

Nittany Mineralogical Society Bulletin

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

August, 2022

Visit our web site: www.nittanymineral.org

Editor (see back page):

David C. Glick

August 17th meeting,
IN PERSON at BOAL HALL:

Show and Tell

by
NMS members and visitors

Our August meeting will be held Wednesday the 17th in Boal Hall (Boalsburg Fire Hall), 113 East Pine St., Boalsburg, PA 16827. Maps can be found on our web site.

7:15 to 7:45 p.m.: Social "hour." We will serve some refreshments - snacks and a few beverages - or feel free to bring your own non-alcoholic beverage.

7:45 to 8:00 p.m.: Announcements, door prizes, sales about 8:00 p.m.: featured program

*The event has free admission and free parking (lot just east of Fire Hall along East Pine St.), and is open to all; **parents/guardians must provide supervision of minors.** Bring your friends and share an interesting evening.*

We won't Zoom this meeting, but we plan to record the presentations (with permission) for later posting to our web site. -Editor

The program topic for August will be **Show and Tell**, presented by anyone and everyone who would like to "show and tell" for up to 5 to 10 minutes or so. This is a great chance to bring in new specimens, lapidary work, books, photos, equipment, projects in progress, interesting contrasts and comparisons, **anything you like** which represents some area of interest in our hobby or science, and share it with others. You can speak about it as informally or formally as you'd like. Stories or questions on their own are fine, too. You can connect with other members who have similar interests, or awaken an interest or spark an idea in someone else. We've had many fun and interesting presentations in the past, and look forward to more this time around.

ATTENDING THE AUGUST MEETING?

Donations of **one or two high quality, labeled door prize specimens** are invited.

Larger quantities can go in a giveaway box.

Bring a friend!

EFMLS Convention, Show, & Field Trip Harrisburg, PA September 23-24-25

The June EFMLS Newsletter, available on the NMS web site, has the schedule and descriptions of the various activities for the EFMLS Convention in Harrisburg. It is being held in conjunction with the Central Pennsylvania Rock and Mineral Club's annual show, which is Saturday and Sunday, September 24-25. Friday the 23rd will include the Cracker Barrel discussion session and the Annual Meeting of the Federation; those and most convention events are at the Penn Harris Hotel, 1150 Camp Hill Bypass, Camp Hill, PA 17011. The Show and some convention activities are on Saturday and Sunday.

The schedule at the Show venue (Harrisburg Consistory, 2701 N. 3rd Street, [beside the Zembo Shrine], Harrisburg, PA 17110) is:

SATURDAY Sept. 24:

- Central Pennsylvania Rock & Mineral Club Annual Show – 10:00 a.m. to 6:00 p.m.
- EFMLS Auction at the show venue – 1:30 p.m.

SUNDAY Sept. 25:

- Show – 10:00 a.m. to 4:00 p.m.

A Sunday field trip will provide an opportunity to collect at Mount Pleasant Mills quarry; there is no fee to attend but you must be registered for the convention.

The deadline for the Advance Registration Form is August 23. A fillable PDF of this form is available on the NMS web site under EFMLS Newsletters. It includes a discounted 2-day pass for the Show. The form contains information concerning the convention schedule, cost of activities (where applicable), and to whom and where to send your form. You have the option to register by mail or online and pay via PayPal. See the form for details.

Penn State Earth & Mineral Sciences Museum Open

Penn State’s Earth & Mineral Sciences Museum & Art Gallery is once again open to the public, following pandemic restrictions and renovations of the galleries and other spaces on the ground floor of Deike Building. The Museum is now entirely on the Burrowes Road side of the building, and has gained a little space in the move across the hall.

Nittany Mineralogical Society continues to have a display case and some wall space in the museum. We are grateful to Director Dr. Julianne Snider and Collections Manager Patti Wood Finkle for not only continuing that tradition but providing helpful assistance as well. The long-awaited NMS fluorite display is now in place! Watch for a photographic report in a future issue.

Summer hours are M, T, Th, F 10:00 a.m. to noon and 2:30 to 4:30 p.m., and Wednesday 9:00 a.m. to noon. Dr. Snider reports that fall hours will begin August 22: M, W, F 10:00 a.m. - 4:00 p.m. and T, Th 10:30 a.m. - 4:30 p.m. They are planning to be open on home football game days. If the game is scheduled for noon or early afternoon, open hours will be 9:00-11:00 a.m. If the game is scheduled for evening, hours will be 2:00-4:00 p.m. Check <<https://museum.ems.psu.edu/visit/location-and-hours>> as game times are announced or changed. *-Editor*

Geo-Sudoku

by David Glick

This puzzle contains the letters ABCHIKRSW. One row or column includes a water environment hosting specific organisms. 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.

