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

January, 2020 **Visit our web site: www.nittanymineral.org**

January 15th meeting:

Marcellus Shale Gas Well Drilling and Wellsite Geology

by Steve Clark, P.G.

Our January meeting is planned for Wednesday the 15th 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.: announcements, questions, answers
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! -Editor*

This talk will broadly describe how exploration for oil and natural gas is done, emphasizing wellsite geology and the Marcellus Shale in northeastern Pennsylvania. It will include how drilling pads are chosen, as well as how well paths are planned. Then, there will be a description of the basic setup of drilling rigs and of oil and gas wells. Several pictures from drilled wells, including core pictures and cuttings pictures, will be shown. There are potential geologic hazards that must be considered when planning wells and while drilling, and this talk will describe and provide examples of some things that wellsite geologists must look out for as a well is being drilled.

Geosteering is guiding the horizontal drilling so that it stays in rock that will produce the most oil and/or natural gas. Different tools involved in geosteering will be described. Natural gas analysis of Marcellus wells will also be described, as well as how Marcellus gas is distinguished from the biological or shallow gas found in residential water wells. During the talk, some references will be made to west Texas (Permian Basin) wellsite geology and geosteering for comparison.

See the photographs on **page 2**.

See page 6 for
Winter Weather Cancellation Policy

Minerals Junior Education Day
Saturday, March 28, 2020
PLEASE VOLUNTEER!

NMS's 25th Annual Minerals Junior Education Day is set for Saturday, March 28, at Central Pennsylvania Institute of Science & Technology at Pleasant Gap, the same location as the last few years. Please save the date and volunteer to help with one of the stations at the event.

At this event, kids get an empty egg carton when they check in, then go to a series of stations, each concerning a different aspect of mineral properties, rocks, fossils, etc. They learn about the topic from a demonstration or discussion, and receive a properly labeled specimen or educational item related to the topic, so they gather a whole collection in their egg carton. There is also a sales table with kid-friendly prices. **Registration for kids to attend will open in mid-March.** More news will be on the NMS web site.

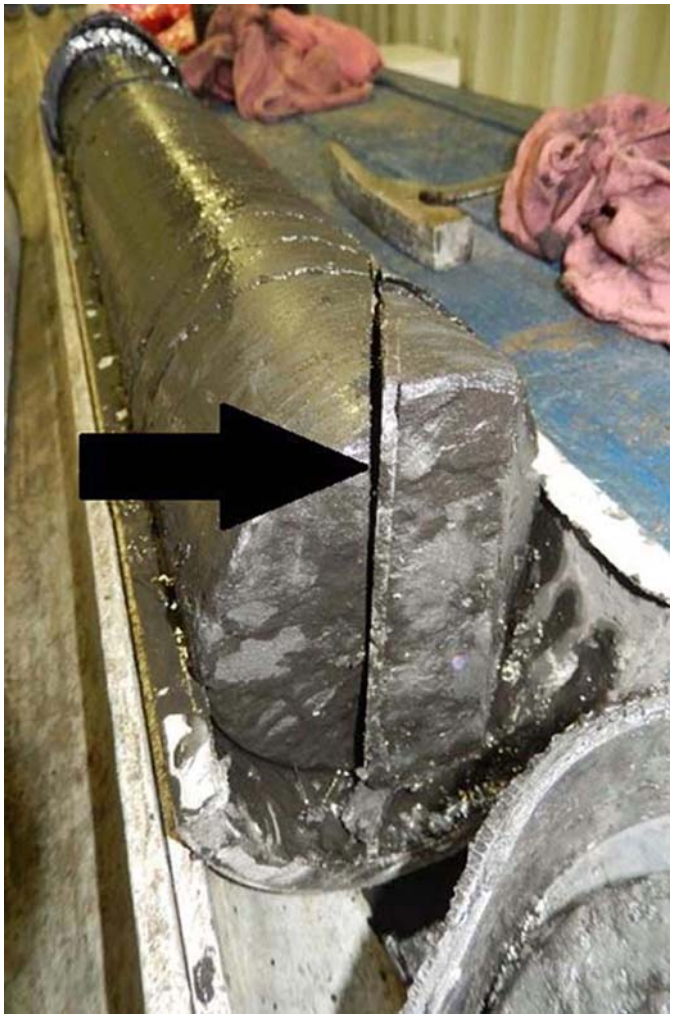
We are **seeking volunteers** to help with various aspects of the event. We also welcome advance donations of identified minerals, tumble-polished material, fossils, books, etc. which can be sold at child-friendly prices. To volunteer or get more details, **please contact**

