# Friends of Mineralogy
## Pennsylvania Chapter

## Fall Symposium

# Pennsylvania Mining and Mineralogy

## November 13 & 14, 2021

### Presented Online and In Person at Bright Side Opportunities Center, Lancaster, Pennsylvania

Pyromorphite, Wheatley Mine, Chester County, Pennsylvania. 8.5 cm, probably dating to the early 1850s. Charles Wheatley Collection, Union College Collection. *Ron Sloto photograph.*

# Friends of Mineralogy

**Dedicated to the advancement of serious interest in minerals and related activities**

We are collectors, professionals, and curators who share a love of mineral specimens and the desire to promote understanding and appreciation of mineralogy.

FM's objectives are to promote, support, protect and expand the collection of mineral specimens and to further the recognition of the scientific, economic and aesthetic value of minerals and collecting mineral specimens.

National FM newsletters, links to other chapters, and much more can be found on their web site: **www.friendsofmineralogy.org**

## Friends of Mineralogy - Pennsylvania Chapter

**provides:**

• the benefits of membership in the national organization
• an annual Symposium in November
• field trips
• quarterly illustrated Newsletter
• an extensive WWW site with news, downloadable books, and more

Membership application forms are available on our web site

Please explore the FM-PA web site at
**www.rasloto.com/FM/**

## Symposium Zoom information

The Zoom link is being sent via e-mail. The session opens at 8:30 a.m.

Please join promptly so that the Symposium can begin at 9:00 a.m.

Start by muting your microphone to avoid extraneous noises in the symposium.

Please submit questions via Chat (move cursor near bottom of screen to make line of icons appear).

## Professional Geologists: Professional Development Hours

Certificate for 5 PDHs available on request.

# Pennsylvania Mining and Mineralogy

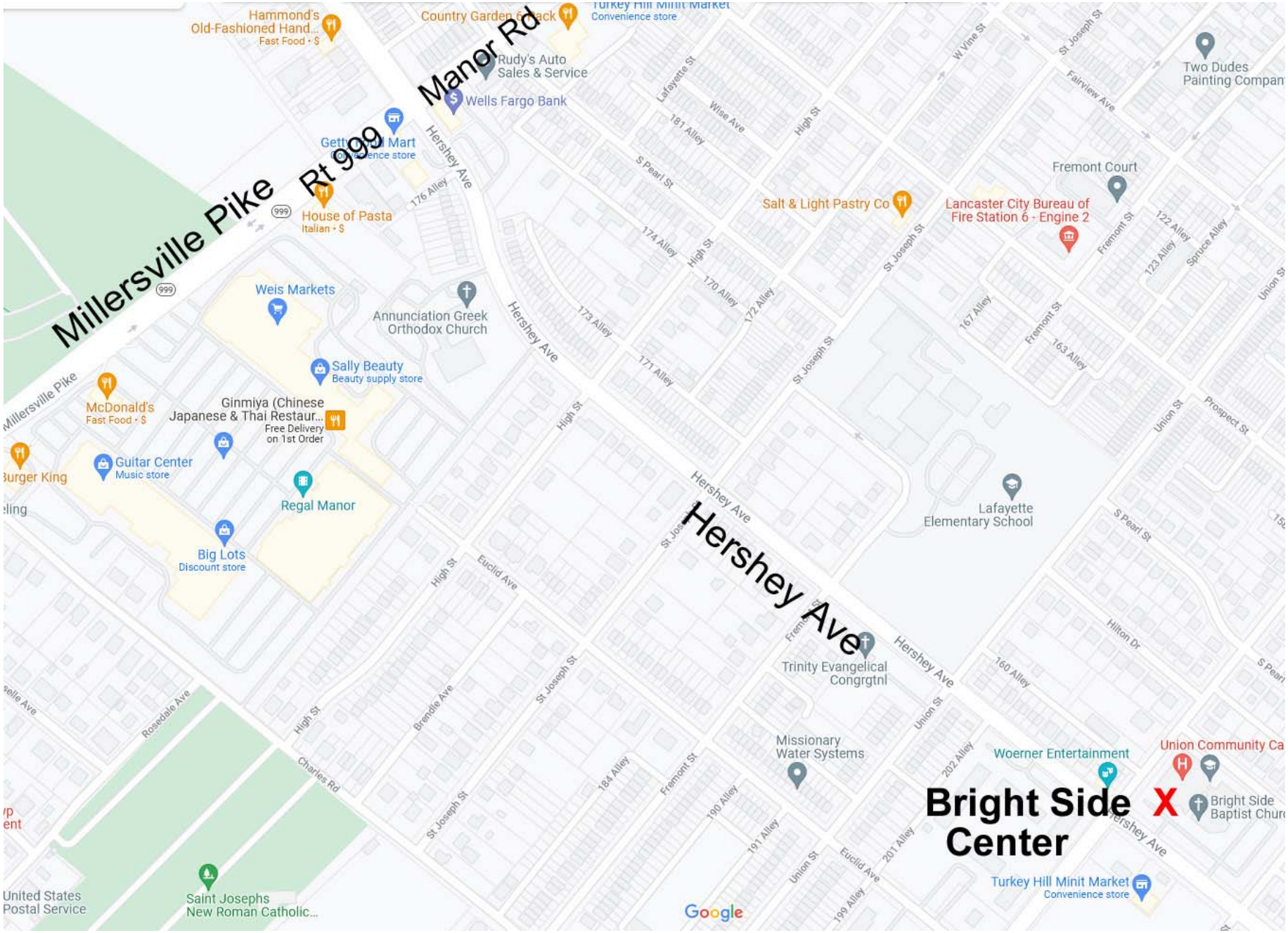
## Friends of Mineralogy - Pennsylvania Chapter
## Fall Symposium November 13 & 14, 2021

