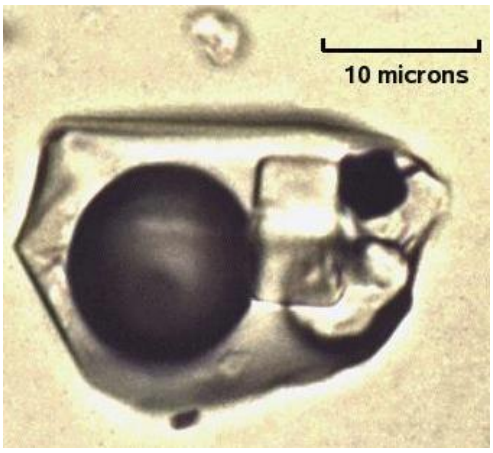
Wayne County Gem and Mineral Club News

February, 2018 **Always Looking for Places to Dig!**



Micro-micro minerals .. OR .. What is a daughter mineral? See page 2

http://www.wcgmc.org/

FACEBOOK link

Kathleen Cappon *teaches "rocks" at a January outreach event in Rochester (see pg. 4)*

Next Club Meeting
Friday February 9th, 7:00 PM

Presbyterian Church, Maple Court, Newark, NY

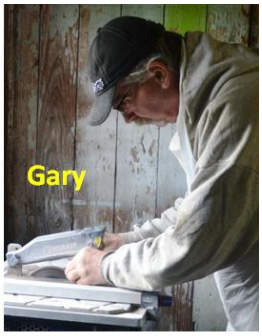
PROGRAM: Egg Crate Collections
(Rescheduled from January)

WCGMC has handed out its famous egg crate rock/mineral/fossil collections at all sorts of community and school events for several years. But we have not featured them recently at a club meeting. That will change in February. We'll have lots of club inventory minerals as well as surplus from the club's 2017 field trips available. All who attend can make their own WCGMC club collection. This will be a great program for all the kids in the club, and we know "kids" come in all ages. Come prepared to have fun and go home with a new rock/mineral/fossil collection.

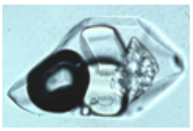
Here is a sampling of what you get to choose from when you build your egg crate collection. BUT, you will need to be selective; there are only 18 slots in the egg crates!

WCGMC Workshops
January 27th, February 10th

When: 10:00 AM til mid-afternoon
Where: The Weiler's Barn and Club Workshop
6676 E. Port Bay Rd, Wolcott, NY
Rules: Bring your own rocks to saw, grind, polish, or even facet. Training on equipment is available. Eye protection is required. $5/adult to offset maintenance costs.

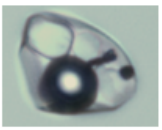


WCGMC artisans in December: We lost our early January workshop to Mother Nature, but have another on January 27th and then there is another scheduled for Feburary 10th.



Mineral Musings: Micro-Micro Minerals

BY FRED HAYNES

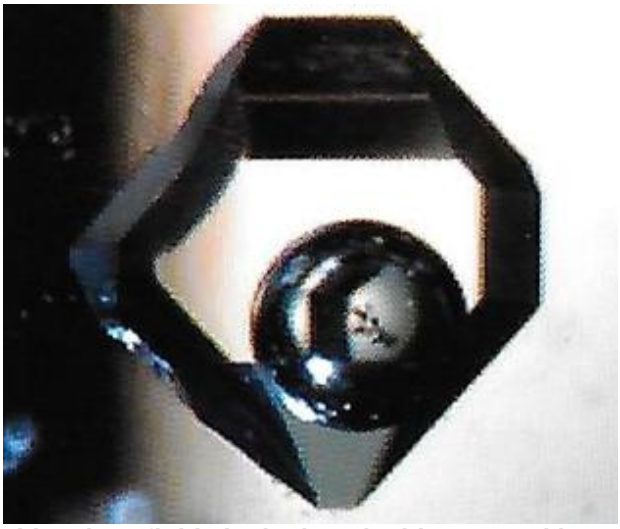


Some WCGMC folks like to collect rocks and minerals the size of small cars, or at least motorcycles. You know who you are (and so do the rest of us!). Others settle for samples that can be carried, a size that seems to decrease with each collecting season. But we also know of those who collect thumbnail specimens (less than 1") and stick them into tiny boxes. There are even folks who like to collect specimens that require microscopes to be seen; these collectors are called micromounters. But I am going to tell you a bit about some "mineral specimens" that are even smaller. And I am even going to make up a new name for them. I am calling them micro-micro minerals.

