.Mineralogical Society of the District of Columbia

MINERAL MINUTES

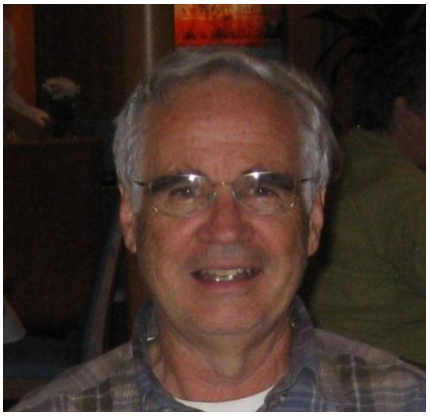
The Mineral Minutes is the bulletin of The Mineralogical Society of the District of Columbia, Inc.

The purpose of this Society is to promote interest in mineralogy, geology, and related earth sciences and to encourage mineral collecting. An annual scholarship is awarded to a deserving student in the related field.

The Mineralogical Society of the District of Columbia is one of the founding Societies of the Eastern Federation of Mineralogical and Lapidary Societies.

Vol. 72, No. 6 ***Founded 1942*** ***June 2013***

June 5, 2013: Rare Earth Minerals Presentation by Michael Pabst



Born in Washington, DC, Michael Pabst, Ph.D., was 10 years old when his grandmother gave him an old mineral collection. It kicked off a lifelong interest in mineralogy.

Receiving a B.S. degree in chemistry at Boston College, and a Ph.D. in biochemistry at Purdue University, Michael's most prized achievement at Purdue, was meeting his wife, Karen. Karen had access to very fine stereo-microscopes. They visited rock shops near Mammoth Cave in Kentucky, and bought azurite from Zacatecas, Mexico, as well as sphalerite from the Tri-State region. Looking at them through stereo-microscopes led to an addiction.

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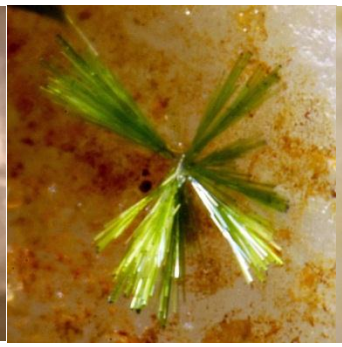
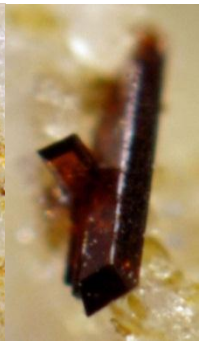
Gadolinite


Bastnaesite


Agardite


Aeschynite

(Photos: Minerals by Michael Pabst)

Upon completing graduate school, Michael and Karen moved to Washington, DC. Michael secured a fellowship at the National Institutes of Health. He even joined the MSDC! Two years later, they moved to Denver and joined the local micromount group. They collected specimens from local silver mines and visited mineral shows in Denver and Tucson.

After many years in Denver, Michael moved to Memphis to teach at the University of Tennessee Health Science Center, where Michael became a Professor of Molecular Sciences. Finally leaving Memphis in 2005, Michael and Karen retired moved to Harrisonburg, VA, to be near their daughter, Diana's, family. Michael's special interest is larger specimens featuring a suite of microminerals that he enjoys exploring at his leisure.

THE PREZ SAYS…

By Stephen Johnson


(photo: S. Sims)

Okay…Sheryl hasn't started nicely reminding me that my words of wisdom are due yet. Maybe this will be a surprise for her. Hopefully, this newsletter will have enough reading material to get everyone through the summer break. There are some good collecting opportunities coming up – the Vulcan Quarry in Manassas on 18 May and the Vulcan Quarry inHavre de Grace on June 8th. Additionally, I will be up at the EFMLS meeting and show on Long Island the end of May. Additionally am probably going to try to visit Glenn Rhein's place while I'm up there – see the article in this newsletter about Glenn and the pretty amazing stuff he's been finding on his land.

We had some good discussion last meeting. Hopefully, by the time we return from the summer hiatus we will have membership cards to issue out to all. Please keep thinking about ways to engage with kids about geology and mineralogy and build our junior membership. There was some really good discussion about this last meeting and I believe we should continue the dialogue and brainstorming.

I hope everyone has a very pleasant summer and looking forward to seeing all of you after the summer break.

The 2nd Annual NY/NJ Gem & Mineral Show

By Stephen Johnson, MSDC President

I recently attended the 2nd Annual NY/NJ Gem & Mineral Show which started on Friday April 12 and ran through Sunday April 14 - what an outstanding event! I will absolutely be there again next year.

As a little background, the first NY/NJ Gem & Mineral Show in 2012 was attended by 6,000 visitors and had 115 exhibitors offering everything from minerals, fossils, meteorites, gems, jewelry, gold, silver, opals, petrified wood, and so much more. Both the general public and advanced collectors were wowed by the specimens in the 'Fine Mineral and Gem Gallery'. Fortunately (or I guess unfortunately, depending upon your perspective), the show grew too large to stay at the 61,000 sq. foot Meadowlands Exposition Center. So they moved 25 minutes south to the 2.5x bigger (150,000 sq. feet) NJ Convention & Exposition Center. The larger space allowed them to double the size of the Fine Mineral and Gem Gallery (and they had some really great dealers there like Arkenstone), triple the number of dealers on the main exposition floor, and create a separate 90-booth 'Wholesale Only' section for business-to-business sales.

According to the show's website, the visitor count for the April 2013 show was 10,230 (up 70%!) and the final booth count was 271. The theme for this year was "Minerals and Fossils of NY/NJ" and was supported by a gigantic special exhibit of NY / NJ minerals & fossils in 35 beautiful wall-cases. Both the Franklin Mineral Museum and the Sterling Hill Mine Museum turned the Junior Ballroom into a huge darkened Ultraviolet mineral room. Glenn Rhein had a case with fluorescents from his property also displayed in the UV room. (see other article in this newsletter for more information about Glenn). The Main Ballroom hosted the high-end 'Fine Mineral & Gem Gallery' which showcased millions of dollars' worth of fine minerals. These specimens were absolutely magnificent although mostly well out of my price range. I saw one gorgeous Tanzanite crystal where the asking price was $175K! (see photo) This is definitely one of those rooms where you feel like a kid in a candy store.

On the huge exposition floor visitors browsed hundreds of booths of jewelry, gems, gold, minerals, fossils, and dinosaurs. The original dinosaur props from Jurassic Park were a hit. I had the opportunity to meet Jolyon Ralph of Mindat.org fame. A very nice and gracious man – he kindly pointed me in a good direction to identify my Afghanistan blue and white unknown. Turns out that is Hauyne/Lazurite with anorthite(but apparently all high NA) – thanks to Rob Woodside.. Mindat.org is coming out with some very cool mineral t-shirts (they're available on the website) – a different crystal structure for each day. I'm probably going to buy the complete set. Local mineral clubs were also fairly well represented and I got myself on two or three mailing lists. Always interesting to see what other clubs like to focus on and initiatives they might have. I also got to meet some of the folks from the Weather Channel's show "Prospectors". What a great booth of Colorado minerals they had!

Some of the show's highlights included:

- A separate 20,000 sq. ft. 'Wholesale Only Area' was available (for those members who also moonlight as dealers) as well as the Fine Mineral & Gem Gallery
- Sterling Hill Mine Tour & Museum of Fluorescence hosted the glow-in-the-dark UV exhibit

(millions-of-dollars-worth of exquisite specimens) Outside the show at the NJ Convention & Exposition Center in Edison, NJ. (Photo courtesy of Jolyon Ralph from mindat.org.)

- The most complete and well preserved Archaeopteryx yet (Thermopolis specimen)
- The world's finest collection of Devonian Bundenbach (Hunsruck Slate) fossils (18 feet of wall-cases)
- A rare collection of trilobites with preserved legs and antennae by Gold Bugs
- Specimens on loan from the Staten Island Museum and the American Museum of Natural History

I truly would recommend this show for our member consideration – well worth the visit and I see great potential for growth. I know I will be back.

Mindat.org manager Alfredo Petrov with his mineral selection. (Photo courtesy of Jolyon Ralph from mindat.org.)

Feeding frenzy. (Photo courtesy of Jolyon Ralph from mindat.org.)

The show is very busy - here “Rocksaholics” booth is swamped by visitors. (Photo courtesy of Jolyon Ralph from mindat.org.)

Glenn and his wife Karen, posing together in the minerals.net booth. Note the video playing is the video on Glenn, and is showing the Spinel finds! (Photo courtesy of Hershel Friedman from minerals.net)

Hershel Friedman and Glenn Rhein in the Minerals.net booth. Glenn was a real celebrity at the show. He even had requests for his autograph! (Photo courtesy of Hershel Friedman from minerals.net)


Amanda Adkins (from the Weather Channel's "Prospectors" show) had a brand new find of etched/complex topaz crystals from Mt. Antero, Colorado. (Photo courtesy of Jolyon Ralph from mindat.org.)


The best doubly-terminated topaz crystal.
(Photo courtesy of Jolyon Ralph from mindat.org.)