**SCHEDULE of EVENTS**

| | | page |
|---|---|---|
| **Saturday, November 13: SYMPOSIUM** | Local map (parking map page 14) | 4 |
| 8:30 to 9:00 a.m. EST | Registration on second floor outside meeting room | |
| 9:00 to 9:10 a.m. | **Opening Remarks** | |
| 9:10 to 9:55 a.m. | **William Kochanov, PG, Pa. Geological Survey, retired**<br>**Revisiting G33: The Hummelstown Hematite Locality** | 5 |
| 9:55 to 10:05 a.m. | **FM-Pa Members: Chapter Membership Meeting** | |
| | **also** | |
| 9:55 to 10:35 a.m. | BREAK- Check out the silent auction and visit the dealers. | |
| 10:35 to 11:20 a.m. | **Ryan Kerrigan, PhD, University of Pittsburgh - Johnstown**<br>**The Geology of Corundum Hill, Chester County, PA – Serpentinites intruded by Pegmatites** | 8 |
| 11:20 a.m. to 12:50 p.m. | LUNCH BREAK - lunch on your own (local map on page 4)<br>Silent auction continues until 1:00 - Room open during lunch | |
| 1:00 p.m. | Silent Auction ends | |
| 1:10 to 1:55 p.m. | **Peter Heaney, PhD, Penn State**<br>**Iris Agates and Cantor Dusts: The Textural Complexity of Agates** | 9 |
| 1:55 to 2:40 p.m. | **Ronald A. Sloto, PG, West Chester University**<br>**Minerals of the Silver Hill Quarry, Brecknock Township, Lancaster County, Pennsylvania** | 11 |
| 2:40 to 2:55 p.m. | BREAK | |
| 2:55 to 3:40 p.m. | **Bill Stephens, PG, Stephens Environmental**<br>**Pyromorphite! The Famous Phoenixville Lead-Zinc Mines** | 12 |
| 3:40 to 3:50 p.m. | **Field Trip Instructions** | |
| 3:50 to 4:00 p.m. | Distribution of Prof. Development Hours certificates to PGs | |

**Sunday, November 14: FIELD TRIP to collect on mine dumps at Pickering Valley Golf Club** **see map on page 16**

9:00 a.m. to 3:00 p.m. **For Symposium Registrants Only** Meet in parking lot by 9:00 a.m.
Pickering Golf Club, 450 S Whitehorse Rd, Phoenixville, PA 19460
About 4 miles west of Valley Forge National Historical Park, or
1.5 miles south of Phoenixville.


