Nittany Mineralogical Society Bulletin

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

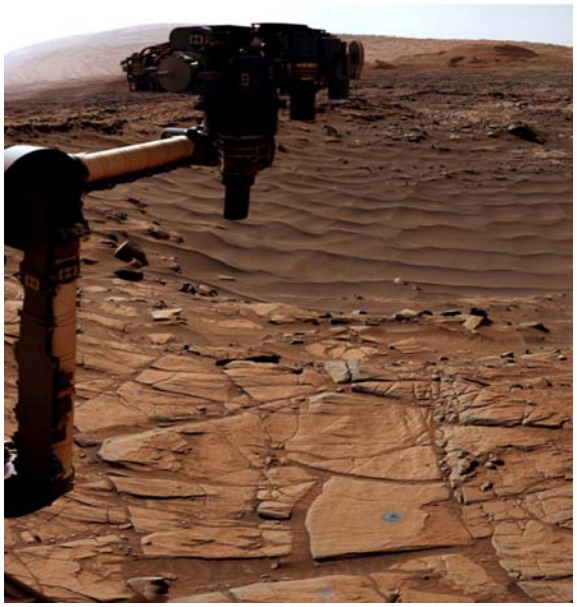
Editor (see back page):
David C. Glick

January, 2023 **Visit our web site: www.nittanymineral.org**

January 18th meeting,
IN PERSON at BOAL HALL or via ZOOM:

Organic Molecules on Mars - Recent Progress on an Old Problem

by Christopher House
Professor of Geosciences
Penn State



Our January meeting will be held Wednesday the 18th 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 hope you will join us in person, but if you can't, the ***Zoom link*** *will be e-mailed to all paid members who receive our e-mails. Others are welcome to request it by e-mailing <xidg@verizon.net>. We plan to record the presentation for later posting to our web site. -Editor*

For the past 65 years, there have been searches for organic material starting with telescopic searches for chlorophyll and including the 1976 Viking Landers. Presently, the two active rovers on Mars have found multiple examples of indigenous organic material. Also, there are several examples of carbon isotopic measurements of carbon on Mars. Obtaining carbon isotopic data from sedimentary organic matter from other worlds, including Mars, has long been a goal of astrobiology. Isotopic ratios from Mars can potentially elucidate the origin of indigenous organics and reveal aspects of the cycling of carbon on past Mars. Extended exploration by the MSL Curiosity rover of the fluvio-lacustrine sedimentary system at Gale crater includes samples collected from a variety of locations within a known stratigraphic context. Carbon isotopic values have been obtained by the Curiosity Rover for CO_2 in the atmosphere, CO_2 released during pyrolysis of powders, CO_2 released during combustion of powders, and methane released during pyrolysis. The results suggest a carbon cycle unlike that of the Earth. The results from the combustion experiment are the first quantification of bulk organic carbon in Mars surface sedimentary rocks. About 1,000 µg C/g was released at low temperatures representing a minimum of 431 µg C/g indigenous organic and inorganic Martian carbon components (Stern et al., 2022). Carbon isotopic values of the methane released during pyrolysis of 24 powder samples at Gale crater, Mars demonstrate a wide range as measured by the tunable laser spectrometer (House et al., 2022). There are multiple plausible explanations for the results. Three possible explanations are the photolysis of biological methane released from the subsurface, photoreduction of atmospheric CO_2 (e.g., 5), and deposition of cosmic dust during passage through a galactic molecular cloud. All three of these scenarios are unconventional, unlike processes common on Earth.

Minerals Junior Education Day March 25

Minerals Junior Education Day is set to return on Saturday, March 25, 2023! We'll need about eight stations where students in grades 1-8 learn about some aspect of minerals, earth sciences or lapidary, and get specimens to take home. Please plan for what station you might present, or **volunteer to help** at an existing station. Donations of minerals, books, etc., for the sales table are also welcomed - make arrangements in advance, so that we can get them organized and priced. Contact Frank Kowalczyk: frank.j.kowalczyk@gmail.com or 814-404-9854.

ATTENDING THE JANUARY 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!

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 AFMS News is linked from our web site, <http://www.nittanymineral.org>, found at <http://www.amfed.org/afms_news.htm>. The Eastern Federation now has the January Newsletter on its web site (use Chrome if Firefox does not work), and we hope that they will add back issues soon. EFMLS back issues have been removed from the NMS web site to avoid publicizing private contact information; if you want to see a recent back issue, contact David Glick.

The AFMS December-January Newsletter's contents were noted here last month.

The Eastern Federation's January Newsletter is available on the EFMLS site. It includes a message from president Bill Stephens, reprinted in part below. Bill also introduces the EFMLS Social Media Director; see that article on page 10.

Eastern Federation President's Message

Bill Stephens writes, in part
(see the entire message and Newsletter on the web)

I hope you saw my write-up last month on the new EFMLS member organization: **Friends of Mineralogy PA Chapter (FM-PA)**, of which I am also President, and a reprint of my article on the Mount Pleasant Mills wavellite locality currently on the website. The FM-PA Symposium was a huge success and I issued 8 certificates of attendance for 5 CEUs to Professional Geologists including myself (☺). The FM-PA has a new Facebook page which you may find by searching for "Friends of Mineralogy Pennsylvania".

The EFMLS has a new Facebook page "EFMLS Mineral Shows and Events". Both pages (FM-PA & EFMLS) are administered by our new Social Media Director, Andrew Eppig, who is also President of the Central Pennsylvania Rock and Mineral Club (CPRMC), and me. If you would like to make a post, submit one for review. Field trips and show pics are of particular interest to our growing fan base. Given the importance of social media in our world today, I intend to have the executive board make this a permanent standing committee. If you are interested in being a committee member on any committee, please email me directly.

