DAISY MOUNTAIN ROCKCHIPS

The purpose of Daisy Mountain Rock & Mineral Club is to promote and further an interest in geology, mineralogy, and lapidary arts, through education, field experiences, public service, and friendship.

VOLUME 7, ISSUE 3 **MARCH 2022**

I'm gonna keep pestering you :-)…. This is Microcline variety Amazonite cluster, from the Two Point Claim, Teller Co., Colorado. Once more into the fray….How to view a stereo pair: Center an eye over each image, let your eyes cross, and concentrate on the center image. It should pop into 3-D. (I had trouble at first, but now "bam" -- 3D. You may have to adjust your head tilt and position to facilitate the "pop".)

Photo by Stan Celestian and used with permission of the Natural History Museum of Los Angeles County Gem & Mineral Hall.

No, this is not a stereo pair, but a side by side view of a slab of almandine in graphite, Red Embers Mine, Erving, MA . On the left is the rock in plain light, and on the right is the same rock backlit. The almandine garnets glow like hot embers. *Photo by Stan Celestian and used with permission of the Natural History Museum of Los Angeles County Gem & Mineral Hall.*

GARNET

By Susan Celestian

Garnet is really a group of related minerals: almandine, andradite, grossular, pyrope, spessartine, uvarovite, and others (uncommon and unlikely to be encountered during your rockhounding forays).

Chemical Formula - *$X_3Z_2(SiO_4)_3$ (X = Mg, Ca, Fe^{+2}, Mn^{+2}, etc. and Z = Al, Fe^{+3}, V^{+3}, etc.*
Crystal System - *Isometric (3 axes of equal length, and at 90° to each other)*
Growth Forms/Habits - *Massive, ball-like crystals with many faces (dodecahedron, trapezohedron, hexoctahedron) See Figure 1.*
Hardness - *6-7.5*
Luster - *Vitreous, resinous*
Streak - *white*
Color - *Reds, greens, white, brown,*
Diaphaneity - *Transparent to opaque*
Specific Gravity - *3.1-4.3*
Cleavage - *none*
Fractures - *Irregular/uneven to conchoidal*
Occurrence - *Garnets are primarily found in metamorphic rocks, especially schist and skarn; however are often found in igneous rocks, such as granite and kimberlite. Garnet is hard and often is a constituent of sand deposits.*
Other - *Uses: Gemstones (January's birthstone), abrasives (including sandpaper), water filtration media, collectible mineral specimens.*

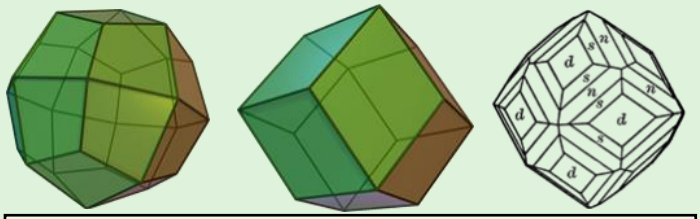


FIGURE 1 COMMON GARNET FORMS Two of the most common forms displayed by garnet are the trapezohedron (on the left) and the dodecahedron (middle). The distinctive faces are a big hint to the identity of garnets in hand specimen. *Images by unknown author and licensed under CC BY-SA 3.0*

On the right, is the hexoctahedron, a less common crystal form. *Image courtesy of Florida Center for Instructional Technology; https://etc.usf.edu/clipart/*

There are quite a few minerals in the Garnet Group; however, you are most likely to encounter one of the following 6 species of Garnet:

Almandine	*$Fe^{2+}{}_3Al_2(SiO_4)_3$*
Spessartine	*$Mn^{2+}{}_3Al_2(SiO_4)_3$*
Pyrope	*$Mg_3Al_2(SiO_4)_3$*
Andradite	*$Ca_3Fe^{3+}{}_2(SiO_4)_3$*
Grossular	*$Ca_3Al_2(SiO_4)_3$*
Uvarovite	*$Ca_3Cr_2(SiO_4)_3$*

Images of garnets follow, in Figures 2-28.

FIGURE 2 ALMANDINE IN SCHIST These crisp -- and huge -- dodecahedral garnets are from Ötztal, Tyrol, Austria. The right-most crystal is 3 inches in diameter!

Garnet commonly forms in schists, and is considered an ***index mineral***; i.e. a mineral that indicates the general temperatures and pressures experienced during metamorphism. Garnet is indicative of a moderate grade of metamorphism.

Photo by Stan Celestian

FIGURE 3 ALMANDINE IN SCHIST These garnets display the trapezohedral form. The rock is from Goodall, Sanford Co., ME. *Photo by Stan Celestian and used with permission of the Natural History Museum of Los Angeles County Gem and Mineral Hall*

Garnet continued on 21…

INSIDE THIS ISSUE

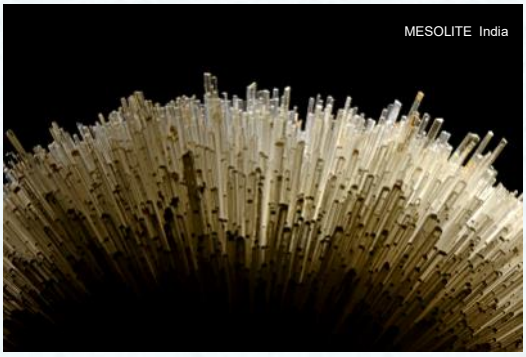
Each item is now hyperlinked to the page on which it is found

MARCH SPEAKER - Stan Celestian

"THE HIDDEN TREASURES OF THE NATURAL HISTORY MUSEUM OF LOS ANGELES COUNTY"

Stan is creating a visual record of some of the best specimens in the museum collection, at this time it is of those not on exhibit -- hidden treasures. Why Stan? Well, he is fairly acquainted with the curator of the Gem and Mineral Hall -- Dr. Aaron Celestian. Plus he works for free, takes the curator to lunch every day -- and he works for free. His photos can be a valuable resource for the museum, and Stan has a hoot photographing wonderful gem and mineral specimens!

ALL PHOTOS BY STAN CELESTIAN AND USED WITH PERMISSION OF THE NHMLA



One big topaz crystal from Brazil.

"The Door Knob", a 4644 carat Topaz from Brazil.

A heavily repaired, but still gorgeous -- and big, Elbaite var rubellite (tourmaline) in Quartz, from the Cryo Genie Mine, in southern California.

The 2nd largest faceted aquamarine, in the world. A whopping 2594 carats.