Millersville Pike
Rt 999
Manor Rd
Hershey Ave
Bright Side Center
Hammond's Old-Fashioned Hand...
Fast Food • $
Country Garden Snack
Turkey Hill Minit Market
Convenience store
Rudy's Auto Sales & Service
Wells Fargo Bank
House of Pasta
Italian • $
Weis Markets
Annunciation Greek Orthodox Church
Sally Beauty
Beauty supply store
McDonald's
Fast Food • $
Ginmiya (Chinese Japanese & Thai Restaur...
Free Delivery on 1st Order
Guitar Center
Music store
Regal Manor
Big Lots
Discount store
Salt & Light Pastry Co
Lancaster City Bureau of Fire Station 6 - Engine 2
Fremont Court
Two Dudes Painting Compan
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# Revisiting G33: The Hummelstown Hematite Locality

**William Kochanov, PG**
**Pennsylvania Geological Survey, retired**

During the 1960's and 1970's, General Geology Report G33, Mineral Collecting in Pennsylvania (Lapham and Geyer, 1965, 1969; Lapham and Gray, 1972) was a landmark publication for the mineral collector. It was an attempt to provide accessible mineral collecting sites to the general public in counties across Pennsylvania. Over time, the publication was discontinued due to several factors, among them, property ownership changes, liability, and over collecting.

It has become increasingly difficult to establish publicly available mineral collecting sites. Many current sites are regulated to active or semi-active quarry operations. Access to these sites is commonly coordinated through insured organizations where collecting and safety guidelines have been established. However, gaining access, at least among the mining sites, remains an issue as fewer and fewer facilities are permitting entry. Collecting on private property has also suffered, as a result of unauthorized "commando" type of exploits, i.e., those operations ravaging a site without proper consultation with the property owner(s) as to the intent and extent of a collecting foray and ignoring basic regards to collecting etiquette.

There are opportunities to the collector, however, it just may take more initiative and a bit of research to find a locality. Generally, these types of sites are not conducive to large groups but rather for the individual or at best, a handful of common-sensed enthusiasts.

One such site is the hematite locality for Dauphin County listed in G33 (Lapham and Geyer, 1965, 1969). The collecting site is the remnant of a hematite/magnetite iron mine, now a somewhat open woodland used primarily by the locals as a challenging off-road bicycle trail.