TUCSON is coming up fast! I would like to personally invite all of you and your members to join **Friends of Mineralogy National's Annual Symposium at the Tucson Gem and Mineral Show**, Saturday February 11, 2023. This symposium is free in person and via zoom. We have 8 speakers including myself speaking on topics related to quartz. I'm giving a talk on spectacular quartz crystals found at new mines in Herkimer District of New York. Want to learn about Mexican (Laguna) agate, how iris and other agates form, other cool quartz stuff, join us for presentations from the world's experts (see how I included myself in that group ☺). Just visit the website for more information. If you are a Professional Geologist, we can issue you a certificate for at least 4CEUs, just let us know when you register. FM-National and its chapters are pre-approved continuing education providers for most states that have CE requirements for PGs. FM-PA has been doing it for years. FM-PA and NJFM are both EFMLS member organizations.

I am calling for volunteers to chair any of the following standing committees that have no current chair: All American Award, audit/review, Eastern Foundation Fund, Historian, Legal Advisory, Operating Procedures, Website contest, Ways & Means. All committees except the nominating committee can use volunteers.

We have a lot planned for the coming year, not the least of which is expanding the functionality and content of the website, working out any bugs and training member organizations to utilize the website and keep their profiles and show/event content current. Look for more articles on the website pertaining to field trips and collecting locations, potential zoom presentations open to all members, announcements for Wild Acres and the like going forward. We are in the business of getting our members more engaged and better informed as to the services and benefits available to them through the EFMLS. Feel free to reach out to me any time.

Sincerely,

Bill Stephens, PG.

EFMLS President, Region IV RVP, Webmaster, & FM-PA President

Fun at NMS December Dinner

photos by David Glick

Our group had an enjoyable Holiday Dinner on December 21st at Quaker Steak & Lube Restaurant. NMS provided appetizers and table prizes; Bob Altamura, Jim Van Fleet and NMS had items for sale.

Geo-Sudoku

by David Glick

This puzzle contains the letters ADEIMOPST. One row or column spells what Dirtman places on a social network (2 words). 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.

	D	E	M	S		A		O
I	O			E	D	S		
		S			T	D		
	T	I					A	
		D						T
O					S	E		
	S		E					A
A				P				D
	P			T		I	O	S

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 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.

Using Watersheds in Earth Science Student Activities

Dr. Charles E. Miller, Jr.

The March 2020 issue of the Nittany Mineralogical Society Bulletin published the author's article "The Slab Cabin Watershed Study with Applications to Instructional Courses." One figure in the article showed the Slab Cabin Watershed. That article did not address how watershed boundaries are drawn. The following discusses delineating watersheds and using them in student activities, as in earth science or geology, or Junior Rockhounds. Membership in our Society includes/has included teachers/instructors in these courses. The following ideas may interest those involved in teaching, as well as our general membership. These ideas are from a recent submission to The Science Teacher. Although written for high school (grades 9-12) earth science, it has applications in college introductory geology. Several examples are adapted from Miller (2021).

Introduction

Topographic maps are widely used because they depict surface relief. They are ideally suited in delineating watersheds. A watershed, or drainage basin, is an area hydrogeologically isolated from adjacent areas. The largest in our country is the Mississippi River Watershed. Smaller examples include a watershed to a trout stream, or to a reservoir serving as a public-water source. The watershed concept is important in water-resource management. Conservation districts and environmental groups strive to balance water resources with land development. Watershed studies assist in this by providing assessments and developing databases for future comparisons.

This article describes delineating watersheds and using them in earth-science and geology classes. There is a need for discussing these uses. Regarding topographic maps, textbooks are strong on fundamentals but weak on applications. The only application usually mentioned is drawing topographic cross sections. Alternatively, the Internet offers tutorials on delineating watersheds but little or no examples of how those watersheds are used, especially as student activities.

If fundamentals of topographic maps are adequately taught, delineating watersheds, and using them in student activities, is suitable for the mentioned courses. These activities are amenable to remote and in-class learning, can be done in a paperless environment, and incur little or no cost if students access computers and the Internet. The watershed is an excellent cross-cutting concept, incorporating chemistry, biology, and geology.

Watersheds and Drainage Divides

A first step in planning a watershed study is delineating the watershed. The boundary is a line of highest elevation (drainage divide) diverting water into, or away, from the watershed. A drainage divide is analogous to an A-frame roof with a high ridge at the center. When it rains, water either flows to the right or to the left. One of the best-known drainage divides in our country are the Rocky Mountains, also called the Continental Divide. It diverts water on the west to the Pacific Ocean and on the east to the Gulf of Mexico. Except for those that are perfectly flat, all areas contain drainage divides at various scales.

Methodology for delineating watershed boundaries

Several examples show the methodology for delineating watersheds. These assume students were taught fundamentals of topographic maps. Delineating watershed boundaries involves four concepts:

1. A drainage divide separates adjacent streams.
2. Contour lines bend upstream when crossing a stream.
3. Closed contours, usually elongated, represent hills.
4. Surface water flows perpendicular to contour lines.

- Example 1

Figure 1a is a topographic map showing adjacent streams, A and B. Blue arrows show surface-water flow toward streams (Concept 4), with one set to the right and one set to the left. Opposing flow directions indicate a drainage divide between the two streams (Concept 1). Figure 1b shows the drainage divide (black dashed line) added to Figure 1a (Concepts 1-4).

- Example 2

Figure 2a is a topographic map showing an impoundment (blue polygon) on Big Run. Red arrows are stream-flow directions (Concept 2); blue arrows show other surface flow perpendicular to contour lines (Concept 4). X's are highest elevations, marking positions of the watershed boundary (drainage divide). Using Concepts 1-4, the highest elevations (X's) are connected to show the watershed boundary (black dashed line, Figure 2b). Red and blue arrows assist in identifying a drainage divide and are optional.

