Wayne County Gem and Mineral Club News

January, 2023

Always Looking for Places to Dig!

A busy day at the Workshop in December

http://www.wcgmc.org

FACEBOOK link

Holiday Party 2022 !!

January Meeting

Friday January 13th , 7:00 PM.
Park Presbyterian Church,
Maple Court, Newark, NY

Garnet Sands in the Northeast US

By Fred Haynes

Sand collectors (arenophiles) love heavy mineral sands and garnet is one of the more common minerals found in heavy mineral sands. New England and the Great Lakes region are full of rocks containing garnet and their erosion leads to garnet-rich sands in many locations. Fred will discuss the occurrence and collection of numerous garnet-sand locations in the northeast USA, including those found along Lake Ontario right here in western New York.

This talk was presented last September at the International Sand Collectors Society SandFest convention in Coos Bay, Oregon. A brief discussion of the field trips and workshops accompanying that event will be included. Oregon's Pacific coastline is a sand collector's paradise.

For more see Two garnet-rich sands – page 7

Hamlin State Beach, Hamlin, New York

Saturday Workshop: January 14th
(10:00 AM until mid-afternoon)

Where: 6676 E. Port Bay Rd, Wolcott, NY

Eye protection is required.
Training on equipment is available.
$5/adult to offset maintenance costs.

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Holiday Party 2022 was a Huge Success

Happy New Year everyone! I am looking forward to an eventful year with the club and the things we are able to do together. We have great talks planned for the year, some structured field trip planning and resulting trips, GemFest in the spring, and plenty of workshop and community time sprinkled into the mix to make 2023 fulfilling for everyone.

As we mark one year ending and another beginning, I've found myself pondering the nature and scale of time. As mineral lovers and hobby geologists, we often talk about geological eras especially as it relates to the ages of various mountain ranges, mineral deposits, or fossil occurrences. The sheer scale of these time periods is really mind boggling in the scope of our meager 100-year life spans – it's difficult to conceptualize things that are *hundreds of millions* of years old when our best frame of personal reference is 100 years and even written history is less than ten thousand years old. Many of the rocks we break open in the field are millions of years old, so when you crack one open with a hammer, take a moment and reflect on the fact that you're opening a time capsule into the very distant past.

For a sense of scale of mineral ages, I wanted to share one of the interesting news articles that got me thinking along these lines. Michael Ackerson, a research geologist from the Smithsonian's National Museum of Natural History, published a study where he had analyzed zircons and their unique chemical composition to build a timeline of the development of the Earth. I won't make the club's professional geologists groan by misinterpreting the article or use terms more imprecisely than I may have already done in my previous paragraph, but if you want to read more of the fascinating time capsule analysis and insights into the formation of the Earth that zircon's provide then I'd highly recommend checking out the article at: https://www.si.edu/newsdesk/releases/earths-oldest-minerals-date-onset-plate-tectonics-36-billion-years-ago.

Enough of my science nerding and back to the fun stuff! If you haven't been to the workshop lately, Glenn's outfitted us with more cabbing machines to make more room for people to work on polishing stones so it's a great time to come by and use a brand new cabbing machine as well as a couple of new-to-us ones. There are always helpful club members there to teach new people or give advice on improving your skills. Bonus – the workshop is heated so you won't freeze during the winter!

I'm looking forward to seeing everyone for Fred's talk on garnets at the Friday the 13th meeting – they're New York State's official gem, so garnets should hold a special place in all proud New Yorkers' mineral-loving hearts! Stay warm and I hope you all have a wonderful beginning to the new year.

James

A piece of my heart has broken,

but somehow it feels bigger and filled with love.

Thank you ALL for happy times, kindness and support.

Fondly, Donna Smith

(Madam Louise)

In 1959 I was first inspired to collect rocks by a wonderful neighbor who showed me his rock collection. He even took me on his field trips to the Penfield quarry! Fast forward about 60 years and now his son has gifted me some of his father's collection. This generous offer, along with my passion for building things, inspired me to create a Rock and Mineral Museum and to dedicate it to both of them.

You may remember the article in the June 2018 issue titled "Greenhouse/Solarium/Storage Barn: ROCK HOUSE". Since the time of that article, I had been gathering wood, plastic, metal, hardware and rock related accessories to build the interior. I wanted to complete the entire project using at least 80% recycled materials. As a re-cap of the 2018 article:

- The 23 windows (framed in by a 14ft. by 18ft. skeleton of reclaimed 4x4 posts,) came from Marion Elementary School when they replaced all of the windows.
- The light diffusing panels over the ceiling were from the gymnasium.
- Jalousie windows and a door came from a dismantled porch.
- The high impact plastic flooring was from the Utica Club brewery warehouse.

