collision threw huge chunks of ice into the atmosphere, and a giant hailstorm showered the mid-Atlantic Coastal Plain, digging the shallow depressions that we know as Carolina bays.

It sounds far-fetched. But so did the theory about an asteroid strike causing the extinction of the dinosaurs (what geologists call the Cretaceous–Tertiary extinction event) about 66 million years ago. That theory is now widely accepted, and some researchers take the comet theory for the Carolina bays very seriously as well (Howard 2013; Tennant 2008c; Zamora 2013).

The theory seems compelling, in part, because the alternatives seem so weak. Perhaps the strongest alternative theory is that the interaction of wind and water formed the Carolina bays in permafrost lakes and ponds at the height of the last Ice Age.

But the Laurentide ice sheet reached only as far south as central New Jersey. Could permafrost (permanently frozen soils) ever have reached southern Virginia, let alone as far south as Florida? Moreover, scientists have shown that some Carolina bays never had standing water in them (Howard 2013). Therefore, something other than permafrost lakes and ponds must have formed the Carolina bays.

Figure 1—*Lake Drummond (top) bears a striking resemblance to other shallow basins on the Coastal Plain, known as Carolina bays (bottom). Sources: Top—Higgins (2015). Bottom—Zamora (2013b); Lidar image of Bowmore, NC.*

Intersecting Axes

The comet theory has considerable supporting evidence. For example, the shape of the Carolina bays varies regionally. The bays tend to be more elliptical in the Southeast and rounder in the mid-Atlantic states, just as Lake Drummond is almost round. The

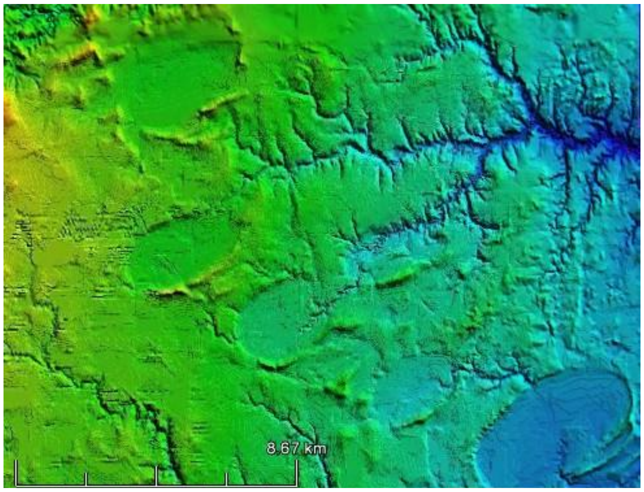


Figure 2—*Bays in Nebraska show the same elliptical shape as the Carolina bays but the opposite orientation. Source: Zamora (2013b).*

regional differences would fit the theory: they would result from variances in the trajectory of material ejected from the ice sheet by a collision with a comet.

Moreover, the Carolina bays have counterparts in Kansas and Nebraska (fig. 2). Although more weathered than their Carolina cousins, the midwestern bays have the same shape. They, too, are large and shallow elliptical depressions with raised rims, with about the same length-to-width ratios as the Carolina bays. But their orientation is just the opposite—from southwest to northeast.

And that suggests a common origin. A study of the Carolina bays and their midwestern counterparts showed that their axes are roughly aligned (Zamora 2013). Most point toward the same place—a point in Michigan. The rest align with a nearby point in southern Canada.

That seems to suggest that the bays originated in the same way at about the same time: from something happening near the Great Lakes, possibly during the last Ice Age.

A Cataclysmic Event

Climate and archeological records seem to suggest a sudden cataclysmic event about 12,900 years ago. At the time, the Laurentide ice sheet that covered much of North America up to about 18,000 years ago was in full retreat. The Earth was warming again, as it typically has during the cooling and warming cycles of the Quaternary Period beginning about 1.6 million years ago.

Then something happened to interrupt the latest warming cycle. Global warming abruptly reversed during what is known as the Younger Dryas cold period. For about 1,200 years, the global ice sheets began to advance again.