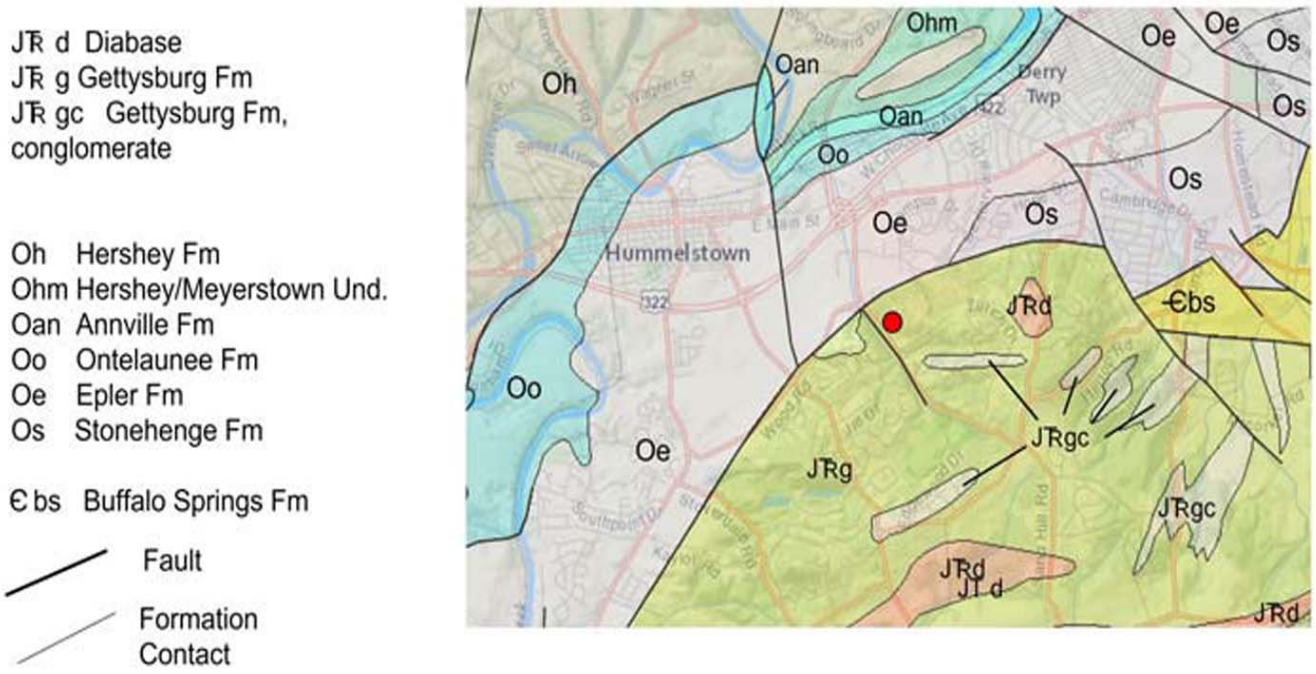



Figure 1. Geologic map of the Hummelstown area. Red dot marks approximate location of the mine. North is up.

Two notable depressions along the wooded hillside mark the locations of the mine as shown in G33. At the surface, the site is mapped as Triassic/Jurassic age sandstone and conglomerate of the Gettysburg Formation (PAGS, PaGeode). Additionally, Triassic/ Jurassic diabase is nearby as well as Cambro-Ordovician carbonates abutting the Mesozoic rocks to the north (Figure 1). Based on exposures to the north and south of the mine, the iron deposits are likely to lie adjacent to or along a fault (Spencer, 1908). Genesis of the ore is from contact metamorphism. Heated by the intrusive diabase, subsurface fluids interacted with sedimentary country rock. Structural and bedding discontinuities provided the pathways for the heated fluids to interact with the reddish, iron-bearing Triassic sedimentary rock, providing the iron for the ore (Lapham and Geyer, 1965, 1969). Specimens from the site will often display an admixture of hematite and magnetite suggesting that magnetite has replaced the hematite, at least in part. During a recent visit, fossilized wood was found within a weathered iron clast suggesting that perhaps the focus for iron replacement may have been associated with organic components within the sandstone and conglomerate deposits.

The primary minerals found at the site are hematite (specular variety), magnetite as black masses or platy where replacing hematite, white quartz as irregularly shaped masses, micro to pea-sized grossular garnets (honey brown to greenish brown) as single or clustered crystals, pyrite as irregularly shaped blebs associated with hematite and magnetite, and blue-green chrysocolla as secondary coatings on hematite/magnetite.

Figure 2. Reference points showing location of the mine, Eshhenour Trail (ET) and meta-conglomerate site (MC). North is up.

Well worth examining is an outcrop of metamorphosed conglomerate occurring further south on the Eshenour Trail - from the parking lot, cross the bridge, travel left (south) following the paved trail for about a fifteen-minute walk (Figure 2). The primary lithology at the outcrop is reddish-brown Mesozoic sandstone with lens-shaped beds (<.5m thick) of coarse sand and small to medium-sized pebble conglomerate. This lithology is found at the base of the outcrop on the right-hand side of the trail at stream level. It is easily identified by its light gray color and irregular surface.

The meta-conglomerate is a hodgepodge of different clasts providing surprisingly good color that may be suitable for lapidary work. Additional mineralization occurs within small vugs developed within the meta-conglomerate. Grossular garnet, specular hematite, and stilbite have been recognized in the conglomeratic gravels and cobbles within the bed of the stream that drains into Bullfrog Valley Pond.

For the casual collector, forays near the mine entries along the base of the abutting hills, as well as along the "roadway" to the mine should provide small 2-4cm "sparkly" specular hematite. Palm-sized specimens containing patches of the specular hematite are also common. Specimens can be found lying on the land surface with minimal digging. Train the eyes for silvery reflective surfaces for the specular hematite; look for black, magnetic masses for the magnetite (have those magnets handy). Red to reddish black, honey to dark brown and rare pale yellowish-green garnets are commonly associated with the iron minerals and within the vuggy conglomerate in the stream. Garnets are typically small and require a more hands and knees approach for success at the mine and stream. Crystal faces are more easily viewed with the use of a magnifying glass or hand lens. Additionally, reflective crystal faces of small loose garnets are more easily recognized on a sunny day (leafless conditions are best for better lighting in the mine area). Although not personally conducted, panning the stream for the heavier garnets may be another option.