It sure was fun acquiring "stuff" to build with, but then it was time to get to work. First, I built structures to support 104 shelves using 4x4 posts, 2x6's and 2x4's. All of the back walls were comprised of cast off sawmill wood and tongue and groove flooring mis-cuts. The shelves were made of stair tread seconds discarded because of too many knots! Other shelves were made of cedar, old growth fir, stippled maple, and ash from the local dead ash trees.

The shelving in the back of the rock house museum.

I designed a large work /display table for the center of the room built around the two support beams (center right picture). The two 150 pound oak leg sections were from a post and beam log processing table thrown out by New Energy Works in Farmington (upper right), a company that recycles wood beams from 18th century factories and barns. The table was fastened together with 4 beams of side rails. Twelve planks were fit together for the table top. The table was then jacked up a bit on the west and south end to level it (lower picture below). Four 18 inch drive bolts were fastened into the main beams and compensating spacers were placed under the legs.

Building the table was both challenging and exhilarating.

It was time to finish this monstrous table. Five coats of preservative and marine varnish were applied to the table top.

Other parts were rubbed with linseed oil. The top planks looked beautiful as each was a different species of wood. The boards with "modern" wormholes and tracks now look like "fossil" rocks with worm tracks! This table (upper right photo in title box) will be a perfect place for me to work on my collection.

Four coats of waterproof preservative were applied to all 104 shelves and to the walls and trim. Sections of trim on the walls and windows were fashioned out of slices of birch logs, providing a nice design contrast to the brown wood.

The petrified wood area has its own design. All 80 pieces of my fossil wood collection now rest on large two foot diameter slices of varnished ash pine and walnut. These displays are raised and placed on antique iron brackets. The display is lit by a series of 8 diffused LED shop lights.

Petrified wood samples atop slices of varnished ash and walnut.

It was time to move the mineral collection from the barn and the house to the museum. This took 4 days. Each rock was brushed clean and placed alphabetically: A-G on the first 38 shelves on the north wall. The remainder are on the shelves along the east wall.

Various international minerals were placed on the shelves below the world map. Note the birch logs on the left side of the map and the shelves.

The last 24 shelves host my fossil collection. Many of my better "yard rocks" found homes on the floor. The upper shelves have large seashells, horseshoe crabs, fungi, turtle shells, bee's nests and the like. Rocks with beautiful reflective qualities were placed on the south exposure. Rocks like amethyst or others that could fade or suffer light damage were put in a more protected spot. I may move a few around as time passes, but for now I am pleased my creation.

A good dousing of Home Defense insecticide to the floor and a concentrate of mint rodent spray to all the perimeters provided the final touch. I will run a small heater on colder days and spend time labeling the rocks and adding to the collection. Rocks that were previously stored in boxes or rolled in newspaper are now on display. Beautiful rocks should be displayed in an artistic, but well planned building. The conversion of a greenhouse to a rock house permits all of their unique qualities to be admired.

I'm very satisfied with the appearance of the Rock House from the outside as well.

The fossils and some of the larger specimens reside on the right side of the east wall.

Aluminum

by Howard Heitner

One of the most recognizable structures in the United States is the Washington Monument. It can easily be seen from the airport and the parkway on the Virginia side of the river. Its cornerstone was laid in 1848 but building was very slow. It was stopped during the Civil War and the structure was not completed until 1884. At that time it was decided to put a metal cap on top made of a precious metal. What was that metal? Surprisingly, it was aluminum. Aluminum was known in the 19th century. Small amounts were made by reacting aluminum chloride with sodium. That is probably how the cap was made. The metal made in this way was expensive, roughly the price of silver.

Aluminum is not a rare element in the earth's crust. It is in many common minerals like feldspar. The problem with isolating the metal is that it is usually strongly chemically bonded to silicon with an oxygen atom in between. This prevents it from being easily extracted from silicate minerals. Today, the ore of aluminum is a rock called bauxite, named for the type locality LeBaux in France. It contains three non-silicate aluminum minerals, gibbsite, boehmite and diaspore. It also contains silicate minerals, quartz and iron oxides. Bauxite is formed by weathering of aluminum bearing rocks and many deposits are found in tropical or formerly tropical areas.

Shortly after the cap for the Washington Monument was made (1886) a method was devised to recover aluminum from bauxite, called the Bayer process. The minerals in bauxite cannot be separated by physical means. Instead the aluminum has to extracted by what is called a hydrometallugical process. This means concentrating the aluminum into a liquid solution, rather than a solid concentrate as is done with other metal ores.

Bauxite ore: The aluminum-rich minerals often grow in concentric balls called pisoliths when aluminum-rich rocks are subjected to intense weathering in tropical conditions.