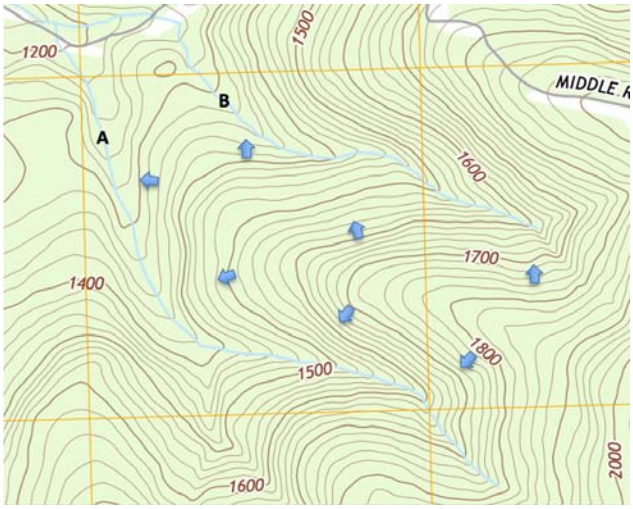


Figure 1a: Topographic map showing two adjacent streams, A and B. Blue arrows show surface-water flow directions toward the streams.

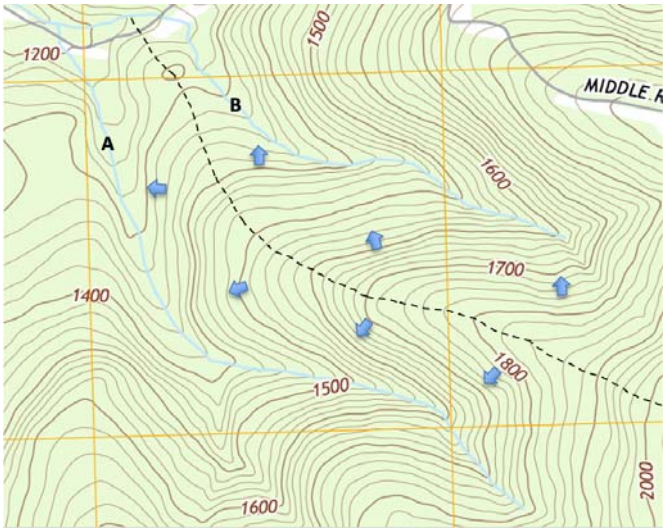


Figure 1b: Drainage divide (black dashed line) added to Figure 1a.

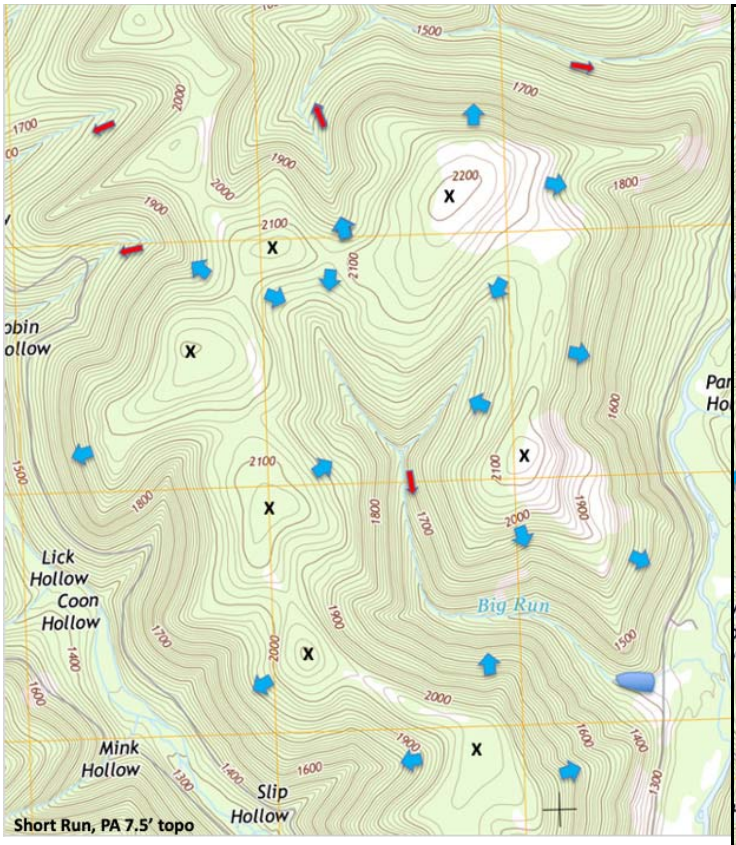


Figure 2a. Topographic map showing impoundment (blue polygon at lower right) on Big Run. Red arrows indicate streamflow directions. Blue arrows show other surface flow, perpendicular to contour lines. **X**s are highest elevations of the drainage divide forming the watershed boundary.