Frank J. Kowalczyk:
frank.j.kowalczyk@gmail.com
or 814-404-9854. ❄

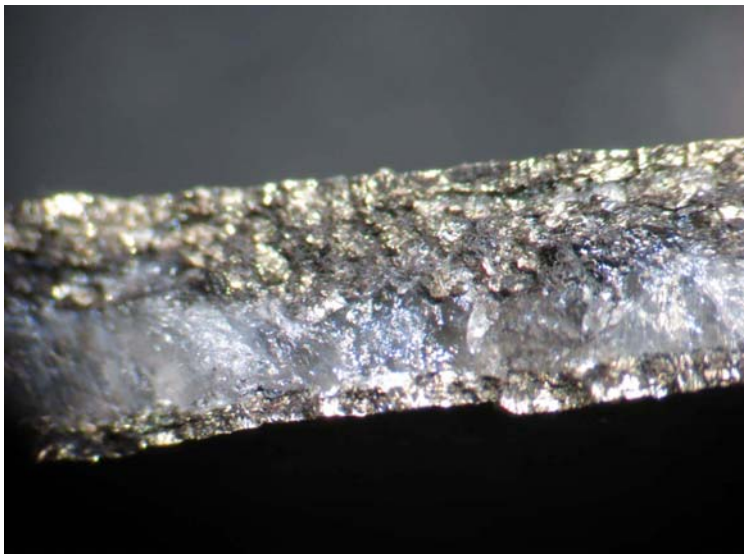
3" geode, a January meeting door prize

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

Marcellus Shale Gas Well Drilling and Wellsite Geology continued from page 1

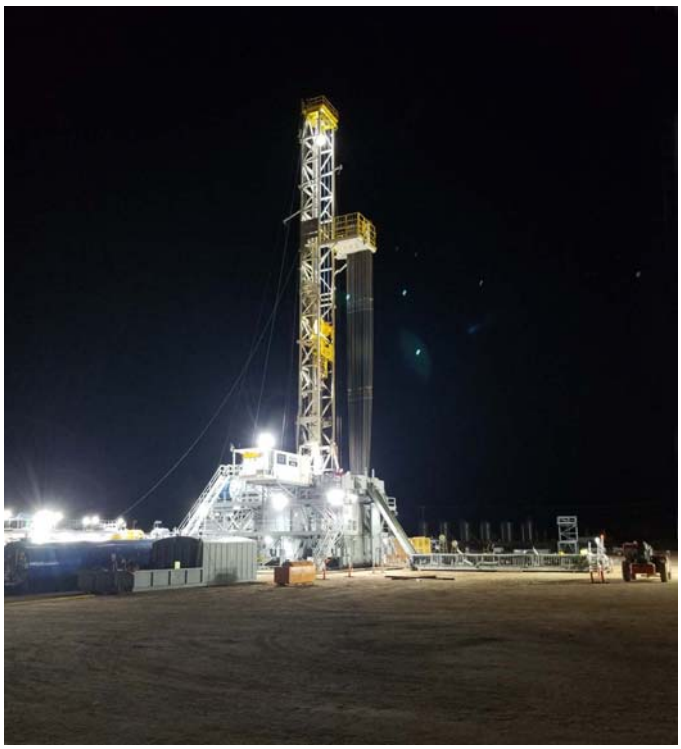


A. Fracture fill in a fault within 4 inch Marcellus Shale core



C. Fracture fill from 'A' with calcite in center, pyrite on either end

B. Slickensides on a Marcellus Shale reverse fault surface



D. West Texas drill rig

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. The **Federations and our Society strongly encourage all members to read the monthly Federation Newsletters, available on their web sites**, which are linked from our web site, www.nittanymineral.org . We present brief summaries here in order to encourage readers to see the entire newsletters. There's a lot there!