Ground bauxite is digested with a hot solution of sodium hydroxide. The aluminum minerals react to form a soluble compound called sodium aluminate. Silicates are also dissolved and react with some of the aluminum to form the mineral sodalite, which can come out of solution later as a hard white scale on the inside of the heat exchangers. Special polymers must be added to prevent the formation of sodalite scale *Yes, this is the same mineral that we cherish in its blue form from the Princess Mine in Ontario or that fluoresces bright yellow when found in syenite rocks along some of the Great Lakes. Folks in Upper Michigan call these rocks "yooperlites."*

The iron minerals do not dissolve and have to be separated from the aluminate solution. Unfortunately, these are in the form of fine particles which do not settle out easily. This process is accelerated by adding water soluble polymers called flocculants in large vessels called thickeners. The insoluble material (called red mud) comes out the bottom. It is carefully washed and flocculated again several times to recover as much aluminum as possible. When the clarified aluminate solution (called Bayer liquor) is cooled, aluminum hydroxide (gibbsite) comes out of the solution. The gibbsite is heated to a high temperature to form aluminum oxide (alumina).

Bauxite also contains the rarer metal gallium which is also recovered from the Bayer liquor.

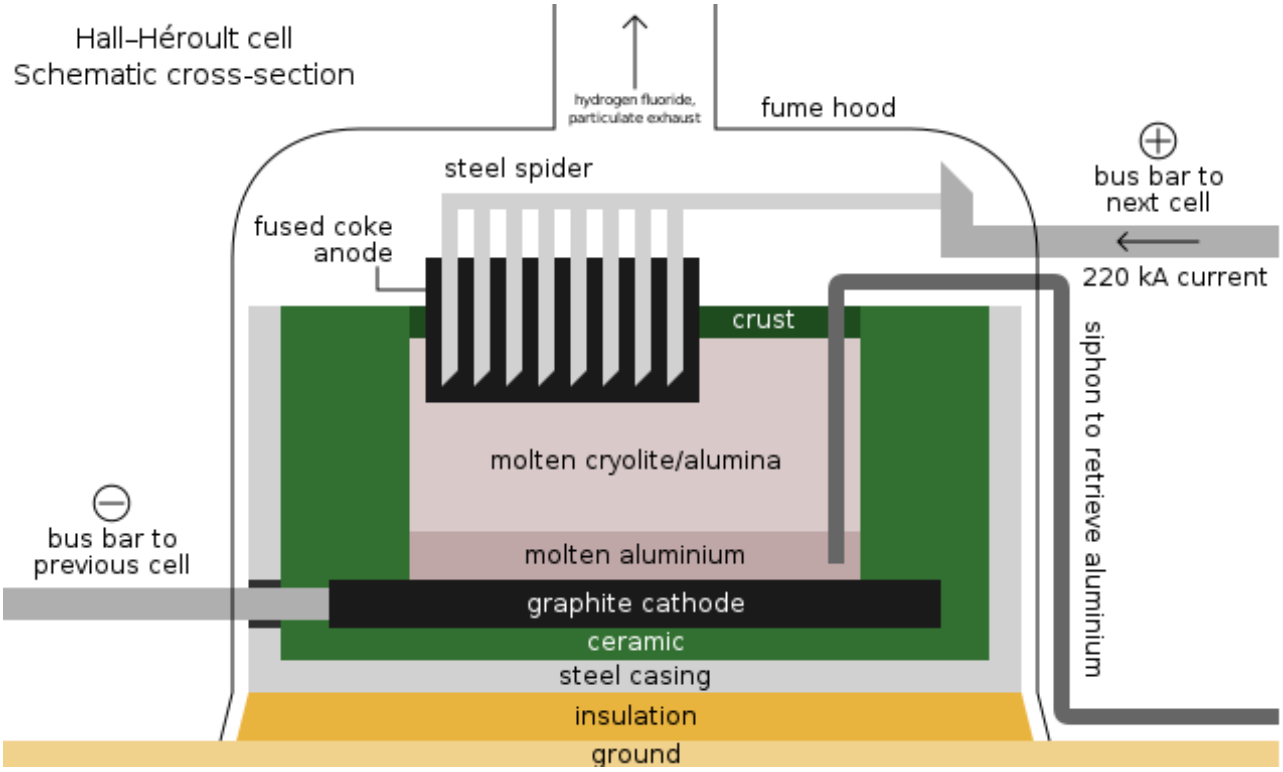
The aluminum in alumina is very strongly bound to oxygen and a lot of energy is required to break those bonds. This energy is supplied as electricity. That is also how the metals sodium and potassium were first isolated. Alumina is not soluble in water or any other common liquid, but experimentation indicated that it was soluble in molten cryolite.

Cryolite is a fluoride mineral of sodium and aluminum. It was originally discovered in a large deposit in Greenland, which has since been mined out. Fortunately it can now be synthesized. Mineral specimens from Greenland are available. There is a simple test to confirm that a sample is cryolite. It is the only mineral that will melt in a candle flame.