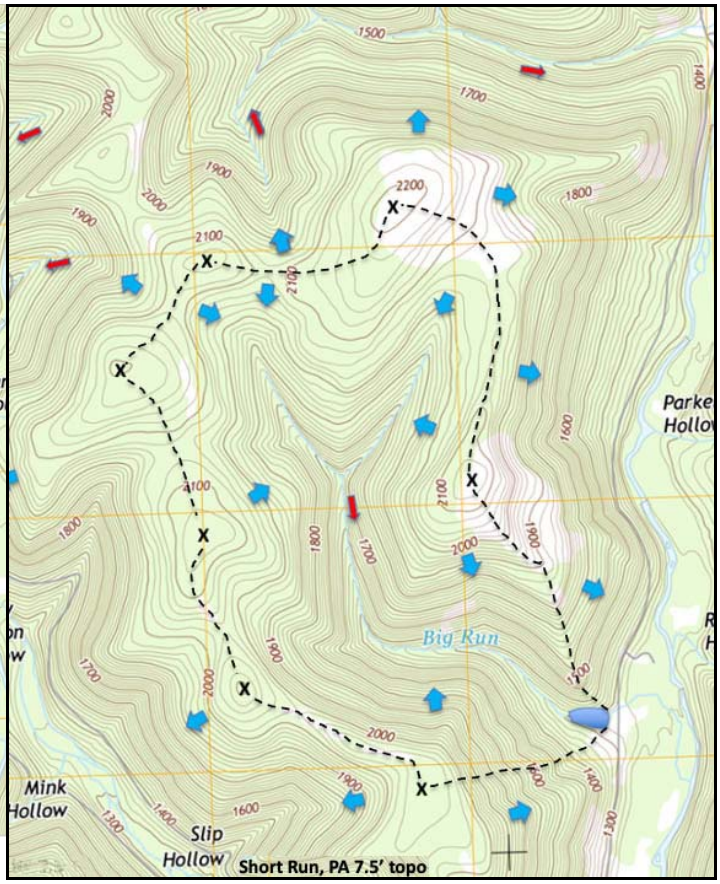


Figure 2b: Watershed boundary added to Figure 2a.

Applications

Figure 3a is a topographic map showing an intake (black dot) on Mill Branch just before its confluence with Tangascootack Creek. The 14 polygons (red dashed lines) are land uses such as mining, timber cutting, construction, etc. Each land use may affect water quality at the intake. To assess potential impact from each polygon, the watershed boundary must be drawn. For this exercise, only

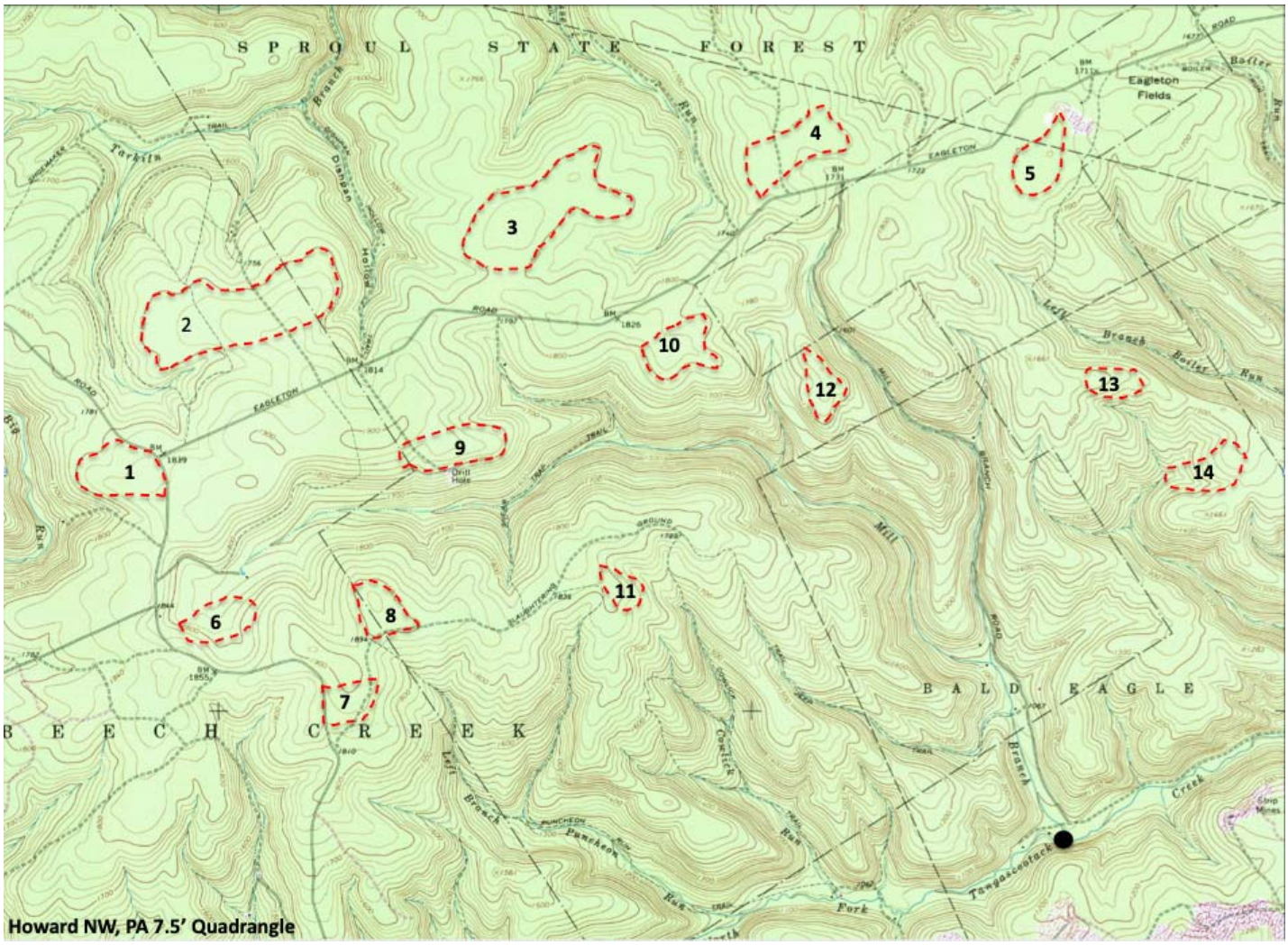


Figure 3a: Topographic map showing an intake (black dot) on Mill Branch, and polygons (red dashed lines) representing land uses.

surface water is considered. If any part of a polygon is in the watershed, the land use will potentially affect water quality at the intake. If a polygon is outside the watershed, no surface water from it will flow to the intake and, therefore, there will be no effect from land use in it. The following 14 questions relate to **Figure 3a**. Answers are in Table 1. The watershed boundary is shown in Figure 3b.