A selection of these topaz, some showing bicolouring. (Photo courtesy of Jolyon Ralph from mindat.org.)


Dinosaurs (actually used in the "Jurassic Park" films) roamed the center of the hall for an authentic Jurassic experience. (Photo courtesy of Jolyon Ralph from mindat.org.)


Well, OK, they were fairly static. But still impressive. (Photo courtesy of Jolyon Ralph from mindat.org.)

Terry Szenics had some wonderful British minerals, including this superb Carn Brea fluorite.
(Photo courtesy of Jolyon Ralph from mindat.org.)

Caledonite from Leadhills, Scotland.
(Photo courtesy of Jolyon Ralph from mindat.org.)

Have you ever seen amethyst sceptres from Devon, England? No? Me neither. (Photo courtesy of Jolyon Ralph from mindat.org.)

"Stonetrust" booth at the show, in the Fine Gem and Mineral Gallery. (Photo courtesy of Jolyon Ralph from mindat.org.)

A large plate of silver from Imiter, Morocco that they had.
(Photo courtesy of Jolyon Ralph from mindat.org.)

Sokolowski Poland had a huge collection of synthetic zincite from Poland. (Photo courtesy of Jolyon Ralph from mindat.org.)

Visitors admiring mineral cabinets from both sides. (Photo courtesy of Jolyon Ralph from mindat.org.)

Astro-Gallery of Gems had this piece, which I don't think carries the current price. (Photo courtesy of Jolyon Ralph from mindat.org.)

They also had this interesting Anglesite in Sulphur. I loved the stripey paper clip too. (Photo courtesy of Jolyon Ralph from mindat.org.)

A beautiful Legrandite. (Photo courtesy of Jolyon Ralph from mindat.org.)

And a fabulous English calcite. (Photo courtesy of Jolyon Ralph from mindat.org.)

And a fabulous Chinese calcite!!! (Photo courtesy of Jolyon Ralph from mindat.org.)

The “Mineral Movies” booth had this great Faraday mine, Bancroft hunk of chalcopyrite-included calcite. (Photo courtesy of Jolyon Ralph from mindat.org.)

And this classic Pakistan aquamarine. (Photo courtesy of Jolyon Ralph from mindat.org.)

Green Mountain Minerals had a superb Tanzanite. (Photo courtesy of Jolyon Ralph from mindat.org.)

Joaquim Callen's portable photography setup. I need to set up something like this! (Photo courtesy of Jolyon Ralph from mindat.org.)

“Miner's Lunchbox” booth in the Fine Gem and Mineral Gallery. (Photo courtesy of Jolyon Ralph from mindat.org.)

IN THE FALL…
NORTHERN VIRGINIA MINERAL CLUB’S
22nd Annual Gem, Mineral and Fossil Show - November 23rd and 24th, 2013

The HUB (previously named SUB II), George Mason University, Fairfax, VA
Saturday 10:00 A.M. to 6:00 P.M. and Sunday 10:00 A.M. to 4:00 P.M. Silent Auction on Sunday. Free parking for the show - Lot A. (East) Courtesy shuttle from there. This interactive, educational event is co-sponsored by GMU's Department of Atmospheric, Oceanic and Earth Sciences.

Admission is $5.00 for adults; $3.00 for Senior Citizens (65+) and Teens (13-17). Free for Children (12 and under), Scouts in Uniform, and GMU Students with ID.

For additional show information please email jkostka at juno.com. Club Website: www.novamineralclub.org . Previous year’s show video http://www.youtube.com/ watch?v=xq-EsM1w74A

Scott Werschky of “Miner's Lunchbox” removing the many grubby fingerprints after a day's viewing. (Photo courtesy of Jolyon Ralph from mindat.org.)

His stunning Chinese Acanthite.
(Photo courtesy of Jolyon Ralph from mindat.org.)

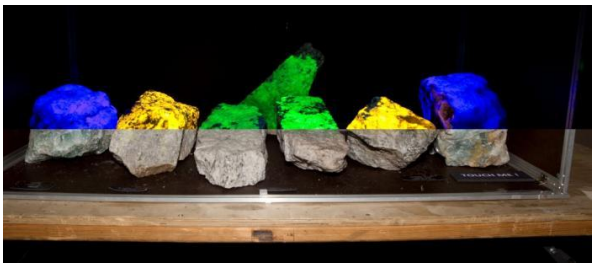
Super Tsumeb dioptase.
(Photo courtesy of Jolyon Ralph from mindat.org.)

This shot is looking back out towards the entrance. When visitors walk in they are greeted by these wonderful displays, principally of New Jersey and New York minerals. The displays are by local universities, clubs and collectors. Jolyon had to wait until the end of the show to get this shot without it being swamped with visitors. (Photo courtesy of Jolyon Ralph from mindat.org.)

Franklin Rhodonite - Franklin Mineral Museum.
(Photo courtesy of Jolyon Ralph from mindat.org.)

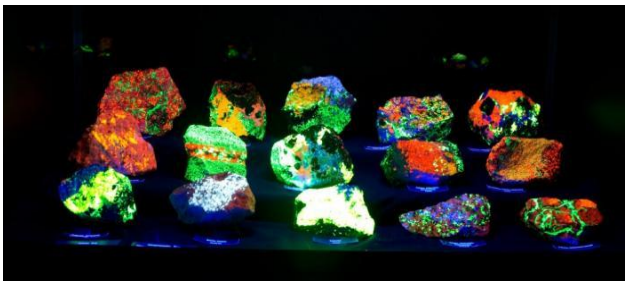
Franklin Amazonite - Franklin Mineral Museum. (Photo courtesy of Jolyon Ralph from mindat.org.)

Huge crystals from the Rhein Property, Amity, New York. (Photo courtesy of Jolyon Ralph from mindat.org.)



Sterling Hill Mining Museum put on a display of Fluorescent minerals. Here's a composite showing some pieces with/without UV. (Photo courtesy of Jolyon Ralph from mindat.org.)

Superb Rhodonite from Franklin - Rutgers Department of Geology. (Photo courtesy of Jolyon Ralph from mindat.org.)



Another UV cabinet. (Photo courtesy of Jolyon Ralph from mindat.org.)

This is a magnificent case by Arkenstone.
Probably close to $1M in this case alone

Beautiful man-made, sort of, zincite
crystals from Poland.
Formed in the smoke stacks at a smelter.

The floor plan for the show gives you an idea
of the scale of the event

A $175,000 tanzanite. What a stunner!

Rochester Mineralogical Symposium

By Cynthia Payne

Several members of MSDC attended the Rochester Mineralogical Symposium in April (George Loud, Tom Tucker, and Cynthia Payne). Also in attendance were: Barbara Sky, Bruce Gabor, Wayne Sukow, and Willow and Quintin Wright. (They all were very active until they moved from the area.) George Loud is shown below setting up his mineral display. [*Editor's Note*: Federation officers, Steve and Carolyn Weinberger, were also in attendance.] (Photos by Cynthia Payne)

CHECK US OUT ON FACE BOOK!

Please help us keep friends and members interested and informed. Search for, or visit, "Mineralogical Society of the District of Columbia" to share your comments, links, and photos. (Administrators are: Steve Johnson, Betty Thompson, Bob Simonoff and Sheryl Sims.)

OUR OLD GHOST MSDC WEBSITE NEEDS TO DISAPPEAR! CAN YOU HELP?

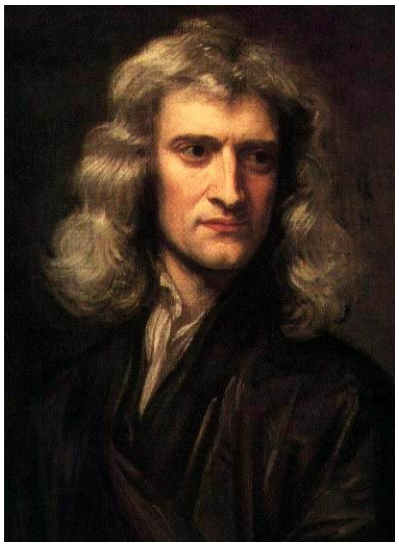
Long, long, ago, Betty Thompson set up a website for MSDC on her own (with zero expertise). Later, Casper Voogt very graciously set up a more flexible and attractive site that Betty can update (with some exceptions... that's another story). But the old website somehow continues to exist, and reportedly sometimes appears in searches. Can anyone tell Betty how to make the old website disappear? Many thanks! Please contact: bdthompson01@yahoo.com

Linked-in:

* http://www.mineralcalendar.com/php/calendar.php.
* EFMLS Events: http://www.amfed.org/efmls/calendar.htm
* http://geogallery.si.edu/index.php/en/gems/

Sir Isaac Newton: Scientific Genius And Mineralogical Sleuth

By Andy Thompson



http://upload.wikimedia.org/wikipedia/commons/3/39/GodfreyKneller-IsaacNewton-1689.jpg. http://en.wikipedia.org/ wiki/ File:GodfreyKneller-IsaacNewton-1689.jpg

It is common knowledge that Isaac Newton made several important contributions to science. Most familiar has been his breakthrough explanation of gravity, supposedly based on his observation of apples falling from an orchard tree. What may interest mineral collectors, however, is that in his mature years, his strongest interest and research focus was on the dynamics of how precious metals were formed in the earth and possibly could be generated in the laboratory.