EFMLS leaders want **you** - the club member - to see the **Newsletter**. Please see it at <https://efmls.org/newsletter> (also linked from the NMS home page). The January issue includes news of inter-club field trip arrangements. Clubs are encouraged to recognize our members through the Club Rockhound of the Year program. The safety article cautions about internet scams targeted at mineral club officers.

The **AFMS Newsletter <**http://www.amfed.org/news/> has no separate January issue.

-Editor

2020 Philadelphia Mineral Treasures and Fossil Fair

Saturday March 28, 10 am to 5 pm;
Sunday, March 29, 10 am to 4 pm.
Lulu Temple, 5140 Butler Pike, Plymouth Meeting, PA.,
(PA Turnpike, exit 333; or I-476, exit 20)
Free Parking.
Adults: $6.00. Children under 12: $1.00;
Uniformed scouts and troop leaders free.

Special Features: On both days a line-up of distinguished professional speakers will be presented. The Academy of Natural Sciences of Philadelphia will present a display of minerals from its collection. In addition, there will be fossil and mineral displays, educational materials, door prizes and a food concession. Thirty dealers will offer fossils, minerals, crystals, and jewelry from all over the world, as well as books, decorative items, and other merchandise. Young visitors can enjoy the annual fossil dig for children, and the kid's corner with free mineral gifts.

Information: www.phillyrocks.org/mineral-show/
Contact: Cheryl Leibold, cleibold@verizon.net.

Geo-Sudoku

by David Glick

This puzzle contains the letters ABEIMNRSU; one row or column spells a description of the White Island volcano. As usual, if you've read this issue, you've seen 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.

R	S	I						A
		A		R			E	N
			M				R	
N			B					
B	A	U	R					
		S			A	E		B
S	I	B		N			M	E
U			E		S	A	I	R
		R						

January Door prize

Calcite crystals on limestone, from National Limestone Quarry at Mount Pleasant Mills, PA, another January meeting door prize. *D. Glick photo*.

White Island, New Zealand

by

Dr. Charles E. Miller, Jr.

On November 14, 2018, the writer presented to the Nittany Mineralogical Society "Geology, scenery, and natural history of New Zealand." Part of the talk discussed White Island, the most active volcano in the country. It is located off North Island (Figure 1). Information about the volcano was largely from a tour in which the writer participated in 2018. On December 9, 2019, a tour turned deadly when the volcano erupted, sending an ash plume to 12,000 feet, killing 18 people, and causing severe burns to many others. For those who missed the writer's talk, much of that information is summarized in this article. Photographs are by the author.

White Island is part of the Pacific Ring of Fire, coinciding with converging crustal plate boundaries around that ocean. Specifically, it is in the Taupo Volcanic Zone where the Pacific Plate subducts beneath the Australian Plate. Subduction creates magma, now in a chamber within the volcano.

The island is the top of a submarine volcano rising 1053 feet above sea level. Within the crater is a lake with a distinctive green color (Figure 2) due to dissolved sulfur and extremophile bacteria. Fumaroles, hot springs, and boiling mud (Figures 2-4) characterize the

Figure 1: Map showing White Island, NZ.

Figure 2: View showing fumaroles (background) and greenish-colored lake (center) in crater of White Island, NZ.

volcano's geothermal system. The landscape is dotted with sulfur deposits (Figure 4). Water is very acidic, with crater water having a pH of -0.6! Volcanic gases include carbon dioxide (CO_2), sulfur dioxide (SO_2), hydrogen sulfide (H_2S), hydrochloric acid (HCl), and sulfuric acid (H_2SO_4). Combination of periodic ash deposits in conjunction with acidic water and air results in a barren landscape (Figures 2-4). Corrosiveness of the acidic environment is apparent. Abandoned metal equipment is rapidly

Figure 3: Tour group approaching the crater. White plumes are fumaroles. White Island, NZ

deteriorating (Figure 5) and tour guides replace their footwear about every three weeks.