1. If coal is mined at Site 1, will it affect the Mill Branch intake?
2. If coal is mined at Site 2, will it affect the Mill Branch intake?
3. Will proposed timber cutting at Site 3 affect the Mill Branch intake?
4. Will a large construction project at Site 4 potentially affect the Mill Branch intake?
5. Will surface water from a garbage dump at Site 5 flow to the Mill Branch intake?
6. If coal is mined at Site 6, will it affect the Mill Branch intake?
7. Will construction of a large home at Site 7 affect the Mill Branch intake?
8. Vandals broke a lock on an above-ground tank, releasing 2000 gallons of gasoline. Assuming surface flow, only, will gasoline flow to the Mill Branch intake?
9. Will surface water from a garbage dump at Site 9 flow to the Mill Branch intake?
10. If this site is mined, will runoff flow to the Mill Branch intake?
11. Site 11 is a shale borrow pit. Will surface flow from it go to the Mill Branch intake?
12. Will surface drainage from Site 12 flow to the Mill Branch intake?
13. Will surface drainage from Site 13 flow to the Mill Branch intake?
14. Will surface drainage from Site 14 flow to the Mill Branch intake?

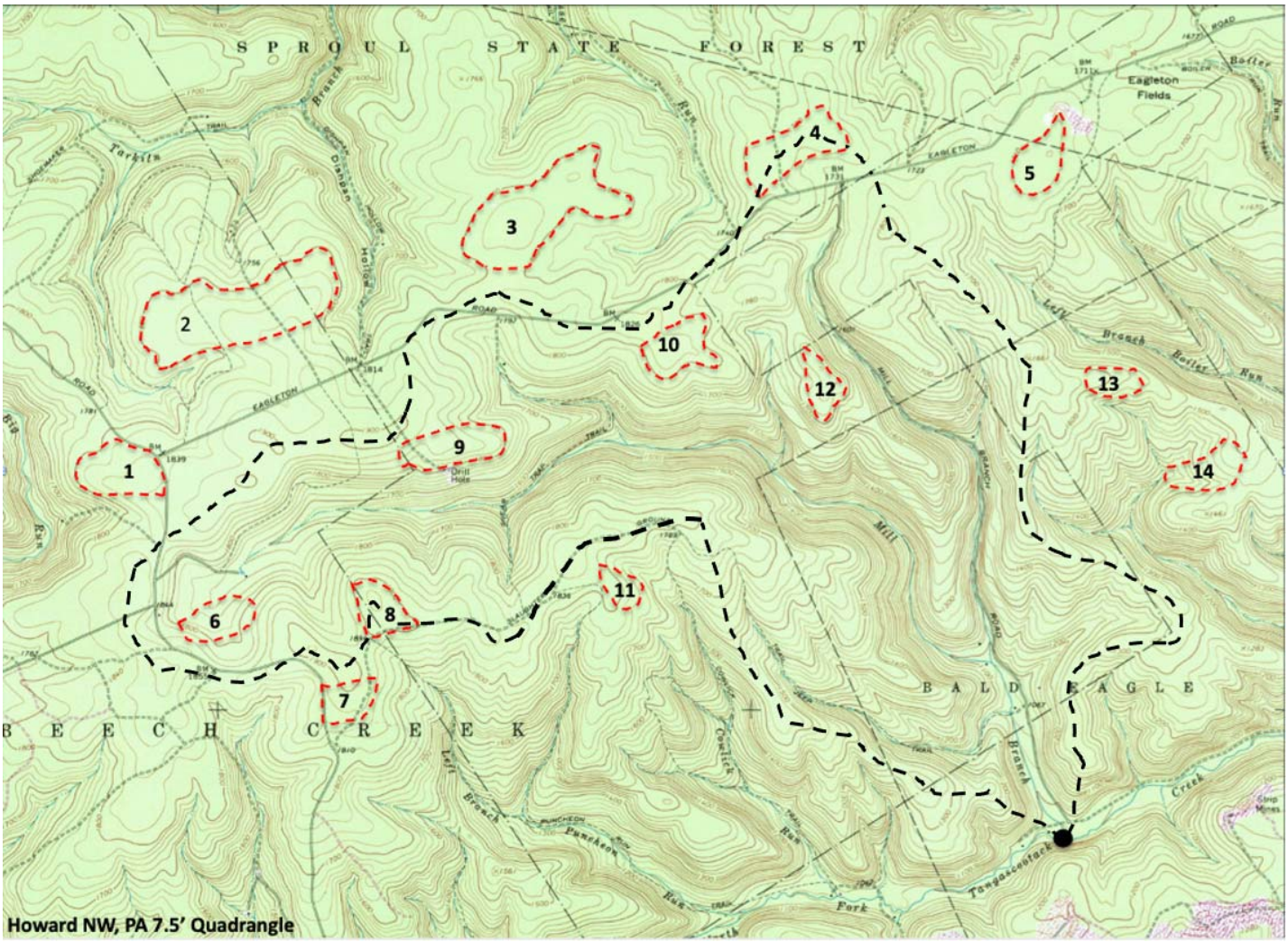


Figure 3b: Watershed boundary added to Figure 3a.

Table 1: Answers to questions 1-14 (see text).		
Polygon	In or outside the watershed?	Will it affect the intake?
1	Outside	No
2	Outside	No
3	Outside	No
4	Partially in	Yes
5	Outside	No
6	Inside	Yes
7	Outside	No
8	Inside	Yes
9	Inside	Yes
10	Inside	Yes
11	Outside	No
12	Inside	Yes
13	Outside	No
14	Outside	No

Additional applications

Additional watershed applications suitable for discussions and/or student activities are given. These include water sampling and water data. The former may be impractical for a class. An alternative is having samples brought to the classroom for testing. In one of the author's earth-science classes, a student collected samples so they could be analyzed in class the next day. Water-testing kits and their availability for this purpose are described in the "General Information" section. Conservation groups and local agencies offer another alternative to field sampling by compiling water data for watersheds. These are public data, and available for students to graph and interpret.

