Nittany Mineralogical Society Bulletin

Nittany Mineralogical Society, Inc., meeting in State College, Pennsylvania
Contact information on back page

Editor (see back page):
David C. Glick

October, 2017 **Visit our web site: www.nittanymineral.org**

October 18th meeting:

From the Drake Well to the Marcellus Shale: A Story of Science and Technology

by Mike Canich,
Geologic Consultant

Our October meeting will be held Wednesday the 18th in room 114 (the large auditorium) Earth & Engineering Sciences Building on the west side of the Penn State campus in State College, PA. Maps are available on our web site.

6:45 to 7:45 p.m.: Social hour, refreshments in the lobby
7:45 to 8:00 p.m.: Annual Meeting & elections
about 8:00 p.m.: featured program

The event has free admission, free parking, and free refreshments, and is open to all; ***parents/guardians must provide supervision of minors.*** *Bring your friends and share an interesting evening!*

The Drake well (above) was drilled in 1859 to a depth of 69 ½ feet in Northwestern Pennsylvania where there were numerous oil seeps. Early efforts to find more oil involved offsetting known production and drilling near newly discovered oil seeps. As the industry matured, geologic concepts and technologies were developed to identify drilling locations for oil as well as natural gas. In addition new equipment to drill the wells was developed for operations on land and on water. My presentation will be a very high level overview of the science, technology and equipment that was developed during the 140 plus years after the drilling of the Drake Well which brought us to the development of the Marcellus Shale (drill site shown above). I will mix my personal experiences during my 39 year career in the oil and gas industry into this story and note the changes that occurred.

OFFICIAL NOTICE: Annual Meeting and Elections on October 18

by David Glick, NMS President

The October 18th meeting will be the **Annual Meeting of the Corporation**, and will include election of officers. In accordance with our bylaws (available on the web site), the Board of Directors, acting as the Nominating Committee, presents the following slate of candidates:

President	David Glick
Vice President	Bob Altamura
Secretary	John Dziak
Treasurer	Stuart Bingham

If you would like to volunteer to be on the ballot, or nominate someone, please contact the President (see page 8). The Board truly needs **additional volunteer**s to get involved with running the Society, providing **new energy and fresh thinking** and some new names on the ballot. In many cases it would be useful to have newcomers spend some time on committees and attending Board meetings before stepping into elected office. **All members: please consider volunteering!**

See page 2 for news on: - Dues due this month
- T-shirt order

Membership Dues - Online or Snail Mail

We are continuing last year's option of payment via Paypal and dues form submission via fillable PDF form (available for download from http://www.nittanymineral.org/mem). The old way is still fine too - fill in the printed form and mail it in with a check, or bring them to the October meeting. Members receiving the printed Bulletin, who have not already paid for the coming year, will find a printed dues form enclosed. The membership years ends October 31.

Upcoming NMS Programs

Nov. 15 Iceland: A Geological Tour, by Dr. Charles E. Miller, Jr.

Dec. 13: NOTE date change: **SECOND WEDNESDAY**. Holiday Dinner at Quaker Steak & Lube restaurant.

FEDERATION NEWS

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 now being distributed electronically; a link is available on our web site **www.nittanymineral.org**. The October issue begins with details on the EFMLS Annual Convention and Show in Bristol, Connecticut, on October 20-22, in particular the auction to benefit the Eastern Foundation Fund. President Dave Korzendorfer writes about attending the AFMS and EFMLS conventions, and the valuable volunteers who make the Federation run smoothly. Ellery Borow's safety article covers safety of kids in our hobby. Various parts of the Club Rockhounds of the Year program are described. Tickets for the 2018 Endowment Fund drawing (at the April 6-8 convention in Raleigh, NC) will be available.

The **AFMS Newsletter** is available by the same methods. In the October issue, President Ron Carman writes of his continuing travels to regional federation conventions. Junior activities, bulletins and ongoing projects are also covered.

The Federations encourage everyone to see the web sites for the complete Newsletters. There's a lot there!

-Editor

NEW NMS T-SHIRT ORDER!

NMS will be doing a new printing run of our T-shirts and selling them for an estimated $10 each in the colors Royal Blue, Galapagos Blue (a bluish teal) and Texas Orange. Each shirt is printed on both sides using white ink, with map on the front and specimens and WWW address on the back (colors shown below, or see www.nittanymineral.org/merchandise.htm#shirts). Sizes available are: Adult S, M, L, XL, 2XL to 5XL; Youth Y-S (6-8), Y-M (10-12), Y-L (14-16), Y-XL (18-20). We will order extras for future sales but to ensure you get your size & color you should contact Bob Altamura: call 814-234-5011 or e-mail raltamura@comcast.net. The order will be placed immediately after the October monthly meeting. Order by October 18 and pick up your shirt(s) at the November 15th monthly meeting or by other arrangement through Bob. We can also mail them at extra cost and a little extra time.

