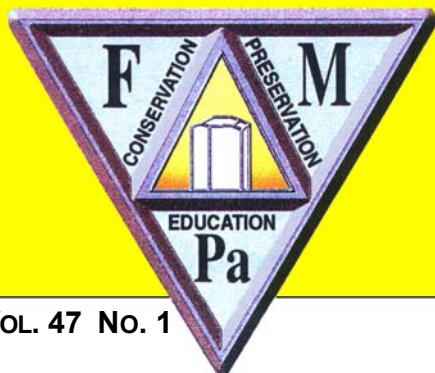




FRIENDS OF MINERALOGY

Pennsylvania Chapter

NEWSLETTER

VOL. 47 No. 1

SPRING 2019

Field Trip Season

Some field trips (by invitation from other clubs, which we greatly appreciate) have already been announced to members via e-mail.

What field trips or types of field trips would encourage you, the Pennsylvania Chapter member, to participate more? Field Trip Chair Tom Pankratz (see p. 6) asks that you let him know about your interests and preferences.

Our Chapter Online

Past issues of our Chapter newsletter are available on our web site, www.raslo.to.com/FM. Also visit the Facebook page, <https://www.facebook.com/pages/Friends-of-Mineralogy-Pennsylvania-Chapter/1174230635931641>

Members and friends are invited to *Like* the page, post, and generally provide a good level of activity.

The *Bulletin of Friends of Mineralogy*, FM's national newsletter, can be found at <http://www.friendsofmineralogy.org/newsletters/>. The first issue of 2019 is expected to be posted there soon.

20 Years ago in MATRIX magazine

The Spring 1999 issue of *MATRIX: A Journal of the History of Minerals* featured two articles on 19th century British mineral dealers Bryce Wright and Bryce Wright, Jr. In his editorial introduction, Jay Lininger wrote of his first visit to England in 1978:

"[during] the obligatory pilgrimage to the British Museum of Natural History... I observed a number of fine Pennsylvania specimens now residing in London. Of particular interest was a large, beautifully crystallized brucite from the Wood Mine located at Texas, Pennsylvania. How, I remember wondering, how could these great pieces have made their way to Great Britain? Only later, when I began my interest in the history of 19th century mineralogy did I learn of the notable English dealer Bryce M. Wright and his special exchange relationship with Pennsylvania collector William W. Jefferis."

Obituaries

We have lost two well-known and enthusiastic mineral dealers in our region. Our sympathies are extended to their families.

Ron Kendig

The obituary noted below reports that Ronald J. Kendig died January 24, 2019, at the age of 71, after a long illness. He was a frequent dealer at mineral shows in our region; he and his wife Emilie had the business Nature's Window for thirty years. "They shared a wonderful marriage of fifty years of adventure, travel, outdoors, and mineral collecting."

"He was a past member of the Berks Mineralogical Society, Pennsylvania Earth Science Association, and the National Spelunking Society. He loved to guide, give tours, and speak to groups at the Reading Museum, Nolde Forest, and Schuylkill Canal Lock #60."

See <https://www.milkinsgilesfuneralhome.com/notices/Ronald-Kendig>

C. Carter Rich, 1935-2018

Widely known mineral dealer Carter Rich died on September 6, 2018, in northern Virginia. He was married to Mary Jean for 60 years, and had been a longtime employee of General Electric Aerospace.

"Upon retiring from General Electric in 1991, he turned his mineral collecting hobby into a retirement business, which he pursued avidly to the benefit of a large coterie of customers. He was known for and specialized in the purchase and resale of mineral specimens from old collections and long closed localities. Although he purchased most specimens for resale, he always felt that he was a collector. As a personal statement, he assembled and retained a definitive collection of minerals from Delaware County, PA. [He had lived in Newtown Square, PA, for 25 years.] He traveled widely to acquire and sell his minerals."

See <https://www.legacy.com/obituaries/name/C.-RICH-obituary?pid=190171645>
[published in the Washington Post Sept. 9, 2018]

Minerals of the Penn/MD Materials Quarry, Fulton Township, Lancaster County, Pennsylvania, Part 1, Brucite, Desautelsite, and Pyroaurite

Ronald A. Sloto, P.G.
West Chester University

INTRODUCTION

The Penn/MD Materials quarry (fig. 1) is located on the Mason-Dixon Line in Fulton Township, near Peach Bottom, Lancaster County, Pennsylvania. The quarry has expanded across the Pennsylvania state line into Maryland. The quarry, owned and operated by the H&K Group, produces aggregate from ultramafic rocks of the Baltimore Mafic Complex, known locally as the State Line Serpentine District. This complex of ultramafic and associated gabbroic rocks is believed to

be a remnant from the roots of an island arc complex formed about 490-510 million years ago above a southeast-dipping subduction zone. This zone incorporated detritus from the margin of the Laurentian continent and nearby microcontinents, as well as ultramafic oceanic material from the floor of the Iapetus Ocean (Smith and Barnes, 1998; Smith and Barnes, 2008).

All analyses were performed at the West Chester University Center for Microanalysis and Imaging, Research and Training. Imaging and chemical analyses were done using an FEI Quanta 400 environmental scanning electron microscope integrated with an Oxford AZtec X-ray energy dispersive spectrometer (SEM/EDS). Samples were unpolished and uncoated.

The minerals in the photographs were collected on Pennsylvania Chapter Friends of Mineralogy field trips to the quarry, except for specimens RS-2811 and RS-2812, which were given to the author by Ed Carvalho many years ago.



Figure 1. The Penn/MD Materials quarry in Fulton Township, Lancaster County, Pennsylvania. Photograph taken by a drone on Pennsylvania Chapter Friends of Mineralogy Symposium field trip, November 5, 2017.

BRUCITE $\text{Mg}(\text{OH})_2$

Brucite forms as a low-temperature vein material in serpentinite. It is found as white, hexagonal crystals (fig. 2) with a pearly luster and as soft, white aggregates of thin platy crystals or foliated masses (fig. 3). It occurs more commonly as pearly, white cleavages on serpentinite. Brucite occurs rarely as colorless prismatic crystals (fig. 4). Brucite is soft (hardness $2\frac{1}{2}$ - 3), and the folia are somewhat flexible.

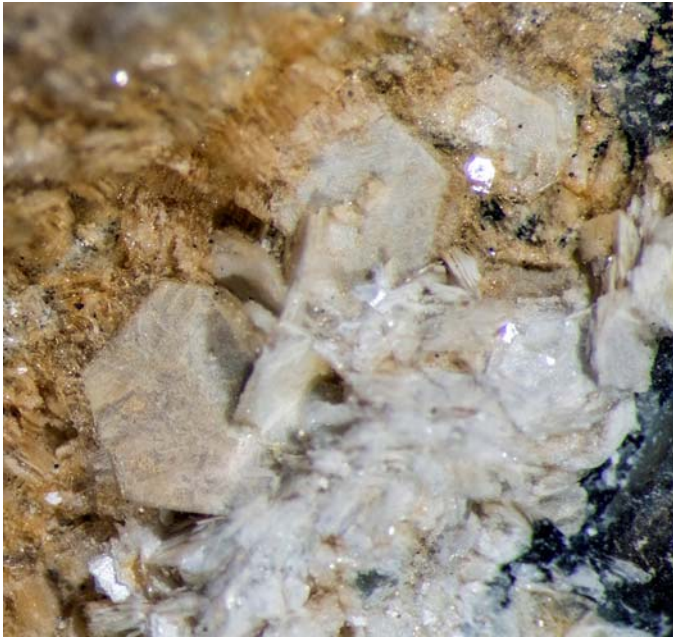


Figure 2. Hexagonal brucite crystals from the Penn/MD Materials quarry. Sloto collection RS-3176.



Figure 3. Aggregates of brucite crystals from the Penn/MD Materials quarry. Field of view is 1.5 cm. Sloto collection RS-4087.

DESAUTELSITE $\text{Mg}_6\text{Mn}_2^{3+}(\text{OH})_{16}[\text{CO}_3] \cdot 4\text{H}_2\text{O}$

Desautelsite was named in 1979 after Paul Desautels, former Curator of Mineralogy at the National Museum of Natural History in the Smithsonian Institution in Washington D.C. Desautelsite is a rare

mineral that is known to occur only in California, Maryland, Pennsylvania, and Japan. The type locality is the adjacent Cedar Hill quarry. Desautelsite is the Mn^{3+} analog of pyroaurite and forms a solid solution series with it.

Desautelsite occurs as minute, bright orange hexagonal crystals and aggregates (fig. 5) associated with brucite. Dunn and others (1979) described a method to distinguish desautelsite from pyroaurite. When exposed to a 1:1 solution of hydrochloric acid, the resulting solution is deep brown for desautelsite and light greenish yellow for pyroaurite. This should be done on a small sample as the acid will destroy the specimen.



Figure 4. Colorless brucite crystals from the Penn/MD Materials quarry. Field of view is 1.2 cm. Identification confirmed by SEM-EDS analysis. Sloto collection RS-3177.



Figure 5. Desautelsite from the Penn/MD Materials quarry, 6 cm. Identification confirmed by SEM-EDS analysis. Sloto collection RS -3176.

PYROAURITE $\text{Mg}_6\text{Fe}^{3+}_2(\text{OH})_{16}[\text{CO}_3]\cdot 4\text{H}_2\text{O}$

Some of the pyroaurite from the Penn/MD Materials quarry contains nickel and is considered to be nickeloan pyroaurite. SEM-EDS analyses indicate that the nickel content ranges from 1.3 to 4.3 weight percent. It is the Fe^{3+} analogue of desautelsite and forms a solid solution series with it.