First, a little background may help set the stage for understanding and appreciating his contributions. Newton was born on Christmas day in 1642, the same year that Galileo died. The latter invented the world's first telescope in 1609 while the former invented the first reflecting telescope in 1668. Many of today's scientists, especially those of British persuasion, recognize Newton as the greatest scientist who ever lived, more important than Einstein. Newton not only discovered calculus a decade before Leibnitz began writing about it, but with his three laws of motion, Newton laid the foundation for the laws of mechanics and for the orbits of planetary motion. He was the first person to explain the oceans' tidal movements based on the gravitational pull of the moon and sun. Sir Isaac also contributed to understanding the nature of light and was the first person to explain why someone could use a prism to split white light into its component colors. That, in turn, enabled him to improve on Galileo's refracting telescope by building the world's first reflecting telescope which corrected the lens aberrations in Galileo's instrument.

The British Royal Society of scientists elected him as their President and for three decades Newton was Master of the national mint (the currency of his day was metal). Also, he was the only Cambridge University faculty member who at the time never complied with the requirement to become an ordained minister of the Church of England. The fact that he disbelieved in certain Christian theological doctrines (Trinity) was not publically contested, so esteemed was his intelligence.

Here is the interesting mineralogical part of his life's story. In his later years, he secretly devoted himself to alchemy which was strictly forbidden in his day. Alchemy was perceived as a cousin of witchcraft because people feared it tinkered with unchangeable realities by mixing religion, philosophy, mythology and early forms of science. It was most famous for its attempt to change base metals into noble or precious metals. For centuries, the "scientists" of the day sought to find the philosopher's stone, which was popularly believed to be capable of changing iron and lead into silver and gold. It was also believed to be a mineral version of the fountain of youth, capable of restoring youthful vitality to the elderly. For centuries, famous philosophers and early scientists pursued discovery of this stone because if found, it was thought capable of bringing immediate wealth to individuals but also it threatened to collapse the economy of nations which were based on precious metal coinage.

Historically speaking, the interesting mineralogical belief of Newton's day was based on metal miners' reports that most metals were found in seams which to them resembled the roots of trees. That tree's roots died before reaching maturity, the thinking went, the roots remained as base metals such as iron and lead. But, if the tree grew to maturity, the roots and trunk became silver and gold. So some of the secretive mineralogical scientists of the day, the alchemists, believed that if they found the correct stimulant, the philosopher's stone, they could add it to the base metals and that would reanimate the iron or lead. The elements from the metal tree roots would come back to life, continue growing to maturity, and there would be silver and gold aplenty.

Unfortunately, they, similar to modern gold miners, employed liquid mercury in the distillation process, hoping to nourish and stimulate the coma-like base metals. They hoped that eventually this early form of chemistry would re-grow the metals and precipitate out the silver and gold. Newton, as a very hands-on Master of the British mint, fixated on extinguishing counterfeiting. So his personal integrity, scientific curiosity and position managing and being responsible for the national mint all compelled him to pursue this discovery process, to gain control of the philosopher's stone and thereby avert any future monetary chaos.

dendritic or tree-like appearance led scientists to speculate that metals were somewhat organic and "grew" in the ground. If the metal

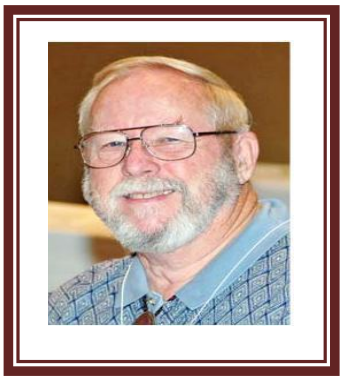
Neither he, nor the other top scientists of his day, such as Robert Boyle, one of the founders of modern chemistry, was successful in their pursuit. What they did not know was that changing iron to gold required a change in the elements' nuclear structure, which, in turn, required the extremely high energy available only briefly in moments following the explosion of a cosmic super nova. Neither did they know the toxic effects of extended contact with mercury. Recent analysis of Newton's hair showed it contained high levels of toxic mercury which account for the decline of his mental faculties in his final years.

For me personally, I was relieved to learn that Newton remained true to his scientific methodology and did not fall prey to an overactive imagination in pursuit of a magical stone. Rather, his mineralogical research was rooted in the miners' observations of how metals seemed to grow beneath the earth and in their convictions which, though incorrect, helped develop an organic theory of metals' genesis. In one sense, it is comforting to know that even a genius such as Newton was not playing with a full deck. He is a model of a scientific sleuth who continues to ask questions, generate theories, and explore new ways of understanding our mineralogical world.

THE TEN ROCKMANDMENTS

• Thou shalt not touch thy neighbor's minerals unless he placeth them into thy hand.
• Thou shalt not test the strength of crystals by punching, squeezing or biting.
• Thou shalt not drop thy neighbor's fossil, for many do not bounce properly.
• Thou shalt not place thy neighbor's specimen into thine own pocket.
• Thou shalt not argue the name of that mineral too violently; sometimes thou couldst be wrong.
• Thou shalt not test thy neighbor's agates for hardness by rubbing them together.
• Thou shalt not climb over thy neighbor when on a field trip, lest thou are willing to spend the remainder of the day, digging him or her out.
• Thou shalt protect thine eyes, hands, and feet, so thou canst enjoy many more field trips.
• Thou shalt not encroach upon thy neighbor's digging, lest his hammer be dropped upon thy toe.
• Thou shalt not complain about or denounce thy club officers, under penalty of being elected as one thy-self.

(Rock Buster News, Central PA Rock & Mineral Club, Vol. 53, No. 4) *Source: Nana Gems via the Berks Geode, via Desert Diggings, 3/1999, Via The Franklin County Rockhounder 3/2013*



AFMS President's Message

The Way I See It

by Don Monroe

from AFMS Newsletter 4/2013 &
The Backbender's Gazette, May 2013

The "Deal" -- a True Story

About 20 years ago, give or take a few, I received a telephone call from Ed Elam who is remembered by many of you as a master of the art of channel or as called by some, channel inlay. Ed noted that we had lost two of our old-time instructors and that he wanted to ensure that the future of channel was preserved and the art form would continue to be taught.

Ed offered me a deal that involved coming to his home in Brent, Alabama. He promised that if I would spend time working with him that he would teach me all that I needed to know about doing channel. He further stated that he would help me assemble the tools needed to do channel work and would furnish me with some of his slabbed material to get started.

Well, I took him up on his offer, and this was followed with the opportunity to teach with Ed at John C. Campbell. We did this together for several years. During this period I also taught channel at William Holland and recruited my wife Ann who had developed a significant ability to do channel work.

I continued to teach with Ed until his wife's physical condition forced him to give it up. After Ed retired from teaching, I continue

to this date at William Holland, and we teach a few private students.

There is a message in this story—all of us who teach need to sponsor someone to take up our job when we must give it up. Ann and I have concentrated on a few dedicated students, and hopefully they will take up the challenge when we are no longer able to teach.

The Eastern Federation has a competition program entitled "Each One Teach One" which recognizes Eastern club members who teach others. Clubs and individuals submit information about their members who teach skills to others as Ed did to me with no monetary remuneration for their time or effort. A committee reads all the nominations and makes a determination as to the winner. It's a great way to ensure that the skills we've all learned continue for the next generation and to recognize those who make sure that it happens.

Our own AFMS Club Rockhound of the Year program can be used as a way of saying "thank you" to the members who teach others. Each club may submit the name and information about one member (or husband and wife team) each calendar year. I'd like to see more clubs brag about these important members each month. Just send your submission to your regional federation "ACROY" chair, and you'll see them honored in the pages of the AFMS Newsletter.

Upcoming Events

May 18: Manassas Quarry

18-19: Berks Min Soc Gem/Min Show/Sale, Farmers Market Banquet Hall, Rt 61, Leesport, PA

May 25: 24th Annual Chesapeake Gem & Mineral Show. Free admission.
May 31 thru June 2. EFMLS Meeting; Friday, EFMLS Convention & Show hosted by the Island Rock hounds and Suffolk Gem & Mineral Club. Smithtown, NY.

June 1-2: 63rd EFMLS Convention & Show hosted by the Island Rockhounds and the Suffolk Gem & Mineral Club . Plainview NY

June 8: Vulcan Quarry in Havre de Grace

June 28-30: InterGem Show, MD State Fairgrounds, 2200 York Rd, Timonium, MD

August 23-25: BeadFest, Greater Philly Expo Ctr, Oaks, PA

Sept. 14-15: 48th Annual Gem & Mineral Show Zembo Shrine

Oct. 26: 29th Annual South Penn Fall Rock Swap
Sponsored by: The Central Pennsylvania and
Franklin County Rock and Mineral Clubs
South Mountain Fairground.