When crystals grow they often do so imperfectly and they can trap material, often along the planes of growth. These can be solid material, rutilated quartz, star garnet, anthraxolite or other hydrocarbons, etc., or they can be the actual fluid that the crystal was growing from. Mineral collectors have a name for minerals where these internal fluids are visible. They call them **enhydros** and marvel at how the fluid or vapor bubble moves within the inclusion as the specimen is rotated. Geologists refer to them as **fluid inclusions** and study them for their scientific value.

There is often both a liquid and gas phase within an aqueous fluid inclusion. This is because the fluid was trapped at high temperature and pressure and upon cooling the liquid contracts and a vapor bubble forms. Geologists can heat the inclusion and watch the bubble decrease in size and eventually disappear. In most cases this tells them the minimum temperature at which the crystal grew. Other gases such as carbon dioxide and various hydrocarbon phases can form as the mineral and its liquid inclusions cool. But there can be more than liquid and vapor inside a fluid inclusion/enhydro.

Hot fluids migrating within the earth's crust or being released by a cooling magma are often saturated in various minerals. They are often saturated in salts (like halite-NaCl or sylvite-KCl). Upon cooling, salt crystals begin to precipitate within the inclusion. Tiny, micron-sized cubes of halite can grow. [*A micron is 1/1000th of a millimeter, i.e. very small!*] These micro-micro minerals can be viewed in thin polished sections under powerful microscopes and identified by their form and character or sometimes by electron microscopes. Geologists call these **daughter minerals** because they are younger than the inclusion within which they reside. They can be very useful indicators of the type of solution from which a mineral grew.



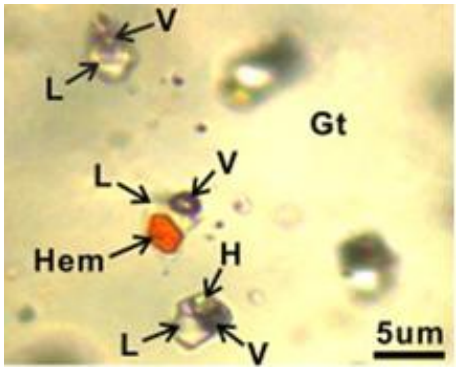
This tiny fluid inclusion inside a Herkimer diamond from Treasure Mountain Mine in Little Falls, New York contains liquid with a large round vapor bubble. Inside the vapor bubble is a dendritic solid hydrocarbon phase. The negative crystal shape of the inclusion is evidence that this inclusion was trapped when the Herkimer diamond was growing. (Figure 163 from Walter, 2014).

There are more exotic minerals found in some inclusions. Granitic magmas contain metals as dissolved elements, but these elements do not fit into the lattice structure of the primary minerals that crystallize from magmas (feldspars, quartz, pyroxenes, etc). As magmas cool to form igneous rocks like granite, metals are concentrated into a water phase that separates from the magma. These waters have very high salinity which permits the metals (copper, lead zinc, etc.) to be dissolved in solution as positively charged cations balanced by negatively charged chloride ions (Cl).

When these waters are released from the magma (the geologic term is exsolve), they often do so violently, and fracture the surrounding rocks. The vapors/waters move through these rocks and cool quickly while depositing minerals in the fractures to form mineralized veins. The fluids are silica-rich and quartz is the dominant mineral, but metal bearing sulfides are also deposited. The large porphyry copper deposits of the southwest

United States are formed by this process with chalcopyrite being deposited in the fractures. Later the copper sulfides can be oxidized into the wondrous blues and greens of azurite, malachite, chrysocolla and turquoise we seek from places like Bisbee, Arizona or Chuquicamata, Chile. But that is another story.