White Island is a composite or stratovolcano, one of three major volcano types. Other types include cinder cones and shield volcanoes. A stratovolcano consists of alternating layers of volcanic ash and lava. This combination results in steep-sided, symmetrical volcanoes of which Mt. St. Helens and Mt. Kilimanjaro are other examples. For most people, stratovolcanoes are thought of as typical volcano cones.

Usually, active volcanism at White Island is limited to fumaroles (Figures 2-4), hot springs, and boiling mud. These occur when meteoric water infiltrates close to magma and becomes superheated. Fumaroles erupt constantly as opposed to geysers that erupt periodically. Occasionally, phreatic or steam eruptions occur, as happened on December 9, 2019. These do not involve movement of magma toward the surface. Rather, superheated steam builds up pressure and blows out vent obstructions and results in short-duration pyroclastic events.

The tour emphasizes geology and safety. Hardhats and gas masks are issued. Instructions include following, in-line, the tour guides. Unstable, thin crust poses potential dangers. Previously, one tourist disregarded instructions and wandered off to take photographs. He suffered severe burns on his foot and leg. Volcanic activity is monitored routinely using remote instruments on the island. Obviously, such monitoring is not foolproof, as

Figure 4: Sulfur deposit and abandoned mining equipment (lower left). Note fumarole activity (top).

evidenced by the recent eruption. Phreatic or steam eruptions are more difficult to detect or predict because they do not involve upward movement of magma that triggers small earthquakes and surface bulges, harbingers of pending eruptions.

Air quality at White Island can be compromised, depending on which way wind blows and volume of gases released. As a result, gas masks may need to be used. Hydrochloric and sulfuric acid aerosols can irritate respiratory systems, sting eyes, corrode equipment, and affect clothing. Of the previously mentioned volcanic gases, presence of hydrogen sulfide (H2S) is particularly significant. At low concentrations, hydrogen sulfide smells like rotten eggs. However, at higher concentrations, it is odorless and deadly. It is also heavier than air and, therefore, accumulates in low areas.

From the mid 1880's to the 1930s, sulfur was intermittently mined at the volcano. Remnants of that past industry (Figures 4 and 5) are reminders of a harsh life. Consider working all day in a bleak landscape of no vegetation or wildlife while poisonous gases occasionally blow by. There is no fresh water and missteps can result in severe burns or death. In 1914, sulfur mining on the island temporarily ended with disappearance of 10 workers who were never seen again. At that time, part of the crater wall collapsed into the lake creating a lahar (slurry of volcanic ash and water) that swept over the sleeping workers. In this case, the water was also very acidic. A lahar solidifies into a cement-like material, making recovery of bodies nearly impossible.

Figure 5: Deteriorating mining equipment.

The recent eruption has garnered lots of attention, largely because of death and injuries to people. As mentioned, the 1914 loss of 10 sulfur miners also became big news. Less well known is a 2016 fire that completely engulfed a tour boat with 60 people on board. All had to abandon ship and jump into the sea. Three were hospitalized. An Internet search provides video of the fire and additional details. The future of White Island tours remains uncertain at this time. ❄

Weather Cancellation Policy

In case we experience active winter weather on a meeting date, our policy is to cancel the meeting only if evening classes at Penn State have been cancelled. That cancellation is publicized in the usual radio and TV service announcements.

Penn State notes that weather-related cancellation / closing information can be found at WPSU-FM, the news site <http://news.psu.edu/>, and <http://www.facebook.com/pennstate >

Bureau of Geological Survey 100th Anniversary of the 4th Survey

The Pennsylvania Bureau of Geological Survey held a celebration of 100 years of the Fourth Survey at its Middletown offices on December 6. Articles on each of the four Geological Surveys created by Pennsylvania's legsilature, starting with the first in 1836, can be found in the February 1987 issue of Pennsylvania Geology (vol.18, no.1). A new article on 100 years of the Fourth Survey is in the Fall 2019 issue (vol. 49, no. 3). Both are available through a link on the NMS web site.