An Amazing New Mineral Discovery in New York

By Hershel Friedman, *www.minerals.net*

Glenn Rhein on his property in Warwick, NY (not pictured is his gracious wife, Karen, who very understandingly lets Glenn dig holes around their property. (Photo: Hershel Friedman)

Glenn Rhein lives in the hamlet of Amity, New York, about 5 miles from the picturesque village of Warwick. He constructs new homes for a living, and like most other people of his neighborhood, had no idea of what was lying underneath him. At the entrance to Amity there is an old sign stating that Amity is a historically rich mineral locality, but most residents are unfamiliar with the exact details.

The town of Warwick, in which Amity is located, required Glenn and his brother to hire a geologist in order for them to subdivide their property. The geologist did his survey, but he did not find anything of interest relating to the subdivision. However, he did inform Glenn that the area was rich in rare and interesting minerals. This aroused Glenn's curiosity and he started searching for minerals himself, but also found nothing. After a few years living on his property, Glenn eventually found a small trail of crystals that really got him wondering what lies underneath his property.

In summer 2010, when Glenn was digging with his tractor on his property, he hit some very large and interesting-looking crystals. He had no idea what these were or what their value was, and did not know who to ask for help. Glenn did some research online. He came across the Mindat website, and found the Mindat message board. Glenn decided to make a post on the forum to reach out to anyone in the mineral community who could help him. He made his very first post on the website, stating the following: "Massive amphibole crystals found in Warwick, New York. Any feedback or comments welcomed." He then posted a picture of some giant unknown crystals.

Almost immediately, several mineral enthusiasts reached out to Glenn and offered to help. He was eventually connected with important geologists and museum staff such as Mike Hawkins and Marian Lupulescu (New York State Museum), Earl Verbeek (Sterling Hill Museum), George Robinson (A.E. Seaman *Mineral* Museum) and Lance Kearns (James Madison University). These mineral experts assisted Glenn in identifying the minerals being found, as well as the geological setting. Glenn learned from everyone who visited his deposit and also corresponded with many experts on Mindat. He continuously posted photos and received feedback on his postings. In a very short time, Glenn had learned a tremendous amount about minerals and about the deposit on his property. He is now very familiar as well as fascinated with all his new finds.

Glenn regularly searches and digs in and around his property seeking for the hidden treasures that lie beneath the earth. These include giant well-formed crystals, beautifully fluorescent minerals, and several rare species. Glenn has donated many of his out-standing finds to various museums, and maintains a fine collection of his own. His personal collection features some of his best finds since the beginning of his discovery. The NY/NJ Gem and Mineral show had the distinct honor of having Glenn exhibit some of his greatest minerals in the Special Exhibit section, and his display fascinated attendees. Aside from the amazing crystals he showcased, he brought some very large crystallized boulders, and set up a fluorescent display exhibit.

About Amity

The hamlet of Amity is located only 13 miles north of the world-famous mineral locality of Franklin, New Jersey. Amity is in the same marble formation as Franklin, and although each mineral deposit is unique,

they have many similarities. One of the most amazing aspects of Glenn's discovery in Amity is the abundance of strongly fluorescent minerals that are there, similar but different to the nearby Franklin deposit.

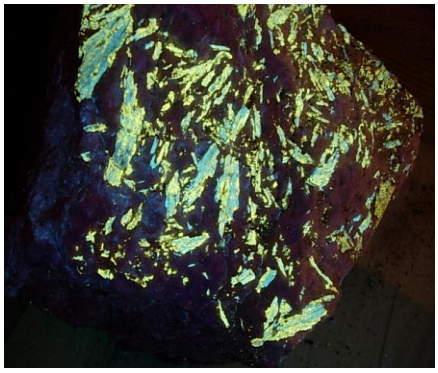
The most coveted mineral of Glenn's deposit and of the Amity area is spinel. Although most spinel crystals are opaque and dark, Glenn has found pink and red crystals on occasion. The largest crystals of the Rhein property are scapolite and diopside. Other important minerals of the deposit include titanite, chondrodite, apatite, graphite, phlogopite, serpentine, pargasite, edenite, fluoro-edenite, fluorite, fluoro-tremolite, norbergite, pyrhottite, uvite, corundum, azurite, malachite, and zircon.

Massive ampibole crystals found in Warwick, New York. (Photo: Glenn Rhein)

Hershel Friedman, founder of Minerals.net, has recently produced a video documentary about Glenn and his discovery. The video explains the geological formation, describes how Glenn found the material, and looks at the various excavation sites on Glenn's property. The video also looks at some of the best minerals Glenn has found and showcases his fluorescent collection. The video can be seen at www.minerals.net/videos. To read the Mindat forum dedicated to this topic started by Glenn, visit http://tinyurl.com/dxh3nye. (President's note: An alternative to getting there is to go to mindat.org and type in "massive crystals" in the keyword search on the left side of the home page. The link to Glenn's thread will be the first one that pops up. Glenn and his wife Karen are tremendously gracious hosts – I've visited twice – and Glenn is a great guy to go collecting with!)

Super iron out makes all the difference. 20 minutes in the ultrasonic cleaner. (Photo: Glenn Rhein)

Some pictures of the Tremolite-Norbergite without UV. (Photo: Glenn Rhein)



Tremolite and norbergite. (Photo: Glenn Rhein)

Some of the Chondrodites are
half green! (Photo: Glenn Rhein)

This Scapolite (Meionite) cleaned
up really well.
(Photo: Glenn Rhein)

Nice shiny black Spinels on Chondrodite
3/4 to 1-1/4 inches overall (Photo: Glenn Rhein)

Display at the Mid-Hudson show in
Rhinebeck, NY
(Photo: Elizabeth Triano)

Graphite butterfly, in a slightly weathered Hornblende matrix –
Glenn carefully removed the matrix to expose the Graphite.
(Photo: Glenn Rhein)

MEET, GREET, & EAT!

Join MSDC club members for dinner at Pier 7 at 6:00 p.m., before each meeting.

ROCK & MINERAL DISPLAY: Kingstowne Public Library

By Sheryl Sims

During the Month of May, samples of my minerals and painted rocks were on display, along with website information for MSDC and NVMC, at the Kingstowne library. The library staff was very excited to have what they thought was a fun, interesting, and unique display.

Young rock hounds, Jade Hughey, and Brice & Thalea Trinidad, were spotted enjoy the mineral display.

(Photo: S. Sims)

The famous Fluorescent Wall. Banks of strong UV lights illuminate this section of the dump when the sun goes down – even more spectacular in person. (Photo from the Sterling Hill Museum website)

The Sterling Hill Super Dig 2013

By Steve Johnson

On 27 April, The Delaware Valley Earth Science Society (DVESS), in cooperation with the Sterling Hill Mining Museum, sponsored this year's Super Dig which is an internationally famous collecting experience. This year, the field trip attracted over 500 (by my estimation since I didn't sign in till after lunch and I was #427) dedicated collectors from across the globe. This is the third year that I've attended the event. The first year I left with pounds and pounds of rocks. Last year, I decided to be a little more selective and came away with about half a bucket. This year, I decided to focus more on pictures and came away with a handful of rocks that weighed in at about 10 pounds as well as about 100 photos. This has become sort of my start of the Spring/Summer collecting season.

For a little history for those not familiar with Franklin, Wikipedia provides the following background information. "Franklin, known as the "Fluorescent Mineral Capital of the World," is located over a rich ore body containing more than 150 minerals, many of them fluorescent and 25 of which are found nowhere else on earth. Settled in the 17th century, the village known as Franklin Furnace after Benjamin Franklin, developed near iron mines and iron smelting operations located along the Wallkill River. In the early 19th century, zinc deposits in the area began to be developed commercially. For most of the century many small companies mined zinc and iron in the Franklin area. In 1897 all zinc mining efforts merged into the New Jersey Zinc Company The Zinc company was a major controlling factor in the development of Franklin. Immigrants from Russia, Britain, Hungary and Poland joined the work force at the mine. The population, 500 in 1897, had swelled to 3,000 by 1913. On March 18, 1913, the Borough of Franklin was incorporated from portions of Hardyston Township, based on the results of a referendum held on April 23, 1913." Franklin and Ogdensburg are adjacent to each other and back in the day I'm sure they were distinct towns, but today they pretty much continuous from one to the other.

In addition to collecting at Sterling Hill, there are also two shows/sales for folks to go see. The first is more of a sale…DVESS sets up tables with specimens on them right by the entrance to the Super Dig. Good prices and good selection. The second is the show at the high school in Franklin…both outside on the field as well as in the gymnasium. This is one of the big shows for fluorescent fans, but there is something for everyone to be found. You usually end up running into folks you know there too. I usually float around between them and the dig. Lunch time is usually a good time to visit the high school.

Besides collecting, the Super Dig offers: a New Glowhound orientation for those unfamiliar with fluorescents; the official tour of the Lower Mine and Museums (given two times); a guided tour of the newly opened Trotter Tunnel (given two times and you MUST have a hard-hat, strong flashlight and safety goggles to participate in this one); an Upper Mine and Mill Tour (two times) where you have a chance to get your "Last Day Of Mine Operation" specimen with certificate; the evening meeting where prizes such as UV lamps are given away and

more; world famous Black-Out Tour of Mine; and the crowning event is the illumination of "The Fluorescent Wall" out in the pit area!! It really is a beautiful sight. They have to wait for the sun to go to sleep, so the UV floodlights can light up the gigantic mineral wall of colors. Also, night digging begins the using of your own UV lamps – you don't need to find a dark place to look for colors!