Geo-Sudoku

by David Glick

This puzzle contains the letters CDEFILONR. One row or column spells a place where a farmer would not want a sinkhole. As usual, if you've read this issue, you've seen the word, or a variation of it. Each block of 9 squares, each row, and each column must contain each of the nine letters exactly once. The solution is on page 8.

	E	L			O	I		
			E	D				
		O		I		L		
	I							O
		F	O				R	
C					I			D
	C			N	R	D	E	
D			I	E			C	R
		E	D	O		N		L

SYMPOSIUM ON PENNSYLVANIA MINING AND MINERALOGY

Mineral Collecting Enthusiasts Meet and Learn

November 4-5, 2017
Franklin and Marshall College, Lancaster, PA
Please Register in Advance

The Friends of Mineralogy – Pennsylvania Chapter will hold their 2017 Symposium and field trip on the first weekend in November. Mineral collectors in attendance on Saturday will meet in the Hackman Physical Sciences Building at Franklin & Marshall College, Lancaster, PA., to hear several talks by experts on minerals, geology and mining in Pennsylvania and beyond. On Sunday, a field trip for those registered for the symposium will provide an opportunity for mineral collecting at H&K Group's Penn/MD Materials Quarry.

The following five presentations have been scheduled for the symposium.

Stan Mertzman, PhD: Through the "Looking Glass": Optical Mineralogy and Common Igneous and Metamorphic Minerals and Rocks.

Ron Sloto, PG: The Dyer Diabase Quarries, Berks County, Pennsylvania

Bill Stephens, PG: Lapidary Grade Agate and Other Semi-Precious Gemstones from the Penn-MD Serpentine Quarry, Lancaster County, PA.

Bill Kochanov: The Occurrence of Smoky Quartz Crystals in Northeastern Pennsylvania

Kent Littlefield, PG: Friedensville Zinc Mines of Southern Lehigh County: Geology, Industrial History, and Environmental Impact

All interested mineral collectors are invited to register and attend. As usual, select mineral dealers will be present, and there will be a silent auction, give-away table, refreshments, and plenty of opportunities for visiting with fellow enthusiasts. Lunch is available at restaurants within walking distance. Details, updates, and a registration form will soon be available at <www.rasloto.com/FM/>.

ATTENDING THE OCTOBER MEETING?
Donations of **a few high quality, labeled door prize specimens** are invited.
Your donated snacks will be welcomed.
Bring a friend!

Donations Made by NMS

Book donations

The NMS Board is working to return to our program of donating books to libraries. Those donated to public or university libraries are in memory of NMS members or supporters. This year we have donated "The Mines and Minerals of Berks County, Pennsylvania," by Ron Sloto, to the Penn State Earth & Mineral Sciences Library in memory of David Snell. This was felt to be appropriate because Dave was in the College of Earth & Mineral Sciences, was a Pennsylvanian, and a collector. He was the curator of Penn State's Mineral Museum, at that time in Steidle Building, for more than 38 years, from the 1950s to the 1990s.

Also this year we donated "Geology of Pennsylvania," edited by C.H. Shultz, to St. Francis University Library, Loretto, Pa., in memory of Mike Sincak. Mike and his wife Barbara were the proprietors of Treasures of the Earth, a chain of retail mineral & fossil stores in western & central Pennsylvania shopping malls, and wholesale & WWW outlet in Holsopple, Pa.. He made extensive donations through the years to NMS, particularly of specimens for our annual Minerals Junior Education Day and our Junior Rockhounds program. Barbara has continued the donations.

The complete list of donated books can be found on our web site under "Outreach." Suggestions for appropriate books to donate can be made to Dave Glick (see page 8).

One of the more notable books donated by NMS is *Masterpieces of the Mineral World: Treasures from the Houston Museum of Natural Science*. It's a "coffee table book" with excellent, large photographs of impressive mineral specimens, and it's available at Schlow Library in State College, shelf number 553.8 HOU.