Fluid inclusions in quartz from hydrothermal ore deposits can be full of exotic daughter minerals. With original temperatures at the time of entrapment of several hundred degrees centigrade, these fluids often carry large quantities of salt and metal ions in solution. As they cooled, they lose their capacity to hold ions in solution. Minerals like chalcopyrite, hematite, and gypsum can form in fluid inclusions along with the more common salts, halite and sylvite.

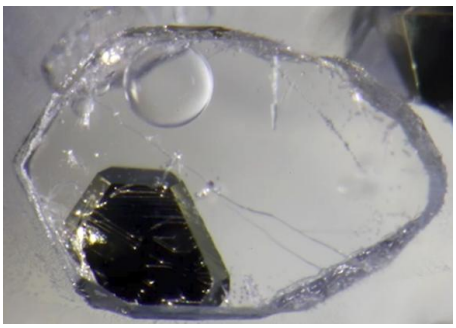


These inclusions are in garnet associated with large iron deposits in the Huanggang District of China. Magmatic waters separated from a granitic intrusion and altered the surrounding limestone to garnet- and pyroxene- bearing skarn. The fluid inclusions within the garnet reflect the chemistry of those highly saline and iron-rich magmatic waters. In addition to liquid (L) and vapor (V) phases, they contain daughter minerals such as halite (H) and hematite (Hem). (Mei, et. al., 2015).

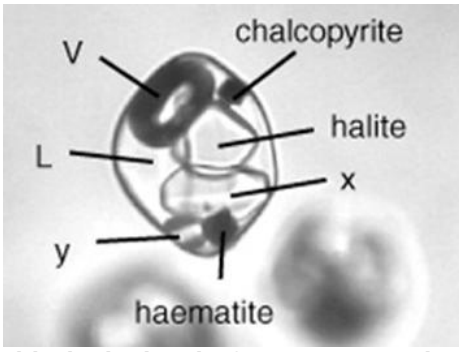
Inclusions containing micro-micro/ daughter minerals are neat to view in the microscope, but as you look at the pictures in this note, it is interesting to think for a moment about the geologic history that is stored in those little drops of fluid and the solids that formed within it after it was trapped. If the tiny drop of fluid was trapped when the crystal grew (geologist's refer to these as **primary** fluid inclusions) then it has been chemically isolated for hundreds of millions of years or more depending on the age of the mineralization.

The mineral hosting a fluid inclusion may have formed at great depth and only have been recently exposed after eons of uplift and erosion. Inclusions in quartz pebbles within a conglomerate will reflect the origin of quartz that predates the formation of the rock within which it now resides. But inclusions in a wide variety of rocks permit the history of the mineral/rock to be unraveled if analyzed properly.

Gemologists observe the fluid inclusions in sapphires and other gems to learn if they have been heat treated to enhance their color (Koivula, 1986). The inclusions can not survive the heating required to alter the color of a sapphire. If the inclusions are intact and still contain CO_2 then the gem has not been altered.



Gemologists also use fluid inclusions. This 30 micron inclusion in sapphire (corundum) is from Sri Lanka and has a metamorphic origin. The inclusion contains a CO_2 liquid phase, a CO_2 vapor bubble and a large hexagonal graphite daughter mineral. Check out the interesting video link in Renfro et. al. 2016 to observe a CO_2 inclusion change as temperature is varied.



This inclusion is from quartz vein in a porphyry copper deposit. It is only 30 microns across, but contains at least five daughter minerals in addition to a vapor phase and some liquid. Halite, chalcopyrite, and hematite are identified. X is likely sylvite, y is an unknown phase (Ulrich et. al., 1999). Note the British spelling of *hematite* in the illustration.

Is it any wonder that geologists seek out, and literally salivate, over the opportunity to study the content of fluid inclusions from their favorite ore deposit or geologic project?

References:

Koivula, J. I., 1986, Carbon Dioxide fluid Inclusions as Proof of Natural-Colored Courundum, Gems and Gemology, Fall, 1986, p. 152-155.