If you've never visited this area to collect, I highly recommend it; and, if you can wait until next April, I highly recommend attending the Super Dig! The weather is usually great, the people you meet are fantastic and range from the extremely knowledgeable to the novices, and what can be better than collecting at a world famous, world class locality.

Some collectors in the upper part of the dump.

You see lots of folks with their own portable dark rooms. Yes there is actually a person under the cover.

Andy near the fresh material provided at this year's dig.

Jeff Cessna looking through the fresh material that was pulled out of the mine for this year's Super Dig.

Door prizes in the afternoon. They start with the kid's prizes. Several nice UV lamps were given out as well as other less expensive prizes.

Members of local DC clubs at the Super Dig. From left to right: Andy, Pat, Sandra, Jeff and Steve.

Mark Dahlman and his daughter at the SuperDig.

A new friend. Actually met Donnie at the NY/NJ Gem and Mineral Show. He's a member of the North Jersey Mineralogical Society and a very nice guy.

The dump at Sterling Hill.

At least two trips to the Upper Mine and Mill are offered. You can select your own specimen from the belts and get an official certificate to go along with it.

Geology and Mineralogy of Quartz Crystals

J. Michael Howard

[Vol. 13 No. 4 THE HOT SPRINGS BULLETIN April 2013]

MOST OF THE QUARTZ veins are restricted to a belt about 30 to 40 miles wide that extends a distance of about 170 miles west southwest from Little Rock, Arkansas, to eastern Oklahoma. This area corresponds to the core region of the Ouachita Mountains.

Productive Veins

The most productive quartz veins are present in both Paleozoic sandstones and shales, but those having shale as the host rock typically are massive milky vein deposits with a smaller proportion of clear, well-developed crystals. Deposits in sandstone units may be in the form of veins, sheeted zones, and stock works. Sandstone-hosted deposits usually contain less quartz volumetrically than shale-hosted deposits, but often yield a higher percentage of clear crystals in cavities or pockets. Many crystal-bearing pockets were distorted or crushed by structural adjustments during the Ouachita orogeny (mountain-building episode) after initial quartz deposition. The deformation commonly causes the veins to show complex fabrics.

Quartz formed in the cracks

The quartz veins were formed by the filling of open fissures and display little evidence of significant replacement of wall rock. Milky quartz crystals and associated vein minerals of the Ouachita Mountains were deposited from hot waters during the closing stages of mountain building, ranging from the Late Pennsylvanian (300-286 million years ago into the Permian (286-245 million years ago). The veins attain a maximum width of 60 feet in Arkansas and nearly 100 feet in Oklahoma. They are most numerous along the central core of the Ouachita Mountain region, where they are present in shale, slate, sandstone, and other rock types. Along and near the borders of this region, the veins are usually confined to sandstone beds encased within thick shale units.

Most of the collectible quartz crystal is obtained from deposits in the Blakey and Crystal Mountain Sandstones (both Ordovician), but attractive quartz crystal may occasionally be discovered from any of the Paleozoic units. The more than 25,000 feet of Paleozoic rocks exposed in the Ouachita Mountains have been deformed into complex, gently plunging folds that trend nearly east-west. Steeply dipping fractures closely related to the major folds and faults of the region controlled the location and deposition of most of the quartz.

Geologic environments

The mineral quartz forms in a variety of geologic environments. These include crystallization in magmatic rocks, particularly granites; authigenic crystals in sedimentary carbonate rocks; from hydrothermal fluids in veins filling fractures in various host-rock types; by the dissolving and reordering of silica in metamorphic rocks due to the agents of heat, pressure, or chemically active fluids; and as deposits from hot, warm, or cool water-based solutions in gas cavities, solution and breccia cavities, pockets, and even cave-sized voids in pre-existing rocks. Because quartz forms under so many conditions and is resistant to most of the forces of weathering, it is the second most common mineral in the earth's crust, feldspar being the most common. Let's discuss each one of these types of formation in some detail.

Quartz that forms from the crystallization of magmatic rocks crystallizes from a melt that is rich in silica and water. The crystals usually do not express their own crystal form, but instead fill voids between other earlier-formed minerals. Sometimes they even encase other minerals as inclusions. The grain size is determined by the size of the void being filled and the supply of silica. Certain types of igneous rocks called pegmatites contain gigantic-sized crystals of various minerals, including quartz. However, very large crystals of quartz tend to be whitish to milky in color, due to the presence of minute fluid-filled cavities. These cavities disperse the light and reduce the transparency of the quartz.

Pegmatites
Quartz-bearing pegmatites are often associated with masses of granite and may be seen in many places in New England, Colorado, and Canada. Whitish quartz crystals to 6.5 feet long by 1.5 feet in diameter have come from pegmatites in New Hampshire. A single crystal 8 feet long and 6 feet in diameter was on exhibit in Tucson, Arizona, a few years ago. It was from a pegmatite in Africa and was the typical milky color.

Authigenic crystals form after the deposition of the original sediment, and either before, during, or after the processes of compaction and lithification. Silica is dissolved and then reprecipitated, crystallizing as quartz during this process. Usually the crystals are free-floating in the matrix rock and never reach very large size. Some quartz crystals present in the matrix of dolostone or limestone formed in this manner. They may or may not contain adjacent minerals in the sedimentary rock, such as clay or feldspar. A type of doubly terminated quartz from south Texas called "Pecos diamonds" and reddish doubly terminated quartz from Spain both contain iron oxide inclusions from the original sedimentary host rock.

In Arkansas, the best known quartz is that which formed from hydrothermal fluids in veins that fill fractures in differing types of host rocks. Minable veins are present in either sandstone or shale. Sandstone-hosted quartz veins normally have a higher percentage of rock crystal (water-clear quartz) than quartz veins in shale. Shale-hosted veins are predominantly milky quartz, but tend to occur as larger individual veins than those in sandstone. Milky quartz is the most common variety, making up the great bulk of all veins. Rock crystal is much less common, although in places it is very abundant.

Veins may be very large and complex
Milky veins in shale in the Ouachita Mountains have been reported that measure several hundred feet in outcrop length and 60 to100 feet in thickness. Only the core of such veins, along with isolated pockets scattered throughout the vein, produce any rock crystal. The major commercial deposits of rock crystal are usually sandstone hosted. They tend not to be one single vein, but a complex series of veins that follow the fracture patterns of the rocks that were broken and shattered by the mountain-building processes. Deposition of quartz took place several times, often interrupted by breakage and refracturing of the host rock.

The major deposition of quartz in the Ouachita Mountains of Arkansas and Oklahoma took place during the Late Pennsylvanian to Early Permian Periods, some 300 to 250 million years ago. The rocks that we see the veins now exposed in were buried under a mile or more of cover during the time the quartz was being deposited. There is a common misconception by both hobbyists and miners, that somehow the present topography had an influence over the deposition of quartz veins. Actually, the presence of quartz veins, as a cementing agent in sandstones and as a highly erosion-resistant unit when present as thick veins, exerts an influence over how the topography develops.

Quartz deposits in sandstone units are often present on the crests of ridges where they help cement the sandstone fragments and make the entire unit more erosion resistant. Major faults are commonly filled by quartz veining, which may have been fractured many times during mountain building. The sandstone-hosted veins contain a lot of milky quartz, but usually have a higher percentage of rock crystal present. This is due to the nature of quartz crystallization and the geometry of the actual deposits themselves. When quartz begins crystallize, it must have a nucleation site. If one is already available, such as a fractured quartz grain on a sandstone face, then quartz crystal will start to grow. But since not all the grains will be oriented in the same direction, some of these early formed crystals begin to dissolve and their silica added to those that are oriented properly for the local conditions.

In hydrothermal veins, quartz typically grows as elongate crystals normal (perpendicular) to the wall rock. The crystals are attached at the wall rock and grow inwards from both sides to the center of the fracture. When two fractures in the host rock intersect, an open pocket may be formed because there is more space for the fluids to pass and continue to supply the crystals with silica necessary for continued growth. In some simple undistorted veins, you may actually be able to tell which direction the fluids were flowing by the orientation of the majority of the quartz crystals on the wallrock face. The side of the crystal facing the flowing fluids grows at a more rapid pace than the faces on the downstream or eddy side. The dominant face on the termination usually faced into the current. The size of individual crystals in hydrothermal veins is dependent on a number of factors, including the size of the vein and subsequent pockets and the nature of growth conditions.

Early digging
Up until World War II, the local diggers had a major misconception concerning the extent and nature of the Arkansas veins. In the early 1940s, about a year into the war, the need for quartz for oscillators became critical because the Allies supply from South America was cut off by German U-boats. Exploration work on the Arkansas deposits proved that the veins extended far deeper than the old timers ever thought possible. They had thought that once the first milky zone in the veins were encountered, no rock crystal would be found deeper. We now know that rock crystal may be present at any depth in the right rock type. When the rock type changes, then often the quartz veins pinch out.

