The Mineral Minutes

Volume 78-10
October 2020

Zoom Meetings Continue

After a successful foray into the virtual world in September, the MSDC continues with Zoom meetings for the time being. Please connect to our October program at our usual time and date: **7:30PM Eastern Time** on **October 7th, 2020**. You will receive an email from the MSDC Treasurer, John Weidner, with a link. If you have not received it, please email John (jfweidner42 at gmail dot com) and he will forward the link to you.

October 7, 2020 Program: "Chimney Rock Quarry" by Dan Teich

MSDC Board of Directors' member, Dan Teich, will be our presenter in October. Everyone who met Dan knows that minerals of New Jersey are his specialty. His presentation will focus on one of the famous mineralogical locales of that state, Chimney Rock Quarry in Bound Brook, New Jersey. Over the last 200 years, it's been known as a copper mine (although not commercially successful), a quarry (still in operation), and a source of several copper minerals including native copper, chalcocite, and chrysocolla.

http://raritan-online.com/chimney-rock.htm

Sharing Time

by Dave Hennessey, MSDC President

Our presentation this month will take us into one of the trap rock quarries of New Jersey. So what is a trap rock? "Trap Rock" has become a term used for convenience in the construction industry for any dark-colored igneous rock that is used to produce crushed stone. According to Geology.com, the name "trap rock" is from the Swedish word "trappa" which means "stair step." This refers to the step-like landscape that is present in geographic areas where basalt flows form a landscape of steep cliffs and narrow ledges. The basalts in eastern New Jersey are the home of many trap rock quarries.

Over geologic time, many interesting minerals form in the cracks and fissures of the basalt flows. Fabulous specimens from New Jersey trap rock quarries include prehnite, apophyllite, datolite, pectolite, calcite, and many zeolite species. Specimens of any of these minerals, especially from New Jersey localities, would be terrific for our sharing time. And as always, anything else you want to share for any other reason is welcome. If it interests you it will interest the rest of us.

A lesson learned from the Zoom meeting in October was that it is necessary to have very bright lighting to successfully share a specimen via Zoom. Crank up the lighting if you want everyone to see the minerals you have to share.

In this Issue:

Prez Says…

by Dave Hennessey, MSDC President

I was very sorry to miss last month's presentation. The topic promised to be interesting and it was to be our club's first foray into Zoom. But to quote Robert Burns, "the best laid schemes o' mice and men gang aft agley." I was meeting my mom (age 91) that morning to take her grocery shopping and when I let myself into her condo she was on the floor. She had fallen and cracked her head good. I called 911. It was off to the emergency room for CAT scans, etc. and ultimately 7 staples to close up her wound. So, no meeting for me.

(Cont. on p. 2)

(Prez Says… continued)

Skipping forward, my mom was okay – no stroke or brain bleed – and she is now safely ensconced in an assisted living facility that is about 10 minutes from my home. I'd been trying to get her to give up her condo for years but it took this event for her finally to agree that she needed the assistance. She and I will both rest easier.

The feedback I received after last month's meeting is that everybody received the link and had success getting onto Zoom (Thank you John), the presentation was great (Thank you Tim), the whole Zoom meeting experience was great (Thank you Betty), and that the meeting was superbly run (Thank you Yury). I am a little afraid to return for the October meeting since things went so well in my absence. One other thing. Several members have suggested that it would be good if we can simultaneously Zoom our meetings even after we are able to meet again in person. This is something we will definitely have to look into.

Everyone please keep staying safe. Use those masks. Maintain social distance. Wash hands frequently. And get your flu shot! No getting careless now – this virus is far from over.

It will be good to see everyone on the Zoom grid. See you on the evening of Wednesday, October 7th.

September 2020 Business Meeting

by Andy Thompson, MSDC Secretary

Yury Kalish, V.P. for Programs, stood in for President Dave Hennessey and called the meeting to order. He welcomed and thanked everyone for attending MSDC's first-ever Zoom meeting, necessitated by COVID 19's having prevented the club's access to its usual meeting in the NMNH Cathy Kerby room. He acknowledged the service of past MSDC presidents who were in attendance and especially thanked Tim Rose, the evening's speaker, Betty Thompson, the Zoom meeting's host, and all who brought snacks for supporting the members' conviviality.