Mei, W., et. al., 2015, Ore genesis and hydrothermal evolution of the Huanggang skarn iron-tin polymetallic deposit, southern Great Xing'an Range: Evidence from fluid inclusions and isotope analyses, Ore Deposit Reviews, V. 64, P. 239-252.

Renfro, Koivula, J. I., and Skalwold, E. A., 2016, A Fantastic Display of Phase Changes in a Sapphire's Fluid Incluson, Gems and Gemology, V. 52, no. 1

Ulrich, T., Gunther, D., and Heinrich, D.A., 1999, Gold concentrations of magmatic brines and the metal budget of porphyry copper deposits, Nature, v. 399, p. 676-679.

Walter, M., 2014, Collector's Guide to Herkimer Diamonds, Schiffer Earth Science Monograph Volume #18, 94 p.

A New York "Rock Hound" Meets Students from Other Countries by Kathleen Cappon

A retired colleague asked me to bring my rocks, minerals and fossils to show the kids where she has been volunteering. So, on January 17th, I put together a New York State mineral, fossil and gem presentation to a group of students who attend the All Star Scholars Program at Sacred Heart School in Rochester. The students are from grades 1-7 and from countries such as Indonesia, Zambia, Jamaica and China. They attend this program after school to receive help with language skills, homework and local Rochester and New York history.

WCGMC Kathleen Cappon at the All Star Scholars Program in Rochester.

It was fun showing them rocks/minerals and my "rock hound" tools. I entered the room dressed in full quarry "get up" with vest, hard hat and a pail of labeled tools. On the tables I set up books, maps and an assortment of New York State fossils and minerals.. There were other cool fossil "eye catchers" like a big trilobite, a fish in shale, ammonites, giant shark tooth, and, of course, a Eurypterid (the State Fossil). The minerals were from localities in northern New York and our own Walworth Quarry. The kids spent a lot of time looking at and handling all the specimens and trying on the "quarry" outfit.

After this we discussed some interesting examples of fossils and minerals found in each of their native countries. For example, the most beautiful and richly colored emeralds from Zambia and the petrified forest there. Beautiful gems and minerals come from every country and continent but the group saw that our State gem (garnet) was pretty neat. Everyone in the group got a colored chart of the birthstones along with a short talk about jewelry and what we do at the club's lapidary shop.

I suggested that students start collecting locally and also visit the the Rochester Museum and Science Center. As further encouragement, I provided them with a starter kit to take home. Each kit contained blue calcite, magnetite (with a nice magnet), biotite, a garnet, a brachiopod, a horn coral and two shark teeth!! What fun it is when you have an interested audience! This summer I am planning to go on a collecting spree with WCGMC to be prepared to do more of these talks. I thank Bill Lesniak for the blue calcite and other club members, all of whom inspire me to get others interested in geology and collecting.

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ODE TO A ROCKHOUND

I think that there shall never be,
an ignoramus quite like me.

I roam the hills throughout the day,
to pick up rocks that do not pay.

There is one thing that I've been told,
just take the rocks and leave the gold.

Over the deserts and mountains blue,
I search for rocks of varied hue.

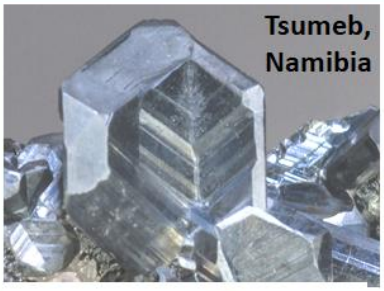
A hundred pounds or more I pack,
with blistered feet and aching back,

and after that is over and done,
I cannot name a single one.

I pick up rocks wherever I go,
the reason why I do not know.

Most rocks are found by fools like me,
where God intended them to be.

written by Bill Pittillio (1990's)
recently posted in Facebook Group "Rockhound Connection". Reprinted with permission



Pictures from mindat

Can you name me?