Pyroaurite commonly originates as a low temperature alteration product of magnetite in serpentinite. Pyroaurite occurs as parallel groups of hexagonal crystals (figs. 6 and 7). Nickeloan pyroaurite occurs as small, pale green, tabular crystals (fig. 8), groups of lamellar green crystals, and rosettes on serpentinite or associated with hydromagnesite (fig. 9).



Figure 6. Scanning electron microscope image of pyroaurite from the Penn/MD Materials quarry. Magnification is approximately 76 X. Identification confirmed by SEM-EDS analysis. Sloto collection RS-4218.



Figure 7. Pyroaurite on serpentinite from the Penn/MD Materials quarry. Field of view is 2 cm. Identification confirmed by SEM-EDS analysis. Sloto collection RS-4218.



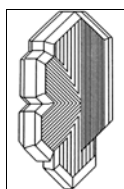
Figure 8. Pyroaurite crystals on hydromagnesite from the Penn/MD Materials quarry. Field of view is 4 mm. Identification of both minerals confirmed by SEM-EDS analysis. Sloto collection RS-2811.



Figure 9. Pyroaurite rosette, 1 mm, and hydromagnesite from the Penn/MD Materials quarry. Identification of both minerals confirmed by SEM-EDS analysis. Sloto collection RS-2812.

REFERENCES

- Dunn, P.J., Peacor, D.R., and Palmer, T.D., 1979, Desautelsite, a new mineral of the pyroaurite group: *American Mineralogist*, v. 64, p. 127-130. Available at www.minsocam.org/ammin/AM64/AM64_127.pdf
- Smith, R.C. II, and Barnes, J.H., 1998, Geology of Nottingham County Park: Pennsylvania Geological Survey, 4th ser., Trail of Geology 16-009.0, 41 p. Available at http://www.docs.dcnr.pa.gov/cs/groups/public/documents/document/dcnr_20032575.pdf
- Smith, R.C. II, and Barnes, J.H., 2008, Geology of the Goat Hill Serpentine Barrens, Baltimore Mafic Complex, Pennsylvania: *Journal of the Pennsylvania Academy of Science*, v. 82, no. 1, p. 19-30. Available at <https://pennsci.org/wp-content/uploads/2015/02/JPAS-82-11.pdf>



From <https://www.rasny.org/minsymp/> - see registration form and updates there

46th Rochester Mineralogical Symposium

April 11-14, 2019

Radisson Hotel Rochester Airport at
175 Jefferson Road Rochester, NY 14623

It is our pleasure to announce the program for the 46th RMS. We are fortunate to have a superb lineup of speakers again this year, featuring friends who have been part of the RMS over the years.

We are continuing with the revised policies that have been in place for a while now: those with accepted abstracts will be given a \$40 reduction in their registration fee. Temporary badges for the exhibits will continue to be free, but non-registrant badges for the dealer floor will cost \$5.

Thursday April 11, 2019

2:00 pm	Registration Opens, Back Lobby
4:00-6:00pm	Dealers and 4th Floor Hospitality Suite Open, with a 5:00pm Welcome New Attendees, Hospitality Suite
6:00-7:45pm	Dinner in the restaurant
8:00-9:15pm	John Rakovan – Crystal Growth, A Primer
9:15pm-	Dealers and Hospitality, 4th Floor

Friday, April 12, 2019

9:00am	Announcements
9:15-10:15am	Peter Richards – Distorted Crystals: What Are They And Why Should We Care?
10:30-11:30am	John Jaszczak – Criminal Minerals: Investigating Minerals That Break the Law
11:30-1:30pm	Lunch and Shopping Break
1:00-5:00pm	Technical Session - Contributed Papers in Specimen Mineralogy
6:30-8:00pm	Dinner in the restaurant
8:15-9:15pm	Terry Huizing – The Variety and Appeal of Calcite
9:15pm-	Dealers and Hospitality, 4th Floor

Saturday, April 13, 2019

9:00-10:00am	What's New in Minerals - Jeff Scovil
10:00-11:00am	What's New in Minerals II – John Betts
12:15-1:30am	Lunch and Shopping Break
1:30-2:30pm	William Severance – Mineral Collection Matters
2:45-3:45pm	Les Presmyk – Arizona Sulfates
5:15-6:30pm	Silent Auction (Please consider making a donation)
7:00-8:30pm	Dinner in the Ballroom
8:30pm	Voice Auction (Please consider making a donation)

Sunday, April 14, 2019

9:00-10:00am	Christopher Stefano - Lucius Lee Hubbard: One of the Copper Country's Greatest Mineral Collectors
10:15-11:15am	Les Presmyk – Collecting Arizona Minerals: 150 Years of Mining, 100 Years of Statehood and My 50 Year Journey
11:30am	End of the Symposium

46th ROCHESTER MINERALOGICAL SYMPOSIUM, April 11-14, 2019
P.O. Box 965, Mechanicsville, VA 23111

Raymond McDougall - Chairman <mcdougallray@gmail.com>
Carl Miller - Registrar (804) 517-6709 <contactrms@hotmail.com>
Bruce Gaber - Exhibits (301) 654-7479 <sun@visionrising.com>
Quintin Wight – Micromounters Playroom <qwight@sympatico.ca>

Check the RMS link under Minerals at <www.rasny.org> for program updates.

From the Editor

David Glick

THANK YOU to everyone who has been providing material for the Newsletter! Everyone else - join the fun! Feel free to contact me at xidg@verizon.net, or 814-237-1094 days and evenings. Mail can be sent to 209 Spring Lea Dr., State College PA 16801. Materials for the June issue should be submitted by **June 18**.

Materials related to Pennsylvania mineralogy, collecting or collectors are invited for this newsletter: articles, long or short; announcements from FM-PA committees; photographs of specimens, field localities, collections, etc.; reports on publications about PA minerals or by PA authors, or actual book reviews; or other items within the mineralogy and mineral collecting areas of interest. Photographs should be of good resolution (at least 1000 pixels across) without much JPEG compression, so that they will look good in print. Please provide captions including photographers' names.

We are producing four issues each year; your material is needed! If you know people who have interesting material, please encourage them to submit it.

DONATIONS WELCOMED

The FM-PA Chapter is a 501(c)(3) nonprofit organization; donations are gratefully accepted and should qualify for deduction from your federal income tax. Donations of any size help to offset the general operating costs of the Society, helping to keep dues low.

UPCOMING EVENTS

See www.mineralevents.com for more

March 30-31, 2019: Philadelphia Mineral Treasures and Fossil Fair, by Philadelphia Mineralogical Society and Delaware Valley Paleontological Society. Lulu Temple, 5140 Butler Pike, Plymouth Meeting PA 19462. Sat. 10-5, Sun. 10-4. <http://www.phillyrocks.org/mineral-show/>

March 30-31, 2019: North Jersey Gem, Mineral & Fossil Show, by North Jersey Mineralogical Society. Midland Park High Sch., 250 Prospect St., Midland Park NJ. Sat. 10-5, Sun. 10-4.

April 5-6, 2019: Atlantic Micromounters Conference, Alexandria, VA. See <http://www.dcmicrominerals.org>

April 11-14, 2019: Rochester Symposium. See page 5.

April 13-14, 2019: Lehigh Valley Gem, Mineral and Jewelry Show 2019, by Saucon Valley Lion's Club. Saucon Valley High School, Hellertown PA 18055. Sat. 10-6, Sun. 10-5.

April 27, 2019: Super Digg, 32 Evans Street, Franklin New Jersey 07416. 9AM to 11PM rain or shine, no age restrictions. Details incl. required liability insurance are listed on the pre-registration (required) page at <http://superdiggg.com/>.

April 27-28, 2019: Gem, Mineral & Fossil Show, by Monongahela Rockhounds. West Mifflin Volunteer Fire Hall Number Four, Skyview Hall, 660 Noble Drive Pittsburgh PA. Saturday 10-6 Sunday 10-4. Free admission.

May 18-19, 2019: World of Gems & Minerals Show, by Berks Mineralogical Society. Leesport Farmers Market Banquet Hall, 312 Gemant's Church Rd., Leesport PA 19533. Sat 10-5, Sun. 10-4. www.berksmineralsociety.com

May 18, 2019: Earth Science Show & Sale, by The Rock & Mineral Club of Lower Bucks County, PA. Christ United Methodist Church, 501 Wistar Rd., Fairless Hills PA. Sat. only, 9-3

June 1, 2019: Spring Mineralfest, by PESA. Macungie Memorial Park, 50 N Poplar St, Macungie PA 18062 Sat. only 8:30 - 3:00.

FM on the WWW

Please explore the FM-PA web site at www.rasloto.com/FM/ and facebook: Friends of Mineralogy Pennsylvania Chapter

National News

The Bulletin of Friends of Mineralogy, links to other chapters, and much more can be found on their web site: www.friendsofmineralogy.org

Friends of Mineralogy Pennsylvania Chapter Directory of Officers

OFFICERS and BOARD OF DIRECTORS members

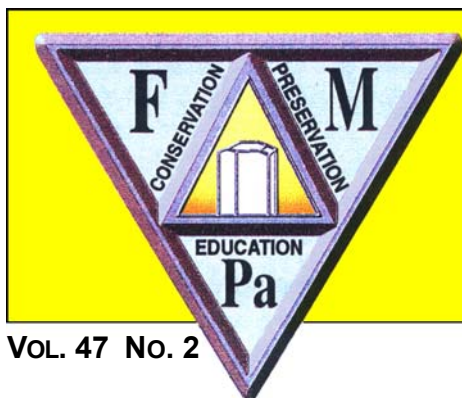
President	Joe Marchesani
Vice President	Dianne Soccio
Treasurer	Ron Sloto
Secretary	David Glick
	Mike Dunton
	William Kochanov
	Bill Stephens

Members can find Board contact information in the Newsletter which they receive directly.