Yury asked if any members had interesting "Geology in the News" and attendees noted and discussed: 1) the closing of the Natural History Museum; 2) that Denver's famous mineral show, September 10-20, despite COVID 19, has several components which will take place in multiple locations in the metropolitan area; 3) the Franklin NJ show, September 26-27, also intends to hold an outdoor event.

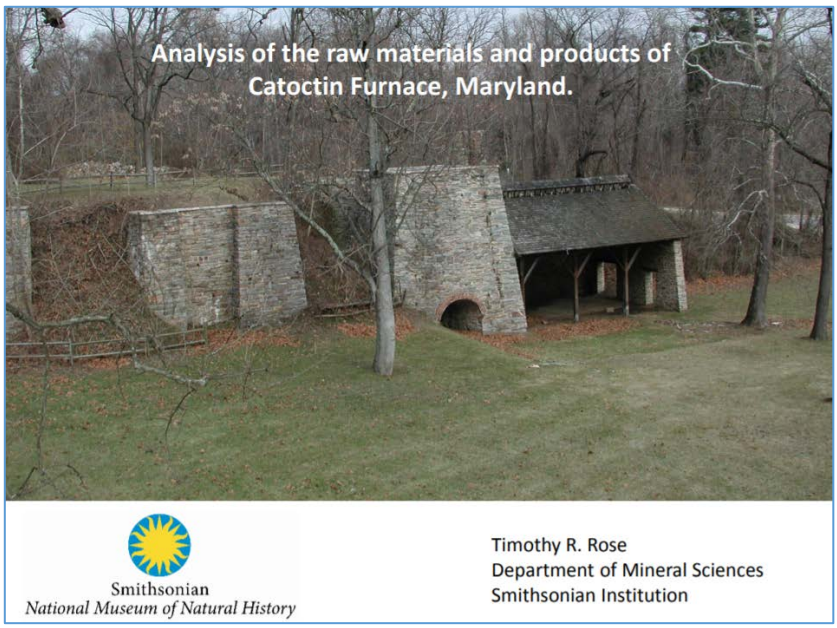
With no further discussion of geology news, Yury welcomed the Treasurer's Report and John indicated the club's continued solvency. However, he noted the number of the club's paid memberships has declined over the last three years and described his current and future email efforts to encourage timely payments.

Having completed all necessary business, Yury called for and received a unanimous vote to close the business meeting and move to the core of the gathering, the presentation by MSDC's sponsor, Tim Rose.

September 2020 Program: Catoctin Furnace" by Tim Rose

Synopsis by Andy Thompson, MSDC Secretary, with editorial assistance from Tim Rose

The September program was presented by Tim Rose, Analytical Laboratories Manager, Department of Mineral Sciences, Smithsonian Institution and was entitled "Analysis of the raw materials and products of Catoctin Furnace, Maryland."



Tim began his presentation by explaining that his research was initiated due to a request by colleagues in the Smithsonian Department of Anthropology. They, in turn, had been recruited by Maryland historians researching a somewhat forgotten community of slaves who worked, died and were buried near the Catoctin Furnace ironworks not far from Frederick, Maryland.