	S					W	A
			S	W	C	K	I
			I	H	A		
	A		R			W	H
		I		S			R
R		B	A		H		K
S	I	H			W		
K	C		H	R			
				K			

Lincoln Caverns Tour

by David Glick

NMS members were very pleased to attend a tour of Lincoln Caverns and Whisper Rocks near Huntingdon, PA, on Sunday May 22. We gathered in the gift shop, had an introductory talk on the caves and their history from Ann Dunlavy, President of Lincoln Caverns and an NMS member. We then toured the caves with guide Zach, seeing lots of speleothems with interesting shapes. We took advantage of the gift shop, and made some donations to the Cave Preservation Network (CPN, part of the National Speleological Society - see <https://learnmore.caves.org/>). We extend our thanks to Ann for hosting us and to Zach for an interesting tour.

For more about the caverns, see <<https://lincolncaverns.com/about-the-caverns/>>.

Photos by D. Glick except middle left by John Dziak.



Pittsburgh Museums Tour

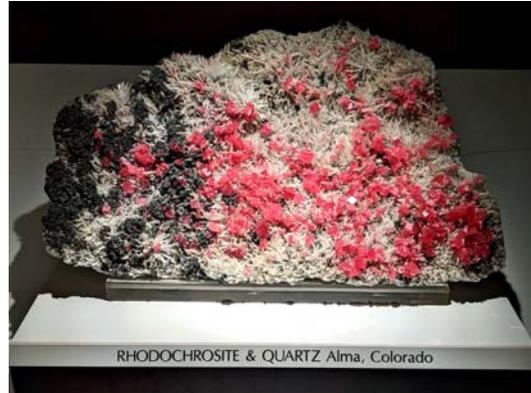
by David Glick

On Saturday, June 25, several NMS members enjoyed a trip to Pittsburgh, meeting first at Jeff Smith's private Geode Museum (photos below). It exhibits Jeff's decades of collecting the best specimens that passed through his hands, mostly from Mexico and Indiana. His workshop in the next room is equally impressive. We appreciated a relaxing lunch in the shade, while exchanging stories on collecting. Many thanks go to Jeff and Sue for their gracious hospitality.

We next went to Carnegie Museum of Natural History. Their temporary exhibit of Cut and Polished Pennsylvania Minerals and Gems (otherwise being called "Everything Pennsylvania") in Wertz Gallery of Gems and Jewelry had originally prompted the trip. No photographs are allowed in that gallery, but a few are illustrated, and others listed, at <<https://carnegiemnh.org/everything-pennsylvania/>>. That exhibit was small but nicely made. Wertz Gallery and Hillman Hall of Minerals and Gems (which includes a section of Pennsylvania minerals) are

extensive and occupied a lot of our time. Hillman Hall includes a delicate mordenite and calcite geode from Mexico, purchased from Jeff Smith. We also toured Carnegie's famous dinosaur exhibits, which had been renovated since the last time many of us had visited.

Photos by David Glick except as noted.



Above: Jeff's geode at Carnegie. Below: Dr. Charles Miller with the petrified log he helped collect and bring back to Carnegie. These two photos by Sue Smith.



Left: lunch photo by Sue Smith.



Applied Penn State Geological Research: The Coal Fields

by
Dr. Charles E. Miller, Jr.

Penn State’s Department of Geosciences is highly recognized for its education and research. This article discusses some of its research we used at the Bureau of Mining and Reclamation. These are examples of applied research. At that time, the Bureau’s primary mission was regulating Pennsylvania’s coal industry. Part of that mission was reviewing coal-permit applications and conducting hydrogeological investigations.

One issue in central Pennsylvania coal stratigraphy is distinguishing coals from each other. This is challenging because they are so similar. A seam may not have consistent thickness, something that might be useful in identifying it. In addition, at some locations, it may subdivide into “splits”; elsewhere the splits may be absent. A seam may be discontinuous because it was eroded out or never deposited in an area. One or more rider seams (thinner coal layers) may be associated with a main seam. These riders might be indicators of a particular coal. However, they, too, may not occur consistently. When one looks at associated strata (overburden, underburden), rarely is there a marker bed that assists in identifying a particular coal.