COMMITTEE CHAIRS

Membership Chair	Dianne Soccio
Field Trip Chair	Tom Pankratz
Web Manager	Ron Sloto
Newsletter Editor	David Glick

Friends of Mineralogy Pennsylvania Chapter Web Site: <http://www.rasloto.com/FM>



FRIENDS OF MINERALOGY

Pennsylvania Chapter

NEWSLETTER

VOL. 47 No. 2

SUMMER 2019

Symposium on Pennsylvania Mining and Mineralogy

Mineral Collecting Enthusiasts Meet and Learn

Saturday, November 2, 9:00 - 4:00
Franklin and Marshall College,
Lancaster, PA

Field Trip to Penn/MD Quarry November 3

Please Join Us!

Register in Advance or at the Door

Watch for news at <http://www.rasloto.com/FM/>

The Friends of Mineralogy – Pennsylvania Chapter will hold our 2019 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. Doors open for registration by 8:30 a.m., but anyone wishing to help set up may arrive as early as 6:30. In addition to the talks, there will be select mineral dealers (by invitation only), a silent auction (donations are welcomed!), give-away table, refreshments, and plenty of opportunities for visiting with fellow enthusiasts. We anticipate that professional geologists can receive five (5) Professional Development Hours (PDH) for lecture attendance. Lunch is available at restaurants within walking distance.

The mineral collecting **field trip on Sunday** is planned for H&K Group's Penn/MD Quarry, Peach Bottom, PA, which has now expanded operations into Maryland. The trip is open **only** to symposium registrants (please register by Saturday Nov. 2); non-member field trip attendees must pay the non-member symposium registration fee. Safety equipment will be required; watch for details.

PRESENTATIONS NEEDED!

We are seeking a few additional Symposium speakers to make presentations on minerals, mineral collecting, and mining history, with an emphasis on Pennsylvania. We offer a **\$100 honorarium**. If you are interested in making a presentation, or can suggest a good speaker, please contact President Joe Marchesani (see page 6).

Board Members Sought

The Board of Directors invites any member who would be interested in serving on the Board to contact the President (see page 6). More Board members to provide varied viewpoints and help with Chapter projects would be beneficial. Board terms are for three years, and we typically meet at the Symposium and once during the year.

Shall we have a Chapter Picnic?

Some other groups enjoy holding an annual picnic, sometimes in conjunction with a collecting trip or swap meeting. Members' comments and suggestions for a possible FM-PA Chapter picnic in 2020 are invited. Are you in favor? Would you attend? Do you have any suggestions for a venue? Combination with collecting, a swap, or some other event? And regarding specifics, what time of year (how about June?), and Saturday or Sunday? Please send your comments to Secretary David Glick (see page 6), who will compile the responses.

National Bulletin now coming to Chapter Members

Chapter members should now receive the national Bulletin of Friends of Mineralogy as soon as it is available, via a link in e-mail. This can happen only if the Chapter has your current e-mail address. Please inform Membership Chair Dianne Soccio (see page 6) of any e-mail (or address) changes. Thanks go to Beth Heesacker and Iva Veselanova in the national organization for arranging for this e-mail connection.

The next issue is expected around late September. Issues are posted later on the national web site, <http://www.friendsofmineralogy.org/newsletters/>

Our Chapter Online

Past issues of our Chapter newsletter are available on our web site, www.rasloto.com/FM. Also visit the Facebook page, <https://www.facebook.com/Friends-of-Mineralogy-Pennsylvania-Chapter-1174230635931641>. Members and friends are invited to *Like* the page, post, and generally provide a good level of activity.

Minerals of the Penn/MD Materials Quarry, Fulton Township, Lancaster County, Pennsylvania, Part 2, Clinochlore, Zircon, and Monazite-(Ce)

Ronald A. Sloto, P.G.
West Chester University

INTRODUCTION

The Penn/MD Materials quarry, owned and operated by the H&K Group, produces aggregate from ultramafic rocks of the Baltimore Mafic Complex, known locally as the State Line Serpentinite District. This complex of ultramafic and associated gabbroic rocks is believed to be a remnant from the roots of an island arc complex formed about 490 to 510 million years ago (Smith and Barnes, 1998; Smith and Barnes, 2008).

All analyses were performed at the West Chester University Center for Microanalysis and Imaging, Research and Training (CMIRT). Imaging and chemical analyses were done using an FEI Quanta 400 environmental scanning electron microscope integrated with an Oxford AZtec X-ray energy dispersive spectrometer (SEM-EDS). Samples were unpolished and uncoated. A Bruker D2 Phaser powder X-ray diffractometer (XRD) was used to determine mineral species.

The author thanks the H&K Group and Jay Lang for access to the quarry.

CLINOCHLORE $(\text{Mg,Fe})_6(\text{Si,Al})_4\text{O}_{10}(\text{OH})_8$

Clinochlore is the most common member of the chlorite group; it forms a series with chamosite. Clinochlore is the magnesium-rich end member, and chamosite is the iron-rich end member of the series. Clinochlore is a hydrothermal alteration product of pyroxene in serpentinite. Clinochlore forms thin to thick pseudo-hexagonal crystals. It can be foliated with flexible laminae, fibrous, granular, earthy, or massive.

Clinochlore is a common mineral at the Penn/MD Materials quarry occurring in a variety of forms and colors, mostly as anhedral to subhedral crystals (fig. 1). The color can be silvery gray, light green, dark green, light brown, or dark brown. Clinochlore exhibits a range in composition (table 1). Although some of the clinochlore can be light to dark brown (RS-3206 and RS-4331) and resemble vermiculite (fig. 2), it contains too little aluminum and too much silicon to be considered vermiculite. It also contains too little iron and too much magnesium to be considered chamosite. In addition, the X-ray diffraction patterns fit clinochlore much better than vermiculite or chamosite.

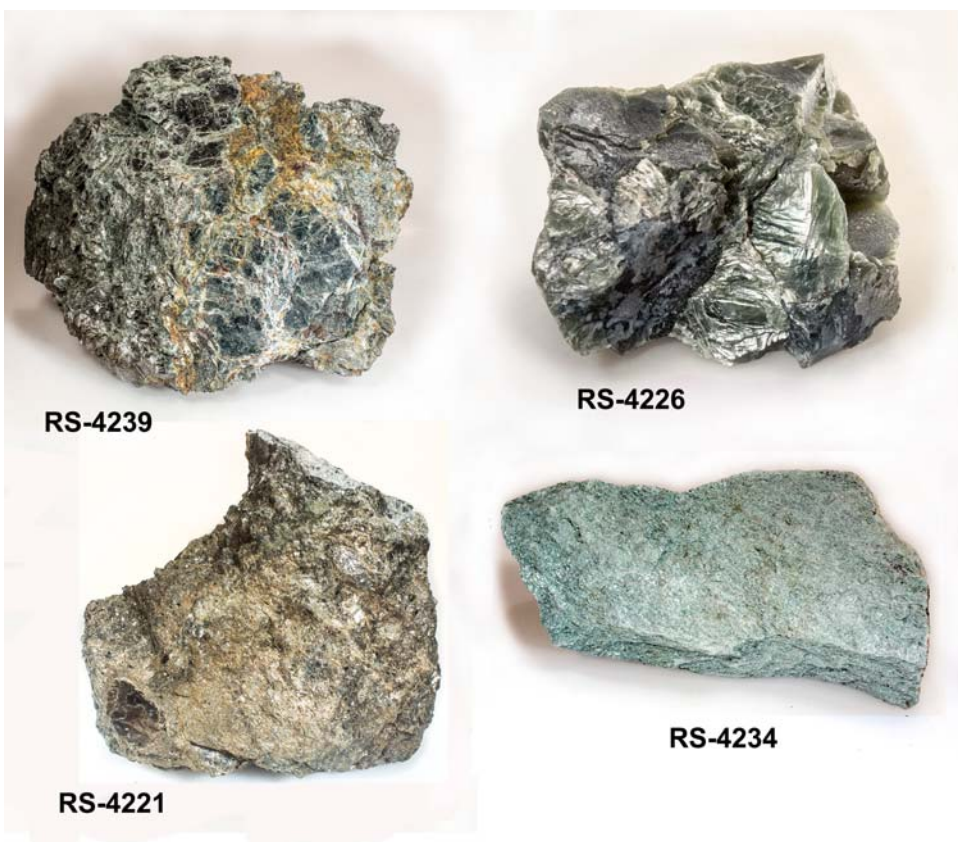


Figure 1. Clinochlore from the Penn/MD Materials quarry.



Figure 2. Clinochlore from the Penn/MD Materials quarry, 7 cm. Sloto collection 3206.

All samples listed in table 1 were verified as clinocllore by XRD. The brown clinocllore contained more iron than the silvery gray and green clinocllore. Some of the clinocllore contained potassium, possibly substituting for magnesium, and some contained titanium. One sample (RS-4234 in fig. 1) was light green, very soft, fine grained, and slippery, resembling fine-grained talc; it contained trace nickel and chromium.