AFMS Scholarship donation

We recently donated $112, which was $2.00 per member at the time, to the AFMS Scholarship Fund. This brought our total to 800%, meaning $8 per member. The recent gift was in memory of members who passed away since our last donation in 2012: Joann Snell, Charlotte Smith, Mike Sincak, John Passaneau, and Jeanne Dague. It was acknowledged in the September EFMLS Newsletter. The September AFMS Newsletter includes a complete description of how the program, administered by AFMS for six of the seven regional federations, operates.

Stories professors told me:

a series by
Charles E. Miller, Jr.
State College, PA

2. Over-zealous trilobite collecting

Trilobites (Figure 1) are a favorite for many fossil collectors. These can be found in many of Pennsylvania's geologic formations and appear in a wide variety of genera and sizes. Pennsylvania's state fossil is the Devonian (405-365 million years) trilobite *Phacops rana*.

Not well known to many collectors, some Pennsylvania trilobites range up to 12 inches in length. These are not common. A trilobite of this size in our state is quite the discovery. These large trilobites are associated with shale formations, such as the Devonian Mahantango Shale. It was the lure of these large trilobites that led to over zealous fossil collecting.

A geology professor at one of our state universities was leading a field trip when the group came upon very large trilobites in a shale outcrop. The hunt was on and a great amount of shale was dug up. Unfortunately, this particular shale outcrop was the embankment of a private lane. Their fossil collecting was followed by a call to the dean of the university.

Figure 1: Pennsylvania's state fossil *Phacops rana*, a trilobite. (PA DCNR image)

3. The Geode

In the late 1960s, a professor at a state university was working on his doctorate at Indiana University. On a weekend, he and a friend were driving through southern Indiana when they spotted some huge geodes in the front yard of a residence. The geodes were about three feet in greatest dimension and were part of a flowerbed. While the southern third of Indiana is known for geodes, the two geology students had not previously seen any so large. Being keenly interested, they stopped and knocked on the door of the house. A young boy about six or seven years old came to the door and spoke with them. The two geology students asked permission to crack open one of the geodes, which the boy gave. When the two students were finished, they set the geode halves on top of each other.

Later, in reflection, an older and more mature professor realized how imprudent their behavior had been many years previous.

4. Carbonatites

A carbonatite is an intrusive or extrusive igneous rock consisting of greater than 50 percent carbonate minerals. It may be confused with marble. Carbonatites are extremely unusual as compared to silicate igneous rocks. They are uncommon because of poor preservation through earth's history. The concept of igneous carbonates is so unusual that for a long time geologists refused to endorse the idea. Alternative proposals were that the carbonates were melted limestones or marbles or huge carbonate xenoliths. One well-known carbonatite locality is at Oka in Quebec. Carbonatites are often associated with rare-earth metals. These metals are used in many devices such as computer memory, DVDs, rechargeable batteries, cell phones, catalytic converters, magnets, fluorescent lighting, and much more.

Professor Emeritus Duff Gold is an expert on carbonatites. As a student, his thesis ("The Relationship between the limestones and the alkaline igneous rocks of Oka and St. Hilaire, Quebec") objective was to examine emplacement energy of igneous dikes of the host marble. The setting was a series of alkalic dikes intruded into Grenville marble approximately 30 miles west of Montreal, Canada. After his first collecting visit to the field area with one of the professors, Duff

encountered a problem with some tests. He suspected that the carbonates were not Grenville Marble, but a carbonatite similar to some he had seen in southern and east Africa. This was when students did not question professors. That mind set was exemplified in requesting a change in objectives to characterize the rocks. He was met with opposition and skepticism. One comment was that the idea of "mantle carbonates" was ridiculous. Another comment was that Duff probably also believed in "continental drift." These comments were sufficient to have him "canned," so-to-speak. However, three years later, the professor apologized. Fortunately, the Geological Survey of Canada, the Quebec Department of Mines, and the Geophysical Laboratory in Washington (the heavy weight in petrology) saw merit in the proposal and helped Duff move forward with fieldwork. This site is now known as the Oka Carbonatite Complex, a 117 Ma old double ring-dike/cone sheet structure, that later was mined for niobium and rare earth minerals.

5. Sinkholes and Interstate 81

Interstate 81 was completed in south-central Pennsylvania in the mid-1960s. That location is in the Cumberland Valley of the Great Valley physiographic province. It is underlain with Cambro-Ordovician carbonates (limestones and dolomites). This section mostly goes through Franklin and Cumberland Counties. Such geologic terrane is known as karst topography. Characteristics of karst include: soluble rock such as limestone or dolomite at or near the surface, fractured rock allowing meteoric water to easily infiltrate, absence of or reduced number of surface streams, and presence of sinkholes, sinkhole ponds, caves, hard water, lapies, karst springs, etc. Construction in karst usually requires special considerations, such as spaced drilling to detect sinkholes.