If different coals look similar, why care about identifying specific seams? Identifying a coal is useful for several reasons. For example, the British Thermal Unit (BTU) rating of coals varies. A coal’s BTU positively correlates with its economic value. Some, as in Clearfield County, are metallurgical coal. This coal is used to produce good-quality coke for the steel industry and is more valuable for that reason. Knowing a coal is metallurgical grade is important to an operator for estimating costs and profits. Identifying coals to be mined also has environmental considerations. Experience shows mining certain coals is conducive to creating acid mine drainage (AMD) while mining others is, generally, environmentally safe. This is information coal operators need to consider, more so now than in the past when mining laws either did not exist or were less stringent.

Eugene G. Williams, Department of Geosciences at Penn State, did seminal work in the central Pennsylvania coal fields starting in the 1950s. His work was the basis for Pennsylvania Geologic Survey geologic atlases of coal-producing counties that came later. Coal consultants and the Bureau regularly use these references. Williams showed that certain fossils

Figure 1: Fossils associated with bituminous coals in central Pennsylvania.

associate with specific coals (Figure 1). That work involved 57 fossil genera and species. For the first time, a means to identify coals, with consistent nomenclature, was possible. Prior to his work, coals could be misidentified. Identifications were based on local familiarity, made by drillers who were not geologists. One operator might refer to the “B” coal and another refer to it as the Clarion. The consequence of misidentifications was apparent later. When the PA Geologic Survey began detailed work in the coal fields, some historical data were unreliable due to misidentifications. Proper identifications are necessary in correlating and maintaining data bases. The fossils and stratigraphic work of Williams et al. were also useful in differentiating marine and

nonmarine strata associated with coal. This distinction has economic and environmental implications. Marine and brackish sediments overlying coals are higher in total sulfur than coals of freshwater strata. When exposed to air from mining, marine and brackish overburden produces acid mine drainage (AMD). Not only is AMD deleterious to the environment, it is also expensive to treat.

One fossil Williams identified is *Lingula* (Figure 2), a brachiopod found in Mercer through Middle Kittanning coals (Figure 1). These coals are notorious



Figure 2: *Lingula* in overburden associated with the Lower Kittanning coal in Clearfield County, PA.

for producing AMD. *Lingula* associates with brackish settings and, as such, are proxies to potential AMD from mining. Al Guber (Department of Geoscience at PSU) complemented the work of Williams. He correlated *Lingula* with high-sulfur, brackish intervals overlying Lower Kittanning-coal in Clearfield County (Figure 3). Brackish-water environments contain high concentrations of both sulfate and iron. Under reducing conditions, pyrite is deposited, leading to AMD when the coal is mined. Presence of *Lingula* correlated well with those intervals. *Lingula* became a predictive tool for identifying strata with potential for creating AMD. Because Lingulid brachiopods are macroscopic, they are easily identified in the field. Using *Lingula* for this purpose is an example of applied paleontology. These observations were a precursor to acid-base accounting (ABA), the most-used method of overburden analysis (OBA), that came later. OBA involves leaching tests simulating weathering in the environment. The tests determine

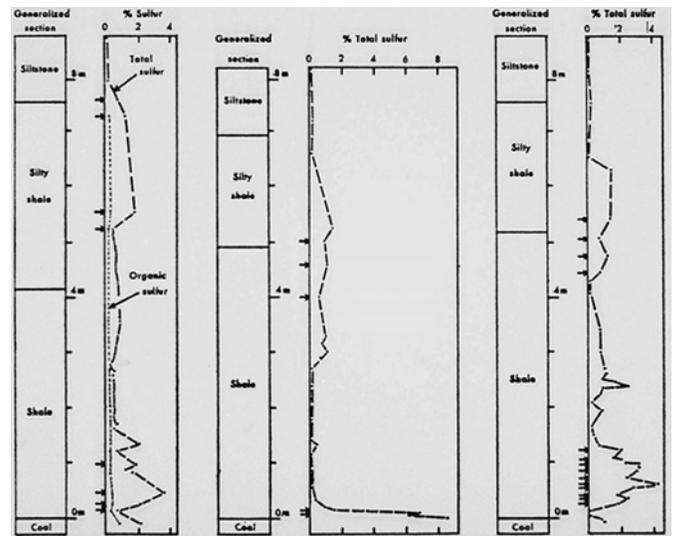


Figure 3: *Lingula* (arrows on left side of sulfur charts) and high total-sulfur intervals in brackish overburden. Clearfield County, PA.

neutralization potential and percent total sulfur of coal-bearing strata. High total-sulfur intervals positively correlate with AMD generation. The work of Williams et al. and Guber shows marine/brackish overburden generally produces AMD.