A dike of clinocllore was exposed on the north side of the quarry several years ago. The dike was several feet across and contained dark green (RS-4239 in fig. 1) and soft, dark brown clinocllore (RS-4221 in fig. 1). However, this material was unsuitable for aggregate, and the dike was backfilled and is no longer accessible.

ZIRCON $\text{Zr}(\text{SiO}_4)$

Zircon is a silicate mineral (zirconium silicate); however, hafnium is almost always present in quantities ranging from 1 to 4 percent, and rare-earth elements may be present. Zircons were found in the dark brown, fine-grained clinocllore (RS-4221 in fig. 1) in the dike described above. They were identified as zircon by their orange fluorescence.

The zircons occur as small (4 mm or less), transparent, orange crystals and fragments (fig. 3). The

zircons described here were provided by Tom Pankratz, who separated them from the clinocllore. Analysis by SEM-EDS (table 2) shows that the zircons contained 0.81 to 2.09 weight percent hafnium.



Figure 3. Zircon crystals from the Penn/MD Materials quarry. Crystals are 4 mm or less in length. Collected by Tom Pankratz.

Table 1. Results of X-ray energy dispersive spectrometer (EDS) analysis of 12 clinocllore specimens from the Penn/MD Materials quarry. Values are mean values in weight percent.

Sample ID	Description	O	Mg	Al	Si	Fe	K	Mn	Ti	Ni	Cr
RAS-3179	Dark green	48.13	21.54	7.19	17.42	2.96	2.48		0.27		
RAS-3206	Large, light brown crystal	48.33	11.52	8.19	16.96	8.55	4.64		1.81		
RAS-4103	Dark brown, fine grained	47.44	13.20	8.41	15.86	10.79	3.05	0.26	0.99		
RAS-4204	Silvery gray	50.28	19.12	7.18	17.02	5.18	0.17		1.14		
RAS-4205	Light brownish green	53.80	21.95	3.25	17.91	2.76			0.35		
RAS-4220	Silvery gray	53.52	23.77	1.70	19.18	1.65			0.18		
RAS-4221	Dark brown, fine grained	47.27	12.25	7.73	15.59	8.90	7.11	0.24	0.92		
RAS-4226	Silvery gray; associated with semi-transparent antigorite	50.20	22.52	3.12	21.64	2.03			0.48		
RAS-4227	Silvery gray	50.74	24.13		23.60	1.53					
RAS-4234	Soft, light green, fine grained	51.40	20.84	5.82	15.97	5.34	0.12			0.42	0.09
RAS-4237	Silvery gray; associated with picrolite	48.21	23.68	0.36	21.87	5.88					
RAS-4239	Dark green; from the dike	50.93	22.87	4.13	19.44	2.30			0.32		

Table 2. Results of X-ray energy dispersive spectrometer (EDS) analysis of five zircon specimens from the Penn/MD Materials quarry. Values are mean values (except zircon 3) in weight percent.

	Zr	Hf	O	Si	Mg	Ca	Ti	Fe
Zircon 1	50.11	1.23	32.91	14.83		0.43	0.26	0.24
Zircon 2	46.94	1.04	36.85	14.19	0.29	0.71		
Zircon 3	48.40	1.00	36.22	14.16		0.22		
Zircon 4	44.27	0.81	41.26	13.39		0.28		
Zircon 5	44.56	2.09	35.51	14.42	0.93	1.95	0.56	

MONAZITE-(Ce) (Ce,La,Nd)(PO₄)

Monazite is a phosphate mineral containing rare-earth elements. There are at least four different kinds of monazite, depending on the dominant rare-earth element; the most common is monazite-(Ce). The chemical formula for monazite indicates that cerium, lanthanum, and neodymium can substitute for one another in the mineral's structure. Other rare-earth elements and thorium may be present, and substitution of silica (SiO₂) for phosphate also occurs. The first element listed in the parenthesis is the rare-earth element with the greatest percentage in the mineral; monazite-(Ce) is enriched in cerium. Monazite is part of several solid-solution series with other minerals.

Monazite-(Ce) was identified during analysis of dark brown, fine-grained clinocllore (RS-4221 in fig. 1). While imaging and analyzing the clinocllore, grains of other minerals were apparent. A solid state (backscatter) detector was used to produce an SEM image (fig. 4) that showed the other minerals as bright white grains standing out in contrast to the dark clinocllore. Backscattered electrons are high-energy electrons originating in the electron beam that are reflected or back-scattered out of the specimen interaction volume by elastic scattering interactions with specimen atoms. Heavy elements (high atomic number) backscatter electrons more strongly than light elements (low atomic number) and appear brighter in the image. Backscatter electron detectors are used to highlight contrast between areas with different chemical compositions.

Analysis of the mineral grains showed them to be, in decreasing order of abundance, monazite-(Ce), a titanium-iron oxide (ilmenite or an alteration product of ilmenite), and zircon. Cerium was the most abundant rare-earth element (table 3). Most mineral grains were

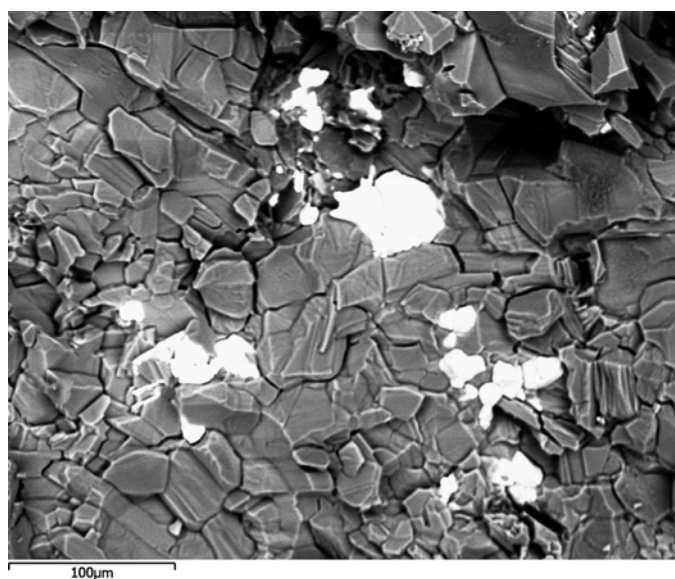


Figure 4. Backscatter scanning electron microscope image of dark brown, fine-grained clinocllore from the Penn/MD Materials quarry. Magnification is approximately 660 X.

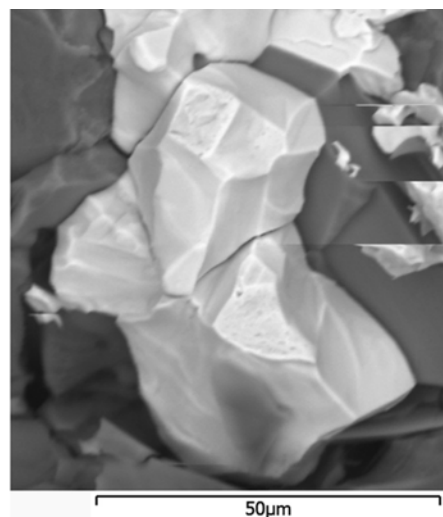


Figure 5. Backscatter scanning electron microscope image of monazite-(Ce) from the Penn/MD Materials quarry. Magnification is approximately 2100 X.

anhedral, but one mineral grain (fig. 5) showed somewhat of a crystal shape. Rare-earth elements present included cerium (Ce), lanthanum (La), neodymium (Nd), praseodymium (Pr), and promethium (Pm) (table 3). In addition, thorium (Th) was detected in three mineral grains. Silver occurred in trace amounts in most mineral grains. Some silica substituted for phosphate in all samples.

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- Back, M.E., 2018, Fleischer's glossary of mineral species: Tucson, Arizona, Mineralogical Record, Inc., 410 p.
- Smith, R.C. II, and Barnes, J.H., 1998, Geology of Nottingham County Park: Pennsylvania Geological Survey, 4th ser., Trail of Geology 16-009.0, 41 p.
- Smith, R.C. II, and Barnes, J.H., 2008, Geology of the Goat Hill Serpentine Barrens, Baltimore Mafic Complex, Pennsylvania: Journal of the Pennsylvania Academy of Science, v. 82, no. 1, p. 19-30.

Table 3. Results of X-Ray energy dispersive spectrometer (EDS) analysis of monazite-(Ce) from the Penn/MD Materials quarry. Values are in weight percent.

