Nittany Mineralogical Society Bulletin

Nittany Mineralogical Society, Inc.
P.O. Box 10664
State College PA 16805

September, 2011 **Visit our web site: www.nittanymineral.org** *Editor (see page 8): David C. Glick*

September 21st meeting:

The Rupp Quarry - A geologic detective story in State College, PA

by Dr. Charles E. Miller, Jr.
Geologist

Our September meeting will be held Wednesday the 21st in the room 114 auditorium of Earth & Engineering Sciences Building on the west side of the Penn State campus in State College, PA. Maps are available through our web site.

6:30 to 7:30 p.m.: Social hour, refreshments in the lobby
7:30 to 8:00 p.m.: announcements, questions, answers; door prize drawings
about 8:00 p.m.: featured program

The event has free admission, free parking, and free refreshments, and is open to all – ***Bring your friends and share an enjoyable evening.*** *-Editor*

For years, shoppers have gone to the Hamilton Avenue shopping center in State College without realizing there was an abandoned limestone quarry behind the stores. Even longer, for decades, geology students at The Pennsylvania State University and, more recently, Juniata College have used the abandoned Rupp Quarry as a field stop. Its proximity to the University and interesting geologic features has made it an inviting site to visit.

"Cabbage-head" stromatolites approximately three feet in height. These are interpreted as being intertidal (between high and low tide). As such these are shore-line indicators. Attempts have been made to use intertidal stromatolites to ascertain ancient tidal ranges, as paleontologic clocks, and as support that the Moon recedes from the Earth. Each of these will be discussed in the presentation. *All photographs by the author.*

Continued on page 2 with more photos

ATTENDING THE SEPTEMBER MEETING?

Donations of door prize specimens are invited.
NMS will provide ice, soft drinks, and water;
your donated snacks will be welcomed.

Junior Rockhounds

Junior Rockhounds will meet at 5:00 p.m. on the third Wednesday of the month this Fall. That's the same night as our regular meetings. The dates are Sept. 21, Oct. 19, and Nov. 16. We'll decide on the December meeting a little later.

Each month's Junior Rockhounds meeting has a new topic or topics with fun, hands-on learning for the kids. We encourage those who attend to become NMS members, but it's not required. Just $7.00 covers a whole year (through October 2012) of student membership. Parents may get a lot out of the meetings, too! Check the web site for news, or contact Dr. Andrew Sicree (see page 8). *- Editor*

Dues are Due!

by David Glick, NMS President

Our membership year ends in less than six weeks, so it's time to pay dues. For current members, a form is enclosed; the form and payment can be mailed in or brought to our September meeting. Your prompt payment helps a lot in reducing work for our volunteer staff. The rate remains at $20 for an individual member.

The dues form now includes a line for "don't send a printed Bulletin." If you read the Bulletin on the web site anyway, you can help reduce our printing and mailing expenses by checking this line. You can go back to the printed version, or request individual printed issues, at any time.

Elections in October:

Report of the Nominating Committee

by David Glick, NMS President

The October 19th meeting will be the Annual Meeting of the Corporation, and will include election of officers. In accordance with our bylaws, the Board of Directors, acting as the Nominating Committee, announces the following slate of candidates. No other volunteers or nominations have been received, and these incumbents have agreed to serve again:

President: David Glick
Vice-President: Robert Altamura
Treasurer: John Passaneau
Secretary: Ellen Bingham

Additional nominations may still be made. Members are also encouraged to volunteer for an appointed position as a committee chair or member. We need "new blood," energy and fresh thinking! Members are invited to attend Board meetings (generally held on the first Wednesday of the month at 7:30 p.m.) to see how we operate.