Hydrothermal fluids
Too many people, hydrothermal quartz brings up the source model of an igneous parent, like granite, rich in silica and water. From the source, the hot water (with its load of dissolved silica) moved through fractures into the surrounding country rock. Many quartz veins, especially those with gold, are in such close proximity to granitic bodies that other sources are rarely considered. Yet, in Arkansas, where we have the greatest concentration of collectable vein quartz in North America, no granitic rocks have been discovered associated with the deposits. In fact, what igneous rocks are in the region are very deficient in silica. So what is the source of the silica to form the veins? Several lines of evidence lead to it being one of metamorphic sweat out of water, silica, and some of the more mobile metals in the metamorphic environment, like antimony, mercury, lead, and zinc. The reason no gold, other than typical traces, has been discovered in Arkansas is that there was no gold of any consequence in the original sediments that were metamorphosed. Miners have been digging quartz in this state for well over 100 years and they have never reported a trace of visible gold. Not like in California, Colorado, and the western states where deposits of quartz associated with granitic rocks often contain gold!

Quartz is present in many metamorphic rocks
At low grades of metamorphism, quartz is only slightly mobile unless the rocks are water-saturated. Then, along with water, silica is relatively mobile. In fact, metamorphism may be viewed as a dewatering process. At lower grades, water and silica are expelled while at higher metamorphic grades water-bearing minerals are dehydrated (like micas). At higher metamorphic grades, quartz not oriented properly to the pressure is dissolved and those grains with the correct orientation grow. Quartz augen or eyes form in this manner. In gneisses, quartz actually separates into bands which are seen as light-colored bands alternating with dark bands of mafic minerals. Much silica along with water is released during reactions that take place at the higher grades of metamorphism. Rarely are collectable crystals reported from metamorphic rocks, but they may be the source of many hydrothermal-appearing veins.

Host rock
Although any type of rock may make a favorable host if holes or voids are present, limestone and dolostone commonly have secondary deposits of quartz crystals which fill the void space. Some highly vuggy lava hosts major deposits of crystal. Warm to cool silica-saturated water may deposit any of several varieties of quartz, ranging from quartz crystal to amethyst, agate, chalcedony, or opal, depending on the conditions. Literally thousands of geodes containing millions of quartz crystals have been collected from the sedimentary rocks near Keokuk, Iowa. These geodes were deposited as quartz linings in solution cavities, but never as large crystals. They make attractive specimens as aggregate clusters, but no gem-grade quartz is present. The major deposits of rock crystal in Herkimer County, New York, occur as infillings in pockets in dolomitic limestone. The so-called herkimer diamond deposits of central New York are one of the more important deposits of rock crystal in the world. The individual crystals have high luster, are doubly terminated, and nearly equidimensional in size. They occur in an extremely dense hard dolostone -- the Little Falls formation, a Cambrian age unit. Small irregular solution pockets are scattered throughout the sedimentary unit, with larger pockets being restricted to a zone termed by miners as the "pocket layer". The pocket layer is overlain by a mud seam which is recognized as a location marker by the miners. The pockets run as large as 4 feet in diameter, but average closer to 3 feet across in this layer, which is some 18 inches thick. Each pocket encountered varies in crystal content, crystal size, and quality. The better pockets may be round in plain view and are domal in cross-section, like a tire that is cut in half. Space between the roof and floor of any individual pocket varies. The floor of the pocket is usually domed upwards. Individuals and clusters of individual crystals that have coalesced together are encased in wet clay in fresh pockets, many as loose "floaters" not attached to the matrix rock. Herkimer crystals may be on the floor, ceiling, and in the clay pack. Crystals

from these pockets must be allowed to warm up slowly because when collected they are ground temperature and, if heated too quickly, will break from thermal expansion. Specimens can be ruined in this manner from any collecting site, but herkimer diamonds appear to be particularly susceptible to this type of damage. Several other minerals may be present, including dolomite and calcite crystals. Very interesting infillings of anthraxolite, a type of dead petroleum, may coat the walls and predates the infilling of the cavities by the clay pack. Sometimes smoky quartz crystals are recovered from these deposits, the coloration due to finely divided anthraxolite captured during quartz crystallization. Sometimes larger spots of anthraxolite are seen in herkimer diamonds. Some pockets have no clay, but a solid pack of anthraxolite and are known for very brilliant lustered high-quality crystals.

Other locations of rock crystal

Other than the locations we've mentioned above, several other localities for rock crystal should been mentioned. Brazil, especially in the states of Minas Geraes, Sao Paulo, and Goyza, contains commercially important deposits of rock crystal. Two types of deposits are important -- primary hydrothermal and alluvial gravels. The primary hydrothermal deposits occur as pockets in veins which fill fractures. The weathering and transportation of crystal from primary vein-type deposits result in well-rounded frosted, but optically clean, alluvial gravels. This quartz gravel was the source for many years of quartz for optical and electronic applications as well as being used to manufacture the seed blanks for growing synthetic quartz crystals. In South America, deposits of rock crystal are mined in both Columbia and Bolivia for specimens. Pockets of both rock crystal and smoky quartz from the Swiss Alps are also notable, having been collected for over 200 years. They are called "alpine cleft" deposits and sometimes yield thousands of pounds of high-lustered prismatic crystals. A famous characteristic crystal form of these deposits is called a "Gwindel". A gwindel is a crystal that displays a rotational twist, either right or left, along its C axis. Since the mid-1930's Madagascar deposits have yielded rock crystal for both the collector and industrial uses. In the 1970's and 1980's the Japanese developed extensive deposits of rock crystal in various countries for electronic applications and as a feedstock for synthetic quartz production.

Mineralogy of Quartz Crystals

ENTIRE BOOKS have been written on quartz and its many varieties. Here we'll only discuss the properties of crystalline quartz and end with a list of what we know about Arkansas quartz vein formation in the Ouachita Mountains.

Although quartz has a unique structure, so do many other minerals. That in combination with the chemistry is what makes a mineral a mineral.

We will begin with some basics: To meet the definition of a mineral, quartz must be composed of an orderly arrangement of certain elements, so that we may describe its internal structure and present its chemistry by a representative formula: SiO_2. Here is a hand-sized piece of metallic silicon. This metal combined with oxygen makes quartz crystals: silicon dioxide.

Any mineralogist would agree with me when I say that quartz is the most diverse species in terms of varieties, shapes and forms for a single mineral species. The feldspars or the pyroxenes and amphiboles include a whole host of minerals with similar structural characteristics, but variable chemistry. Quartz certainly has the most COLLECTABLE varieties of any single species.

Silica

We know that quartz is the low-temperature stable form of silicon dioxide or silica. Several other forms of silica exist at higher temperatures and pressures. Quartz forms over a temperature range, the upper limit of which is 867°C at one atmosphere of pressure. Think of the earth being a giant pressure cooker, different things happen at high temperatures and pressures than what we see on the surface around us.

For your own data base of trivial knowledge, the temperatures of an industrial blast furnace where iron is processed is about 400°F (200°C) at the top of the furnace, and near the bottom it is about 3,000°F (1,650°C) or higher. So for making crystals, we see the conditions are much hotter than a pizza oven, but less than a steel mill. For information about how man-made crystals are grown in industrial autoclaves, read Synthetic Crystals.

Alpha and beta quartz
Two forms of quartz exist, alpha-quartz (the kinds of crystals we all have in our collections) which is stable from the low end of the temperature range up to 573° C and beta-quartz, the high temperature stable form from 573° to 867° C. The actual temperature that alpha-quartz can form at depends on the pressure in the system. The higher the pressure, the higher above 573° C that it may crystallize from the fluid system. Our crystals won't melt unless you chunk them into a foundry, but they can fracture from thermal shock.

Now most of these numbers won't mean anything to you unless you try to figure how the world was made. But some people do, so here's a little more. Crystalline quartz may be described as alpha-quartz (low quartz) or beta-quartz (high quartz). Alpha-quartz forms at temperatures lower than 573° C at one atmosphere pressure, where beta-quartz forms at the temperatures above 573° C and lower than 867° C. at the same pressure. If the pressure increases, so may the temperature of formation of both alpha- and beta-quartz. For example, at about 2 miles in depth, alpha-quartz may form at as high as around 600° C and beta-quartz at over 1000°C. These conditions may exist in our present world today at the margins of the continental plates in subduction zones or at a depth of 2 miles below where you happen be reading this article.

Beta-quartz is relatively uncommon, most occurrences being confined to rhyolite lava flows where the mineral "froze" in the rapidly cooled rock. Examples of beta-quartz from rhyolitic lava flows appear as small equidimensional crystals floating in the fine-grained (and rapidly cooled or quenched) matrix. At room temperature, beta-quartz is meta-stable, that is it will, given geologic time and some energy, invert or change its internal structure to that of alpha-quartz.

All the quartz from Arkansas is alpha-quartz, so from here on we'll simply call it quartz. Studies on rock crystal from Arkansas indicate a range of temperatures of formation, from as low as around 200° C to about 265° C. Note that this is well above the boiling point of water at atmospheric pressure so there was some confining pressure due to depth of burial. Perhaps as much as 2 miles of sediment and rock overlay the formations which contain the bulk of the quartz deposits when the veins were forming. These formations have been exposed on the surface by over 200 million years of erosion.