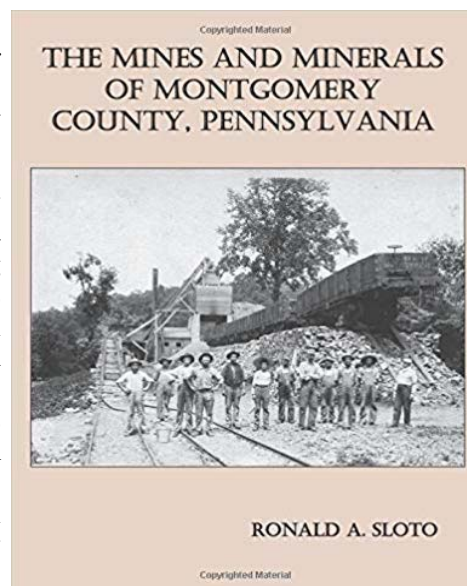
Sample ID	O	Si	P	Ag	La	Ce	Pr	Nd	Pm	Th
R2-1-Spectrum 1	50.53	19.80	0.30		4.41	15.34	1.82	7.79		
R2-1-Spectrum 3	33.89	4.51	9.93		13.57	27.85	2.63	7.63		
R2-1-Spectrum 4	30.54	6.68	9.56	0.29	15.28	29.60	1.90	6.15		
R2-2-Spectrum 15	28.01	6.11	6.42		15.09	31.24	2.51	8.64	1.04	0.93
R2-3-Spectrum 19	30.94	4.51	10.92	0.23	14.93	29.25	2.41	6.63	0.19	
R1-5-Spectrum 21	31.54	7.58	9.50	0.15	13.01	28.59	2.40	6.67	0.55	
R1-5-Spectrum 22	38.32	2.66	12.61	0.20	11.43	25.20	2.43	6.75	0.40	
R2-4-Spectrum 27	42.28	7.62	5.92	0.84	0.48	25.68	3.63	3.76	0.05	9.74
R2-4-Spectrum 29	31.09	5.83	9.72	0.99	13.55	29.25	2.53	6.80	0.25	
R1-8-Spectrum 31	39.36	2.40	12.71	0.32	12.26	25.39	1.66	5.80	0.11	
R1-8-Spectrum 32	29.01	5.66	6.53	0.20	12.50	34.74	3.29	8.08		
R1-8-Spectrum 33-36 ¹	33.92	4.19	9.67	0.17	12.46	29.12	2.54		0.05	

¹ Average of three spectra.

Montgomery County book now available

Ron Sloto has followed up his Chester County and Berks County books with one covering Montgomery County. It is now available from Amazon.com.

The Mines and Minerals of Montgomery County, Pennsylvania, provides a comprehensive description of the mining history and mineralogy of the county. It pulls together over 300 years of mining and mineral history under one cover. It is richly illustrated with 510 figures — old and new photographs, old maps, mine surface plans and cross sections, and photographs of minerals from museum, university, and private collections. Many of the old photographs have never been published before. This book describes nearly 200 mines and mineral localities. It includes



the known history of each mine and locality and a list of reported minerals. The locations are shown on a set of USGS topographic maps. Because many of the mines had several names over the course of their history, a comprehensive cross-index is provided. An extensive bibliography also is included. One hundred twenty six mineral species have been reported from Montgomery County, plus an additional 13 mineral species that were reported, but not verified. Extensive coverage is provided for the two most prolific mineral localities in the county—the Perkiomen-Ecton lead-copper-zinc mines near Audubon and the Kibblehouse (Perkiomenville) quarry in Perkiomenville.

From the Editor

David Glick

THANK YOU to everyone who has been providing material for the Newsletter! Everyone else - join the fun! Feel free to contact me at xidg@verizon.net, or 814-237-1094 days and evenings. Mail can be sent to 209 Spring Lea Dr., State College PA 16801. Materials for the Fall issue should be submitted by September 20.

Materials related to Pennsylvania mineralogy, collecting or collectors are invited for this newsletter: articles, long or short; announcements from FM-PA committees; photographs of specimens, field localities, collections, etc.; reports on publications about PA minerals or by PA authors, or actual book reviews; or other items within the mineralogy and mineral collecting areas of interest. Photographs should be of good resolution (at least 1000 pixels across) without much JPEG compression, so that they will look good in print. Please provide captions including photographers' names.

We are producing four issues each year; your material is needed! If you know people who have interesting material, please encourage them to submit it.

DONATIONS WELCOMED

The FM-PA Chapter is a 501(c)(3) nonprofit organization; donations are gratefully accepted and should qualify for deduction from your federal income tax. Donations of any size help to offset the general operating costs of the Society, helping to keep dues low.

UPCOMING EVENTS

See www.mineralevents.com for more

Sept. 14-15, 2019: Annual Gem, Mineral & Jewelry Show, by Central Pennsylvania Rock & Mineral Club. Harrisburg Consistory, 2701 North 3rd St., Harrisburg PA 17110. Sat. 10-6, Sun. 10-5.
<http://www.rockandmineral.org/annual%20show.htm>

Sept. 28-29, 2019: Franklin-Sterling Hill Gem & Mineral Show. Littel Community Center (formerly known as the Armory), 10 Munsonhurst Rd #12, Franklin NJ 07416.
<https://franklinmineralmuseum.com/event/61st-annual-franklin-sterling-gem-mineral-show/>

October 5, 2019: Autumn Mineralfest, by PA Earth Sci. Ass'n. Macungie Mem. Park, Poplar St., Macungie, PA. One hundred tables overloaded with minerals, fossils, gems, jewelry, crystals and geodes from six continents, & more. Sat. only, 8:30-3. www.mineralfest.com

October 26, 2019: Ultraviolation: Fluorescent Minerals Show, by R&MC of Lower Bucks County PA. First United Methodist Church, 840 Trenton Rd., Fairless Hills PA 19030. Sat. only, 9-4.
<https://sites.google.com/view/lowerbucksparocks/shows>

October 26, 2018: South Penn Fall Rock and Mineral SWAP & Sale: South Mountain Fairgrounds, 1.5 miles West of Arendtsville, PA. Sat. only, 8-3.

Nov. 2-3, 2019: FM-Pa Symposium & Field Trip; see p. 1. Saturday Symposium at Franklin & Marshall College, Lancaster, PA. Sunday Field Trip for Symposium registrants only. Please register in advance.
<http://www.rasloto.com/FM/>

FM on the WWW

Please explore the FM-PA Chapter web site at www.rasloto.com/FM/ and facebook: Friends of Mineralogy Pennsylvania Chapter

National News

The Bulletin of Friends of Mineralogy, links to other chapters, and much more can be found on their web site:

www.friendsofmineralogy.org

Friends of Mineralogy Pennsylvania Chapter Directory of Officers

OFFICERS and BOARD OF DIRECTORS members

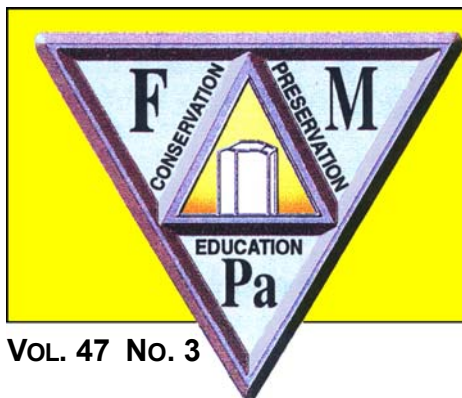
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Vice President	Dianne Soccio
Treasurer	Ron Sloto
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	William Kochanov
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COMMITTEE CHAIRS

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Friends of Mineralogy Pennsylvania Chapter Web Site: <http://www.rasloto.com/FM>



FRIENDS OF MINERALOGY Pennsylvania Chapter NEWSLETTER

VOL. 47 No. 3

FALL 2019

Symposium on Pennsylvania Mining and Mineralogy

Mineral Collecting Enthusiasts Meet and Learn

Saturday, November 2, 9:00 - 4:00
Franklin and Marshall College,
Lancaster, PA

Field Trip to Penn/MD Quarry November 3

Please Join Us!

Register in Advance or at the Door

**Please check for any updates at
<http://www.rasloto.com/FM/>**

The Friends of Mineralogy – Pennsylvania Chapter will hold our 2019 Symposium and field trip on the first weekend in November. Mineral collectors in attendance on Saturday will meet in the Hackman Physical Sciences Building and the Life Sciences and Philosophy Building at Franklin & Marshall College, Lancaster, PA., to hear several talks by experts on minerals, geology and mining in Pennsylvania and beyond (see page 2). Doors open for registration in Hackman Building by 8:30 a.m., but anyone wishing to help set up may arrive as early as 6:30. In addition to the talks, there will be select mineral dealers (by invitation only), a silent auction (donations are welcomed!), give-away table, refreshments, and plenty of opportunities for visiting with fellow enthusiasts. Lunch is available at restaurants within walking distance.

The mineral collecting **field trip on Sunday** is planned for H&K Group's Penn/MD Quarry, Peach Bottom, PA, which has now expanded operations into Maryland. The trip is open **only** to symposium registrants (please register by Saturday Nov. 2); non-member field trip attendees must pay the non-member symposium registration fee. Safety equipment will be required.

Registration: \$25/person for non-members,
\$15/person for current FM-Pa members;
free for students with student ID.

To register in advance, a form is available on the
web site <http://www.rasloto.com/FM/>

Message from the President:

A Wealth of Pennsylvania Minerals

by Joseph Marchesani

It's that time of year when we come together for our annual FM-PA symposium. The symposium will be at Franklin and Marshall College, Lancaster, Pennsylvania. Registration for the Symposium is set up at room Hackman 119, and at this location will be the silent auction, dealers tables, and refreshments. **There is a small change and we will not be using the regular auditorium.** Instead, this year we are upgrading our presentations and using the Life Sciences and Philosophy building auditorium room LSP142. The Life Sciences and Philosophy building auditorium (LSP142) is more modern and we will be able to use it to our advantage. It is located adjacent to where many usually park (the football field parking lot off Harrisburg Pike at the traffic light), and is only about a 1-2-minute walk from the Hackman 119 room. It is also closer to the Iron Hill Brewery, a favorite lunch spot for many. So, we will register and meet as usual in Hackman 119 and walk to room LSP142 for the presentations.