©Laurie Manifold 2022 (Reproduction denied without permission of the artist)

Zoom Board Meeting Minutes
February 28, 2022

- In attendance: Bill F., Bob E., Bob S., Claudia M., Don R., Ed W., Howard R., Nancy G., Rebecca S., Renee I., Stan C., and Sue C.
- Bill F. called the meeting to order
- February minutes approved
- Financials were discussed
  - Deanne G. treasurer was not in attendance
  - Report was provided for club
    - Net income because of vendor payments for show
  - Stan C. talked about the claim's committee
    - An offer was accepted for the Dave Haneline mine
      - Bob E. is creating bill of sale
        - ⇒ Needs to be signed and notarized
        - ⇒ Then can be sent to BLM for transfer
        - ⇒ Cash offer deposited into club bank account
  - We will scope out the Mushroom Rhyolite area next
    - fee only – no initial fee
    - Not owned by anyone
    - Will be surface claims – no bond necessary
  - Yearly Saddle Mountain is another option
  - Gold claim is another option
- Membership was discussed
  - **Thank you so much Tiffany P. for your attentiveness and hard work with emails!**
  - New members are mostly from online form
    - It was created due to Covid-19 but will remain
- Wire wrapping was updated
  - Jennifer G. was in an accident
    - must cancel this month's online wire wrapping class
    - sorry for any inconvenience
  - Next on Zoom or YouTube
    - Watch emails for update when she can resume classes
- Bill F. discussed the field trips
  - Peridot trip was such a success, we will have another one
    - Scheduled for March 26th
    - Large pit with small gemmy material
    - Next trip will not have a vehicle limit
  - Always check emails for changes/additions to trips
  - Reserve mine was on pause due to storm damage
  - Dave Haneline mine trip is paused until paperwork is complete
- Ed W. talked about the upcoming show
  - Claudia M. is the co-chair for the show
  - Tiffany P. is sending emails for more requests for volunteers
  - 31 vendors paid, 4 unpaid as of meeting
  - Irma (registrar) will be giving us access to school
    - She has graciously volunteered her time to help us
      - Will tip her for her troubles
    - School is closed for spring break that Friday
    - We can use their chairs in gym
    - Her hours available to have gym accessible is proposed for
      - Friday 11am-7pm
      - Saturday 8am-5:30pm
      - Sunday 9am-6pm
    - Sprinkler system is turned off for the weekend
  - We are the custodians for the club
    - Trash bags will be supplied
    - Find Claudia M. during show if there are any issues
  - Next show meeting Wednesday 16th 6pm-7pm
    - At civic building for final preparations
    - Will have a follow up meeting to improve process after show
  - Club approved to have Bob E. sell tumbler
    - It was donated to the club
- The North Mountain Visitor Center saw cuts have been increased
  - Unanimously passed

	Small Cuts < 3"	Large Cuts 3"-7"
Member	$1.50	$3.00
Nonmember	$2.50	$5.00

Respectfully submitted,
Rebecca Slosarik, secretary

Minutes continued on page 6…..

….Minutes continued from page 5…..

General Meeting Minutes
March 1, 2022

- I was not able to attend the meeting
  - Notes from board meeting covered all pertinent information

Respectfully submitted,
Rebecca Slosarik, secretary

Emergency Show Meeting
March 11, 2022

- Open attendance
- Chris F. discussed the hot dog stand
  - He is trying to get a temporary food handler's permit
  - Will have soda, water, and buns
  - Monday Claudia M. will get grill from the trailer
    - Chris F. will clean it – thank you
- Ed W. discussed show security
  - Need volunteers to fill slots:
    - Friday and Saturday night 3-4 hr shifts
    - 3 people each shift during the day
  - Day volunteers
    - Just walk around with vest on
    - Rarely had issues in the past
  - Overnight volunteers
    - Do not confront anyone
    - Call 911 to report issues
  - The vests have been cleaned – thank you Claudia M.
  - Will let sheriff's office know about the show
    - After meeting and each night for the show
- Irma will be there from 11am-7pm Friday
  - School is on vacation
  - School being paid for:
    - Lights/electrical usage
    - staff hours at 1.5x rate
    - janitor - (will contest charge)
  - She will supply us with garbage bags
    - We must dispose of bags on campus ourselves
  - Sprinkler system turned off
  - No janitors will be available
  - Vendors will be asked to come in around 2pm
  - Will ask about getting access to chairs in gym
- If you must purchase material for the show
  - Must have receipt
    - Deanne G. will reimburse you
- If you are a member and come to the show
  - Please wear nametag to get in for free
- Tiffany P. will be signing members up at the show
  - She has square space and tablet for easy administration
  - Send interested patrons her way during show
    - Will be near the exit of the show

- **If you have dollies/hand carts, please bring them to setup/shutdown**

Respectfully submitted,
Rebecca Slosarik, secretary

Show Meeting
March 16, 2022

- Open attendance – 22 participants
- Friday setup will begin at 11am at Anthem Civic Building
  - We will collect donated tables
  - More will be delivered to school in the morning
    - Don R. will receive rented tables
  - Afterwards some will travel to get material
    - From storage trailer and member's house
  - Gym available from 11am-7pm Friday
- Stacy N. (not present) vendor's chair
  - Needs to complete badge names for vendors
    - Receive from Claudia M.
  - Vendors notified to start setup after 1:30pm Friday
- Rented tables will be picked up Monday at 10am
  - School will be in session that day
- Food vendor
  - Food Handler's certification on hold
    - Process is slow
    - If we cannot receive on time
      - Either don't sell hot dogs
      - Or give away for donations only
  - We can still sell water, soda, chips
    - Claudia M. will get with coolers
    - Need a volunteer to help collect money
  - Sunday 9am-6pm

Minutes continued on page 7…..

….Minutes continued from page 6…..

- Setup still needs volunteers
- Raffle still needs 2 volunteers for Sunday 10am-1pm
- Bill will have fluorescent displays
- Marketing going great
  - Check out Nancy G.'s spectacular interview about the show, In Foothills Focus
- Admissions and raffle table will be inside the front area
- Claudia M. made deposit slips for cash
  - Fill out form
  - Rubber band cash and slip
  - Call Deanne G. for pickup
  - Enter data onto personal ledger
    - This is important to see where the money is coming from during the show
- If you have membership display case items
  - Give to Tiffany P.
  - Have tag with location, name, specimen information
- Leaflets available to hand out
  - Will send volunteers to the park during show
  - Will put up sign in the park as well
- Final hours that the gym will be accessible
  - Friday 11am-7pm
  - Saturday 8am-5pm

Respectfully submitted,
Rebecca Slosarik

THANKS TO

SARAJAYNE SCHNIPKOWEIT

For the 100! Beautiful & Yum-my Cupcakes at the Meeting

2021 MINERAL SHOW IS ROUSING SUCCESS!

Photos by Susan Celestian, Bill Freese, Nancy Gallagher, and Bill Powell

FOR MORE PHOTOS, VISIT THE CLUB WEBSITE

Co-Chair Ed -- **Thanks Ed!!**

The storage trailer yields supplies and rocks to these burly fellows

SET UP

Co-Chair Claudia keeps the set up on track. **Thanks Claudia!!!!**

Show continued on page 8...

….Show continued from page 7…..

DMRMC Volunteers help dealers haul their goods to their stalls

ADMISSIONS

POPULAR DEALERS

Inside And Outside

Show continued on page 9...

….Show continued from page 8…..

DOCTORS ROCK

identify rocks for visitors

RAFFLE & DOOR PRIZES

KID'S CORNER

A record number of egg cartons were assembled this year! And the games were a big hit!

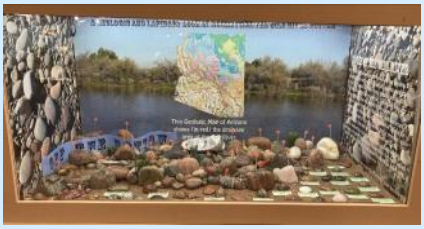
THANKS BILL, JEANNE, CLAUDIA, NANCY & EVERYONE!!

Show continued on page 10..

….Show continued from page 9…..

CLUB SALES TABLE adds to club coffers!

HOT DOGS, CHIPS & A DRINK!



SPECIAL EXHIBIT

By Sue & Stan highlights cool and polishable rocks are in your own backyard.