Physical Properties of Quartz

Quartz has several unique physical properties:

Cleavage
Although quartz has the most cleavage directions of any mineral (7), these are rarely seen in nature. In the laboratory, cleavage can be induced by either electrical or thermal shock in oriented plates cut from natural quartz crystal.

Fracture
Fracture is simply the manner in which a mineral breaks when cleavage is not well developed. Quartz has a well-developed fracture which mineralogists call conchoidal, meaning shell-like. The mineral fractures equally well in any direction. If you look at the broken edge of a piece of glass, you will see conchoidal fracture. This property was recognized by early man as very useful one. With some practice, anyone can learn how to control conchoidal fracturing. Once prehistoric man mastered the chipping of quartz and learned the technique of making projectile points using chipping (controlled conchoidal fracturing), he gained a degree of independence. He could simply carry some basic materials with him and as he needed them, he could stop and make some more tools for hunting. However, flint and chert, both microcrystalline varieties of quartz, are more readily available and easier to chip than rock crystal.

Careful working by early Oriental artisans involved the fracturing of large blocks of rock crystal to attain a roughly rounded shape before grinding in a trough with water and sand to smooth the piece into a sphere.

Hardness
Due to its internal structure, quartz is equal hardness in all directions. At 7, it also is the hardest of all the **common minerals** on the Moh's hardness scale. This hardness explains why it is the most common detrital (a product of disintegration and/or wearing away of a rock) mineral in sediments. Since it has no cleavage and is pretty hard in all directions, it does not get abraded very rapidly during transport.

Remember the Moh's Scale of Hardness? Here's the jingle:
The girl could flirt and flirt quickly though Connie didn't.
Talc Gypsum Calcite Fluorite Apatite Feldspar Quartz Topaz Corundum Diamond

Doesn't easily dissolve
Quartz is insoluble in most fluids. Note that I said in most fluids, like normal ground water. However, in carbonate-rich water and in very salty water with a lot of chlorine and sodium, quartz is somewhat soluble, especially if the water has a little heat also. Quartz from the Ouachita Mountains formed from hot water, expelled from some depth during and shortly after the mountain building processes were active.

Cool stone, dude
Quartz is a good conductor of heat. Ancient peoples were well aware of this property. Objects and spheres carved from quartz always feel cool when touched or held, even in the heat of the day.

Piezoelectric property
The piezoelectric effect was first observed in the laboratory. Several minerals, including tourmaline and sphalerite, exhibit this effect. When you alternately apply and release pressure on a quartz crystal, during the pressure changes on the structure a small amount of electricity is released. So by applying cyclic pressure, a current may be generated. Conversely, when a small amount of electricity is applied to a crystal, the internal structure vibrates. This is the principle involved in the manufacture of new highly accurate generation of quartz watches and quartz tuners on stereo systems.

During World War II, very pure, untwinned pieces of quartz were in high demand for radio oscillators. The term crystal in CB radios was first used in the electronics industry for quartz crystal wafers, although now substitutes have replaced quartz. By cutting the wafer at a certain angle to its C crystallographic axis, we can control the frequency of the vibration. The original crystals in CB radios were cut from wafers of quartz, each having a specific frequency. This determined the frequency of the band for broadcasting and receiving. Very handy!

Triboluminescence
Luminescence is defined as the emission of visible radiation due to some external cause other than heat. Triboluminescence is light that is produced by pressure, friction, or mechanical shock. It may be readily demonstrated with two hand-sized milky quartz crystals in a darkened room. Simply take the prism edge of one crystal and rub it back and forth on the prism face of the other crystal. You may simply rub two prism faces together, but you get more light using the former method. This makes a good classroom demonstration!

Catholuminescence
Cathodeluminescence is a distinctive visible color that is emitted by
bombarding a small piece of quartz with cathode rays. This must be done in a vacuum to best see the visible color. Trace elements influence the cathodeluminescent color of the mineral.

Star of the C axis
Asterism is the last property I will mention. Asterism is not present in all quartz specimens. To see this property exhibited the specimen is best cut into a sphere or at least a high domed cabochon.

In alpha-quartz that forms at higher temperatures there may be other chemical compounds that are "dissolved" in the structure. As the mineral cools, the dissolved material exsolves out of the quartz structure into discrete mineral particles. In the case of asteriated quartz, the dissolved material is thought to be very small amounts of TiO_2. When it exsolves, it becomes oriented along the three principal A Crystallographic directions. These lie in a

plane at right angle to the C axis and each of the 3 A axes are at 120 degrees to each other. When light shines on a sphere or is reflected back through a sphere of quartz that exhibits asterism, there is the appearance of a sharp 6-rayed star when the sphere is properly oriented. You will need to rotate the sphere around until you see the star, then you are viewing down the C axis. Asterism is present in many minerals, particularly gemstones of the Hexagonal system, like ruby or sapphire.

Crystal structure
The basic building blocks of a quartz crystal are silica tetrahedra. In quartz these tetrahedra are linked corner to corner to build up the crystal. During this linking or bonding the overall structure may twist to the left or right as we view the crystal vertically along the C axis. Because a quartz crystal's structure twists either left or right, we term this property enantiomorphism, a fancy term for right- or left-handedness. The term simply means that their respective structures are mirror images of each other. With close examination of the external form of a quartz crystal and a knowledge of what growth faces are present, one may determine which form is present.

A silica tetrahedra consists of a single silicon atom linked to 4 equally spaced oxygen atoms. The tetrahedra are linked together in a ring-like manner in layers. The tetrahedra alternate in the structure - one with the point up, the next with the point down. These linked rings spiral around the C crystallographic axis in either a clockwise or a counter clockwise manner. This was discovered long before the advent of X-ray diffraction analysis of the structure by 19th century investigators observing the rotary power of various crystalline materials on light. John and Marie Curie were two early investigators in this field. Anyway, because the crystal structure rotates we see two crystal forms described by crystallographers as right- and left-handed crystals.

SO….We can deduce
Knowing about the physical properties of quartz can tell us something about the mineral's formation in veins. Having seen many veins in the field, I can use the physical properties and the field evidence to make the following statements about the conditions that existed at the time of quartz growth in the Ouachita Mountains:

- Growth took place at some significant depth (1 - 2 miles).
- The quartz grew from hot water solutions (>200 degrees C.).
- The water was rich in dissolved silica and was salty.
- During growth, earth movement and vein adjustment were both active.
- There were certain sedimentary beds that were more favored for vein formation, due to open fractures. Sandstone beds were favored because they were 1) more fractured and 2) provided better nucleation sites for quartz to begin growth.
- There were several periods of crystal growth in the veins over time.
- Temperature generally decreased during the period of crystal growth.
- Quartz veins may be either simple or complex in form, depending on the local geologic history.
- Quartz veins are more numerous in the tightly folded portions of the sedimentary beds than other
- areas. Veins containing rock crystal may extend for significant depth if a favorable host rock is
- present.

References:
Used with permission by J. Michael Howard.
Complete references found at RockhoundingAR.com
(MSDC Editor's note – For Synthetic Crystal reference, see: http://rockhoundingar.com/types.php#SyntheticCrystal).

FEDERATION NEWS

AFMS Officers for 2012-13

President - Don Monroe (SFMS) President-elect - Richard Jaeger (RMFMS)
1st Regional Vice President – Marion Roberts (CFMS)
2nd Regional Vice President–Matt Charsky (EFMLS)
3rd Regional Vice President – Ann James (SCFMS)
4th Regional Vice President – Sandy Fuller (MWF)
5th Regional Vice President – Doug True (NFMS)
Treasurer – Pat LaRue (2 year term)
The position of Secretary was not up for election this year.
Anne Cook will complete the 2nd year of her 2 year term.

EFMLS Officers for 2012 - 2013

President - Cheryl Neary, ciervo.neary@gmail.com
1st VP - Hazel Remaley, <northridge5@verizon.net>
2nd VP - Merrill Dickinson, medsearchnorth@comcast.net>
Secretary, Gerry Cox, <gerryannec@verizon.net>
Treasurer, Lou Budell, <labudell@windstream.net>
Asst. Treasurer - Michael Patterson,
<Michael.Patterson@pgparks.com>
Editor, Carolyn Weinberger, PO Box 302, <cscrystals2@gmail.com>

Plan Ahead! 2013 AFMS Convention & Show

Sept. 18-22, 2013, Jacksonville, FL
Sept. 18 - Uniform Rules
Sept. 19 - AFMS Annual Meeting &
Scholarship Foundation Meeting
Sept. 20-22 – Show, Sept. 21 - Awards Banquet
Sept. 22 - Breakfast with Editors & Webmasters

Workshop Opportunities - Eastern Federation

The EFMLS fall workshop will also be held at the Wildacres Retreat just before the AFMS Convention in Jacksonville. Each workshop features instruction in a variety of classes plus the added bonus of having six excellent talks by a "Speaker-in-Residence". For the September 2- 9 session, the featured speakers will be Quintin and Willow Wight, well known mineral and gem experts. Cost for the one week session is $380 per person (room, board and instruction). Classes being offered at the fall session include Beading, Cabochon Cutting, Cold Connections, Anodizing Reactive Metals, Faceting, Intarsia, Scrimshaw, Silversmithing, and Stained Glass. To **learn more about the Wildacres Retreat, the classes and speakers, visit the EFMLS web site.** <www.amfed.org/efmls> and click on the Wildacres tab. You'll find class descriptions and a registration form as well.