The African Americans had been buried between 1790 and 1840 in a small cemetery

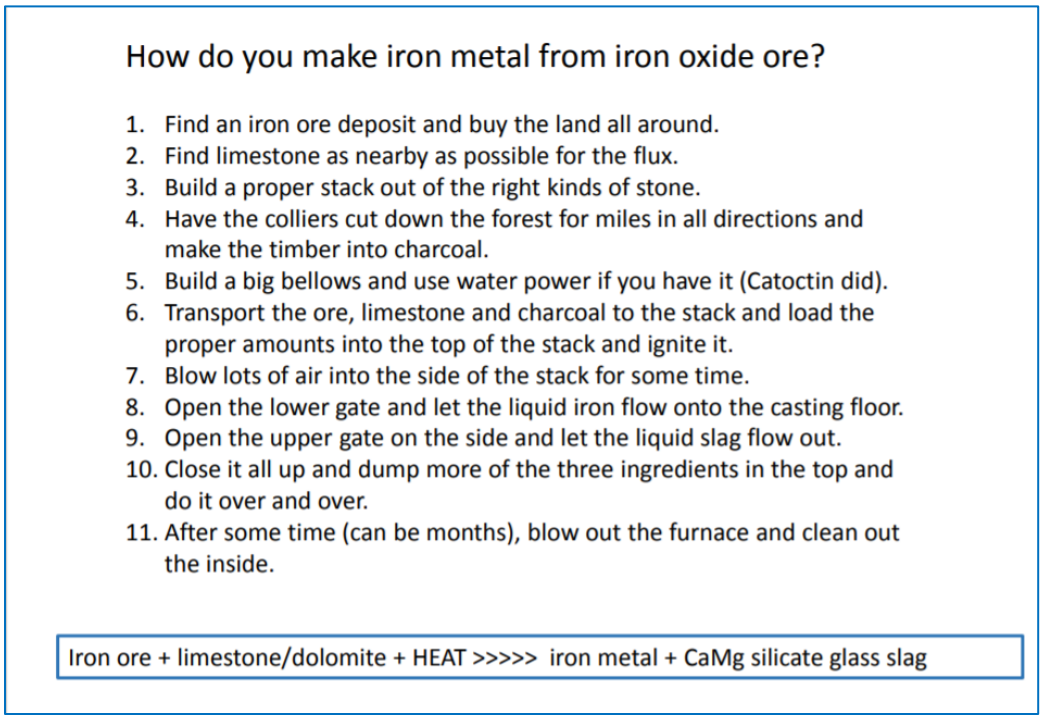
which, over the following nearly two centuries, suffered from neglect. The Maryland State Highway Association, in the early 1980s, authorized expanding Route 15 in Frederick County. That required the graves in a small portion of the seemingly forgotten cemetery to be archeologically excavated and allowed historians to learn about and publicize some of the cultural heritage of that colonial community.

In 2015, the Catoctin Furnace Historical Society received a grant to conduct a data-grounded reinterpretation of the cemetery's skeletal remains. The purpose was to learn more about the community's members and publicize their story. So although initially studied nearly four decades earlier in the 1980s, the current project, starting in 2015, aimed to develop their story by using more recently available scientific analytic techniques. In particular, the research included the use of inductively coupled plasma mass spectrometry, ICP-MS, which allowed researchers to identify the extent of any heavy metal concentrations in the bones, including mercury, arsenic, lead and zinc.

Tim explained that based on the bone scan findings, a central mystery soon surfaced. The chemical analysis of the bones of one gentleman was unique among all the deceased tested in that he had a very high concentration of zinc. He had 1195 parts per million in contrast to the average of all those tested which was closer to about 225 parts per million. The archaeologists determined he lived to about the age of 40 to 50. That raised the question: where did the zinc come from and how might he have absorbed such high amounts into his bones?