CLUB SHOW CASE

Highlights what we collect on our many wonderful field trips.

FIELD TRIP TO PERIDOT MESA

Wednesday, February 26, 2022

Photos & Text by Bill Freese

We did a trip to Peridot Mesa today to collect some Peridot with our host Emery. We ended up with 15 people to visit his claim on the San Carlos Reservation. Once we got to the site, it was apparent we were in the right place as the trail was "paved" with peridot. There was peridot all over the ground at the site and everyone found plenty of beautiful pieces to take home. Go to page 26 for a quick background story.

Peridot is the birthstone for August

GREEN

GREEN

GREEN

See the Peridot Mesa story in the February 2022 issue of Rock Chips

GREEN

GREEN

Field Trips continued on page 12...

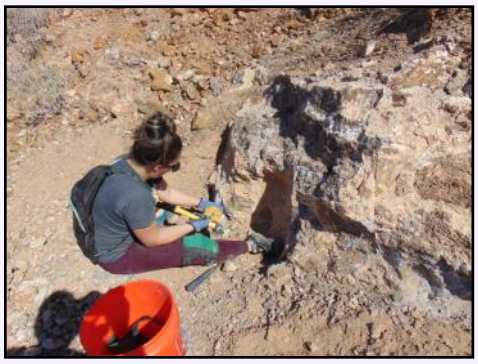
….Minutes continued from page 11…..

FIELD TRIP TO SPECTRUM/BLUE CUBE/ PRISM MINES

Wednesday, March 2, 2022

Photos & Text by Bill Freese

We had another great mid-week trip to the Prism/Blue Cube/Spectrum claims for mostly fluorite, but many other minerals as well. This is one of the sites that you have to work for it as the fluorite is in the hard rock matrix. The last 3 pics are from Valerie Pontrelli who worked really hard to get that great specimen. Everyone found . On to the next.



B A R I T E

F L U O R I T

Field Trips continued on page 13...

...Field Trips continued from page 12

FIELD TRIP TO SADDLE MT

Saturday, March 5, 2022

Text and photos by Bill Freese, Susan Celestian, Stan Celestian

Yeehaw, hold on to your hat partner, it was breezy day in the desert. We had a field trip to an area south of Saddle Mtn for Chalcedony and Fire Agate. We had a great turn-out of 27 people and all found great stuff and had fun. The view from the south side of Saddle Mtn is also very picturesque.

Desert Varnish -- a coating of black iron & manganese oxides. Where the varnish has chipped off, the lighter rock is revealed.

As desert rocks sit about, caliche (a calcium carbonate bound clay) cements the rocks together. On the left, a rock is cradled by the caliche; and on the right, cup-like caliche out of which the rocks have fallen. Caliche will fluoresce bright orange.

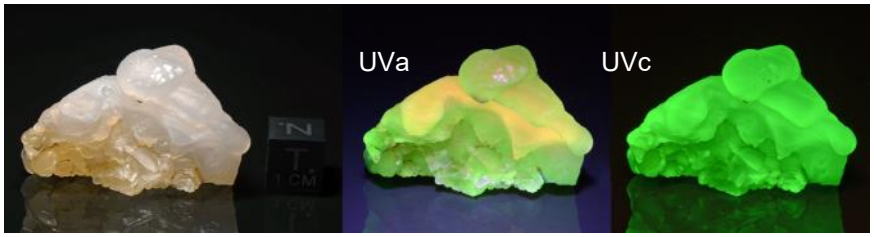
Field Trips continued on page 14….

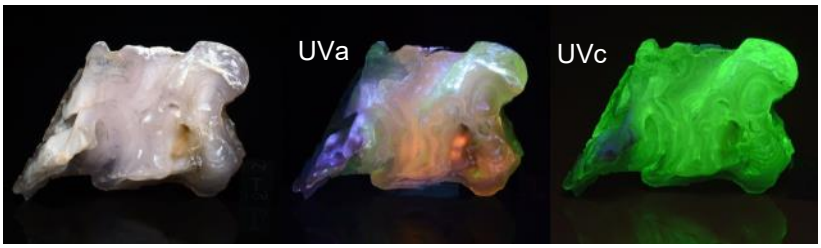
...Field Trips continued from page 13

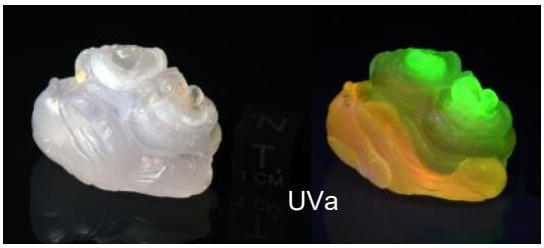
California Poppy (*Eschscholzia californica*)

Ocotillo (*Fouquieria splendens*)

Clean them up and expose them to ultraviolet (UV) light in 3 wavelengths (FYI - scorpion lights are long wave or UVa) Photos by Stan Celestian

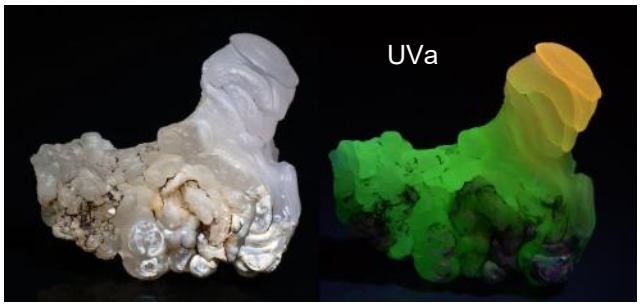






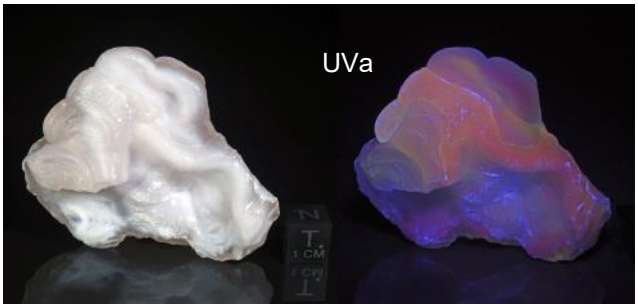
UVa

Long Wave UV



UVc

Short Wave UV



Field Trips continued on page 15….

...Field Trips continued from page 14

FIELD TRIP TO RESERVE BANK MINE

Wednesday, March 9, 2022

Text by and photos by Bill Freese, with notes by Susan Celestian

Today the DMRMC visited Joyce & Gary at the Reserve Bank Mine, southwest of Wickenburg. They were awesome hosts and Joyce explained the process of taking ore from the copper mine and smelting it to get the copper out, and turning it into bars and wire, and eventually jewelry. The 16 of us that made it to the trip found plenty of pieces of chrysocolla, azurite and malachite in the dump. Of course it was a beautiful day in AZ.

Gary Hueston and Joyce Ramage have been rehabilitating the working the mine since 1999. The original mine was opened in 1899, and was called the Angel Mine. Gary and Joyce's operation is really amazing. They have ladders going down about 75 feet, in 10-foot segments. The ore is brought to the surface in an ore bucket. Joyce hand-sorts out the chalcocite-rich ore, which is crushed to about the size of a quarter. Ore is placed in a crucible, and fired in a small furnace to about 2200 degrees F. Once the copper has been released from the rock, it is poured off. Then it is re-fired and poured into rod or bar molds. The bars are stamped with the mine name and sold online. Joyce draws the rod out into wire, which she uses to create beautiful jewelry.