- I'm soft (2.5 to 3 on Moh's scale).
- I'm silvery black with metallic luster.
- Copper miners love me because I contain more copper by weight than other common copper ore minerals except native copper.
- Careful, I am NOT an oxide mineral.
- I'm also dense, specific gravity 5.5-5.8.
- I am ususally granular and massive and do not form nice crystals, but when I do grow crystals I like to twin and show off my monoclinic form.
- I form in the supergene zone of porphyry copper deposits.
- My Norwegian name is Kobberglans.
- I have been found in Ellenville, NY

for answer, see page 6


WHAT IS A "CAB"

BY GARY BERGTHOLDT (GMSVP)

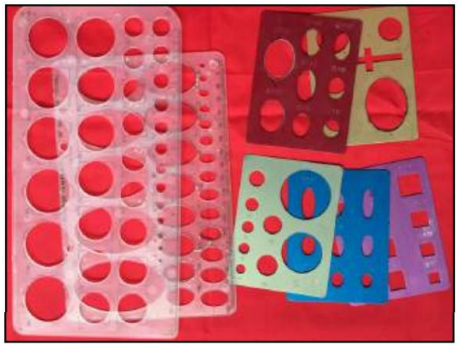

The following is from the September 2017 issue of the Virginia Pen, the newsletter of the Gem and Mineral Society of the Virginia Peninsula (GMSVP), and is republished with permission. Only Part I on Preforming is reprinted. Readers interested in Gary's subsequent segments on Shaping/Grinding and on Polishing can find them HERE.

A cabochon is a gemstone that has been shaped and polished as opposed to faceted (cutting with geometrically related flat cuts that maximize the light reflection/ refraction of transparent stones). The term cabochon comes from the French word, caboche, meaning head. The resulting form is usually a convex (rounded) opaque gem with a flat reverse. Gemstones with a hardness lower than 7 on Mohs hardness scale are easily scratched and would quickly make translucent gems unattractive; instead they are polished as cabochons which make scratches less evident.

The usual shape for cutting cabochons is an oval. This is because: (1) the eye is less sensitive to small asymmetries in an oval, as opposed to a uniformly round shape, such as a circle, and (2) the oval shape, combined with the dome, is attractive. If you are just learning to make a cab, use an oval shape (30mm X 40mm is a good size), it's easier and more forgiving. Making cabs is a three-step process, i.e., preforming, shaping/smoothing, and sanding/ polishing. The figure which follows shows the process from rough stone to final product.

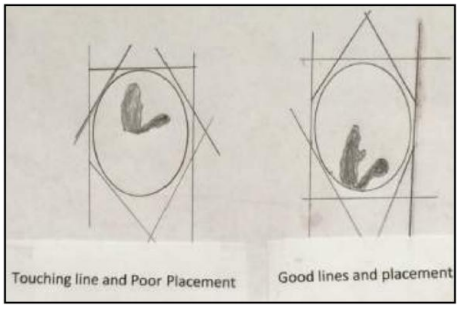
The various stages from rough stone to final product in the creation of a cabochon or "cab".

Preforming: Select the stone to use in making the cab (look for color, scene, or anything you like). The slab thickness should be ¼" (or a little more) and free of pits, cracks, and faults. If you cut a slab from rough stone and are concerned about cracks and fractures, drop it from about 6 – 8" above a hard table top. If the slab doesn't break, it's a good stone. If it breaks, look at the larger pieces, they may be useable. You don't want to do all the work only to have the cab break into pieces. If you are buying a slab from someone, don't drop it unless you're prepared to buy it if it breaks!



Use a template like one of these to select the part of the stone you want.

The part that you want should be centered in a template hole or in the lower 2/3 of the hole. Try different size template holes and choose the one you think is most pleasing to the eye. Trace the cab outline from the template to the stone using a fine tip sharpie.



Draw straight guidelines on the slab within 1/16" of the cab outline.

These lines form a polygon that becomes a guide for you to cut along as you trim out the cab to minimize grinding. Using a trim saw, slowly push the slab into the saw blade using the thumb and forefinger of each hand (be careful that your fingers are away from the blade). Cut straight lines using firm and steady pressure. Do not trim to your template outline.

We are making a cab that will be wire wrapped. Therefore, it must have flat sides. If it has a sloped side, the wire will slide off the stone. Remember your geometry class with circles and tangent lines that touch the circle at one point only (that you said you'd never use), this concept applies to grinding the cab. If you hold the preform horizontally against the wheel, you will cut a curved/sloped edge, because the wheel's surface is grinding more than one point at a time. If you hold the preform vertically against the wheel, you will get a flat edge because only one point is touching the wheel at any one time (see figure on next page).