The synopsis of events begins with Bill Stephens' presentation on Lancaster Amethyst and continues with Karenne Snow's presentation on Pennsylvania type localities, Peter Heaney speaking on celestine, Ryan Mathur relating research on ages of calcite veins, and Ron Sloto's presentation on Penn-MD Quarry minerals. Sunday's field trip, open only to symposium registrants, is to H&K Penn-MD quarry. The gate opens at 9:00am.

The symposium is free to all students, \$15 for FM-PA members, and \$25 for non-members. Friends of Mineralogy-PA chapter membership is available at the symposium registration desk. We anticipate that professional geologists can receive five (5) Professional Development Hours for lecture attendance.

Symposium on Pennsylvania Mining and Mineralogy

Friends of Mineralogy - Pennsylvania Chapter November 2 & 3, 2019

TENTATIVE SCHEDULE NOTE: Events in **BOLD** are in 142 Life Sciences Bldg

Saturday, November 2: SYMPOSIUM

- | | |
|-------------------------|---|
| 8:30 to 9:00 a.m. | Registration: 119 Hackman Building |
| 9:00 to 9:15 a.m. | Opening Remarks |
| 9:15 to 10:00 a.m. | Bill Stephens, PG, Stephens Environmental
Amethyst Occurrences in Southeastern Pennsylvania -
Classic Locales and Recent Discoveries |
| 10:00 to 10:15 a.m. | FM-Pa Members: Chapter Membership Meeting
also |
| 10:00 to 10:45 a.m. | BREAK- Check out the silent auction and visit the dealers, 119 Hackman. |
| 10:45 to 11:30 a.m. | Karenne Snow, President, Philadelphia Mineralogical Society
Minerals and Their Type Localities |
| 11:30 a.m. to 1:00 p.m. | LUNCH BREAK - lunch on your own (local map on back cover)
<u>Silent auction continues until 1:15</u> - Room 119 open during lunch |
| 1:15 p.m. | Silent Auction ends |
| 1:30 to 2:15 p.m. | Peter Heaney, PhD, Penn State
Making the Case for Celestine as the Pennsylvania State Mineral |
| 2:15 to 3:00 p.m. | Ryan Mathur, PhD, Juniata College and
Robert Jacobi, PhD, Consultant
U-Pb Dating of Calcite Veins from Rocks in Pennsylvania;
Implications of these Ages |
| 3:00 to 3:15 p.m. | BREAK |
| 3:15 to 4:00 p.m. | Ronald A. Sloto, PG, West Chester University
Minerals of the Penn/MD Materials Quarry, Fulton
Township, Lancaster County, Pennsylvania |
| 4:00 to 4:10 p.m. | Field Trip Instructions |
| 4:10 to 4:30 p.m. | Distribution of Professional Development Hours certificates to PGs |
| 4:30 to 5:00 p.m. | Chapter Board of Directors meeting |

Sunday, November 3: FIELD TRIP to Peach Bottom, Lancaster County **Daylight Saving Time Ends** For Symposium Registrants Only *maps will be provided*

9:00 a.m. to 1:00 p.m. Meet by 9:00 a.m. H&K Group Penn/MD Quarry, 303 Quarry Rd., Peach Bottom, PA 17563. The quarry is located off of US Rte. 222 just north of the Maryland state line.

The national Bulletin of FM, September issue, should have been received by members who have provided e-mail addresses, and should soon be available on the web site <<https://www.friendsofmineralogy.org/>>. It includes articles on:

The Stephenson (Michael Finger) and LKA Emeralds, Hiddenite, Alexander County, NC Go On Public Exhibit in New York City

Emeralds Elite (emeraldselite.com) from Little Rock, AR announced on September 12, 2019 that the LKA and Stephenson "Michael Finger" emeralds will be going on public exhibit in honor of their respective 35th- and 50th-year of discovery. These two giant emeralds will be showcased in the "Magnificent Emeralds: Fura's Tears" exhibit at the Wilensky Gallery, New York City...

The Stephenson "Finger" emerald was discovered in 1969 and was last displayed publicly in the early 1980's. The LKA emerald, discovered in 1984, has never been publicly displayed. The "Magnificent Emeralds: Fura's Tears" exhibit opens 11:00 AM – 6:00 PM, September 26 to December 30, 2019 at the Wilensky Gallery, 173 10th Avenue (corner of 20th street), New York City, NY 10011.

United States Pollucite Localities with Primary Citations

"Dittrich (2017, p. 24-33) in his Ph.D. thesis created a worldwide list of pollucite occurrences. The United States localities were extracted from his publication, revised and updated for this listing by M. I. Jacobson." The article covers pages 12-19. There are no entries for Pennsylvania.

Pennsylvania Geology Magazine

Issues may be found through the links at

http://docs.dcnr.pa.gov/cs/groups/public/documents/document/dcnr_20033210.pdf

Issue 49:1 includes: A Saga Concerning the Identification of Chevkinite-(Ce), a Rare-Earth Titanosilicate from Northampton County, Pennsylvania. Some Rare-Earth Minerals in Pennsylvania, no. 1, by Robert C. Smith, II, and John H. Barnes Pennsylvania Geological Survey (retired)

Issue 49:2 has no mineralogy articles, but some of general interest. The State Geologist's column notes that the 100th anniversary of the Fourth Survey will be celebrated in early December. The cover article, is The Late Pleistocene-Early Holocene in Central Pennsylvania, by Charles E. Miller, Jr., of State College, Pennsylvania. It provides some fascinating insights on conditions in central and southern PA while the glaciers were in the north, and evidence that can be seen today.

Awaiting Responses about Chapter Picnic

There have been no responses to last issue's request, so we ask again:

Some other groups enjoy holding an annual picnic, sometimes in conjunction with a collecting trip or swap meeting. Members' comments and suggestions for a possible FM-PA Chapter picnic in 2020 are invited. Are you in favor? Would you attend? Do you have any suggestions for a venue? Combination with collecting, a swap, or some other event? And regarding specifics, what time of year (how about June?), and Saturday or Sunday? Please send your comments to Secretary David Glick (see page 4), who will compile the responses.

Our Chapter Online

Past issues of our Chapter newsletter are available on our web site, www.rasloto.com/FM. Also visit the Facebook page, <https://www.facebook.com/Friends-of-Mineralogy-Pennsylvania-Chapter-1174230635931641> (linked from the web site). Members and friends are invited to *Like* the page, post, and generally provide a good level of activity.

40 Years ago in FM-PA

In the summer 1979 issue (available on our web site), a three-page letter was reprinted. It was from Allen Heyl to Don Schmerling in 1978, describing collecting through the years at C.K. Williams Quarry at Easton. Some short excerpts are provided here:

"In the early through mid 1930's I visited the serpentine quarries at Easton, Pa., and north of Phillipsburg, N.J. many times. The Williams Quarry was active and was visited most often. On this particular visit I went there with George Gehman and Floyd Faux..."

"As we sat munching sandwiches and fruit on the boulders, George Gehman remarked that it was in these marble rocks on which we were sitting where he had found veins of quartz and calcite with galena, sphalerite, chalcopryite, chalcocite, malachite, barite, wulfenite, quartz, and orange calcite. So right after lunch we started looking for these minerals. In a very short time we had found most of them except for the wulfenite..."

"About 4 PM, they warned us that they were about to blast, so we wrapped samples and headed for the car. We returned to Bethlehem and Allentown discussing an unusually successful day in which we found many uncommon and beautiful minerals, quite a few of which were not properly identified until years later..."

From the Editor

David Glick

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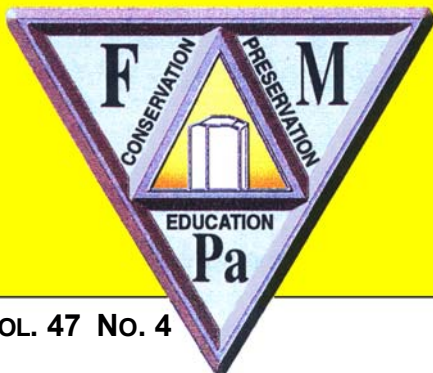
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Web Manager	Ron Sloto
Newsletter Editor	David Glick

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FRIENDS OF MINERALOGY Pennsylvania Chapter NEWSLETTER

VOL. 47 No. 4

WINTER 2019

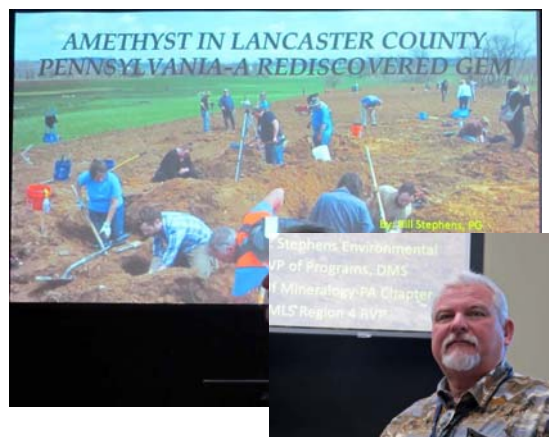
Symposium on Pennsylvania Mining and Mineralogy

November 2019

The Friends of Mineralogy – Pennsylvania Chapter held our 2019 Symposium and field trip on the first weekend in November. On Saturday, November 2, the Symposium was held at Franklin & Marshall College in Lancaster, PA. There were select mineral dealers (by invitation only), a silent auction, refreshments, and plenty of opportunities for visiting with fellow enthusiasts.