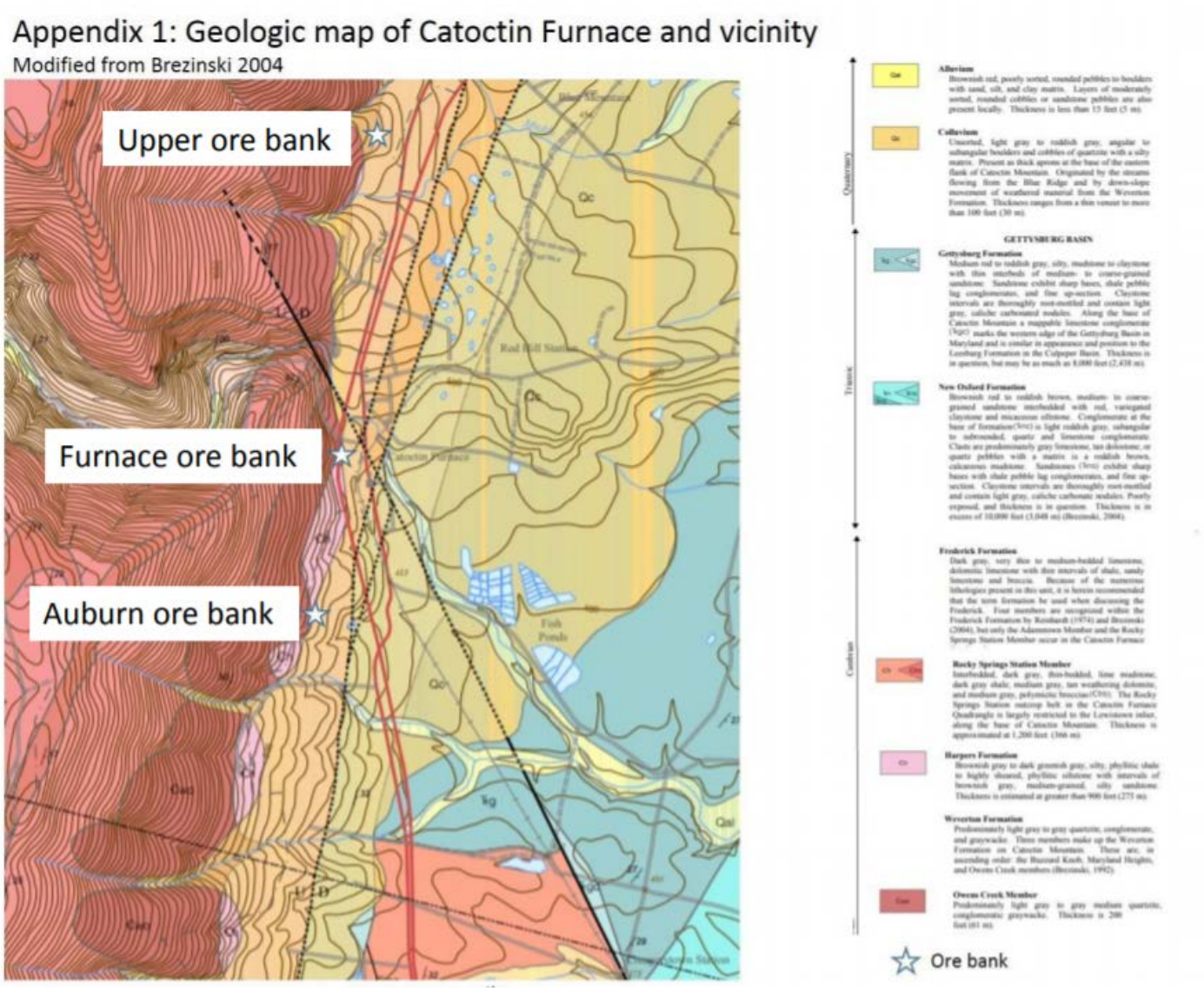
Here is what the researchers did already know. They had evidence that all the deceased had some connection with the Catoctin Furnace ironworks which included their working in some way to support its operation. So that raised a question: what role, if any, might the gentleman have played in the iron works operation which somehow may have exposed him to absorbing high amounts of zinc? An adequate answer required looking at both the iron smelting process as well as the raw materials that were used to make the iron.

For background, Tim listed the 11 traditional steps for making iron metal which included collecting the raw materials, feeding them into the blast furnace, collecting the slag and iron ore, as well as the periodic cleaning of the smelter (see below).