Hold the perform vertically against the wheel to insure a flat side cut.

Start with the 80-grit wheel, hold the preform just below the center of the wheel, and slowly start grinding to within 1/16" of the template line. Begin with the areas furthest from your template outline and work around until you are uniformly close to the template line. Slow, even, smooth strokes are needed with light pressure. Check the size of your stone against the size of the template you used. It's very easy with softer stone to overgrind. You want the edge to be within 1/16" of the template line. Remember: **"Grind a little, look a lot."**

Now transfer to the 220-grit wheel. Use the same procedures to grind the edge slowly until you are touching the outside of your template line.

Look at both sides of your stone, choose the one you want to see, and mark it with "F" for front and the other side with a "B" for back. Move to the "B" side, and while holding the stone, vertically tilt the stone at a 45º angle to the wheel to make a bevel around the backside of the stone and take off the back's edge. No more than a 1/32" cut. As before: "**Grind a little, look a lot."**

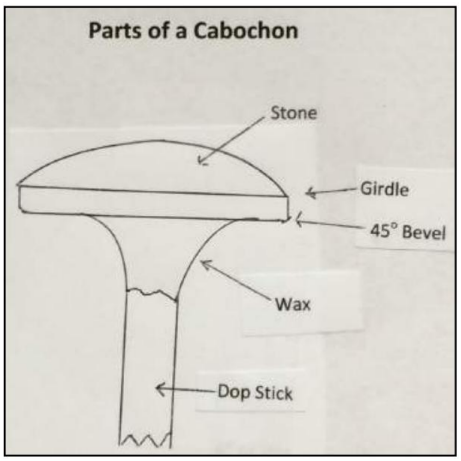
You are ready to mark the girdle line. Make a mark on the stone's edge about 1/3 of the way up from the "B" side. Place the stone with the "F" side down on a flat surface. Use some slabs as a shim and a fine tipped sharpie pen. Hold the pen on top of the shim's edge at a downward angle and adjust the height of your pen point by moving the pen further away from the edge of your shims (raises pen point) or closer to the edge of your shims (lowers pen point). Once positioned on the stone's mark, twist the stone past the pen's tip to make a line around the stone.

Marking the girdle line

It's now time to dop the stone. Clean the stone with alcohol. Choose a dop stick about 2/3 to 3/4 the width of the narrowest part of your stone. (Note: Dop sticks longer that 4" can get in the way during grinding.)

Place the stone on the side of the dop pot "F" side down. Place a few small chips of wax on the "B" side of the stone. When the chips are melted the stone is ready. While waiting, dip the dop stick into the wax about 1/4". Pull the stick out, dip your fingers into water, and shape the wax on the end of the dop stick making it look like a pencil eraser. If the stone isn't ready yet, no big deal, just wait.

When the wax chips have melted, remove the stone from the dop pot's edge ("B" side up), center the dop stick over the stone, and press down gently (the wax on the dop stick will melt), use wet fingers (stone is very hot) to smooth the wax pushed from under the dop stick, and ensure the stick is perpendicular to the stone. Hold stick until the wax has cooled.



Your stone should now look like the picture above, but with flat front and back sides. It's ready for the next step in the process. People, who have a problem controlling the stone during preforming may choose to dop the stone prior to starting this process. Others may choose to smooth the B side of their stone before dopping. I wait until the dop is removed near the end.

Congratulations: you are now ready to shape, grind and polish your preform into a completed cabochon.

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To follow Gary's excellent cabochon instructions through the remaining steps, visit the September, 2017 Virginia Pen on the GMSVP webpage.

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Can You Name Me?

from pg. 4

I am chalcocite. With a chemical formula of Cu_2S, almost 80% of my molar weight is copper. This compares me favorably to chalcopyrite ($CuFeS_2$) which is only 34.6% copper.