**References and suggested reading**


Berg, T.M. and Dodge, C.M., 1981, Atlas of preliminary geologic quadrangle maps of Pennsylvania: Pennsylvania Geological Survey, 4th Series, Map 61, 632 p. (Hershey, p. 272), map compiled by MacLachlan, D.B. and Berg, T.M.,1977.

Lagoeiro, L.E., 2004, Transformation of magnetite to hematite and its influence on the dissolution of iron oxide minerals: Journal of Metamorphic Geology, v. 16, No. 3, p. 415-423.

Lapham, D.M. and Geyer, A.L., 1965, Mineral collecting in Pennsylvania, Dauphin County: Pennsylvania Geological Survey, 4th Series, General Geology Bulletin 33, 2nd Edition, p. 73-74. Also 3rd Edition, p. 77-78.

Lapham, D.M. and Gray, C., 1972, Geology and Origin of the Triassic Magnetite Deposit and Diabase at Cornwall, Pennsylvania: Pennsylvania Geological Survey, 4th Series, Mineral Resources Report M 56, 343 p. (p.71).

Matthews, A.,1976, Magnetite formation by the reduction of hematite with iron under hydrothermal conditions: American Mineralogist, v. 6l, p. 927-932.

PaGeode, Pennsylvania Geological Survey, https://www.gis.dcnr.state.pa.us/pageode/

Smith, L. L. (1931), Magnetite Deposits of French Creek, Pennsylvania, Pa. Geol. Survey, 4th Series, Mineral Resources Bulletin M l4, 52 p.

Spencer, A. C., 1908, Magnetite deposits of the Cornwall type in Pennsylvania: U. S. Geological Survey Bulletin 359, 102 p. (p.29).


## Biography

William (Bill) Kochanov (ko-chan’-off) is a former Senior Geologist with the Pennsylvania Geological Survey. Although most noted for authoring the series of county reports specifically designed to characterize sinkholes and karst within Pennsylvania, he had also been the lead investigator for bedrock mapping projects in the Northern Anthracite Field, the Endless Mountain region, and within the Chester Valley of southeastern Pennsylvania.

# The Geology of Corundum Hill, Chester County, PA – Serpentinites intruded by Pegmatites

**Ryan Kerrigan, PhD**
**University of Pittsburgh - Johnstown**

The Unionville Serpentine Barrens of southeastern Pennsylvania has been known to mineral collectors as Corundum Hill, Mineral Hill, and Point Prospect. The results of this study focus on the unique geologic conditions that promoted the development of this mineral deposit. A report of the field mapping, sampling, and petrographic and geochemical analyses of the serpentinite, pegmatites, and contact aureoles detail the conditions for mineral growth at the Unionville Serpentine Barrens. Geochemical analyses support the hypothesis that the serpentinite was originally the basement component of an island arc that collided with the eastern margin of North America about 450 million years ago. Trace elements plotted on granitic discrimination diagrams suggest that the source melt for the pegmatite intrusions was likely volcanic-arc granites or postcollisional granites. Petrographic textures and element concentrations across the contact aureoles depict areas largely affected by magmatic fluids where significant component exchange occurred. All told, these conditions encouraged the development of unique mineral associations.