Something happened to the planetary climate, disrupting habitats for animals and people alike. About 35 groups of animals went extinct—not only megafauna like mastodons and giant sloths but also species of mice and vultures, animals that people would not have hunted. And the people themselves, an entire culture known as the Clovis, disappeared.

So what happened to cause such tremendous disruption? Some researchers look to an extraterrestrial event. Here's one version of the theory.

Comet Strike

About 12,900 years ago, a comet struck the Laurentide ice sheet in what is now Michigan (with part of it breaking off before impact to strike a point in southern Canada). Comets are not solid but rather collections of ice, dust, and rock, so the collision would have vaporized the comet and thrown great chunks of ice into the atmosphere, causing a shower of giant hailstones in a far-flung radius around the point of impact (fig. 3). The ejected materials ("ejecta") would have struck the ground at an angle, plowing shallow holes that were deepest farthest away from their point of origin (fig. 4).

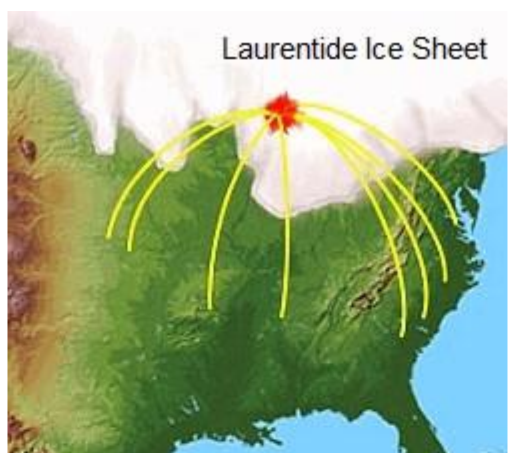


Figure 3—*Model for a comet strike (red) about 12,900 years ago in present-day Michigan. In the model, the secondary effects (yellow arcs, representing ejected chunks of ice) created the Carolina bays and their midwestern counterparts. Source: Zamora (2013a).*

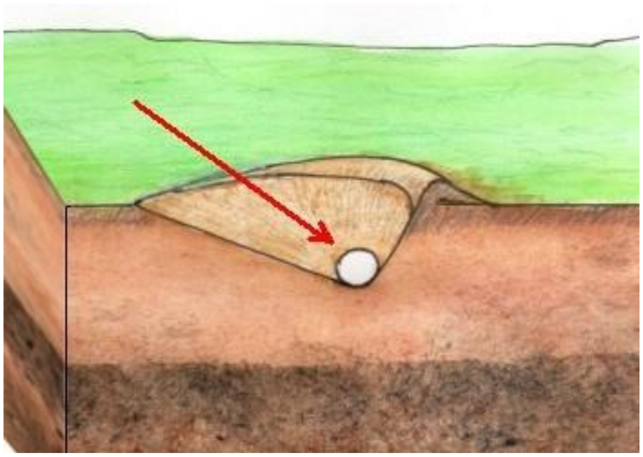


Figure 4—*Depiction of a giant hailstone striking the Earth and digging a Carolina bay, with its deepest part at the farthest end and a sandy overturned rim flap due to the momentum. (Golf balls dig similar holes in sand traps.) Source: Zamora (2013a).*

Accordingly, the Carolina bays are all deepest at their southeastern ends. The ejecta would also have plowed up sediments, leaving rims around the holes. The rims would have been highest at their farthest points, where the momentum from the ejecta would have thrown up overturned rim flaps (fig. 4). Sequential strikes by ejecta of different sizes traveling at different velocities would account for the intersection and overlap among the Carolina bays (fig. 1).

The bays are best preserved in the soft sandy coastal sediments along the mid-Atlantic seaboard. Elsewhere—for example, in the Valley and Ridge or on the Allegheny Plateau—the impacts would have been lesser, and the later effects of water and wind would have been greater. The weathering process is clearly visible in the midwestern bays (fig. 2), despite the flat terrain and its relatively soft sediments.