Building this section of highway involved excavating, grading, drilling, blasting, and paving. These procedures had various impacts on local geology. Inevitably, topography was altered to build overpasses, rest areas, entrance and exit ramps, shoulders, medians, and the road surface. Altering topography, in turn, affected surface and subsurface water flow paths by rerouting them. In some instances, this rerouting concentrated flow paths with an unintended consequence of possibly creating sinkholes. In addition, heavy equipment used in the construction compacted soil to such an extent that permeability/transmissivity is lost or significantly reduced. This compaction causes affected soil to shed meteoric water rather than absorb it, thus concentrating surface water in various directions. However, after 2-4 years, biologic activity in the soil such as earthworms and plant roots allows for macropores (soil pores that can be seen without use of a microscope) to reappear in sufficient numbers that soil permeability returns to pre-construction levels. Also, blasting fractures rocks. Although the fractures do not extend far from blasting, each fracture is a new pathway for groundwater infiltration that did not previously exist. Finally, the road surface is cement and is essentially waterproof. Waterproofing natural land surfaces contributes to increased runoff that, in turn, can cause increased flooding.

The writer traveled this section of I-81 for ten years, noting sinkholes proximal to the highway. Figures 2-4 show several sinkholes along this section of highway.

Figure 2 shows three sinkholes with rectilinear alignment. Such alignment suggests the sinkholes may have developed on a fracture trace. A fracture trace is a linear feature, less than a mile in length, observed on aerial photographs and characterized by alignments of soil tones, vegetation, topographic depressions, straight stream or valley segments, or combinations of these. Fracture traces are usually fracture zones rather than a single fracture. Groundwater accumulates along these fractures, especially at their intersections. State College's and Penn State's water wells are drilled on fracture traces.

Figure 2: Rectilinear alignment of three sinkholes off I-81. (Image by the author.)

Figure 3 shows incipient subsidence in the shoulder of I-81 at Shippensburg, Pennsylvania. Tension fractures and percolation holes identify the sinkhole that is forming within three feet of the road surface. A heavily loaded truck pulling off the highway could initiate further sinking at this location.

Figure 3: Incipient subsidence in the shoulder of I-81. (Image by the author.)

Figure 4 is a sinkhole in a cornfield approximately 20 feet from the shoulder of I-81 at Shippensburg. This is a recurring sinkhole, having been filled-in several times by the landowner. The relative timing of this sinkhole is ascertained from the image. Note that corn is still on the cornstalk near the edge of the sinkhole. Ergo, the sinkhole formed before harvest but after spring plowing and planting.

Many other sinkholes proximal to I-81 in the Cumberland Valley are known. Some have developed in the median strip and some in the travel lanes. Geologists understand how such sinkholes form. However, what cannot always be determined is whether a particular sinkhole is from natural or man-induced factors. More specifically, did land modification from construction of I-81 cause some of the sinkholes?

After this section of I-81 was completed, a Cumberland Valley resident filed a lawsuit against Penn DOT. The complaint alleged that land modification associated with I-81 had caused a sinkhole on private land and the complainant was asking for monetary payment. Was this a valid complaint? Penn DOT asked a Professor of Earth Science at Shippensburg University for assistance. The Geography-Earth Science Department had a good collection of aerial photographs of the local area. The aerial surveys for the photographs were repeated at different times over the decades.

Figure 4: Sinkhole approximately 25 feet from I-81. (Image by the author.)

The first step in the investigation was to locate the property in question on aerial photography that both pre- and post-dated construction of I-81 in the Cumberland Valley. This was done. Next, pre- and post construction photographs were compared. It was discovered that the sinkhole in question pre-dated construction of this section of I-81. The conclusion was that land modification associated with I-81 did not cause the sinkhole. Rather, natural processes were the cause. Not long after this information was provided to Penn DOT, the lawsuit was dropped.

Editor's note: #1 in the series, Pride, appeared in the May issue. More installments are coming soon.

OCTOBER MEETING DOOR PRIZES!

Domeykite (copper arsenide), Michigan. From the uncataloged collection of John Passaneau.

Quartz crystal cluster, Garland County, Arkansas; largest crystal 1.75". Donated by John 'Pen' Ambler.

Quartz crystal cluster, Mt. Ida, Arkansas; largest crystal 1.5".