- **Scenario 1.**

Water sampling shows elevated nitrate (NO3) concentrations in a stream. Nitrate levels indicate sewage, manure, or nitrogen-rich artificial fertilizers. In this scenario, there are no farms upslope of the stream. It is suspected raw sewage is illegally dumped in the woods of the stream's headwaters. A watershed approach is used to determine source and extent of dumping.

To do this, the watershed is delineated using a topographic map. If there has been illegal dumping, nitrate concentrations increase as distance to the source(s) decreases.

This scenario is presented for discussion, introducing geochemical sleuthing - a technique geochemists use for mineral prospecting. In this case, sleuthing involves potential sewage dumping and not a mineral source.

- **Scenario 2.**

Slab Cabin Run flows from a mountain underlain with shale and sandstone to a limestone valley (Figure 4). Water sampling reflects how lithology (rock types) and water hardness are related. Shale and sandstone yield "soft

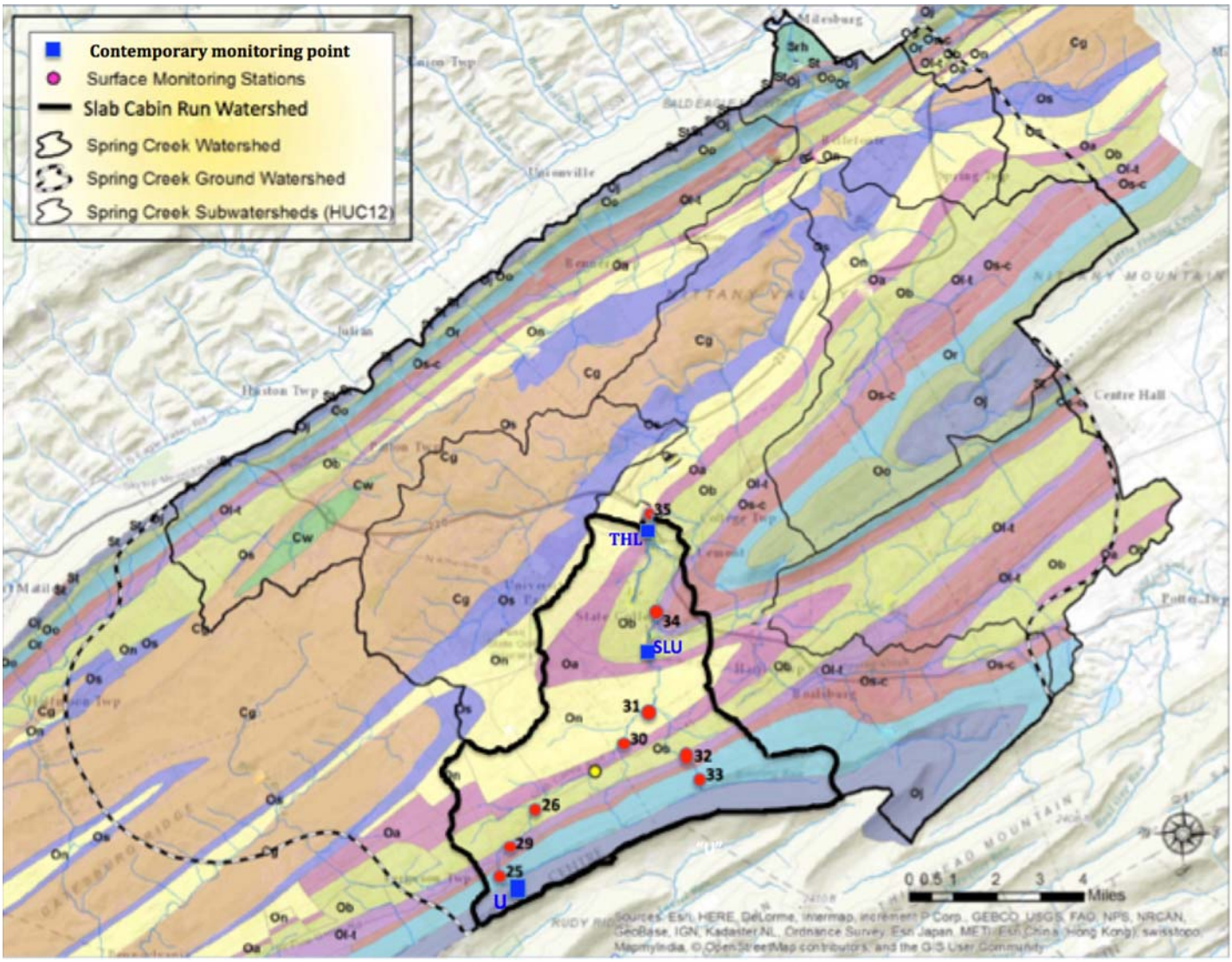


Figure 4: Slab Cabin Run Watershed (black solid line) showing sampling stations. (Modified from Fulton, et al, 2005).

water" (low in dissolved minerals). Because of higher solubility, limestone yields "hard water" (high in dissolved minerals). Hardness is the concentration of dissolved minerals in water. Table 2 lists hardness concentrations for this stream. Station numbers are on Figure 4. At Station 25, stream flow is over shale and sandstone. Flow at other sampling stations (Table 2) is over limestone. Hardness concentrations significantly increase where flow is over limestone.

This activity combines geology and chemistry, showing students different sciences working together. It is amenable to class discussion, analyzing water samples, as well as graphing and interpreting data.

Table 2. Hardness Analyses for Slab Cabin Run (Station numbers are shown on Figure 4)

Station Number	Hardness (ppm)[1]
25	50
29	125
26	130
30	180
31	200
34	187
35	275

[1] ppm, parts per million

- **Scenario 3.**

Electroshocking (Figure 5) and other aquatic surveys are biologic characterizations of stream quality. The former inventories fish as to number, species, size, and weight. The latter describes benthic aquatic larvae on which fish feed. These surveys are done under the auspices of a state fish commission (Figure 5). Aquatic surveys are routine for streams in watersheds with proposed mining. Water sampling is usually done in conjunction with the surveys. Combining aquatic surveys and stream sampling provide biological and chemical baselines for assessing mining impacts.