Rupp Quarry *Continued from page 1*

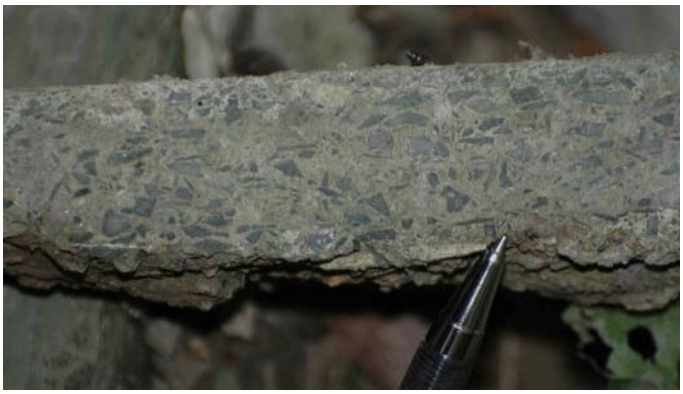
The site is a good example of secondary use of an abandoned quarry. Mining at the quarry apparently stopped some time in the 1930s. For several decades, it remained an unreclaimed/abandoned quarry. Eventually, the Hamilton Avenue strip mall was constructed near the quarry entrance. Later, a miniature golf course was built on the quarry floor. Today, Walk's Towing has its impoundment area for towed vehicles at the site of the erstwhile miniature golf course.

The Rupp Quarry exposes the Half-Moon Member of the Lower Ordovician Axemann Limestone of the Beekmantown Group. This formation is part of the Cambro-Ordovician carbonate sequence in central Pennsylvania that persisted for 120-140 million years. No other carbonate sequence in North America compares in duration. Sedimentologic and paleontologic observations at the Rupp Quarry provide clues to the depositional environment that deposited the carbonates. These clues include the tallest "cabbage-head" stromatolites in central Pennsylvania, abundant mudcracks, horizontal finely-laminated algal stromatolites, intraformational conglomerates, oolites, dolomite, other fossils, and a variety of limestone types. Like a murder mystery, each of these clues will be discussed individually. Collectively, the clues will lead us to interpret the paleodepositional environment of the Rupp Quarry.

Finely-laminated dolomites in Ordovician Axemann Limestone; Rupp Quarry; State College, PA

Stylolites in Ordovician Axemann Limestone; Rupp Quarry; State College, PA. Stylolites are etched surfaces on bedding planes, most commonly in carbonates, and result from pressure solution due to the weight of overlying sediments.

Mudcracks in Ordovician Axemann Limestone; Rupp Quarry; State College, PA. Mudcracks indicate subaerial exposure and desiccation and are useful in geologic mapping as they show tops of beds.



Intraformational conglomerate in Ordovician Axemann Limestone; Rupp Quarry; State College, PA. The individual pieces within the limestone are rip-up clasts. When mudcracks dry, they shrivel. Rains or waves cause the mudcracks to fragment. Broken pieces are washed away and redeposited to become intraformational conglomerates.

At ClearWater Conservancy's Spring Creek Day in June, Bob Altamura (left, above) organized an NMS station on "Rocks versus Minerals" with many examples for everyone to touch, examine, and discuss with the experts. John Passaneau assisted and Steve (at right) and Sarah Poterala demonstrated faceting. *D. Glick photos.*

NEWS FROM THE FEDERATIONS

Nittany Mineralogical Society, Inc., is a member of EFMLS, the Eastern Federation of Mineralogical and Lapidary Societies, and therefore an affiliate of AFMS, the American Federation of Mineralogical Societies. We present brief summaries here in order to encourage readers to see the entire newsletters.

The **EFMLS Newsletter** is available through the link on our web site **www.nittanymineral.org** or remind Dave Glick to bring a printed copy to a meeting for you to see.

The September issue starts with reports on the very successful July convention in Syracuse, New York. Pennsylvanian Susanna MacInnis won the 2011 Citation Award for her extensive service to the Federation. The results of the Web Site Competition and Editors' Competition are announced. In Scholarship Foundation news, NMS is noted for its recent contribution in memory of David Snell, Forest Benford, and Peter Nalle. Election results are announced; among them are Pennsylvanians R.J. Harris, President, and Hazel Remaley, 2nd Vice President. Other reports from the convention include board meeting minutes, two pages of photographs, and winners of the Each One Teach One Award, club "M" (membership increase) awards, and competitive display awards.

The **AFMS Newsletter** is available by the same methods. The September issue covers the annual convention, which this year washeld in conjunction with the EFMLS convention in Syracuse, NY; board meeting minutes are included. Juniors' activities at the show and news on the Future Rockhounds badge program are presented. The safety article covers lightning. Endowment Drawing winners are listed for 36 prizes. Bulletin Editor's Contest winners are listed, and individual winning articles will be available of the AFMS web site; one winner is former NMS member Bob Carnein, writing about "Geodes in Sedimentary Rocks." A "Where Are They Now?" column provides news on some of the earliest (1965-70) winners of the AFMS Scholarships.