Wayne County Gem and Mineral Club 2018 Field Trips

Lucky for all of us, WCGMC is actively lining up therapeutic trips for every spring, summer and autumn month in 2018. We planned to share our early plans at the January meeting, but, alas, mother nature intervened. So here it is now. There will be lots and lots of local day trips sprinkled into the schedule as the seasons progress, but we do need to sort out the longer trips and the joint club trips as soon as possible.

You can help us out by indicating your interest in the overnight trips to MA, VA, PA, Ontario, and KY. We'll also be seeking input at upcoming meetings. This is basically just a list with little detail. We'll put the trips together this winter. Contact Fred Haynes or Linda Schmidtgall if you have any questions.

First Pass at 2018 Field Trips – Wayne County Gem and Mineral Club - Last update January 23, 2018

April 1 (Sunday) - Opening Day at Ace of Diamonds for Herkimers

April 26-29 (long weekend, perhaps more) - **Virginia** area

May 4-6 (central **Pennsylvania**, Mt. Pleasant Mills, etc.)

May 25-28 (Memorial Day weekend) – collecting Herkimers, multiple locations with NPGS

June 1-3 GEMFEST in Canandaigua

June 15-17 or June 22-24 - **Massachusetts**, pending permission release at multiple sites

July 14-22 (**Ontario**, Bancroft and Temagami, 3-4 days at each location

August – perhaps a 4-5 day trip to **Maine**, timing to be determined after picnic date is set

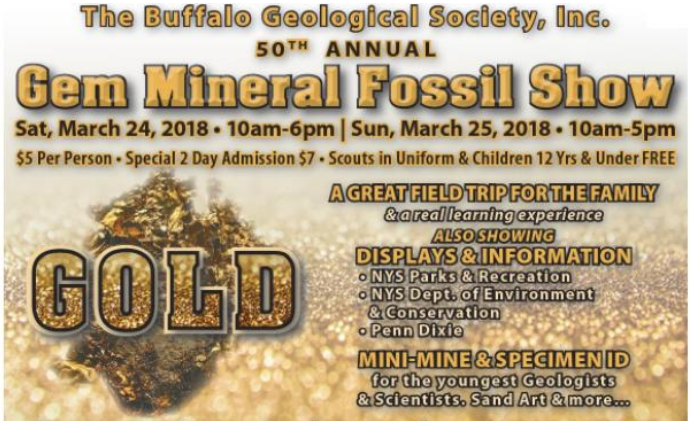
August 31-Sept 3 (Labor Day) – 3 day plus trip to **Kentucky** with CVGMC of NC

September **– Adirondack** weekend mid-month

We will work to line up day trips with the Rochester Academy of Science Fossil Group as we have in past years and we'll likely get to Ilion, Bethany Center, Ridgemount, Lake Ontario shoreline, and other familiar local sites all through the field season. But, if all that is not enough for you, tell us what you would like to do and/or offer to lead an addiitonal trip.

BUS TRIP TO BUFFALO SHOW – March 24th

The Gem and Mineral Society of Syracuse has invited WCGMC members to join them on a bus trip to the Buffalo show. The cost is $25.00 per person. They plan to leave Syracuse at 8 AM Saturday and can pick folks up at Thruway Exit 42 Park and Ride at 9 AM. Contact Cheryl Brown (315-708-9122) for details. Space is first come first served and reservations and payments must be made in advance. Bus will stop for dinner near Hamburg and be back to the car park before 9 PM. Send payments to GMSS, P.O. Box 2801, Syracuse, NY 13220 by February 17th.



More show details at the BGS webpage

Wayne County Gem & Mineral Contacts

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Glenn Weiler – Workshop Coordinator
Linda Schmidtgall – Collection Curator
Eric Elias: GEMFEST Show Chair
thecrystalnetwork@hotmail.com
Fred Haynes – Facebook Administrator

Club meets 2nd Friday of each month starting in Sept.
Social meeting at 6:30 PM.
Regular meeting at 7:00 PM
Park Presbyterian Church, Maple Court, Newark, NY
Website – http://www.wcgmc.org/

Dues are only $15 individual or $20 family for a full season of fun. Renewal is in October. Send to:
WCGMC, P. O. Box 4, Newark, NY 14513