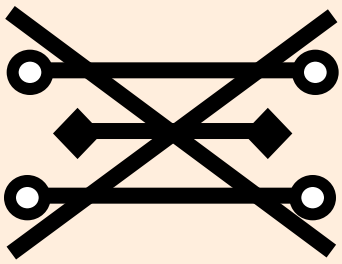










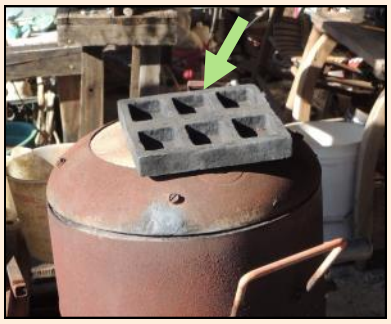




Field Trips continued on page 16….

...Field Trips continued from page 15

Chalcocite, a black copper sulfide, is the ideal ore mineral, as it is very rich in copper (80% by weight). It is associated with the blue-green chrysocolla, a copper silicate (34% copper by weight).

The smelter at the Reserve Bank Mine. Crucibles (orange arrows) full of ore go into the furnace (rusty object, white arrow). The melted copper is poured into the bar mold (seen atop the furnace, in the photo below, green arrow -- or into rod-shaped molds). The rods are pulled into wire in the machine indicated by the green arrow.



Joyce's jewelry made from copper she produces from Reserve Bank Mine ore. Look for her at local gem and mineral shows.

Field Trips continued on page 17….

...Field Trips continued from page 16

FIELD TRIP TO MIAMI

Saturday, March 12, 2022

Text by and photos by Bill Freese

We had another great adventure with the DMRMC today. Jennifer & Randy Jordan (you guys were awesome) lead us on a day of mixed locations. First, we checked out the Bullion Museum in Miami. This is a new museum that you need to check out. Lots of specimens and info on mines. Next we heading to a couple locations off AZ-188 for primarily three minerals: Halloween Rhyolite, Hickoryite and multi-colored marble. Everyone found some great pieces from each location. check out the pics.

HALLOWEEN RHYOLITE

AND

CUPCAKES,

WHAT COULD BE BETTER???

Field Trips continued on page 18….

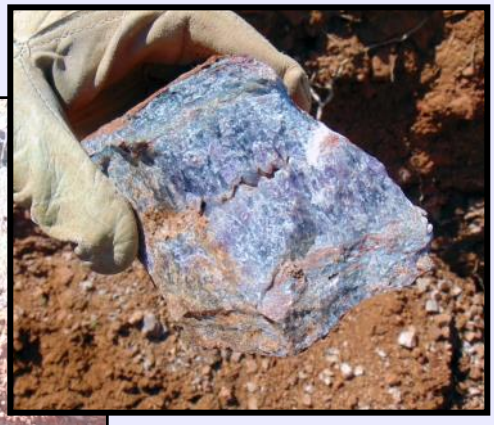
...Field Trips continued from page 17

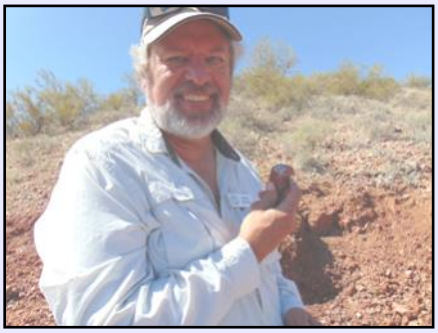
FIELD TRIP TO CONTACT MINE

Wednesday, March 17, 2022

Text by and photos by Bill Freese

On a last minute trip, the DMRMC had a "Spring Break Special" to the Contact mine for amethyst. Kerry Reed had his kids off from school this week and they wanted to go rockhounding, so we added a trip for them. We had some other "big" kids join us on the trip. Everyone had fun in the desert - a beautiful day. I think all the kids had a fun time. Look at those smiles.





A

M

E

T

H

Y

Field Trips continued on page 19….

...Field Trips continued from page 18

FIELD TRIP TO DAVE HANELINE MINE

Wednesday, March 23, 2022

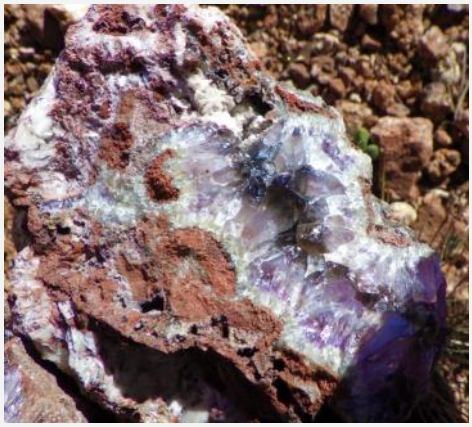
Text by Bill Freese, photos by Heather Lundervold & Stan Celestian

Hey Rockhounds, the DMRMC had our last visit of the season to the Dave Haneline Mine on Wednesday and a bunch of new members (10 in total) had the chance to collect a bunch of minerals. I forgot to take pictures so Heather Lundervold took some pics instead. She was very excited about the stuff she found. The weather was good and everyone had a good time. What more could you want? See ya next time.

Don't be afraid to get dirty.

Think of rockhounding as a way to build up your muscles -- swing that hammer!

Bladed Barite



Quartz var amethyst

A platae of fluorite balls

Glowing Calcite

Fluorescing Fluorite

Field Trips continued on page 20….

...Field Trips continued from page 19

FIELD TRIP TO PERIDOT MESA

Saturday, March 26, 2022

Text by and photos mostly by Bill Freese

Today the DMRMC had the second installment of the Peridot Mesa trip. We had so much interest, we had to break it into two trips. This one was just as exciting as the first one, and everyone found tons of great specimens and some big gems. Peridot covered the entire pit, so finding your favorites required some editing. Everyone left happy -- "A good time was had by all" (Ed. Note: And one of our members flew in from Oregon just for this trip!)

There were some pretty good-sized chunks of olivine aka peridot found on this outing! Maybe we'll see some faceted stones in the future?

FOR MORE PHOTOS OF THIS TRIP, CHECK OUT THE DMRMC FACEBOOK PAGE

Kneepads! Good idea Bob -- I'm getting some for myself.

Somebody has some ballast for the ride home!