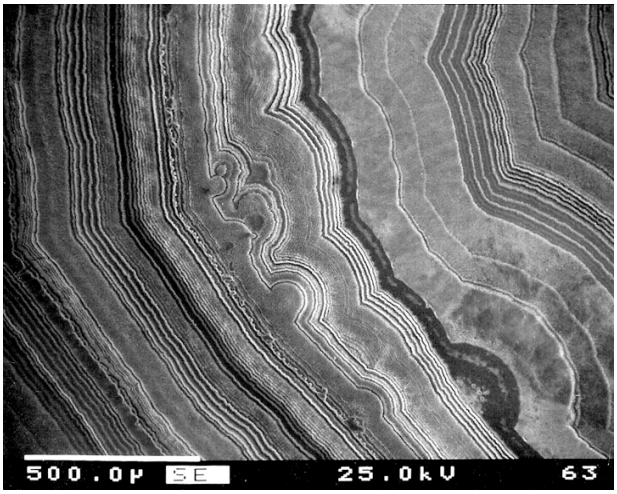
**Biography**

Dr. Ryan Kerrigan graduated from Bridgewater State University with a B.S. in Geology and B.A. in Chemistry before attending the University of Minnesota for his M.S. in mineralogy/petrology. Dr. Kerrigan moved to the University of Maryland to complete his Ph.D. in experimental petrology. After his Ph.D., Dr. Kerrigan spent four years in the private sector completing environmental site assessments and remediation projects where he earned his Professional Geologist's license. In the Fall of 2014 Dr. Kerrigan joined the faculty at University of Pittsburgh at Johnstown and is now an Associate Professor and Chair of the Department of Energy and Earth Resources. Dr. Kerrigan's current research interests include: hydrothermal alteration of ultramafic/mafic rocks, the petrogenesis of granitic and pegmatitic bodies, provenance of orogenic emplacement formations, geology of the central Appalachian Piedmont, and pedagogy in the geological sciences.

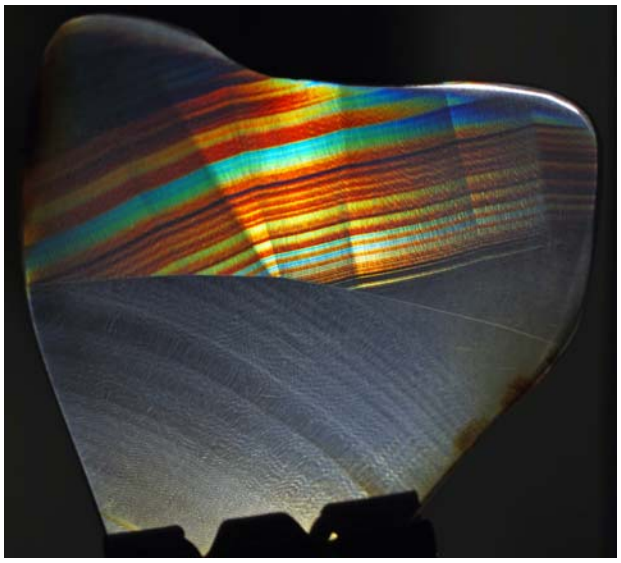
# Iris Agates and Cantor Dusts: The Textural Complexity of Agates

**Peter J. Heaney, PhD**
**Department of Geosciences**
**Pennsylvania State University**

Agates are most famous for their concentrically colored bands, which often are geometrically intricate. Commonly, this polychromatic layering will enable a skilled collector to trace a given agate to its locality with high fidelity. Imprinted on these pigmented bands, however, is yet another type of pattern—a repetitive microfabric with respect to the quartz crystals that compose the chalcedony within an agate. Although this silica texturing is much subtler than the bright colors imparted by metal oxide inclusions, it gives rise to the diffraction effects responsible for the rainbows of iris agate. Moreover, the crystalline defects often occur as a hierarchical fabric characterized by the fractal qualities of a so-called Cantor dust. This presentation will describe the curious nature of the Brazil twins that populate agates as oscillatory waves at length scales of nanometers, microns, tenths of millimeters, and centimeters.



Scanning electron photomicrograph of an agate etched with hydrofluoric acid revealing the micron-scale banding that gives rise to iridescence.
*Peter Heaney image*


Iris agate *Dave Ault photo*

## Biography

Peter Heaney has been a professor of mineral sciences at Penn State University since 1998. He received his Ph.D. from Johns Hopkins in 1989. In 2008 he served as President of the Mineralogical Society of America (MSA), and helped for four years to organize the celebration of MSA's centennial in 2019.

- - NOTES - -

# Minerals of the Silver Hill Quarry, Brecknock Township, Lancaster County, Pennsylvania

**Ronald A. Sloto, PG**
**West Chester University**

The Silver Hill Quarry is located in eastern Lancaster County, 0.8 mile southwest of the Berks County boundary. It is an active quarry owned and operated by the H&K Group, Inc. The quarry is in Jurassic diabase, which has intruded into the Triassic-age Hammer Creek Formation. A suite of interesting minerals is found in the contact zones and in the diabase itself. Minerals found there include actinolite, albite, allanite-Ce, anhydrite, apatite group, apophyllite, calcite, chalcopyrite, chlorite, chrysocolla, dravite-schorl series, hematite, heulandite-Ca, hornblende, laumontite, malachite, microcline, muscovite, prehnite, quartz, scapolite, and titanite.