Tim explained that the central question was where the zinc could possibly have originated? In other words, did any of the raw materials that went into the smelting process initially contain zinc? The three basic materials in question, noted above, were the iron ore, the limestone which served as a flux and the charcoal used for combustion. The iron ore is made primarily of the mineral goethite which is iron hydroxide, FeO(OH). The flux was limestone, mostly calcium carbonite, $CaCO_3$, and dolomite, which has a higher content of magnesium. The charcoal is basically carbon which was used to support the furnace's burning but as Tim pointed out, some trees do incorporate metals in the wood. Tim also explained the process that caused the common accumulation of zinc oxide that occurred in colonial iron furnaces. He mentioned one furnace that, after six months of smelting, accumulated a 25 ton mass of zinc oxide, called cadmia in those days. He showed images of the beautiful man-made zinc oxide crystals from Poland which formed in a similar process and are widely sought after by mineral collectors.

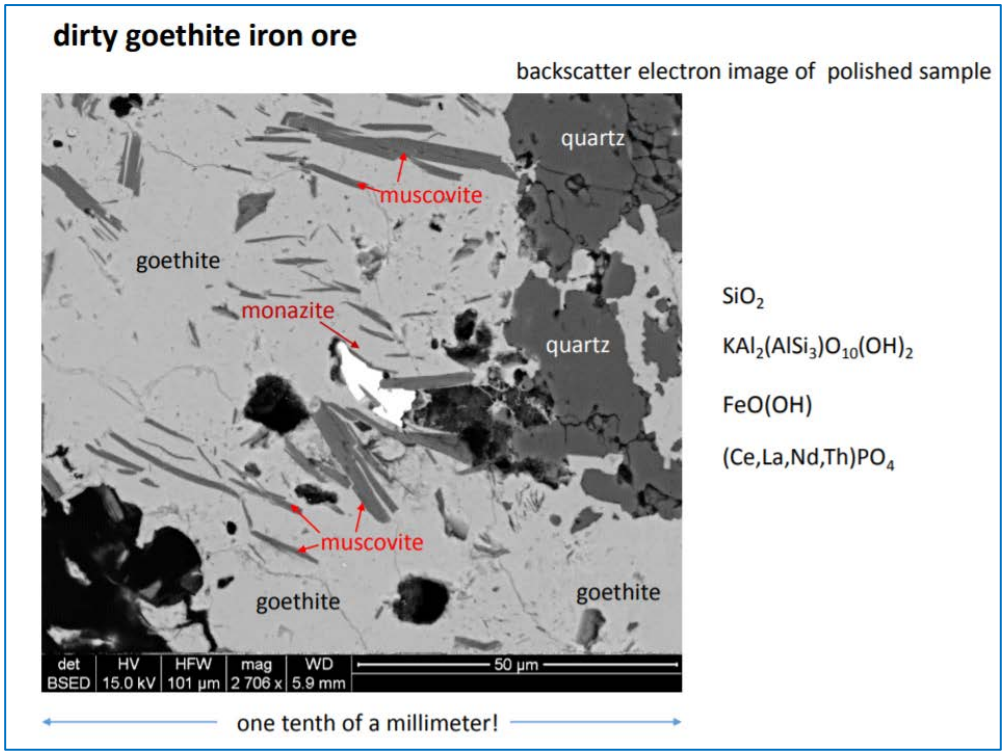
Historians familiar with the Catoctin Furnace iron works knew the iron ore was mined from three sites: Auburn ore bank to the south, the Furnace ore bank located near the furnace and the Upper ore bank to the north, shown on the map shown below.



Tim explained the regional and local geology and showed examples of ore deposits very similar to the Catoctin Furnace ore banks. All of these deposits involve carbonate rocks juxtaposed with micaceous rocks with a fault between. At Catoctin Furnace the micaceous rocks are those of the Harper's formation to the west. The picture below shows a typical chunk of vuggy iron ore from the Auburn ore pit (background grid is centimeter squares). The ore formed in association with brecciated carbonate rocks (limestone or dolomite) broken up by faulting with the iron ore filling in the cracks. Subsequently the carbonate rocks dissolved away leaving the ore very vuggy. Inside the cavity in the ore you can see nicely botryoidal black goethite. The identification of the mineral goethite was confirmed by x-ray diffraction.