Please see the web sites for the complete Newsletters. There's a lot there! - *Editor*

Note from the President

Bits and Pieces - member feedback welcomed

by David Glick

We had a very nice picnic on August 21; many thanks go to Ellen, Stu, Karen, and Nina Bingham for hosting it at their home. See the photos at the bottom of this page.

Thanks also go to Bob Altamura, John Passaneau, Steve and Sarah Poterala, for representing NMS to the public at Spring Creek Day. Photographs are at the bottom of page 2.

The Board is working hard to balance the budget for the coming year, and thus avoid tapping into our savings. If you're happy receiving our Bulletin via the web site, you can check the "no printed Bulletin" line on the dues form (see p. 1) and reduce NMS's cost for printing and postage. As a 501(c)(3) nonprofit, NMS will also happily accept your cash donations, and provide the appropriate documentation for your income tax deduction.

Our December Social & Sale is also being discussed, because the site of Prospector's Restaurant is being renovated for a different restaurant, and we don't know whether it will be suitable, available or affordable for our event. Would you as a member prefer to continue having this event at a restaurant, or should we go back to a potluck party with snacks, or a full potluck dinner? Should we continue the sales of specimens and jewelry at this event? Please let me or other Board members know what you prefer.

Also on the topic of sales, we're investigating a yard-sale type event where NMS and members could sell excess material. Would that be of interest to you?

Finally, we want to continue donating books to libraries in memory of our deceased members. We like to pick a book that relates to that member's interests, and of course it needs to be a book that the library doesn't have. We haven't yet donated in memory of Dave Snell, Forest Benford, or Peter Nalle; suggestions for which book and which library are welcomed. ❄

We ate well at the NMS picnic at the Binghams' on August 21. *D. Glick photos.*

At the picnic, Andrew Sicree, Steve Poterala and Stu Bingham discuss SEM images of skytop pyrite crystal forms.

POPULAR MINERALOGY

Fascinating mineralogy and earth science for the amateur mineralogist and serious collector - #42

Seeing Inside Minerals

by Andrew A. Sicree, Ph.D.

Discovering X-rays

All mineral collectors know about X-rays and most of us have heard that they are useful in identifying minerals. But the details are a bit sketchy. What are X-rays? And how do they help us identify minerals?

Wilhelm Roentgen is usually credited with the discovery of X-rays for his work in 1895. Although the claim that Roentgen was the first discoverer of X-rays is somewhat debatable – there were others who observed the effects of X-rays earlier – certainly Roentgen was the first to extensively study the properties of X-rays. While working in the dark in his lab with a cathode-ray tube, Roentgen noticed that a nearby screen covered with barium platinocyanide (doesn't everyone have one of these in his lab?) was glowing or fluorescing, even though it was well beyond the range of any electrons from his cathode-ray tube.

Experimenting further, Roentgen decided that he had discovered a new and different form of radiation, which he labeled X-radiation, signifying its unknown nature. He determined that X-rays could penetrate opaque matter, passing through paper, wood, skin, and even thin sheets of metal. This led to the famous photograph he took of a woman's hand – which clearly shows the bones of the hand and even a ring on one of the fingers, but only a shadow of the skin and muscles: the first medical X-ray image. Roentgen's X-rays were a fantastic boon to medicine enabling doctors to "see" broken bones inside their patients. In some countries, X-rays are called "Roentgen rays" in his honor.

Making X-rays

X-rays are generated when a high-energy beam of electrons (usually inside of an evacuated tube) hits a target (usually a metal such as copper). Electrons belonging to atoms in the target are knocked out of their orbits by the electron beam, and when they return to their original orbits, the atoms release energy, usually in the form of x-rays.

X-rays are, quite simply, a form of "invisible" light, which is to say that they behave like visible light. Like visible light, X-rays have wave-like behavior and thus one can measure their wavelengths. The difference between x-rays and visible light can be found in their wavelengths. Visible light wavelengths fall in the range of about 700 to 400 nm (nanometers, equal to one billionth of a meter). Below 400 nm is the ultraviolet (UV) region. Shortwave UV lamps favored by mineral collectors put out light of about 253 nm. X-rays are much shorter than UV, having wavelengths in the 10 to 0.01 nm range. In other words X-ray waves are about one-hundredth to one-hundred-thousandth the "size" of visible light.