The Bureau’s work also involved hydrogeological investigations of water diminution and/or degradation from coal mining. One report the author wrote concerned a strip mine in Clinton County (Figure 4). During the investigation and, later, in litigation, Penn State geosciences research played a pivotal role in the State’s case against the coal company. The subject site was a hilltop, hydrogeologically isolated from nearby mining (Figure 4). This isolation implied any adverse water-quality change was from the mine site and not external sources. Water-quality changes were

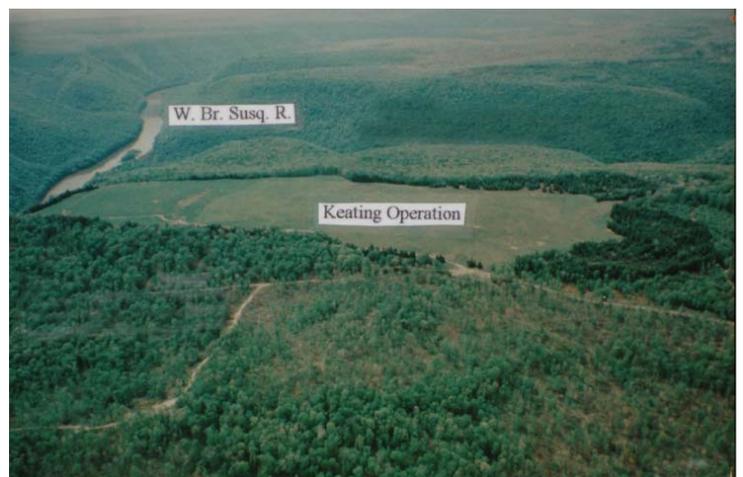


Figure 4: Oblique aerial image showing the hilltop, reclaimed, hydrogeologically-isolated, strip mine referenced in the text.

determined by comparing pre- and post-mining data of receiving streams and point-source flows (seeps, springs, discharges).

Some hydrogeological investigations, including the referenced study, are appealed to the Environmental Hearing Board or other court. In litigation, supporting evidence is exchanged between both parties. During one exchange in the referenced litigation, the coal company stated: "The reclamation work was done by loaders, trucks, and dozers, as was the mining. This type of operation has been shown by research by Penn State University to develop a relatively high degree of compaction. In some instances, the compaction is so great that more post-mine runoff occurs than in the pre-mine disturbed land condition. By virtue of the greater post-mine runoff, the mine area will actually shed water to a greater degree than it did pre-mine." This was a crucial argument for the coal company. It was investigated for creating off-site, AMD discharges and degrading water quality of receiving streams because of its mining. From the company's perspective, if compaction from reclamation did, indeed, divert all surface water away from the site, how could it be hydrogeologically connected to off-site discharges and degraded receiving streams? The company argued there must be other explanations.

Referenced Penn State research was that of geoscience Professor Tom Gardner and students. They studied the relationship between reclamation and infiltration at central Pennsylvania coal strip mines. What the coal company argued was correct, as far as its statement went. Reclamation does cause compaction. However, its consultant failed to follow-up on that research. Failure to do so contributed to the company conceding the court case.

Gardner et al. showed infiltration rates return to pre-mining levels within four years of reclamation. This is due to reestablishment of ground cover, other biologic activity, and non-biologic changes in the topsoil. Roots, burrowing organisms, and desiccation (soil cracks) create macropores, facilitating infiltration. As of the court case, it had been 12 years since the mining was backfilled and reclaimed. That was three times longer than the four-year time frame the company referenced. ❄

John Dziak Reports from Chicago



Dear NMS friends,

Hello from Chicago! I miss Happy Valley but I am doing pretty well here, and I wanted to say hello to you all. My Penn State email is still good until May.

I started my new job this Monday. I was very relieved to find that my supervisor was welcoming and easygoing. I already have a worthwhile project to work on having to do with data from a study on children's dental care.

I went to the Field Museum as soon as I could. Even though I had been there before on a visit a few years ago, it was delightful to see it again. There are still several Charles R. Knight paintings on the walls -- I was so glad that they weren't removed, even though some of the details might not be up to date. Of course, they had many beautiful dinosaurs and other prehistoric vertebrates -- I especially enjoyed seeing the holotype or original specimen of the duckbill *Parasaurolophus*. They also have a titanosaur (very large South American sauropod) on the first and second floors (it's that big).