The comet's collision with the ice sheet would have melted vast quantities of water, which would have poured into the Atlantic Ocean and interrupted the Gulf Stream, altering ocean currents and climates worldwide. Scientists have long theorized that just such an interruption of the Gulf Stream from massive glacial meltwater outflows from Canada caused the Younger Dryas.

The comet strike would have sent out enormous shock waves, including hurricane-force winds that swept across the continent, followed by massive wildland fires. The winds and fires alone would have killed most large animals and destroyed the Clovis culture.

Altered climates and habitats would then have doomed many Pleistocene species to extinction. A layer in the geological record called a "black mat" demarcates the Younger Dryas. Below the black mat, you can find megafauna bones and the large and distinctive Clovis spear points. Above it, there are none.

The black mat also contains "extraterrestrial markers" typical of an extinction event. Iridium, for example, is in the black mat; it is also in the Cretaceous–Tertiary boundary demarcating the asteroid strike that doomed the dinosaurs. Other markers in the black mat, 14 in all, include charcoal, heavy metals, fullerenes, helium-3, and nanodiamonds. Carolina bay sediments have tested positive for the same markers.

Skeptics have noted that the markers rain down from outer space all the time. But the levels in the black mat are higher than expected from normal background levels.

A Problem of Timing

So does that prove the comet theory? No, because a huge problem remains: the Carolina bays evidently did not all form at about the same time.

A study from 2010 used a technology called optically stimulated luminescence (OSL) to estimate the time since the last exposure to the sun for sands in the Carolina bays. As Zamora (2013b) explained:

> Cosmic rays and ionizing radiation from naturally occurring radioactive elements in the Earth cause electrons to become trapped in the crystal structures of buried quartz and other minerals. OSL frees the trapped electrons to produce luminescence in proportion to how long the quartz has been buried.

The study found that wind processes modified the sandy rims of the bays in five stages, ranging from 12,000 to 140,000 years ago. If the bays have such a wide range of ages, then they could not have formed in a single cataclysmic extraterrestrial event.

So is the wind-and-water theory right after all? No one knows; the science remains unsettled.

An Enduring Enigma

No matter what caused the Carolina bays, is Lake Drummond even one of them?

Lake Drummond shares some characteristics with the Carolina bays but not all:

- Like the Carolina Bays, Lake Drummond has a northwesterly orientation (fig. 5), however slight. But its orientation is also consistent with a wind-driven peat fire burning out a hole in the Great Dismal Swamp, an alternative theory. As figure 5 shows, the prevailing winds are from the west to northwest, which is also consistent with the wind-and-water theory.
- Lake Drummond does not have the signature sandy rim of a Carolina bay. Yet it is a high point in the swamp, suggesting high underlying margins. Could the rim be buried under peat?
- Lake Drummond, like the Carolina bays, could be deepest at its southeastern end; I could find no lake bottom studies to show one way or the other. Of course, the lake could also be the deep southeastern end of a much larger Carolina Bay extending to the northwest, with its rim buried in the swamp. Again, relevant studies seem to be lacking.

Some observers maintain that American Indian legends contain a kernel of truth about ancient events (Howard 2008; Tennant 2008b). Some cite a legend among the Lenape people of the mid-Atlantic Coastal Plain (what is now Delaware and New Jersey). According to the legend, the mastodons rebelled against the people they were created to serve, and after a great battle most animals were killed, their blood forming swamps where their bones lay buried. It sounds a lot like an apocalyptic extinction event.

But the lack of a telltale sandy rim makes me suspect that Lake Drummond is not a Carolina bay. In American Indian legend, Lake Drummond is associated with a "fire bird" that came down to Earth to burn out the lake. That would seem to point to the fiery origins for the lake described in the June issue.

Wildfire? Mastodon battle? Wind and waves? Comet—or maybe a meteorite? Nobody really knows how Lake Drummond originated. Like the Carolina bays themselves, the largest of Virginia's two natural lakes seems destined to remain a mystery.