Identification of minerals

It is precisely these short wavelengths that make X-rays useful in mineralogy. All minerals are crystalline (even if they don't display good crystal faces) which means that their atoms are arranged in regular, repeating arrays. The wavelengths of X-rays are similar to the distances between atoms in a crystal. This allows X-rays to penetrate crystals. But as X-rays pass through a crystal, some of the X-rays are bent or "diffracted" by the atoms in the crystal. These X-rays will exit the crystal in a different direction than the incoming X-rays. These diffracted X-rays produce a pattern dependent upon the mineral's crystal structure. Because each mineral species has a different arrangement of atoms in its crystals, each mineral will produce a different X-ray pattern. Patterns for most minerals and a great number of synthetic crystals have been determined and published in libraries of X-ray patterns. Thus, the X-ray pattern of an unknown substance can be compared with and matched to a specific mineral, yielding the unknown's identity. This only works, of course, if the unknown in question is a previously discovered mineral.

If your unknown is a new mineral, the X-ray pattern is still extremely useful because it gives information about the crystal system, the size and structure of the crystal's unit cell, and other useful parameters. The X-ray pattern is an important part of the description of a new mineral species.

Access to X-ray apparatus

Costly X-ray diffraction equipment is well beyond the wallets of most collectors. An assortment of X-ray apparatus finds use by professional mineralogists. Some units analyze single crystals – a small (approximately 1-2 mm) crystal may be all that is needed. Single crystal diffractometers are particularly useful when studying crystals of newly discovered mineral species, but few labs have these machines. For identification of known minerals, powder X-ray diffraction is quicker and cheaper. Here a pea-sized grain of a mineral must be crushed to a powder (thus you have to be willing to sacrifice some of your specimen). This powder is then hit with X-rays to produce a "powder diffraction pattern" which can be compared with libraries or databases of patterns for all known minerals.

Unfortunately, X-ray equipment is very expensive to buy and to maintain, so it isn't something you'll find in the average rockhound's toolkit. But prices are dropping somewhat. The least expensive machines are the new "desktop" powder X-ray diffraction equipment that recently hit the market – they start at about US$50,000. To operate X-ray-generating equipment, you must be trained and licensed by the state.

One alternative to owning and operating your own X-ray equipment is to ship your unknown samples to a commercial analytical lab. They'll do the X-ray work for you for a price. Fees usually range from about US$100 to US$200 per sample depending upon the amount of sample prep needed and whether or not you want a full-fledged report written or only the raw data returned.

The Rarest of Minerals

More than 4400 mineral species are found in nature. Some mineral collectors are species collectors who try to build a collection with as many of these species as possible. It is safe to say that no one has ever collected every known mineral, nor does any museum have a complete collection. New species are found and described each year and many mineral species are quite rare. Many of these species are known only from a few "spots on rocks" at their discovery site – usually referred to as the "type locality".

What is the rarest mineral of all? Many candidates could be submitted for this honor. For some rare species, rarity is really a function of the inaccessibility of the collecting site. Tranquillityite, from the Mare Tranquillitatis (Sea of Tranquillity) on the Moon is undoubtedly one of the rarest of all minerals. It is a dark red-brown hexagonal mineral with the interesting formula $(Fe^{2+},Ca)_8(Zr,Y)_2Ti_3(SiO_4)_3O_4$, but it is its origin more than the structure that makes it rare. Apollo astronauts collected it and it is unlikely that any additional samples will be collected soon. Whether or not it is truly rare on the Moon is a separate question – for all we known the Moon could be crawling with the stuff.

Another extreme rarity is ernstburkeite, a trigonal magnesium methane sulfonate hydrate, $Mg(CH_3SO_3)_2 \cdot 12H_2O$. Although this compound is known synthetically (i.e., it can be made in a lab), it has only been found in nature in Antarctica. It was found as a small (0.005 mm) inclusion in an ice core taken from a depth of 577 m below the Dome Fuji Base on the East Dronning Maud Plateau in East Antarctica. Not exactly the site of your next field trip!