There was a special little hall leading up to Sue the Tyrannosaurus's room, with slightly spooky lighting and ambient sounds, to make it seem like we were actually in some danger of being eaten. I started getting nervous even though it was silly. But the skeleton itself was awe-inspiring.

There was an exhibit on local paleontology, with some mention of Mazon Creek, and also an explanation that Chicago rests on top of a Paleozoic coral reef. I hope to learn more about that later.

Anyway, I hope you are all enjoying summer and wish you an excellent start to the semester

Very best wishes,
John Dziak

Field Trip Finds

Our Society was grateful to be invited on a July 23 field trip organized by the North Jersey Mineralogical Society and Friends of Mineralogy - NJ Chapter. National Limestone Quarry's locations at Middleburg and Mount Pleasant Mills, PA, were visited and collecting was successful. Thanks go

to NMS member Carole Troutman for sharing these photos of specimens that she and her sons collected. They are: first row, calcite; bottom left, fluorite in calcite; bottom right, wavellite.





SYMPOSIUM & FIELD TRIP
Friends of Mineralogy - PA Chapter November 12-13, 2022 Lancaster, PA
 Attend ONLINE -OR- IN PERSON at Bright Side Opportunities Center, 515 Hershey Ave., Lancaster PA 17603

Symposium for mineral enthusiasts on **Saturday Nov. 12** Doors open 8:30 a.m.; Symposium 9:00 - 4:00
 Sales by Select Dealers – Silent Auction – Give-away Table – Meet Fellow Collectors
 Talks by knowledgeable speakers on **Pennsylvania Mineralogy and Geology**, and more:

<p>William Kochanov, PG Pa. Geol. Survey, Retired Reconnaissance of mineral collecting sites in Southeastern Pennsylvania</p>	<p>Ronald A. Sloto, PG West Chester Univ. Classic Mineral Localities of Bucks County, Pennsylvania</p>	<p>Bill Stephens, PG Stephens Environmental Report on Re-opening the Mount Pleasant Mills, Snyder County, Pennsylvania, Wavellite Occurrence</p>
<p>About to be announced!</p>	<p>and...</p>	<p>One more great talk to be announced</p>

Registration (form on web site; or on-site, cash/check only): Current members \$ 15.00/person Non-members \$ 25.00 College Students free
 Professional Geologists: Five Professional Development Hour credits available for full lecture attendance

Field Trip Sunday Nov. 13 Mount Pleasant Mills, PA. Open only to symposium registrants. Register now!
 Visit our web site for details, registration form, changes and updates: www.rasloto.com/FM

UPCOMING EVENTS

Confirm details of events before attending.
See other show calendar links on our web site.

Sep. 24-25, 2022: EFMLS Annual Convention and Central PA R&M Club Show. Harrisburg Consistory, 2701 N. 3rd Street (next to Zembo), Harrisburg, PA 17110 <https://rockandmineral.org/annual-show/>
See page 1.

Oct. 1, 2022: Autumn Mineralfest, by PESA. Macungie Memorial Park, Macungie, PA. 8:30 a.m. to 3:00 p.m. <http://www.mineralfest.com>

Nov. 12-13, 2022: FM-PA Symposium, Lancaster, PA (12th) and Field Trip (13th) See p. 7.

Geo-Sudoku Solution

I	S	C	K	B	R	H	W	A
A	H	R	S	W	C	K	I	B
W	B	K	I	H	A	R	C	S
C	A	S	R	I	K	W	B	H
H	K	I	W	S	B	A	R	C
R	W	B	A	C	H	I	S	K
S	I	H	B	A	W	C	K	R
K	C	W	H	R	S	B	A	I
B	R	A	C	K	I	S	H	W

NMS BOARD MEETING NOTICE

NMS members are invited to attend Board of Directors meetings, which are generally held at 7:30 p.m., early in the month or as decided by the Board, although we do not meet every month. The next date is **August 16**. Members who would like to attend should contact president David Glick to verify time and place; those who would like to have their discussion item placed on the agenda should contact him at least one week in advance of the meeting.

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!

CONTACT INFORMATION

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Door Prizes: Dr. Bob Altamura (see above)

Facebook & Publicity: John Dziak: jjd264@psu.edu

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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425 Armagast Rd. phone: (814) 810-2116 (h)

Bellefonte, PA 16823-9762

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 (good to highest quality JPEG files, about 1050 pixels wide, are preferred). Please provide captions and name of photographer or artist.

Visit us at www.nittanymineral.org