The process of recovering aluminum from alumina using electricity was invented independently around the same time (1886) by an American, Charles Hall and a Frenchman, Paul Heroult. This was about the same time the Bayer process was invented [a remarkable coincidence?, perhaps]. The production cell shown in the figure below is in effect an electric heater that reaches a temperature of about 1300 F, high enough to melt the cryolite and the aluminum that forms at the negative electrode. The positive electrode is made of carbon and the oxygen from the alumina reacts to form carbon dioxide.

This process consumes a lot of energy, approximately 17 kwH/kg. An aluminum can that I weighed was 12.8gm which corresponds to 0.21 kwH. This does not include the energy used in the Bayer process itself. That is why recycling is so important. The energy used to make recycled aluminum from scrap is only about 5% of that used to produce it from ore. It is easy to see why 75% of the aluminum produced in the United States is recycled metal. The rest is imported, as metal, mostly from countries with low energy costs or made from imported bauxite. There are no current domestic sources of aluminum ore.

Now when you see the Washington Monument, look at the peak. You are in effect looking at the distant ancestor of the soda can you just put in the recycle bin: interesting genealogy.



Hall-Heroult cell for aluminum production (Wikipedia Commons attribution/share license)

Splendid Sands Calendar

January, 2023
Rock Harbor Lighthouse, Isle Royale National Park, Michigan (island in Lake Superior)

Photo by Leo Kenney

by Leo Kenney, Kate Clover & Carol Hopper Brill

Isle Royale National Park in Lake Superior, near Michigan's border with Canada, is accessible only be ferry or seaplane. The island is a rugged wilderness and backpacker's paradise with no roads or cars and little internet access. It also features outstanding geological sites, especially along its wave-washed shorelines where rock outcrops and pebbles of various minerals can be found.

Isle Royale is mainly underlain by basaltic lava, the results of hundreds of volcanic eruptions about 1.1 billion years ago. Many flows can be distinguished by their texture, particularly their amygdaloidal zones. These zones have cavities or gas bubble holes that later filled with minerals.

Greenstone or pumpellyite (aka chlorastrolite) occurs as amygdules in particular lava flows on Isle Royale and the Keweenaw Peninsula. Generally greenish in color, it has a distinctive "turtleback" pattern. Weathered out of the lava rock, it can be found as sand to pea-size pebbles on the beach. This sample was collected in the 1960s before it became illegal to collect from national parks.

Two garnet-rich sands, both from New England to preview the program at our January meeting

1-2mm almandine garnets weathering from schist in a roadcut in Tolland, CT.

Pink garnet sand from Madison, CT and a beach on Long Island Sound.

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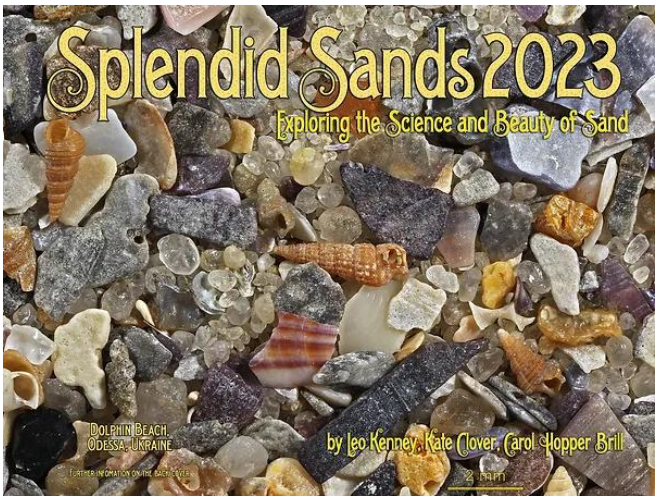
You can follow the sands of 2023 monthly in this newsletter or you can purchase your own from the authors. This calendar has been produced since 2008, but only a small number are produced each year. To acquire your own, click here for details: https://www.splendidsands.com/2023calendar



Wayne County Gem & Mineral Contacts

ELECTED OFFICERS

President – James Keeler
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Vice-President – Holly Woodworth
autum14513(at)yahoo.com
Secretary – Beth Webster
Treasurer - Bill Lesniak

Board of Directors
Bob Linderbery
Heidi Morgenstern
Karen Wilkins

Past President – Linda Schmidtgall

Visit us on Facebook:
https://www.facebook.com/groups/1675855046010058/

APPOINTED POSITIONS

Field Trip coordinator – Teresa Ferris, ***help wanted***
Fossil Field Trip Leader - Stephen Mayer

Fred Haynes – Newsletter Editor
fredmhaynes55(at)gmail.com

Bill Lesniak – Website Coordinator
Glenn Weiler – Workshop Coordinator

Linda Schmidtgall – Collection Curator

Fred Haynes – Facebook Administrator
Jim Rienhardt – Sand Chapter

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