It is interesting to note that rarity does not always create value. You may have the world's largest specimen of "whatchamaycallitite" a 1 mm-long beauty of a species which is known from only five almost microscopic crystals found in one locality (which just happens to be in your backyard). But chances are good that you won't be able to sell that specimen for anywhere near the price of a modest 1-cm rhodochrosite from the Sweet Home Mine, Colorado.

Dr. Andrew A. Sicree is a professional mineralogist and geochemist residing in Boalsburg, PA.

Inter-Galactic Diamonds

Diamonds may be a girl's best friend, but would your fiancée accept a black diamond in her engagement ring? We are not talking about clear black like a nice faceted smoky quartz, either. Would she want a diamond that was black, opaque, and looked like intergalactic space grunge?

Not all diamonds are transparent and many that come out of the diamond mines are less gemmy than those you see in the jeweler's shop. These lower quality diamonds are sold as abrasives, but most mines make the bulk of their profits from the gemstone diamonds they produce. However, in Brazil and the Central African Republic, there are diamond-mining operations that only produce black diamonds known as carbonados.

Carbonado is a variety of diamond that is black or dark gray. Carbonados are adamantine in luster (i.e., they are shiny) and opaque. Unlike most diamonds, they are not single crystals, but rather are polycrystalline, composed of many small crystals. Their polycrystalline nature makes them more porous than other diamonds and also tougher. Toughness is resistance to breakage unlike hardness, which is resistance to scratching (carbonados are about the same hardness – 10 on the Mohs scale – as all other diamonds).

Carbonados can and have been cut as gemstones, in spite of their lack of transparency – but they do not take a polish as good as more normal diamonds.

Carbonados come from sedimentary deposits in Brazil and the Central African Republic, on opposite sides of the Atlantic Ocean. They are not associated with normal diamonds nor are they found with kimberlite, the host rock of most diamonds. Geologists are uncertain of the origin of carbonados. Some researchers contend that these stones originated in outer space and fell to Earth as a giant meteoroid about 2.3 billion years ago at a time when Africa and South America were joined in a single supercontinent.

Mine Shaft Humor

Question: What do you call 57 politicians at the bottom of an old abandoned mine shaft?

Answer: A good start!

Geo-Sudoku

by David Glick

This puzzle contains the letters ACDEINPTY, and one row or column relates to an abbreviation for Roentgen's X-ray sensitive screen. Each block of 9 squares, each row, and each column must contain each of the nine letters exactly once. The solution is on page 7.

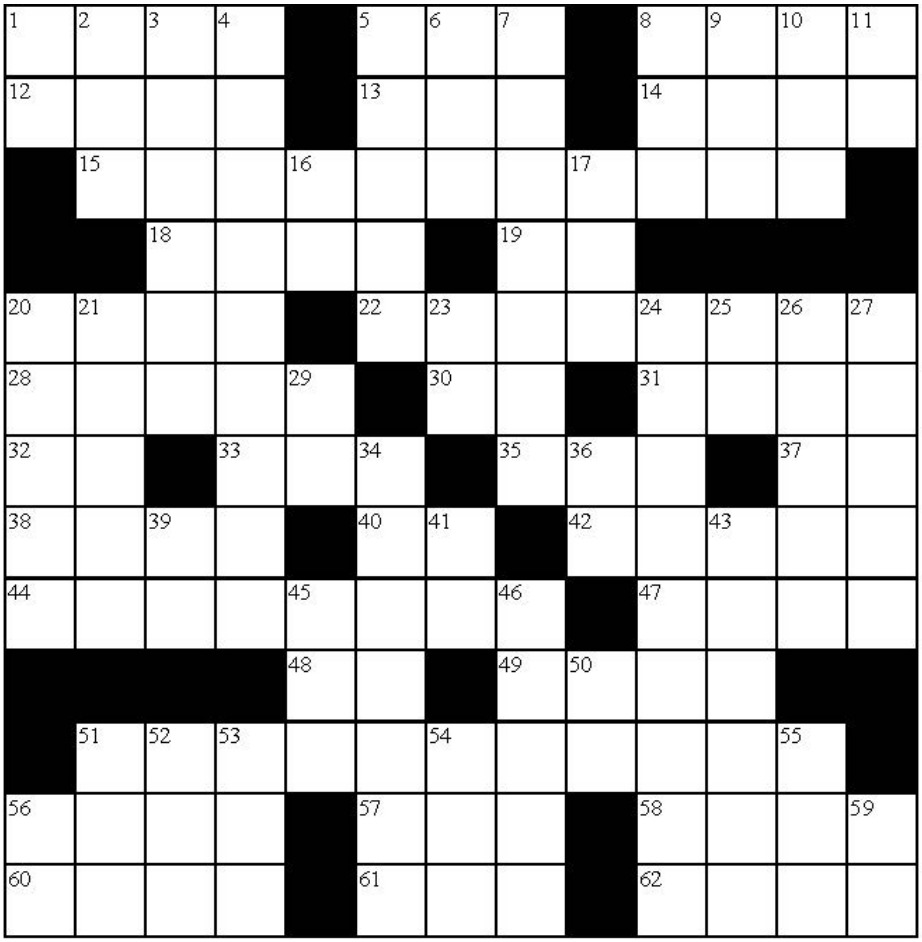
		P	E	N		T	C	A
	D		I			Y		
	C							D
	P	D	N					
A	N	Y					T	
T	I	E		C				N
							A	
	T	C	Y	A			D	E
	A	I		E	P			T