Pennsylvania Geology Magazine

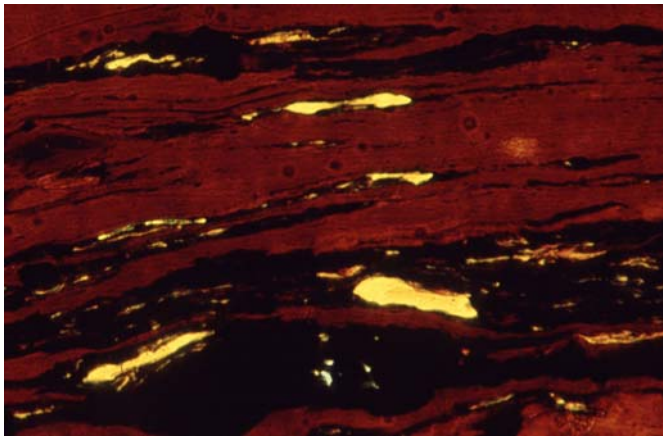
The index to issues of Pennsylvania Geology magazine on the web has recently moved. It can be found through the link on our web site's main page, or directly at http://docs.dcnr.pa.gov/cs/groups/public/documents/document/dcnr_20033210.pdf

The Summer 2017 issue (v. 47 no. 2) includes an extensive and well-illustrated article on Monitoring the Springs of Pennsylvania, by Victoria V. Neboga. Many of the large springs in Pennsylvania are described. Those of interest to NMS readers may include Arch Spring, Bellefonte (Big) Spring, and Nippono Spring (visited on our 1999 symposium field trip).

20 Years Ago in NMS

In October 1997, Nittany Mineralogical Society had just completed its second Symosium for mineral collectors. The theme was Lead, Zinc and Iron Minerals; there were nine presentations including one by Keynote Speaker Richard Hauck of Sterling Hill Mining Museum. The group toured Greenwood Furnace State Park before a late dinner on Saturday, and had a multi-stop field trip on Sunday

The October meeting program was by David Glick, on Coal: Macerals and Minerals. Macerals are the individual organic components of coal which can be distinguished under the microscope, analogous to minerals as the inorganic components of rocks. Minerals can also occur in coal, typically making up about 10% of the total coal, and are the material which remains as ash when the coal is burned.



A thin section of Kentucky bituminous coal in transmitted light; width of field 250 microns (0.25 mm). Macerals visible are vitrinite (red), fusinite (black), and sporinite and/or resinite (yellow). Some mineral matter may be included in the black areas.

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. See www.mineralevents.com for more.

October 21-22, 2017: EFMLS Convention & Show, Bristol, Connecticut. EFMLS meeting Friday October 20.

October 28, 2017: South Penn Rock Swap, by Central Penn. & Franklin County Rock & Mineral Clubs. South Mountain Fairgrounds, west of Arendtsville, PA on Route 234. Contact: tsmith1012@comcast.net

October 28, 2017: Ultraviolation Show - all fluorescent minerals - by R&M Club of Lower Bucks County. First United Methodist Church, 840 Trenton Rd., Fairless Hills PA 19030.

Nov. 4-5, 2017: Friends of Mineralogy - Pennsylvania Chapter Symposium and Field Trip. Saturday Symposium at Franklin & Marshall College, Lancaster, Pa. Sunday field trip.

Nov. 4-5, 2017: Gemarama, by Tuscarora Lapidary Society. Theme: Agates Everywhere. Greater Phila. Expo Center, Hall D, 100 Station Ave., Oaks, PA 19456 http://www.lapidary.org/GEMARAMA/Gemarama.html

Classifieds

FOR SALE: I am selling a large percentage of my worldwide collection and thousands of Pennsylvania specimens, many self collected and old classics. There's plenty of variety, and plenty for different levels of collector interest. Anyone interested should call to set up an appointment. Thanks,
Skip Colflesh, Hershey, PA
phone 717-805-2027

Geo-Sudoku Solution

N	E	L	F	R	O	I	D	C
I	F	C	E	D	L	R	O	N
R	D	O	C	I	N	L	F	E
L	I	D	R	C	E	F	N	O
E	N	F	O	L	D	C	R	I
C	**O**	**R**	**N**	**F**	**I**	**E**	**L**	**D**
O	C	I	L	N	R	D	E	F
D	L	N	I	E	F	O	C	R
F	R	E	D	O	C	N	I	L

Visit us at www.nittanymineral.org

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 in as directed, 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. Photographs or graphics are encouraged, but 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.