Apatite crystal, 3.8 cm, on actinolite from the Silver Hill Quarry. Edward Goebel collection.
*Ron Sloto photograph.*

## Biography

Ron Sloto is on the research faculty of West Chester University of Pennsylvania (WCU). He is the curator for the WCU mineral collection and Director of the WCU Geology Museum. He conducts research on the chemical composition of minerals of southeastern Pennsylvania. Ron retired from the U.S. Geological Survey in January 2015 after a 41-year career that included publication of over 80 reports, journal articles, and abstracts. The HYSEP hydrograph-separation computer program he developed is in worldwide use. Ron has been a mineral collector since the age of 5 and also has a keen interest in history. He has published books on the mining history and mineralogy of Chester County ("The Mines and Minerals of Chester County, Pennsylvania"), Berks County ("The Mines and Minerals of Berks County, Pennsylvania") and Montgomery County ("The Mines and Minerals of Montgomery County, Pennsylvania"). He is currently working on a similar effort on Bucks County mining history and mineralogy. He is a frequent contributor to the Friends of Mineralogy Pennsylvania Chapter and National newsletters.

# Pyromorphite! The Famous Phoenixville Lead-Zinc Mines

**Bill Stephens, PG**
**Stephens Environmental**

The orebodies were initially discovered by Charles Pickering who thought he had discovered silver ore and obtained a grant of 5358 acres known as Pickering or Mine Hole Tract in 1682. Mining of Lead ore, which included Pyromorphite, began at the Wheatley Mine (most extensive and productive of the mines in the area) in 1850. The lead mining boom of the 1850's produced "some of the finest lead minerals the world had ever seen. Especially notable, and best known to collectors is the bright green pyromorphite from the Wheatley Mine." (Ronald A. Sloto, The Mineralogical Record, Volume 20 Number 5, Sept.-Oct. 1989, p. 369-386). Beneath the gossan, shallow zones of pyromorphite comprised the majority of the lead ore, which may account for the abundance of pyromorphite in the dumps. Many superior specimens of pyromorphite from the Phoenixville District reside in world class private and museum collections around the world.

PYROMORPHITE, 6.6 cm. Wheatley Mine, William Jefferis collection at Carnegie Museum of Natural History, Pittsburgh. *R. Sloto photograph*

The mines were essentially idle from the 1860's to 1917 when the Eastern Mining and Milling Company did additional mining (Southwest Chester Mine) that lasted until 1920. The Wheatley Mine was evaluated as a strategic mineral deposit in 1947-48, but no significant ore was encountered.

Today, The Wheatley dumps are on private property and are closed to collecting. The Brookdale and Chester mines reside on a Golf Course which does allow collecting. The Brookdale dumps around the old steam engine stack are picked over, but still produce micros. The Chester dumps, if one can find them, still produce nice thumbnail to small cabinet size specimens.

S.W. Chester County Mine dumps specimens -My Collection- Acquired from another collection.

**Biography**

Bill Stephens is a licensed Professional Geologist, Current President of FM-PA Chapter and President of Stephens Environmental Consulting, Inc., a full-service environmental consulting, engineering and surveying company serving in the Mid-Atlantic Region since 1995. Bill is also a past VP of Programs for the Delaware Mineralogical Society. Bill started collecting about age 11, after being inspired by a National Geographic article on gems of the Eastern Appalachians. Family and later college buddy collecting trips focused on collecting mainly in North Carolina, with incidental trips to southeastern PA locations including Phoenixville. More recently Bill has developed a passion for "machine digs", including Diamond Hill and Hogg Mines machine digs, from which real knowledge of these deposits can be obtained. Bill uses his resources, including geological knowledge, GIS skills and drones to develop programs designed to inspire others and help provide them more tools to be more successful in their collecting adventures.


**Parking at Bright Side Opportunities Center - FM-PA Symposium**