Analyses and imaging of the samples of raw materials from Catoctin Furnace were performed on a scanning electron microscope outfitted with an energy dispersive x-ray detector in the Department of Mineral Sciences at the Smithsonian Institution. Analysis of a sample of colonial-age wood recently collected at the Catoctin Furnace and also charcoal, indicated, as expected, that the timber was not a likely source for zinc. Similarly, the limestone and dolomite were analyzed and excluded as a source. That left the iron ore as the most likely source of the zinc. Tim found the iron ore included not only goethite, but also abundant quartz and muscovite with rare monazite and zircon making it a kind of "dirty" iron ore (see the electron image below). These minerals were likely derived from the adjacent rocks of the Harper's formation. Analysis of the goethite revealed that the ore from the Furnace and Auburn ore banks contain up to 1.5 % zinc. However, the more recently mined Upper ore bank has very little zinc content.

Having identified the probable origin of the zinc, the remaining question was how it may have ended up in such large quantities in the gentleman's skeletal remains. The answer required an examination of the smelting process itself, the structural architecture of colonial furnaces, and which job most likely exposed its worker to absorb the zinc. As Tim explained, zinc in the ore would have melted and because it has a very low vaporization temperature, the zinc would have turned to vapor and gone up the stack. Cooler temperatures in the upper stack would have allowed some of the zinc to oxidize and accumulate on the walls of the upper stack. But surely some of the zinc vapors would have exited the stack with other fumes from the combustion below. A person loading the ore, charcoal and limestone into the top of the stack would likely have been exposed to some of these fumes and Tim concluded that this is where the gentleman of interest probably worked.



At the bottom end of the furnace, where the smelted, relatively pure iron exited from the tap hole, no zinc was found to have deposited into the iron. Nor did Tim find any evidence of zinc in the slag. A colleague of Tim's had collected from the area of the Catoctin Furnace samples of the slag. Tim's analyses discovered a number of minerals in the glassy slag that exited the furnace toward the bottom. None of the minerals or the glassy slag contained zinc.

Tim concluded his presentation with three interesting points:

- Our gentleman of interest was a slave who died at an age of 40 to 50 which may have been rather old for enslaved people of the day. We can speculate that perhaps the zinc that built up in his body did not lead to a premature death.
- He likely worked loading ore, limestone and charcoal into the top of the stack which exposed him to zinc-laden fumes.
- The zinc in his body came from the iron ore from the Furnace or Auburn mine pit but not from the Upper Ore Bank which had little to no zinc.

Tim highly recommended to MSDC members an excellent historical source, Catoctin Furnace: Portrait of an Iron Making Village (Landmarks) written by Elizabeth Yourtee Anderson and available through the Catoctin Furnace Historical Society.

Yury thanked Tim for sharing his interesting research and opened the floor to questions, after which everyone thanked Tim with appreciative applause.

September 2020 Show and Tell

by Andy Thompson, MSDC Secretary

A favorite part of monthly MSDC meetings occurs after the evening's presentation, when individual attendees have an opportunity to show everyone the mineral specimens or fossils they have brought to the meeting. Sometimes the items pertain to the topic of the presentation and at other times they are simply minerals or fossils the attendees want to show to or discuss with others. Because our September meeting was virtual and held on Zoom, it was much easier for people to simply hold their specimens up to their camera. That facilitated a large number of items displayed. We learned that if the person showing the item provides a generous amount of light, that makes for a clearer image for all to enjoy. Similarly, when the person is using a connection which has low transmission power, their voice and images are less available to others. We live and learn and look forward to our October 7th meeting.

MSDC Club Information

Due to COVID-19, our meetings will be virtual over Zoom. No in-person meetings are planned until further notice. In non-COVID times, meetings are the First Wednesday of the Month (Jan-Jun and Sep-Dec). We meet in the Constitution Avenue lobby of the Smithsonian National Museum of Natural History at 7:30 pm.