After a great deal of last-minute effort in making the arrangements for the meeting, FM-Pa President Joe Marchesani had a short moment to relax as the group arrived.



Bill Stephens spoke about **Amethyst Occurrences in Southeastern Pennsylvania - Classic Loci and Recent Discoveries**. He reviewed some geological investigations of Lancaster County and other sites and showed videos of collecting.

Roger D. K. Thomas, Professor Emeritus of Geosciences, welcomed the group to F&M. He spoke about the evolution of complex systems that exist in the natural world, and told some interesting stories from his research career.





Karenne Snow spoke about **Minerals and Their Type Localities**, particularly those from Pennsylvania and New York. Following the presentation, the audience was able to examine her collection of specimens from type localities.



Ron Sloto helped prepare the group for the Sunday field trip by speaking on **Minerals of the Penn/MD Materials Quarry, Fulton Township, Lancaster County, Pennsylvania**. He reported results of microanalysis, some of which are also in the article on page 4 of this issue.

Field Trip Chair Tom Pankratz further discussed Penn/MD Quarry and provided instructions for field trip participants. Some changes had taken place there since last year's trip. A landslide closed the fifth level on the Pennsylvania side, and the new operations across the border in Maryland have been expanding.



Making the Case for Celestine as the Pennsylvania State Mineral was Peter Heaney's topic. He reported on his connections with German museum curators who tracked down the type specimens in Dresden, Berlin, and Freiberg. Celestine was first collected ~1790 in Pennsylvania by Schütz and analyzed by Klaproth in Germany.

Also on Saturday, a brief official meeting of the membership was held in the morning. No Board members were up for re-election this year, and no one had volunteered to run as a new member, so there was no election. President Joe Marchesani reviewed the year's successful activities, including several collecting trips.

Following the presentations in the afternoon, a brief **Board of Directors meeting** was held. The four incumbent officers were re-elected to their positions (see page 8). Attendance at the current Symposium was reported as 45.

On Sunday, field trip participants met at Penn/MD Materials Quarry for a pleasant morning of collecting. Thanks go to the H&K Group personnel who have generously cooperated with FM-Pa Chapter to allow us to collect.



M. Dunton photo

Ryan Mathur discussed **Uranium-Lead Dating of Calcite Veins from Rocks in Pennsylvania and Implications of the Ages**. Much of this work is on the Marcellus Shale, to understand fluid migration and natural gas generation, but also provides insight into mineral emplacement in other situations.





M. Dunton photos



J. Moore photos



J. Moore photo

Minerals of the Penn/MD Materials Quarry, Fulton Township, Lancaster County, Pennsylvania, Part 3, Magnetite, Magnesioferrite-Magnetite Series, and Chromite-Magnesiochromite Series

Ronald A. Sloto, P.G.
West Chester University

Introduction

The Penn/MD Materials quarry, owned and operated by the H&K Group, produces aggregate from ultramafic rocks of the Baltimore Mafic Complex, known locally as the State Line Serpentine District. This complex of ultramafic and associated gabbroic rocks is believed to be a remnant from the roots of an island arc complex formed about 490 to 510 million years ago (Smith and Barnes, 1998; Smith and Barnes, 2008).

All analyses were performed at the West Chester University Center for Microanalysis and Imaging, Research and Training (CMIRT). Imaging and chemical analyses were done using an FEI Quanta 400 environmental scanning electron microscope integrated with an Oxford AZtec X-ray energy dispersive spectrometer (SEM-EDS). Samples were unpolished and uncoated.

The author thanks the H&K Group and Jay Lang for access to the quarry and Robert C. Smith II for his helpful comments and insights.

Magnetite Series Fe_3O_4

Magnesioferrite-Magnetite Series MgFe_2O_4 to Fe_3O_4

Magnetite forms a solid-solution series with magnesioferrite. Magnetite contains three iron atoms per four oxygen atoms, and magnesioferrite contains two iron atoms and one magnesium atom per four oxygen atoms. Both species can be massive or form black metallic octahedral crystals; they are visually indistinguishable.

Small blebs and stringers of a black metallic mineral are ubiquitous in the Penn/MD Materials quarry (figs. 1 and 2). A large, solid mass weighing 24 pounds was found by Jay Lang, the quarry manager (sample

RS-4250). The author carried out an informal study to determine how many of the black metallic minerals were magnetite and how many were chromite. Twenty-two samples (in addition to sample RS-4250) were collected from all five levels of the quarry. Some were associated with magnesite and dolomite; most were associated with various colors and textures of serpentine. Samples RS-4094 (fig. 3), RS-4142 (fig. 4), and RS-4200 were minute octahedral crystals. All other samples were massive. The samples were analyzed by SEM-EDS (table 1).

None of the samples were chromite. All samples, except RS-4250, appeared to be mixed with some serpentine. To "remove" the serpentine after analysis, it was assumed that all silica was due to the presence of serpentine; the serpentine was then "removed" from the analysis.



Figure 1. Magnesioferrite-magnetite series in magnesite from the Penn/MD Materials quarry, sample RS-4250.



Figure 2. Magnetite from the Penn/MD Materials quarry, sample RS-4250.

Table 1. X-ray energy dispersive spectrometer (EDS) analysis of black metallic minerals from the Penn/MD Materials quarry. Values are median values in weight percent.

Sample No.	O	Mg	Si	Ti	Cr	Fe	Ni	Au	Notes
RS-4094	41.40	9.49	4.37	0.01	0.02	46.58	0.55	0	1
RS-4098	30.17	4.83	1.32	0.03	2.94	59.64	0.45	0	
RS-4112-B	29.09	6.68	1.53	0.09	0.47	67.28	0.36	0	
RS-4113	34.02	13.61	8.94	0.04	0.12	41.97	0.60	0	
RS-4125	30.93	4.81	0.53	0.04	0.44	61.70	0.52	0	
RS-4138	22.56	6.88	2.25	0.05	0.13	67.69	0.47	0	
RS-4142	40.38	4.46	2.23	0.02	0.04	52.48	1.11	0	1
RS-4200	38.93	6.03	2.46	0.02	0.02	52.18	0.42	0	1
RS-4201	31.79	5.52	2.33	0.12	0.46	58.95	0.73	0	
RS-4203	30.63	6.80	2.95	0.06	0	59.13	0.61	0	
RS-4225-C	26.94	0.56	0.10	0.16	0.15	71.64	0.52	0.01	
RS-4240	34.17	3.82	0.81	0.18	0.00	60.33	0.51	0.03	
RS-4241	28.84	5.25	1.07	0.18	0.04	66.27	0.39	0.00	
RS-4244-B	30.00	3.93	1.10	0.17	0.01	66.13	0.63	0.11	2
RS-4246-B	32.15	4.05	0.80	0.19	0.01	63.90	0.43	0	
RS-4250	32.50	5.69	0	0.04	0.24	62.01	0.53	0	3
RS-4251	22.18	4.82	0.61	0.01	0.16	70.83	0.68	0	2
RS-4254	22.98	6.17	0.82	0.01	0.11	68.90	0.55	0.02	
RS-4255	23.45	1.01	0.66	0.21	0.55	73.36	0.54	0	
RS-4256	31.73	2.83	1.37	0.14	0.14	63.29	0.62	0	
RS-4257	23.19	1.28	0.74	0.25	0.90	73.17	0.62	0	
RS-4258	25.90	8.18	5.33	0.10	0.11	58.47	0.55	0	
RS-4291	21.66	0.37	0.31	0.13	0.16	76.36	0.47	0	4

Notes: 1 Octahedral crystals

2 Greatest gold value = 0.19 weight percent

3 Sample contained no silica

4 Magnetite

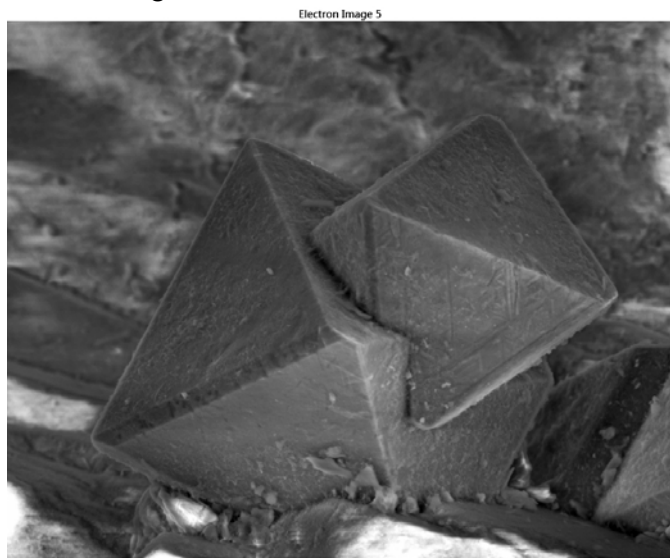


Figure 3. Scanning electron microscope image of magnesioferrite-magnetite series crystals from the Penn/MD Materials quarry, sample RS-4094. Magnification is approximately 740 X.



Figure 4. Scanning electron microscope image of magnesioferrite-magnetite series crystals from the Penn/MD Materials quarry, sample RS-4142. Magnification is approximately 740 X.

All samples (except RS-4291) still contained magnesium, indicating that they were not end-member magnetite but in the magnesioferrite-magnetite series close to the magnetite end member. Sample RS-4291 was end-member magnetite. Most of the samples (table 1) also contained nickel, chromium, and titanium; some samples contained a trace of gold. The presence of gold was initially detected by an X-ray fluorescence (XRF) spectrometer analysis by Sloto and Degnan (2011). The number of magnesium atoms ranged from 0 to 0.64 per 4 oxygen atoms (fig. 5), indicating that most samples (87 percent) were closer to the magnetite end of the series than the magnesioferrite end. None of the samples were end member magnesioferrite.