During 2019, it was noted in *Pennsylvania Geology* that the official name within the state hierarchy is now Bureau of Geological Survey. This rerplaces the former name, Bureau of Topographic and Geologic Survey.

Thanks go to Dr. Andrew Sicree for providing the photographs.

Dr. Gale C. Blackmer (left, with Kristen Hand at right), the Director of the Bureau of Geological Survey, spoke about the history of the survey at a lunchtime talk.

Drs. Charles Miller and Duff Gold of Nittany Mineralogical Society, at left, at the celebration.

Bob Smith and John Barnes of the Survey at the scanning electron microscope.

Bob Smith and Joe Dague at the SEM

January is Anthracite Mining Heritage Month

A regional observance of Anthracite Mining Heritage Month will take place during January. Featured are programs to be held in Wilkes-Barre, Scranton, Pittston, Plymouth, Nanticoke, Bethlehem, and Port Griffith, Pennsylvania. The annual event focuses on the history and culture of the anthracite region of Northeastern Pennsylvania.

- from <https://www.mininghistoryassociation.org/ >; see that site or http://paenvironmentdaily.blogspot.com/2019/12/ (posting from Dec. 31 2019) for links and a schedule of events.

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.

Mar. 7-8, 2020: Earth Science and Mineral Show, by Delaware Mineralogical Society. Doubletree by Hilton, 4727 Concord Pike (Route 202), Wilmington DE 19803 http://www.delminsociety.net/marchshow/marchshow.htm

Mar. 27-30, 2020: EFMLS Convention and Catawba Valley Gem & Mineral Club Show, Hickory, NC. https://efmls.org/annual-convention

Mar. 28-29, 2020: 51stAnnualGem & Mineral Show, by Che-Hanna Rock and Mineral Club. Wysox Volunteer Fire Company Social Hall, 111 Lake Rd., Wysox PA 18854 http://www.chehannarocks.com/show.html

Mar. 28-29, 2020: Philadelphia Mineral Treasures and Fossil Fair, by Phila. Mineral. Soc. & Delaware Valley Paleontological Soc. See p. 3

Apr. 18-19, 2020: Gem, Mineral & Fossil Show, by Monongahela Rockhounds. Skyview Hall, West Mifflin Volunteer Fire Co. #4, 660 Noble Dr., West Mifflin PA 15122. Sat 10-6, Sun. 10-4. http://www.monongahelarockhounds.org/events.php

Apr. 23-26, 2020: Rochester Mineralogical Symposium http://www.rasny.org/MinSymp/

Apr. 25-26, 2020: Gem & Mineral Show, by New Jersey Earth Science Association. Littel Community Center, 12 Munsonhurst Rd., Franklin NJ 07416. Sat 9-5:30, Sun. 10-5. http://njesa.org/index.html

NMS BOARD MEETING NOTICE

NMS members are invited to attend Board of Directors meetings, which are generally held at 7:00 p.m. about two weeks prior to the general monthly meeting, although we do not meet every month. **The next date has not been set.** 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.

Geo-Sudoku Solution

R	**S**	I	U	E	N	M	B	A
M	**U**	A	S	R	B	I	E	N
E	**B**	N	M	A	I	S	R	U
N	**M**	E	B	S	U	R	A	I
B	**A**	U	R	I	E	N	S	M
I	**R**	S	N	M	A	E	U	B
S	**I**	B	A	N	R	U	M	E
U	**N**	M	E	B	S	A	I	R
A	**E**	R	I	U	M	B	N	S

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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e-mail: gold@ems.psu.edu
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:

David Glick E-mail: xidg@verizon.net
209 Spring Lea Dr. phone: (814) 237-1094 (h)
State College, PA 16801-7226

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.

Visit us at www.nittanymineral.org