The Volcano that brought these gems to the surface

...Garnet continued from page 2

FIGURE 4 ALMANDINE IN SCHIST The upper photo is a very lumpy schist, in Western Australia. Those lumps are almandine garnets. Their form is quite flattened, for garnets (perhaps because of some restrictive force during metamorphism). Note the center crystal, in the lower photo -- the crystal form is a dodecahedron (12 diamond-shaped faces) modified by a trapezohedron (24 long, narrow faces). *Photos by Stan Celestian*

FIGURE 5 ALMANDINE IN SCHIST These garnets are about 1 inch diameter, and have been collected in abundance along the Stikine River, Wrangell Island, Alaska. Looking closely at the group below, note that the garnets are dodecahedrons modified by trapezohedrons, although the trapezohedral faces are larger than those in Figure 4. *Photo A by Stan Celestian, and used with permission of the Natural History Museum of Los Angeles County Gem Hall; .Photo B is by James St John and licensed by CC by 2.0.*

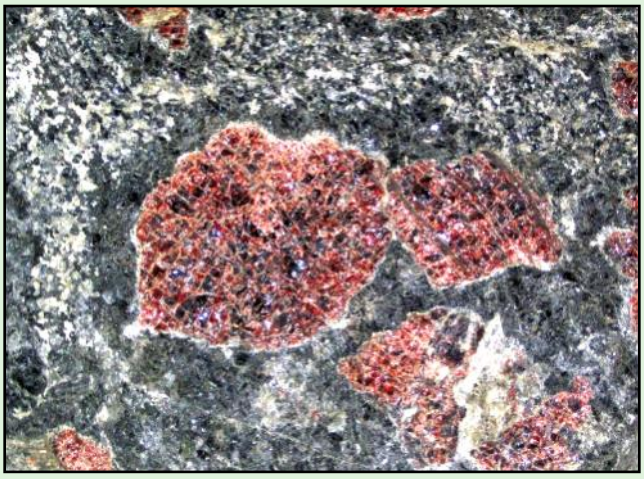


FIGURE 6 ALMANDINE IN AMPHIBOLITE This is a close-up view of the garnet amphibolite (a rock composed of amphiboles, such as hornblende), exposed in a Barnet Garnet Mine on Gore Mountain, in the Adirondacks of New York State. The groundmass is composed of hornblende and plagioclase feldspar, with pyroxene and biotite. The almandine garnets get up to nearly 14 inches diameter -- the largest recorded is over 3 feet in diameter!!![1]

Note the black hornblende rim around the garnets. As hornblende formed, it was displaced by the rapidly-growing garnets; residual plagioclase forms the white rims. These rims formed during crystallization -- not as post-crystallization reaction rims.

The quarry where these garnets are mined is amazing. The walls are black with big polka dots of red garnets. It has been a source of gem and abrasive-grade garnets since 1878. Stop in for a tour and some collecting if you find yourself in upstate New York. *Photo by James St John and is licensed by CC by 2.0.*

[1]Shinevar, William J.; Jagoutz, Oliver; VanTongeren, Jill A. (2021). "Gore Mountain Garnet Amphibolite records UHT Conditions: Implications for the Rheology of the Lower Continental Crust During Orogenesis". *Journal of Petrology*. **62** (4) , pp 1-28.

[2]McLelland, James M; Selleck, Bruce W (2011). "Megacrystic Gore Mountain-type garnets in the Adirondack Highlands: Age, origin, and tectonic implications" Geoscience **7**(5), pp 119401208.

FIGURE 7 FACETED ALMANDINE These gems, out of the Smithsonian collection, display the deep, rich red color typical of almandine. *Photo by Chip Clark and used as Public Domain CCO 1.0*

Garnet continued on page 22….

...Garnet continued from page 21

FIGURE 8 COLOR-CHANGING GARNET This rare Sri Lankan garnet is out of the Smithsonian Gem Collection, and is labelled Almandine; although I suspect it is more probably transitional with one or more other garnet species. At any rate, in artificial light, the stone is decidedly blue, and in sunlight will be purplish-red. *Photo used as Public Domain CCO 1.0.*

FIGURE 9 SPESSARTINE-ALMANDINE IN RHYOLITE A target of an annual club field trip to the Aquarius Mountains (near Wikieup), these garnets are usually compositionally transitional between spessartine and almandine. They are *pneumatolytic* -- in other words, they grew in pockets within the rock, out of hot and mineralized vapors that permeated the rock.

Photo by Stan Celestian

What is the crystal form? (Answer below)

Trapezohedron

FIGURE 10 SPESSARTINE I'm not 100% sure this is spessartine, but it is a color common in the species. This pretty garnet sits atop albite (a feldspar). *Photo by Stan Celestian and used with permission of the Natural History Museum of Los Angeles County Gem and Mineral Hall.*

FIGURE 11 STRIATED GARNETS The lower photo is a close-up view of the upper photo. Note the striations across the trapezohedral faces of garnets (probably spessartine). Those are small steps created by the competing dodecahedral faces (defined by the small diamond shapes at some junctions). *Photo by Stan Celestian*

Garnet continued on page 23….

...Garnet continued from page 22

FIGURE 12 SPESSARTINE ON FELDSPAR Small, but lovely red, spessartine garnets adorn this plate of feldspar. It is from Tongbei, Yunxian, Fujian Province, China. *Photo by Stan Celestian*

FIGURE 13 SPRINKLE This nearly 2" tall quartz crystal, from Yunxiau, Funian Province, China, has a decorative sprinkling of garnets clinging to its prism faces. It is a lovely specimen. *Photo by Stan Celestian*

FIGURE 14 FACETED SPESSARTINE The clarity and beautiful orange-red color make this a desirable gemstone. (Note the scratches on the surface. While garnets are hard, they are relatively soft as a gemstone, making them semi-precious.) (*Photo by James St John and licensed under CC BY 2.0*

FIGURE 15 ANT-HILL GARNETS Photo (A) is of almandine-pyrope (aka *Rhodolite*) garnets gathered off anthills near Ennis, MT. Photo (B) is of chrome pyrope garnets from Garnet Ridge, on the Navajo Reservation, Apache County, AZ. And Photo (C) are faceted chrome pyropes from anthills at Garnet Ridge. Note the great color saturation.

The miners of these garnets are literally ants. The garnets are sand grains and small pebbles that the busy insects remove as they tunnel, and add to their hills at the surface. Being heavier than other sand grains, the garnets resist erosion and tend to accumulate in the anthills, where they are easily collected by humans.

Pyrope typically forms in high pressure conditions, such as within the mantle. *Photos by Stan Celestian*

Garnet continued on page 24….

...Garnet continued from page 23

FIGURE 16 ANDRADITE These lovely glassy green garnets are from Val Malenco, Sondrio, Lombardy, Italy. They are a chromium-rich variety known ad *Demantoid*. Some demantoids are more emerald green. Note how lustrous they are -- with luster mor adamantine than vitreous. *Photo by Stan Celestian and used with permission of the Natural History Museum of Los Angeles County Gem and Mineral Hall.*

FIGURE 17 ANDRADITE Andradite garnet from the Stanley Butte area, on the San Carlos Reservation, Graham Co., AZ is a classic Arizona locality, with a rather unique garnet occurrence. Note that the garnet has a luster that is pearly to iridescent -- sometimes almost metallic-looking. The garnet faces are not usually smooth, as is common in garnet, but have many step-like offsets. *Photo by Stan Celestian*

FIGURE 18 ANDRADITE on JOHANNESITE Another dark green andradite garnet occurs at the Iron Cap Mine, Landsman Camp, Graham Co., AZ. These crystals are a very dark, opaque green, with smooth faces, and a rather dull luster. In this photo, crystals sit on a matrix of Johannesite, a pyroxene that forms in skarns (metamorphically altered carbonate rocks). *Photo by Stan Celestian*

FIGURE 19 ANDRADITE These are rather uniquely -colored andradite garnets, from Avissalos, Seriphos Island, Aegean Island, Greece. They are an orangish-brown color with dark brown edges.
Photo by Stan Celestian

FIGURE 20 GROSSULAR The garnets in both of these photos are from the Lake Jaco area, Sierra de Cruces, Mun. de Sierra Mojada, Coahuila, Mexico. They weather out of calcite -- a skarn (altered limestone). The colors range from red/pink through green, yellow, black, colorless.
Photos by Stan Celestian

Garnet continued on page 25….