Website http://mineralogicalsocietyofdc.org/

Facebook www.facebook.com/Mineralogical-SocietyOfTheDistrictOfColumbia

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THE MINERAL MINUTES

NEWSLETTER OF THE MINERALOGICAL SOCIETY OF THE DISTRICT OF COLUMBIA

Mineralogical Society of DC
Time Sensitive Dated Material
First-Class Mail

Useful Mineral Links

	American Federation of Mineralogical Societies (AFMS)	www.amfed.org
	Eastern Federation of Mineralogical and Lapidary Societies (EFMLS)	www.efmls.org
mindat.org	MINDAT	www.mindat.org
	Mineralogical Society of America (MSA)	www.minoscam.org
	Friends of Mineralogy	www.friendsofmineralogy.org
	WebMineral	webmineral.com
THE GEOLOGICAL SOCIETY OF AMERICA	The Geological Society of America (GSA)	www.geosociety.org
Scovil PHOTOGRAPHY	Jeff Scovil Mineral Photography (not advertising - just great photos)	scovil photography.com
USGS science for a changing world	United States Geological Survey (USGS)	www.usgs.gov
The Geological Society of Washington	The Geological Society of Washington (GSW)	www.gswweb.org

AFMS Code of Ethics

- I will respect both private and public property and will do no collecting on privately owned land without the owner's permission.
- I will keep informed on all laws, regulations of rules governing collecting on public lands and will observe them.
- I will to the best of my ability, ascertain the boundary lines of property on which I plan to collect.
- I will use no firearms or blasting material in collecting areas.
- I will cause no willful damage to property of any kind – fences, signs, and buildings.
- I will leave all gates as found.
- I will build fires in designated or safe places only and will be certain they are completely extinguished before leaving the area.
- I will discard no burning material – matches, cigarettes, etc.
- I will fill all excavation holes which may be dangerous to livestock. [Editor's Note/Observation: I would also include wildlife as well as livestock.]
- I will not contaminate wells, creeks or other water supply.
- I will cause no willful damage to collecting material and will take home only what I can reasonably use.
- 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.
- 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.
- I will cooperate with field trip leaders and the se in designated authority in all collecting areas.
- I will report to my club or Federation officers, Bureau of Land management or other authorities, any deposit of petrified wood or other materials on public lands which should be protected for the enjoyment of future generations for public educational and scientific purposes.
- I will appreciate and protect our heritage of natural resources.
- I will observe the "Golden Rule", will use "Good Outdoor Manners" and will at all times conduct myself in a manner which will add to the stature and Public "image" of rockhounds everywhere.

MEMBERSHIP APPLICATION OR RENEWAL
THE MINERALOGICAL SOCIETY OF THE DISTRICT OF COLUMBIA (MSDC)

(___) Family – $25.00 per year. One address.

(___) Individual – $20.00 per year.

(_____) New * (_____) Renewal Dues are for Year_____*

For new members who join in the last months of the year, membership will extend through the following year with no additional dues.

ANNUAL DUES – PLEASE PAY YOUR DUES PROMPTLY.

Pay at next meeting or mail to:

Mineralogical Society of DC
c/o John Weidner
7099 Game Lord Drive
Springfield, VA 22153-1312

Name(s) (First and Last) _____

Address_____

City_____State_____Zip:_____

Phone(s): Home/Work/Mobile_____

Email(s):_____

OK TO INCLUDE YOU ON CLUB MEMBERSHIP LIST?

( ) Yes – Include name, address, phone, email.

If you want any information omitted from the membership list, please note:

Omit my: ( ) Email; ( ) Home phone; ( ) Work phone; ( ) Mobile phone; ( ) Address; ( ) Name

SPECIAL CLUB-RELATED INTERESTS? _____

Meeting Dates, Time, and Location: The first Wednesday of each month. (No meeting in July and August.)

(**Due to COVID-19, our meetings will be virtual over Zoom. No in-person meetings are planned until further notice.** Normally, the MSDC meetings take place at the National Museum of Natural History, Smithsonian Institution, 10th Street and Constitution Ave, Washington D.C. We usually gather at the Constitution Avenue entrance at 7:30 PM to meet our guard who escorts us to the Cathy Kerby Room.)