A state environmental agency or fish commission could provide pre- and post-mining aquatic surveys for comparisons, as a student activity. Because a hydrogeologist reviews the mining permit, this scenario shows how different disciplines - biology, chemistry, and geology - complement each other. Electroshocking lends itself to a stimulating field trip. If a field trip is impractical, the fish commission would likely have a video or Power Point presentation showing the procedure.

General information

The standard topographic map for delineating watersheds is the 7.5-minute quadrangle from the U.S. Geological Survey. These are free on the Internet through Pickatrail.com. Once a map is selected, the area of interest is cropped (crop tool in Adobe Photoshop Elements, for example) and inserted into Power Point. In Power Point, the "Freeform" drawing tool (under "Shapes") is used to draw the watershed boundary.

If analyzing water samples is desired, a variety of water test kits are available on the Internet. Costs are contingent upon number of chemical parameters to be analyzed, number of tests to be run, and degree of accuracy desired. No brand is endorsed. In lieu of purchasing water test kits, a state environmental agency might cooperate to take and analyze samples for a school project. Although cheaper to

Figure 5: The PA Fish and Boat Commission personnel electroshocking a stream. (Image by the author)

the school, this option deprives students of performing the analyses.

Student achievement, performance, and connections

The watershed concept introduces students to practical applications. Delineating, assessing land-use effects, and interpreting water data of watersheds are tasks geologists perform. For students, these are significant achievements. Student activities/performances can be evaluated in many ways, depending on the objective. The 14-questions-approach in the "Applications" section is one possibility.

With practice, each watershed in this article can be drawn in about 20-25 minutes. The student activities are amenable to discussions, as well as individual or group work. For motivated students, a similar watershed activity could be optional for extra credit. The watershed is an excellent cross-cutting concept, incorporating chemistry, biology, and geology.

One offshoot of these activities is for a class to adopt a small watershed. Exercises described in this article can be integrated into the project. Results could be published in the school and local newspapers.

Conclusion

Topographic maps are an integral part of earth science. Regarding these maps, textbooks and the Internet are long on fundamentals but short on applications. One application suitable to high-school earth science is the watershed concept. This article describes delineating watersheds and using them to assess effects from land uses. These activities can be expanded to include water sampling and analyses. Delineating, assessing land-use effects, and interpreting water data of watersheds are tasks geologists perform. The referenced student activities are amenable to remote and in-class learning, can be done in a paperless environment, and incur little or no cost if students have access to computers and the Internet. The watershed is an excellent cross-cutting concept, incorporating chemistry, biology, and geology.

References

Fulton, J. W., E. H. Koerkle, S. S. McAuley, S. A. Hoffman, and L. F. Zarr, 2005. Hydrogeologic setting and conceptual hydrologic model of the Spring Creek basin, Centre County, Pennsylvania, June 2005. U.S. Geological Survey, Scientific Investigations Report 2005-5091, Reston, Virginia.

Miller, Jr., C.E., 2021, The Slab Cabin Watershed Study in Pennsylvania With Applications to Instructional Courses, Pennsylvania Geology, v. 51, No. 1, pp. 3-21.

Profile for Our New Eastern Federation Social Media Director:

Andrew "Dirtman" Eppig

by Bill Stephens, EFMLS President

Few of our members are apt to be aware we have a new "Social Media Director" (SMD) and his name is Andrew "Dirtman" Eppig aka "Andrew Rockhound". Andrew is a very active, talented, and influential individual in the rockhounding world. He is currently the newly elected President of the Central Pennsylvania Rock & Mineral Club, and Vice President of the Keystone Treasure Hunters. Andrew is the recipient of the EFMLS 2022 "Each One Teach One" award, which recognizes leadership in education within the EFMLS. He is also 2022 CPRMC & AFMS "Rockhound of the Year". Andrew teaches gold panning to hundreds of kids every year and has a remarkable outreach effort in our rockhounding community that includes his famous "Dirtman Report".

Andrew has been producing the geological series "Mining with Cody" and more recently the "Dirtman Report" for a decade. The Dirtman Report typically airs on Jeri Jones Zoom Rock Room first and are available on YouTube for your viewing pleasure. You can also find them on the FM-PA Facebook Page and the **EFMLS Mineral Shows & Events**. Andrew uses his skills to produce these 5 to10 minute videos pushed out on social media to bring rockhounding related geology and mining history to the lay enthusiast and it reaches a much wider audience outside the typical club paradigm, potentially generating new club members. Andrew also engages with mine owners, geologists and influencers while filming his "Viral Live Videos", which is how we first met at Mohawk Valley Mineral Mining in Sprakers, NY, a Herkimer diamond collecting site. Andrew and I have become fast friends since our first meeting this past summer. He is a remarkably energetic, talented, enthusiastic, and productive member of our team.

Like many of us with education and work-related talents, Andrew brings his work experience and expertise as a world class post production audio engineer to our ranks. Andrew has worked with some of the biggest names in Hollywood including Michael Bay and Stephen Spielberg, and in industry, such as Mercedes, BMW, and the mainstream media including Fox and NBC.

Andrew became an avid rockhound during his formative years, collecting rocks along the granite shores of Maine and the Serpentine Barrens of Baltimore, MD. More recently he has been "ground scoring" Herkimer diamonds at MVMM, gold mining from Maine to Virginia, and collecting minerals & fossils with many of us at Mount Pleasant Mills and other locations around PA and MD. We can always count on Andrew for live videos and thoughtful social media posts at all our various club field trips.