Acknowledgment

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

Figure 5—*Lake Drummond and the Lateral West Fire in 2011. (Black = Lake Drummond; solid green = Great Dismal Swamp; purple = area burned; light blue = smoke from the fire). Though nearly round, Lake Drummond has a slight northwesterly tilt, reminiscent of the Carolina bays. But as the smoke shows, the lake's orientation is also consistent with the theory that the lake originated through a massive peat fire driven by prevailing northwesterly winds. Source: National Aeronautics and Space Administration.*

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December 2017—Upcoming Events in Our Area/Region (see details below)

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2 Penn/MD field trip
3 Advent begins	4	5 Lapidary Auction, Baltimore, MD	6	7	8	9 MSDC/ MNCA Anniversary Dinner
10	11 GLMSMC mtg, Rock-vle, MD	12 Hanukkah begins	13	14	15	16
17	18 NVMC/ MNCA Holiday Party	19	20 Hanukkah ends	21 Winter begins	22	23
24 Advent ends	25 Christmas	26	27	28	29	30
31 New Year's Eve						

Event Details

2: Peach Bottom, PA—Penn/MD Materials Quarry field trip; Gem, Lapidary, and Mineral Society of Montgomery County (host); 303 Quarry Rd; start at 8 am; arrive 15 minutes early; age 15 and over okay; RSVP: Bob Cooke at rdotcooke@gmail.com by Nov 29.

5: Baltimore, MD—Annual Lapidary Auction; Gem Cutters Guild of Baltimore; 7:30 pm, 7 pm preview; 3600 Clipper Mill Rd #116; slabs, rough, tools.

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

18: Arlington, VA—Holiday party; Northern Virginia Mineral Club/Micromineralogists of the National Capital Area; 6:30–9:30; Long Branch Nature Center, 625 S Carlin Springs Rd.

MSDC/MNCA Anniversary Dinner

Please join us to celebrate!

What:

- 75th Anniversary of the MSDC
- 50th Anniversary of the MNCA

When: December 9, 6 to 9 p.m.

Where: Holiday Inn Carlyle, 2460 Eisenhower Avenue, Alexandria, VA

Speakers:

- Dr. Jeff Post of the Smithsonian
- Tom Tucker, on the early days of MSDC
- MNCA, brief presentation

Cost: $30 dinner (plated choice of three options). Parking free.

Information/tickets (purchase by November 22): MNCA website (click here)

Hutch Brown, Editor
4814 N. 3rd Street
Arlington, VA 22203

Crystals are the flowers of the Mineral Kingdom

Mineral of the Month: Rhodonite

2017 Club Officers and Others

President: Bob Cooke
rdotcooke@gmail.com
Vice-President: Ti Meredith
ti.meredith@aol.com
Secretary: David MacLean
dbmaclean@maclean-fogg.com
Treasurer: Rick Reiber
mathfun34@yahoo.com
Field Trip Chair: Ted Carver
jtcarve@msn.com
Webmaster: Casper Voogt
casper.voogt@plethoradesign.com
Club Historian: Kathy Hrechka
kshrechka@msn.com
Communications: Vacant
Photographer: Sheryl Sims
sesims4@cox.net
Editor: Hutch Brown
hutchbrown41@gmail.com
Show Chair: Tom Taaffe
rockcllctr@gmail.com
Greeter/Door Prizes: Ti Meredith
ti.meredith@aol.com

PLEASE VISIT OUR WEBSITE AT:
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The Northern Virginia Mineral Club

You can send your newsletter articles to:

Hutch Brown, Editor
4814 N. 3rd Street
Arlington, VA 22203
hutchbrown41@gmail.com

Visitors are always welcome at our club meetings!

RENEW YOUR MEMBERSHIP!

SEND YOUR DUES TO:
Rick Reiber, Treasurer, NVMC
PO Box 9851, Alexandria, VA 22304

OR

Bring your dues to the next meeting.

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) and the American Federation of Mineralogical Societies (AFMS).

You may reprint the materials in this newsletter.

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

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.*