This puzzle contains the letters AEFLNOSTU, and one row or column describes to the SO3 in the rare mineral ernstburkeite. Each block of 9 squares, each row, and each column must contain each of the nine letters exactly once. The solution is on page 7.

	U	E						N
				T			S	E
		T				F	A	U
	O		F	A				
				S	E		F	
F	E		N			A	T	O
			A	U		L		
N	S					U		A
	L	A					O	

Crystal Matrix Crossword

Se and Sn



ACROSS

1 a flat rock
5 pass in the mountains
8 California pegmatite mine
12 ecclesiastical (ab)
13 ____ tree that yields caucho
14 found in goethite, magnetite, etc.
15 overhanging carbonate formation
18 Russian religious art, often with Au
19 found in smithsonite
20 what some Malays do
22 oxygen, peroxide, etc.
28 found on my knee
30 meaning "and" in Latin
31 Scarlet friend
32 and others (ab)
33 long ___ in the Precambrian
35 a unit of work
37 __ be or not __ be
38 animal unchanged by millions of years
40 the (Span. fem. sing.)
42 of great price; a gem but not a stone
44 NiTeSe
47 basketball monopolists
48 mikes and projectors
49 ___ Mesozoic, last dinos
51 tin oxide
56 glacially-formed hill
57 computer maker
58 due to the moon and sun
60 chunk of metal
61 exterior (ab)
62 found in the Grand Canyon

DOWN

1 not found in selenite
2 landing craft (pl.)
3 taking ____
4 miner's term for ZnS
5 phosphate deposit
6 alcohol (ab)
7 silver and gold telluride
8 a mine
9 Car 54, Where ___ You?
10 he (pl.)
11 andesite (ab.)
16 not hi
17 state west of Ohio
20 taken ____
21 natives of New Zealand
23 rare noble gas
24 silver sulfide
25 New Hampshire
26 four
27 woman's cloak
29 Officer of the Guard (ab)
34 a green mineral
36 recipe (ab)
39 Old Testament (init)
41 where it's __
43 acid in vinegar
45 puzzle creator (init)
46 how we get club officers
50 argon
51 Cornwall miners term for wolframite
52 atomic mass unit
53 Society of Economic Geologists (ab)
54 oil-state state
55 Old English letter
56 Kansas
59 means "dawn" – early in geological time

GeoSudoku Solutions

I	Y	P	E	N	D	T	C	A
E	D	A	I	T	C	Y	N	P
N	C	T	P	Y	A	E	I	D
C	P	D	N	I	T	A	E	Y
A	N	Y	D	P	E	C	T	I
T	I	E	A	C	Y	D	P	N
Y	E	N	T	D	I	P	A	C
P	**T**	**C**	**Y**	**A**	**N**	**I**	**D**	**E**
D	A	I	C	E	P	N	Y	T

O	U	E	**S**	F	A	T	L	N
A	F	L	**U**	T	N	O	S	E
S	N	T	**L**	E	O	F	A	U
L	O	N	**F**	A	T	E	U	S
T	A	U	**O**	S	E	N	F	L
F	E	S	**N**	L	U	A	T	O
E	T	O	**A**	U	S	L	N	F
N	S	F	**T**	O	L	U	E	A
U	L	A	**E**	N	F	S	O	T

Some Upcoming Shows and Meetings

Our web site http://www.nittanymineral.org has links to more complete lists and details on mineral shows and meetings around the country.