One of my first acts as President was to create this position and appoint Andrew as our first SMD. Andrew is the right person for this position at the right time. I intend to propose to the executive board, considering the importance of technology in our everyday communications, that this should be a board position with a standing committee. Visit our official Facebook Page "**EFMLS Mineral Shows & Events**" and the FM-PA Facebook page to see our recent social media efforts with Andrew at the helm. Welcome, Andrew, and thank you for your enthusiastic and effective efforts as our new social media Director.

Leidy Gets a Visit from Roy G. Biv

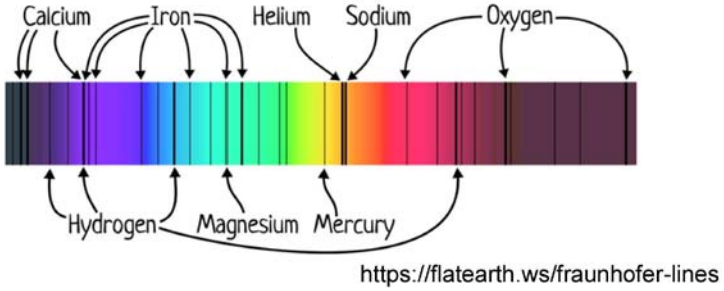
Eric Brosius, Editor, *Rock Chatter*, newsletter of the Rock & Mineral Club of Lower Bucks County, PA , Sept. 2022
Via the October 2022 A.F.M.S. Newsletter

The June 16th, 2022 meeting of the Leidy Microscopical Society was a challenge for the membership when Treasurer, Don McAlarnen proposed homework for our group at the May meeting, when he suggested we bring in micromounts rep-resentative of the solar spectrum. We all took to heart our Society's motto, "Learning Never Ends" and hit the books to find out what elements are found in the solar spectrum and the minerals those elements can produce here on earth.

Don McAlarnen explaining the solar spectrum and Fraunhofer lines. A partial grouping of samples of minerals that contain elements from the solar spectrum.
Images courtesy of E. Brosius.

The solar spectrum is made up of electromagnetic radiation emitted by the sun in the form of energy over a wide range of wavelengths that is close to that of a black body with a temperature of about 5,800 Kelvin. The longer wavelengths have less energy and are representative of the infrared portion of the spectrum and the shorter wavelengths have more energy and are representative of the visible light and ultraviolet light portion of the spectrum. In 1814, Joseph von Fraunhofer studied and measured dark lines in the solar spectrum. Much later it was recognized that the lines coincide with the emis-sion lines in the spectra of heated elements. This allows us to determine the composition of the sun. From the Fraunhofer lines the most prominent elements of the solar spectrum include hydrogen, helium, sodium, magnesium, calcium and iron. Less prominent but still abundant are oxygen, silicon, chromium and nickel.

Joseph von Fraunhofer
(1787 – 1826)



Once the ground work had been lain, all those present shared their micromounts that contained those elements. Don McAlarnen had a group of pyrite geodes, apatite, natrolite, datolite, olevenite, tourmaline, magnetite and hematite. Karenne Snow displayed some millerites and garnets. Dick Tillett had a variety of specimens from worldwide localities and your author shared several augites, diopsides, epidotes and enstatites from an assortment of locations.

NMS SCHEDULE

February 15, 2023:A New Stratigraphic Correlation Chart for Pennsylvania, by Hailey Filippelli, PaGS

March 15, 2023: Geode Night! by Jeff Smith

March 25, 2023: Minerals Junior Education Day

UPCOMING EVENTS

Confirm details of events before attending.
https://efmls.org/events/list/
See other show calendar links on our web site.

Feb. 11, 2023: Tucson Mineral Sympos.(Silica Minerals) free via Zoom; See https://www.friendsofmineralogy.org/2023-tucson-mineral-symposium/

March 4-5 2023: 59th Annual Earth Science Gem and Mineral Show, by Delaware Mineralogical Society. Double Tree by Hilton, 4727 Concord Pike (Rt. 202), Wilmington, DE 19803, Saturday 10:00 a.m. – 5:00 p.m., Sunday 11:00 a.m. – 5:00 p.m. See https://www.dmsrocks.org/news-updates-1

March 25-26, 2023: 43rd Annual Franklin County Rock, Gem, Mineral and Jewelry Show, by Franklin County Rock and Mineral Club. Eugene C. Clark Jr. Community Center, 253 South 3rd St., Chambersburg PA 17201. Sat. 10:00-5:00, Sun. 10:00-4:00.

March 25-26, 2023: 53rd Annual Show, by Che-Hanna Rock and Mineral Club. Wysox Vol. Fire Hall, 111 Lake Rd., Wysox, PA. Sat. 9:00-5:00, Sun. 10:00-4:00. See http://www.chehannarocks.com/show.html

March 25-26, 2023: Mineral Treasures and Fossil Fair, by Philadelphia Mineralogical Society and Delaware Valley Paleontological Society, with demonstrations by Leidy Microscopical Society. Lulu Temple, 5140 Butler Pike, Plymouth Meeting, PA., (PA Turnpike, exit 333; or I-476, exit 20) Sat. 10 a.m. - 5 p.m., Sun. 10 a.m. - 4 p.m. See www.phillyrocks.org

May 15-21, 2023: Wildacres 2023 session, North Carolina. See https://efmls.org/wildacres/

July 7-9, 2023: EFMLS Annual Convention in Syracuse, NY hosted by Gem & Mineral Society of Syracuse, NY.

Geo-Sudoku Solution

T	D	E	M	S	I	A	P	O
I	O	A	P	E	D	S	T	M
P	M	S	A	O	T	D	I	E
S	T	I	O	D	E	M	A	P
M	**E**	**D**	**I**	**A**	**P**	**O**	**S**	**T**
O	A	P	T	M	S	E	D	I
D	S	T	E	I	O	P	M	A
A	I	O	S	P	M	T	E	D
E	P	M	D	T	A	I	O	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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Penna. Furnace PA 16865

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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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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