...Garnet continued from page 24

FIGURE 21 GROSSULAR var Hessonite Hessonite aka cinnamon stone is a brown (trending to reddish) garnet. The name derives from the Greek 'hesson', meaning inferior -- an allusion to its lower hardness and density (than other garnets). This specimen from Jeffery Mine, Asbestos, Quebec Province, Canada is extremely clear. *Photo by Stan Celestian*

FIGURE 22 GROSSULAR-ANDRADITE This transitional garnet is a somewhat resinous reddish-brown, and is from Madiawaya Arrondissement Oussoubidiagna (Ourssoumbidiana), Commune Tomora, Bafoulabe Circle, Kayes Region, Mali. *Photo by Stan Celestian*

FIGURE 23 GROSSULAR Hailing from Northern California, this white to clear grossular garnet specimen fluoresces a vibrant orange. *Photos by Stan Celestian and used with permission of the Natural History Museum of Los Angeles County Gem and Mineral Hall.*

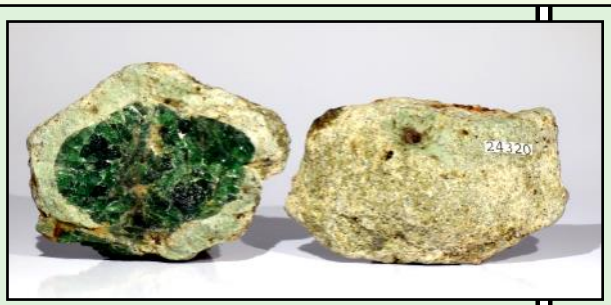


FIGURE 24 GROSSULAR var Tsavorite In Taita Hills, Kenya (in the Tsavo Plains) tsavorite occurs in "potatoes" (porphyroblasts) within a graphite schist. *Photos by Stan Celestian and used with permission of the Natural History Museum of Los Angeles County Gem and Mineral Hall.*

Garnet continued on page 26….

...Garnet continued from page 25

FIGURE 25 GROSSULAR var Tsavorite Tsavorite is really a trade name, proposed by Sir Henry Platt, president of Tiffany & Co. It is a chromium- and vanadium-bearing grossular garnet. *Photo* by sperry746 is marked with CC BY-NC-SA 2.0

FIGURE 26 UVAROVITE These brilliant green (chromium-bearing) garnets are rather rare, coming primarily from Russia and Finland. The one on the top is from Bazhenovskoe Deposit, Asbest, Russia; the one on the left is from Saranovskaya, Permskaya Oblast, Ural Mts, Russia. *Photos by Stan Celestian*

FIGURE 27 STAR GARNET This garnet is from India. Boldly displayed is a 4-rayed star. If you enlarge the image, you can see 2 fainter rays. The asterism is caused by inclusions of rutile, confined to specific atomic planes. In the U.S. star garnets can be found at Emerald Creek Garnet Area, a National Forest site, in Idaho. *Photo by Stan Celestian*

FIGURE 28 GARNET IN GRANITE Garnets (probably usually almandine) are also often found in granites and gneisses. Check out your countertops and the tabletops in restaurants -- or the samples at Home Depot! *Photo by Stan Celestian*

GENERAL RESOURCES FOR GARNET

Gore Mountain Garnet Amphibolite records UHT Conditions: Implications for the Rheology of the Lower Continental Crust During Orogenesis

Megacrystic Gore Mountain–type garnets in the Adirondack Highlands: Age, origin, and tectonic implications

https://en.wikipedia.org/wiki/Garnet#cite_note-lakegeorge-66

https://en.wikipedia.org/wiki/Garnet

https://ruby-sapphire.com/index.php/books-by-richard-w-hughes/10-articles/867-tsavorite-garnet-untamed-green-garnet-beauty

http://m.palaminerals.com/tsavorite-bancroft

https://www.mindat.org/min-27165.html

GEO MINI

How a Mineral Can Get Bigger When It is Squeezed

Reprinted with permission of author

Aaron Celestian

When you squeeze something, it should get smaller -- that's just common sense. You squeeze a sponge to make it smaller, so that water gets pushed out. But why doesn't the water compress along with the sponge as you squeeze it? Why doesn't the water stay in the sponge, but instead drips all over the place? It turns out that water is nearly incompressible. Even though water is trapped in the sponge, it doesn't compress at the same rate, so the water has nowhere to go except out. Even at the bottom of the ocean, water basically has the same physical properties as the water on the surface. It hasn't hardly compressed at all, even with the tremendous amount of weight pushing down on it. Under the right pressure conditions, pure water will eventually compress, as the water molecules are forced together into smaller and smaller spaces. I know freezing water (a liquid) will expand to ice (a solid). Still, that process involves temperature and a physical phase state change. Water will freeze to ice at room temperature, but only if the pressure is around 145,000 psi (1 GPa, gigapascal). At sea-level, our atmosphere pushes down on us at 14.7 psi.

To expand under pressure is a whole different story. It would be a strange sensation to squeeze a sponge only to see it get bigger as you put more pressure on it. However, this is what some minerals do when they get squeezed to very high pressures, like 300,000 psi (2 GPa). In nature, these kinds of pressures are only reached when you get down deep in the Earth. These geologic conditions occur at subduction zones, where rocks (and rocks are made of minerals) are pulled down back into the Earth. Approximately 77 miles down is where these minerals experience these extreme pressures, but instead of compressing (like most of the minerals around it such as quartz, olivine, feldspar) certain minerals will expand. There are only a few that we know of that do this. You may think that this breaks the laws of thermodynamics, and you would be right. So, for a mineral to get bigger at pressure there has to be a catch, and that catch is chemistry.

The minerals of most interest for physical expansion are the ones that have water in their crystal structures, such as the zeolites and clays. These minerals look a little like a sponge, where they have tunnels, tubes, channels, pore spaces, and lots of places for water to find a spot to fit. At this small molecular scale, you can't really call the water inside the mineral water at all. Water is H_2O in the liquid state, just like we call frozen H_2O ice when it crystallizes, and vapor when H_2O is in the gas state. None of those apply to H_2O in minerals, so we simply call it H_2O, where it has none of the physical properties of gas, water, or ice.

As these clay and zeolite minerals get squeezed, they do contract initially, but only to a point. Some of them break-apart and transform to a different mineral, and some of them do something (in my opinion) more interesting. From a recent high-pressure study, on which I was a co-author, graduate student Huijeong Hwang from Yonsei University compressed minerals and water in a diamond anvil cell to observe mineral/water interaction at high pressure. Huijeong found that the mineral nacrite (see Figure A), a clay mineral, takes up water and forms an atomic ice-like layer within the crystal structure of the mineral.

FIGURE A NACRITE Nice nacrite crystals (white) are difficult to find, and when you do, they are often very small. This one is only a few millimeters in size. *Mineral specimen from the Natural History Museum of Los Angeles County. Sample locality: Mt. St. Hilaire, Quebec, Canada.*

So, instead of water forming a chunk of ice minerals at these high pressures, the H_2O moves into crystals to form a single layer of hexagonal H_2O. When this happens, the mineral expands to accommodate. So no laws are broken because the overall mineral chemistry changes, by allowing the H_2O molecules to be absorbed. When nacrite absorbs the water, its volume increases by about 20%, which is significant. That would be similar to the difference in volume increase from an average 'large' egg to an 'extra-large' egg. See Figure B.