EFMLS Convention & Show hosted by the Island Rock hounds and Suffolk Gem & Mineral Club. Smithtown, NY. May 31 - Jun. 1-2: (EFMLS Mtg. May 31.) EFMLS Convention & Show. Long Island Sheraton: 631-231-1100. Deadline for Conference Reservations is May 1, 2013. Deadline for hotel reservations is April 30, 2013. Hosts: The Island Rock hounds & Suffolk Gem & Mineral Club, Plainview, NY. Theme: Long Island Lighthouses & Geology.

Secretary's Report

By Patricia Flavin

Meeting Date: May 1, 2013

Meeting Place: Cathy Kerby Room-CE 340, The Smithsonian National Museum of Natural History
Attendees: 20

Recognition of past presidents: Club President, Steve Johnson, presided and recognized: Andy Thompson, Ed Fisher, Cynthia Payne and, Eric Grundel.

Guests: Irina Kalish and daughter Alyssa (new members).

Old business
Minutes approved: April minutes were approved,

Treasurer's Report: Rebecca Siegal accounted for the club's funds.

New Business
Steve Johnson recommended that the Treasurer bring a roll of blank club cards to every meeting so they can provide new club members with an immediate club card. Ed Fisher will research how this was done in the past. Club members need a current club card, annually, to prove that they have the required insurance coverage when attending field trips.
Michael Pabst is the speaker for June 2013.

Mineral News- There is a new Gold Mining Museum in Gold Vein, Va. near Fredericksburg.
http://www.goldvein.com/educational.html, http://www.goldvein.com/pdfs/FOMP.pdf
(Saudi Arabia has announced that they have just found one of the largest Gold deposits. Andy Thompson had been contacted by an elementary school in Anacostia, who wants a program for minerals.
Business Meeting Adjourned

Program Speaker: Casper Voogt, club member & our webmaster, filled in at the last minute for our scheduled speaker, who had a family emergency. Casper's topic, "Mineral Collecting in Morocco". The website, Mindat.Org, was the host of the exploration which took 120 collectors to various locations for mineral collecting. The guests were treated to a lavish surprise party in a Marrakech mine. Casper exhibited the minerals that he purchased.

Announcements: Please check out our website and Facebook page**.**

Refreshments-Thank You!

Motion to Adjourn to the Program
The Club meeting concluded at 9:45 pm.

2013 Officers and Board Members

(left to right: Steve Johnson, Rick Reiber, Patricia Flavin, Rebecca Siegal, Dave Hennessey, Dave Nanney, Andy Thompson, & Sheryl Sims)

(photos provided by B. Thompson, A. Cameron Siegal, & S. Sims)

Officers & Board Members Contact Information

President: Steve Johnson - StevikJ@gmail.com; Vice President: Rick Reiber - Mathfun34@yahoo.com
Secretary: Patricia Flavin - pattiflavin@gmail.com; Treasurer: Rebecca Siegal – dcmineralclub@gmail.com
Directors: Dave Hennessey - dhennessey@spa.com; Dave Nanney - DNanney@cox.net;
Andy Thompson - thompson01@starpower.net; Editor: Sheryl Sims - sesims4@cox.net

***Thank You* to all who donated door prizes last year, provided refreshments, took photos, brought guests, shared mineral news, and made our club a great one by attending our meetings!**

THANK YOU for your wonderful articles and photos! Your contributions make our club bulletin a great read. Please continue to support our club bulletin by sending me your mineral-related news, articles, photos and/or links. The *Mineral Minutes* newsletter deadline is the 15th of each month. You may email your submissions to me at <sesims4 at cox.net>. Again, thank you! (Note: The Editor reserves the right to edit all submissions as necessary.)

THANK YOU to Andy Thompson for his time and talents in proofreading the *Mineral Minutes*!

Treasurer's Note:

Treasurer, Rebecca Siegal

2013 Dues! $20 for single memberships. $25 for family memberships. Why not invite your friends and family to join MSDC?

Please send all treasurer-related emails to: dcmineralclub@gmail.com

Congratulations to Mother and Sister-of-the-Bride, Ann Cameron Siegal & Rebecca Siegal on the marriage of their lovely daughter/sister!

MORE REFRESHMENTS, PLEASE! If you are able to bring refreshments to our monthly meetings, please do so. Your contribution will be greatly appreciated! We are also looking for a volunteer or two to coordinate refreshements for our meetings. Please let Steve Johnson or a board member know if you can assist.

WELCOME! WELCOME! WELCOME! Guests are always welcome to attend MSDC meetings. Please continue to invite your friends!

Speaker Flash Back:

(Microsoft Clipart)

January 2013: Michael A. Wise, Ph. D, geologist in the Division of Mineralogy, for The Smithsonian National Museum of Natural History, gave a very interesting presentation on cathodoluminescence.

February 2013: Cathleen Brown, Museum Specialist Rocks and Ores Division, for The Smithsonian National Museum of Natural History, addressed MSDC members on the topic of Pegmatites: What they are and where to find them.

March 2013: Meeting cancelled due to inclement weather.

April 2013: Robert Simonoff – Mineral Photography

May 2013: Casper Voogt, Morocco Trip

September 2013: 28-29: 49th Annual Atlantic Coast Gem, Mineral & Jewelry Show hosted by the Gem Cutters Guild of Baltimore. Howard County Fairgrounds, West Friendship, MD.

November 2013: 2 – 3: 44th Annual Gemarama 2013: Shades of Red" sponsored by the Tuscarora Lapidary Society. The School at Church Farm, Business Rte. 30, 1 / 2 mile west of Frazer Rte 30 exit off Rte. 202, Exton, PA.

Upcoming Speakers:

June 5, 2013: Michael Pabst, Rare Earth Minerals.

MSDC RAFFLE!

(photo by S. Sims)

We have your winning ticket in the bag!

Thank you for your mineral donations. They will be used as door prizes.

Pre-Meeting Dinner: Join us for dinner at the Pier 7 Restaurant at 6:00 PM for dinner before the club meeting.
650 Water St SW, (at S L St), Washington, DC 20024, (202) 554-2500, www.pier7restaurant.com/Menu.
Please call Susan Fisher at 703-830-9733 to make a reservation if you wish to attend.

Visitors are always welcome at our monthly meetings and dinners!
MEMBERSHIP APPLICATION OR RENEWAL
THE MINERALOGICAL SOCIETY OF THE DISTRICT OF COLUMBIA (MSDC)

(___) Family ~ $25.00 per year. One address.
(___) Individual ~ $20.00 per year.
(___) New * (___) Renewal Dues are for Year _____*
For new members who join in the last months of the year, membership will extend through the following year with no additional dues.

ANNUAL DUES – PLEASE PAY YOUR DUES PROMPTLY.
Pay at next meeting or mail to:
Mineralogical Society of DC
P.O. Box 9957
Alexandria, VA 22304
Name(s) (First and Last)

_____

Address_____
City _____ **State** _____ **Zip**_____
Phone(s): **Home/Work/Mobile**_____
Email(s) _____
OK TO INCLUDE YOU ON CLUB MEMBERSHIP LIST? Distributed to Club members only.
(___) Yes – Include name, address, phone, email.
If you want any information omitted from the membership list, please note:
Omit my: (__) Email, (__) Home phone, (__)Work phone, (__) Mobile phone, (__) Address, (__) Name
SPECIAL CLUB-RELATED INTERESTS?

_____

MINERALOGICAL SOCIETY OF THE DISTRICT OF COLUMBIA
(2013 Officers & Board Members)

President: Steve Johnson, stevikj@gmail.com
Vice President & Program Chair: Rick Reiber, Mathfun34@yahoo.com
Secretary: Patricia Flavin, pattiflavin@gmail.com
Treasurer: Rebecca Siegal, dcmineralclub@gmail.com, (mail: c/o MSDC, P.O. Box 9957, Alexandria, VA 22304)
Director: Dave Nanney
Director: Dave Hennessey
Director: Andy Thompson, thompson01@starpower.net
Editor: Sheryl Sims, sesims4@cox.net
Co-Web Master: Betty Thompson & Casper Voogt, http://mineralogicalsocietyofdc.org/

Meeting Dates, Time, and Location: The first Wednesday of each month. (No meeting in July and August.) The National Museum of Natural History, Smithsonian Institution, 10th Street and Constitution Ave, Washington D.C. We will gather at the Constitution Avenue entrance at 7:45 PM to meet our guard who will escort us to the Cathy Kirby Room. Street parking: **THERE ARE NOW PARKING FEES, PAYABLE AT THE KIOSKS, AND ENFORCEMENT UNTIL 10 PM.**

MINERAL MINUTES

Newsletter of the Mineralogical Society of the District of Columbia

Mineralogical Society of DC
P.O. Box 9957
Alexandria, VA 22304
U.S.A.

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June 2013