Chromite-Magnesiochromite Series

FeCr_2O_4 to MgCr_2O_4

Chromite (FeCr_2O_4) is an iron chromium oxide mineral belonging to the spinel group. Magnesium can substitute for iron as it forms a solid solution with magnesiochromite (MgCr_2O_4). The name chromite is commonly used for any chromium-rich mineral of the spinel group, particularly for the chromite-magnesiochromite series; it is used here.

In May 2019, the author was attracted to a serpentine boulder on the fifth level of the quarry containing a significant amount of a black metallic mineral. The serpentine in the boulder was a bright green color unlike the color of any other serpentine in the quarry. The author broke off several pieces (figs. 6 and 7) and analyzed the black metallic mineral; it was in the chromite-magnesiochromite series (table 2). A few days prior to the author's return to the quarry on June 2, a landslide occurred, which blocked access to the fourth and fifth levels. The fifth level was abandoned and allowed to flood (fig. 8), and the chromite-bearing boulder on the fifth level was no longer accessible.

The analysis of a sample from this single occurrence (table 2) indicated the presence of a minor amount of serpentine and minor amounts of aluminum, calcium, manganese, titanium, vanadium, and zinc. Assuming that the presence of silica was due to the presence of serpentine, the analysis gave an approximate formula of $\text{Fe}_{0.72}\text{Cr}_{1.06}\text{Mg}_{1.43}\text{Al}_{0.21}\text{O}_4$. The sample contained more magnesium than iron and is closer to the magnesiochromite end of the series than the chromite end.

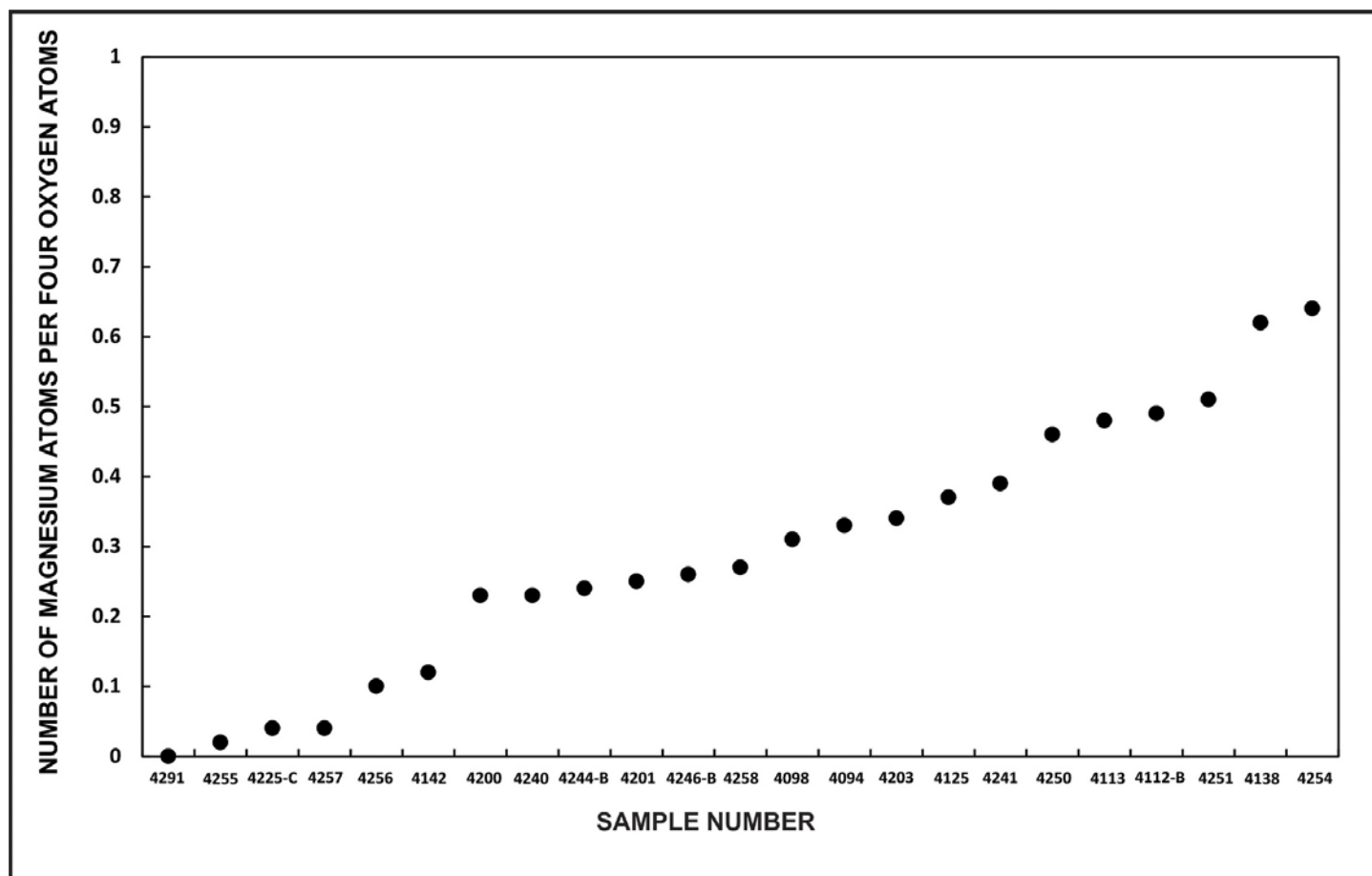


Figure 5. Graph showing the number of magnesium atoms per 4 oxygen atoms in 23 magnesioferrite-magnetite series samples from the Penn/MD Materials quarry.

Table 2. Results of X-ray energy dispersive spectrometer (EDS) analysis of chromite from the Penn/MD Materials quarry. Values are the median, minimum, and maximum of 16 spectra in weight percent.

	Cr	Fe	O	Mg	Al	Si	Ca	Ti	V	Mn	Zn
Median	32.45	22.89	30.58	10.03	0.70	0.58	0.15	0.03	0.03	0.60	0.04
Minimum	27.69	20.13	28.98	4.36	0.26	0.29	0.00	0.00	0.00	0.50	0.00
Maximum	36.94	29.30	32.04	17.39	2.88	0.89	0.24	0.11	0.10	0.87	0.25

The bright green color of the matrix surrounding the chromite was caused by the presence of chromium in the matrix. The serpentine outside of the chromite area was much less intense in color and did not contain chromium. The chromite (fig. 6) appears to have a schlieren habit (Pearre and Heyl, 1960; Smith and Barnes, 2008).



Figure 6. Massive chromite from the Penn/MD Materials quarry.



Figure 7. Disseminated (bird's eye) chromite from the Penn/MD Materials quarry.



Figure 8. Photograph showing landslide in the Penn/MD Materials quarry (right of center). The flooded fifth level is in foreground. Photograph taken on October 11, 2019.

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- Smith, R.C. II, and Barnes, J.H., 2008, Geology of the Goat Hill Serpentine Barrens, Baltimore Mafic Complex, Pennsylvania: Journal of the Pennsylvania Academy of Science, v. 82, no. 1, p. 19-30.

UPCOMING EVENTS

See www.mineralevents.com for more

Jan. 11, 2020: Swap & Sell, by Phila. Mineral. Soc. Cathedral Village Center, 600 E. Cathedral Rd., Philadelphia (Andorra), 19128. Sat. Only, 9-12. www.phillyrocks.org/swap-and-sell/

Jan. 25, 2020: Rutgers Geology Museum Open House. Scott Hall, Sat. Only, 9-3. geologymuseum.rutgers.edu

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.delminisociety.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: 51st Annual Gem & 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. Lulu Temple, 5140 Butler Pike, Plymouth Meeting, PA., (PA Turnpike, exit 333; or I-476, exit 20). Sat. 10-5, Sun. 10-4. www.phillyrocks.org/mineral-show/

Apr. 18-19, 2020: Gem, Mineral & Fossil Show, by Monongahela Rockhounds. Skyview Hall, West Mifflin Vol. 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>

From the Editor

David Glick

THANK YOU to everyone who has been providing material for the Newsletter! Everyone else - join the fun! Feel free to contact me at xidg@verizon.net, or 814-237-1094 days and evenings. Mail can be sent to 209 Spring Lea Dr., State College PA 16801. Materials for the Spring issue should be submitted by February 28.

Materials related to Pennsylvania mineralogy, collecting or collectors are invited for this newsletter: articles, long or short; announcements from FM-PA committees; photographs of specimens, field localities, collections, etc.; reports on publications about PA minerals or by PA authors, or actual book reviews; or other items within the mineralogy and mineral collecting areas of interest. Photographs should be of good resolution (at least 1000 pixels across) without much JPEG compression, so that they will look good in print. Please provide captions including photographers' names.

We are producing four issues each year; your material is needed! If you know people who have interesting material, please encourage them to submit it.

DONATIONS WELCOMED

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FM on the WWW

Please explore the FM-PA Chapter web site at www.rasloto.com/FM/ and facebook: Friends of Mineralogy Pennsylvania Chapter

National News

The Bulletin of Friends of Mineralogy, links to other chapters, and much more can be found on their web site: www.friendsofmineralogy.org

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