.Squeezed continued on page 28...

...Squeezed continued from page 27

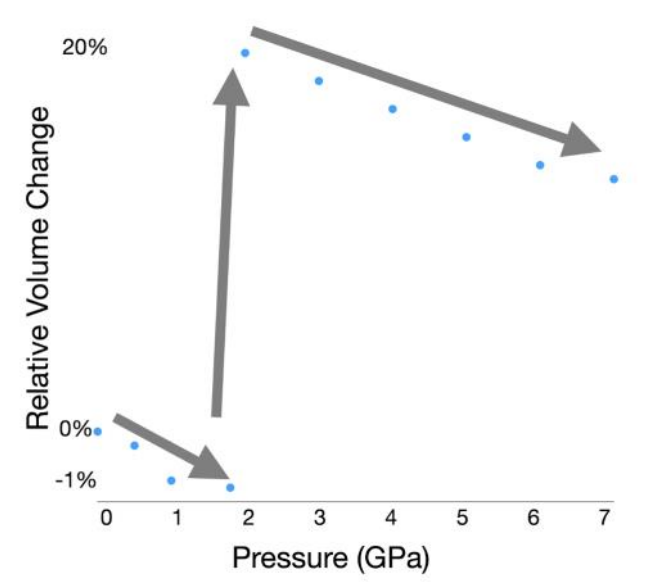


FIGURE B My simplified version of a graph from the Hwang et al. (2020) paper. Pressure is on the X-axis, and volume change is on the Y-axis. As you can see, when the experiment started, the volume of nacrite decreased a little, but when the sample got to 1.8 GPa, the volume suddenly increased.

An exciting outcome of this experiment was that when the mineral was released from the high-pressure chamber, it stayed expanded! It didn't contract to its original state, and the bi-layer ice-like structure was stuck inside the mineral, which is unlike other clay minerals (for example, kaolinite). This means that if you found nacrite in this super-H_2O state, then this would mean that the right chemical conditions and pressure/temperature conditions could be similar to a subduction zone. This is a fascinating way to measure if other planets and moons in our solar system used to (or still do) have plate tectonic activity like Earth. These kinds of mineralogical studies on Earth could be used to identify past signs of habitability in our solar system.

References:

Hwang, Huijeong, et al. "Pressure-induced hydration and formation of bi-layer ice in nacrite, a kaolin-group clay." *ACS Earth and Space Chemistry* (2019).

Colligan, Marek, et al. "High-pressure neutron diffraction study of superhydrated natrolite." *The Journal of Physical Chemistry B* 109.39 (2005): 18223-18225.

You, Shujie, et al. "Pressure□Induced Water Insertion in Synthetic Clays." *Angewandte Chemie International Edition* 52.14 (2013): 3891-3895. This paper is open access.

WILDFLOWERS OF PERIDOT MESA

It is far from a super bloom, but there were some pretty blooms.


Desert Chia (*Salvia columbariae*)


Arroyo Lupine (Lupinus succulentus)


Gooding's Verbena (Glandularia goodingii)


California Poppy (Eschscholzia californica)


Blue Dicks (Dipterostemon capitatus)


Parry's Beardtongue (Penstemon parryi)


Desert Chicory (Rafinesquia neomexicana)

Geo Mini 2: Peridot Mesa: a quick review

By Susan Celestian

Feb/March had two field trips to Peridot Mesa -- home to world-famous peridot. I thought it might be of interest to review the geology of the area.

The mesa at San Carlos, Arizona is capped by a very special lava flow. It was emplaced by a single, violent, volcanic fountain eruption. In 1978, it was dated at 0.93 myo (although I did find an unreferenced date of 580,000 years). Within the flow are many nodules of olivine (specifically forsterite) -- aka peridot, much of it gem quality. These nodules are *xenoliths* -- pieces of rock that originated outside the magma that cooled to form the rock in which they are found. In fact, the nodules contain mostly olivine, but also other minerals, such as chromite, chromium spinel, chrome diopside, lherzolite, and biotite. See Figure AA.

Watch Stan's YouTube video on this area.

FIGURE AA PERIDOT AT PERIDOT MESA The objective of the upcoming field trip is to fill a bucket with the prettiest rocks and biggest crystals of olivine you can find! As you might be able to tell from these photos, there will be no dearth of olivine!!! *Photos by Susan Celestian*

In fact, the xenoliths are chunks of the upper mantle, a layer of the Earth's interior thought to be composed of primarily olivine. The upper limit of the upper mantle is between 3 and 30 miles; and it extend s to a depth of about 400 miles. See Figure BB.

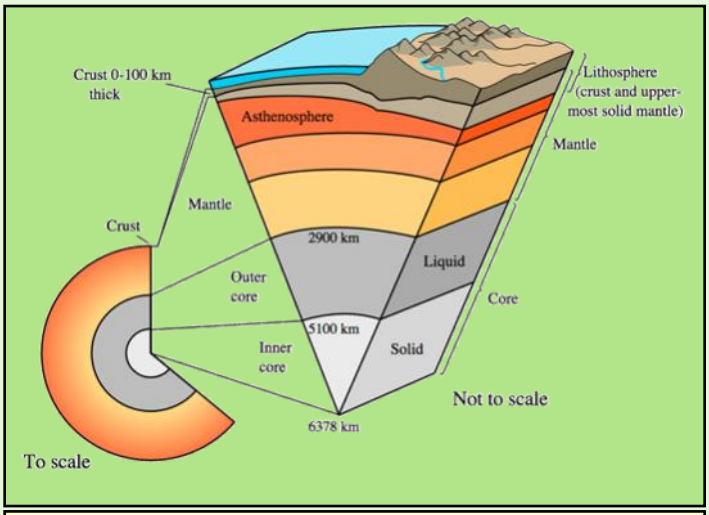


FIGURE BB STRUCTURE OF THE EARTH The Earth is many-layered, and the bulk of it is called the Mantle. However, the Upper Mantle is only the uppermost 350 miles (563 kilometers) or so.

Graphic courtesy of the USGS

It is thought that the magma that brought the olivine xenoliths to the surface was moving exceptionally rapidly. A slow ascent would have allowed the olivine to react to the changing temperatures and pressures, and alteration would have occurred. This gives geologists a rare-ish glimpse into the chemistry and geology of areas of the Earth unreachable by physical means.

UPCOMING FIELD TRIPS

Here is a general list of upcoming trips, for the next 3 months. Details will be emailed to the general membership.

April

Dragon Mine - 2nd Sat
Chilito Mine - 13th Wed
Date Creek - 16th Sat
Dobell Ranch/Grand Falls - TBD
Camp Verde Pseudomorphs - 27th Wed
DMRMC Picnic at Anthem Park - 30th Sat

May

Sycamore Creek (Jasper) - 7th Sat
Agate Mt. - 11th Wed
Luna Agate (long weekend) - 20th-23rd
Globe 'onyx' - 25th Wed
Payson (fossils) & Christopher Creek (zebra jasper) - 28th Sat

June

Lynx Creek (gold) - 4th Sat
Lava Tube/Parks - 11th Sat
Our of State, multi-night trip TBA

Bright Red Jasper at Sycamore Creek

DATES AND DESTINATIONS SUBJECT TO CHANGE

Bill and the field trip committee will be actively looking for productive spots for field trips. If you have any suggestions, you are encouraged to contact him at bfreese77@cox.net

FUTURE SPEAKERS

The April Meeting will be a swap/sale. Bring your spare treasures to share or sell!