Sept. 17-18, 2011: 44th Annual Gem & Mineral Show sponsored by the Central Pennsylvania Rock & Mineral Club. Zembo Shrine, 2801 N 3rd St; Harrisburg, PA. www.rockandmineral.org/annualshow.htm

Sept. 24-25, 2011: Franklin Gem and Mineral Show and Outdoor Swap and Sell. Franklin School, Franklin, NJ. www.franklinmineralmuseum.com/activities.htm

Oct. 1, 2011: Autumn Mineralfest, by PESA. Macungie Memorial Park, Macungie, PA, about 8 miles southwest of Allentown. Sat. only, 8:30 -3:00. www.mineralfest.com

Oct. 29, 2011: South Penn Rock Swap, by Franklin County and the Central Pennsylvania Rock and Mineral Clubs. South Mountain Fairgrounds, 1.5 miles West of Arendtsville, PA on Rt.234. General Admission: $1.00; Tables for swappers: $10.00

Oct. 29, 2011: "Ultraviolation" all Fluorescent Mineral Show, by The Rock and Mineral Club of Lower Bucks County, PA. First United Methodist Church, 840 Trenton Road, Fairless Hills, PA., 9:00 AM – 5:00 PM, Cost $2.00 Donation, Children 12 years old and younger FREE.

Nov. 5, 2011: Gemarama, theme "Out of Africa," by Tuscarora Lapidary Society. At CFS: The School at Church Farm, Exton, PA. www.lapidary.org/gemarama.htm

Nov. 19-20, 2011: Gem Miner's Holiday Festival, by Mid-Atlantic Gem & Mineral Association. Lebanon Expo & Fairgrounds. Sat 10-5, Sun. 11-4. www.gem-show.com

2012: EFMLS Sept.15-16, Harrisburg, PA ❄

For sale / trade: Equipment & Materials

For sale: Rock cutting oil for sale. Food grade clear mineral oil. Up to 10 gallons available. $12 / gal. Contact Jim Garthe at jwg10@psu.edu or call 814-667-2409.

For sale: Highland Park lapidary saw, Model E4, 8" diamond blade, mounted on a stand, ready to use. Contact Willard Truckenmiller, phone 814-625-2531 (9:00 a.m. to 9:00 p.m.) or e-mail jowilltruck@aol.com

For sale: Large mineral collection; will sell all or part. Tumble polisher with three 12-lb. and one 6-lb. drum plus grits, polishes and pellets. My phone number is (570) 672-2325. Leave a message if I'm not in.

For sale: Jade in various types & colors; mostly rough, plus some slabs; some fine Coober Pedy opal. Also equipment and jewelry making supplies from jewelry studio and production shop. Contact Daniel G. Reinhold in Mill Hall, PA; phone 570 726-8091 after lunch every day, or e-mail: dreinhold1@comcast.net ❄

INVITE A FRIEND TO JOIN THE SOCIETY

The Nittany Mineralogical Society prides itself on having among the finest line-up of speakers of any earth sciences club in the nation. Everyone is welcome at our meetings. If you'd like to be part of our Society, dues are $20 (regular member), $7 (student rate), $15 (seniors), $30 (family of two or more members, names listed). Those joining in March or later may request pro-rated dues. Your dues are used for programs and speakers, refreshments, educational activities, Bulletins, and mailing expenses. Please fill out a membership form (available at www.nittanymineral.org), make checks payable to "Nittany Mineralogical Society, Inc." and send them to

Nittany Mineralogical Society, Inc.
P.O. Box 10664
State College, PA 16805

or bring your dues to the next meeting.

We want to welcome you!

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The Bulletin Editor will welcome your submissions of articles, photos, drawings, cartoons, etc., on minerals, fossils, collecting, lapidary, and club activity topics of interest to the members. Please contact:

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Newsletter submissions are appreciated by the first Wednesday of the month. If you include photographs or graphics, please do not embed them in word processor files; send them as separate graphics files (TIF, or good to highest quality JPEG files, about 1050 pixels wide, are preferred). Please provide captions and name of photographer or artist.