WIRE WRAPPING

Is on hiatus. Watch your email for potential zoom or video lessons.

FACEBOOK

Visit and join the club page periodically. See what is happening, and boost our visibility on the web. Go to: The Daisy Mountain Rock and Mineral Club. It is set up so you can post photos of outings or related items. Share with friends!

AWARD-WINNING WEBSITE

http://www.dmrmc.com/

If you have comments, contact Nancy Gallagher.

INSTAGRAM

Follow the club on Instagram. Go to https://www.instagram.com/daisymountainrockclub/ and follow today. Share with friends!

Officers, Chairpersons, & Trustees

President: Ed Winbourne…..ewinbourne@gmail.com
Vice President: Bill Freese…… bfreese77@cox.net
Secretary: Rebecca Slosarik .. rslosarik1@gmail.com
Treasurer:...Deanne Gosse deanne.gosse@gmail.com
Publicity: Jessie Redmond...
Membership: Tiffany Poetsch tnpoetsch@gmail.com
Editors: Susan & Stan Celestian…… azrocklady@gmail.com
Field Trip: Bill Freese ... bfreese77@cox.net
Mine Steward: Stan Celestian ……..stancelestian@gmail.com
Show Chair: Ed Winbourne
Trustees:

Cynthia V	Claudia M
Susan C	Tiffany P
Bob E	Jim R
Don R	Howard R
Jessica C	Rebecca S
Renee I	Bob S.
	Nancy G

Meetings are held the **1st Tuesday of the month** at **the Anthem Civic Building**, 3701 W Anthem Way, Anthem, AZ 85086. General meeting at 6:30 pm. We **do not meet in July or August**.

DMRMCLUB@GMAIL.COM

Membership Dues:
First year $30, then $20.00 Adults per Person
First year $45, then $25.00 Family (2 people)

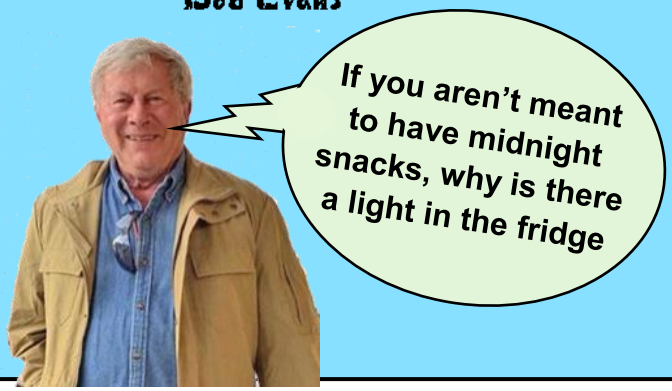
Meeting Dates for 2022

Jan 4, Feb 1, Mar 1, Apr 5, May 3, June 7, Sept 6, Oct 4, Nov 1, Dec 6

Words of Wisdom

passed along by our own

Bob Evans



UPCOMING AZ MINERAL SHOWS

May 7-8 - Kingman, AZ Mohave County Gemstoners; Kingman Academy of Learning, 3420 N Burbank St; Sat 9-5, Sun 9-4; Admission: Free.

June 17-19 - Las Vegas, NV Southern Nevada Gem & Mineral Society (in conjunction with Rocky Mt. Federation & Mineral Society Conference; Orleans Hotel & Casino; Fri-Sat 9-4, Sun 9-2; Admission: Adults $5. See flyer on page 32.

July 9-10 - Show Low, AZ Whit Mountain Gem & Mineral Club; Elks Lodge, 805 E Whipple St; Sat 9-5, Sun 10-4; Admission: Adults $2, 18 & under free with school ID.

October 7-9 - Buckeye, AZ West Valley Rock & Mineral Club; Buckeye Arena, 802 N 1st St; Fri-Sat 9-5; Admission: Adults $3, under 13 free.

If you are travelling, a good source of shows AND clubs is http://the-vug.com/educate-and-inform/mineral-shows/ **OR** http://www.rockngem.com/ShowDatesFiles/ShowDatesDisplayAll.php?ShowState=AZ **OR** https://www.rockandmineralshows.com/Location/?displayShows=true

California Poppy (Eschscholzia californica)
Peridot Mesa, March 2022

NEEDED: QUALITY MINERALS (or OTHER) DONATIONS WITH LABELS -- for monthly raffle and silent auction; and for raffle, door prizes, and sales tables at the annual show. If you have specimens to donate, please see Robin Shannon. The Daisy Mountain Rock and Mineral Club is a 501(c)(3) non-profit organization, and will gratefully acknowledge your donation with a Tax Deduction Letter. Thank You!

NOTE FROM THE EDITOR

Have a geological interest? Been somewhere interesting? Have pictures from a club trip? Collected some great material? Send us pictures -- or write a short story (pictures would be great).

Deadline for the newsletter is the 22nd of the month.

Mail or Email submissions to:
Susan Celestian
6415 N 183rd Av
Waddell, AZ 85355
azrocklady@gmail.com

Visit http://rmfms.org/ for news about conventions, events, and associated clubs. If you are travelling, you might want to contact a club local to your destination. Maybe they have a field trip you could join, while in town.

NORTH MT OPEN STUDIO - APRIL

You are invited to NMVC Open Studio. Lapidary & Silversmithing on Thursdays and the first, third and fifth Saturdays in a month, from 9:00 to noon with cleanup starting at 11:50.

Face masks are now optional.

Only four people can sign up, and must do so for the full three hours that the shop will be open each day. First come, first served. Usage fee is $8/hour.

Notice: Please bring your own towels, polishing compounds and buffing wheels as they will no longer be provided. Mandatory: wear a mask.

Please arrive no later than 8:45 a.m. The center may close to the public at 10.

Email your request for the day(s) you are interested in participating ASAP. Email Shirley Cote at crystalc17@gmail.com

April – Thursday's dates are 7, 14, 21, 28 There is a planned Silversmith Class on Saturdays, if Doug does not fill the class there will be Open Studio on Saturday, April 16, and 30. Will keep you informed. If more than four people wish to participate on the same day, please expect to be bumped or rotated to another day as efforts to accommodate everyone will be taken.

We would also like to inquire as to anyone wishing to come in for **Lapidary Only Open Studio on Mondays - 9am-12pm.** Email Shirley at crystalc17@gmail.com Usage fee is $8/hour.

April - Monday's dates are 4, 11, 18, 25

VIVA LAS VEGAS ROCKS

June 17 - 19, 2022 at the Orleans Hotel

Rocks, Gems & Jewelry Show

Presented By

Southern Nevada Gem & Mineral Society

Hosting The Rocky Mountain Federation & Mineralogical Society Conference

Daily
Admission 5.00
Children Under 12 Free
Tickets Entered in Drawing

Orleans Hotel & Casino
Reservations
800 675-3267
ID: ASN2C06

Exhibition Hours:
Friday 9am to 4pm
Saturday 9am to 4pm
Sunday 9am to 2pm

50 + Vendors
Displays
Speakers

Raffles
Kids Activities
Door Prizes

SNGMS Contacts:
sngmspresident@gmail.com
sngmsshowchair@gmail.com
www.snvgms.org