Friends of Mineralogy
Pennsylvania Chapter

Fall Symposium

Pennsylvania
Mining and Mineralogy

November 12 & 13, 2022

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

Wavellite, Lime Ridge, National Limestone Quarry #2 property, Mount Pleasant Mills, Pennsylvania.
Bill Stephens specimen and 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
• **NEW!** Membership in EFMLS with its many benefits

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 for full lecture attendance available on request.

Pennsylvania Mining and Mineralogy

Friends of Mineralogy - Pennsylvania Chapter
Fall Symposium November 12 & 13, 2022

SCHEDULE of EVENTS

		page
Saturday, November 12:	**SYMPOSIUM,** Bright Side Center, Lancaster, PA	
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** **Reconnaissance of mineral collecting sites in southeastern Pennsylvania**	**4**
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.	**Ronald A. Sloto, PG, West Chester University** **Classic Mineral Localities of Bucks County, Pennsylvania**	**6**
11:20 a.m. to 12:50 p.m.	LUNCH BREAK - lunch on your own (local map on page 4) Silent auction continues until 1:00 - Room open during lunch	
1:00 p.m.	Silent Auction ends	
1:10 to 1:55 p.m.	**Stephen R. Lindberg, University of Pittsburgh at Johnstown** **Geology of the New Paris Limestone Quarry, Napier Township, Bedford County, Pennsylvania**	**8**
1:55 to 2:40 p.m.	**C. Lee McIlvaine IV, Professional Geologist** **Journey to Greenland Ilímaussaq Alkaline Complex, Kujalleq, South-west Greenland**	**10**
2:40 to 2:55 p.m.	BREAK	
2:55 to 3:55 p.m.	**Bill Stephens, PG, Stephens Environmental** **Report on Re-opening the Mount Pleasant Mills, Snyder County, Pennsylvania, Wavellite Occurrence with supplement, Geology & Mineralogy...**	**12** **13A-13H**
3:55 to 4:05 p.m.	**Field Trip Instructions**	
4:05 to 4:15 p.m.	Distribution of Prof. Development Hours certificates to PGs	

Sunday, November 13: FIELD TRIP to collect at National Limestone Quarry at Mount Pleasant Mills, Snyder County, PA **see maps on page 14**

9:00 a.m. to 3:00 p.m.	**For Symposium Registrants Only** Meet at quarry office, 217 Quarry Rd., Mount Pleasant Mills PA 17853 for sign-in, safety meeting and orientation. Personal safety equipment required.

Lancaster / Bright Side local street map **16**

Reconnaissance of mineral collecting sites in southeastern Pennsylvania

Bill Kochanov, PG
Pennsylvania Geological Survey, retired

The search for classic mineral localities is an arduous task. Word-of-mouth discussions oftentimes fall short of the key ingredient, a precise location. It is common within the realm of collecting lore, that these locations are not forthright, as is apparent by an individual's sudden case of failing memory or the interpretation of an illegible, hand-scrawled map displayed on a weather-beaten, coffee-stained napkin.

In the detective world, planned collecting forays usually begin with researching the available literature. The trailhead usually starts with the perusal of well-known publications, Genth (1875), Gordon (1922), Montgomery (1969), Smith (1978), publications from the U.S. and Pennsylvania Geological Surveys, and more recently, the series of reports by Sloto (2009, 2016, 2019, 2022).

Aerial imagery available through Google Earth Pro and lidar imagery from the PASDA website, as well as county GIS data layers, can reveal evidence for historic mining activity and crucial data on property ownership.

Utilizing these publicly available tools, past mineral localities can oftentimes be identified with surprising accuracy and repositioned onto modern-day base maps. Field checking is a necessary step to ascertain access points, parking, and other useful logistical information. Finally, the site itself needs to be evaluated as to its collecting potential, tools needed, and crowd limits.

As examples, an exploratory foray was conducted in May 2022, briefly evaluating three sites over a 4-5-hour period.

Site 1 was an exposure of anorthosite in Chester County (O'Neill, 1952). Interest in this site stemmed from the rather unique occurrence of anorthosite and its relatively close proximity to the Cornog locality (G-33,1969, Chester County, p. 56). Historically, outcrops in the general area are rare but it was thought that bedrock exposures may exist along an abandoned rail line, now a rail trail, that parallels the western bank of East Brandywine Creek and that there was potential for other specimens among the alluvial cobbles and boulders. The preliminary review of data successfully led to a lone outcrop, oozing with the targeted anorthosite.

The Site 2 foray was an effort to field check anomalous topographic features identified through viewing the lidar imagery of the Mineral Hill region of Delaware County (Gordon, 1922, p.

191). Greenbriar and poison ivy aside, reconnaissance resulted in identifying a series of metamorphosed bedrock exposures along one of the tributaries to Ridley Creek and the serendipitous rediscovery of a noted amazonite locality.

Site 3 revisited Smedley Park (G-33, Delaware County, p. 81, 1969). Although a county park, the visit was to assess mineral occurrences more or less along the fringe of the park borders. Limited time at the site revealed several nice outcrops of mica schist and tempting pieces of pegmatitic float throughout the park warranting further exploration.

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.

Classic Mineral Localities of Bucks County, Pennsylvania

Ronald A. Sloto, PG
West Chester University

Bucks County is one of three original counties established by William Penn in 1682. Its name is an abbreviation of Buckinghamshire, the county where Penn lived in England. Mining in Bucks County predates the arrival of Penn in the New World. The Dutch are believed to have mined copper in Upper Makefield Township about 1650. Bucks County's varied geology produces an abundance of minerals; 91 mineral species are reported from Bucks County.

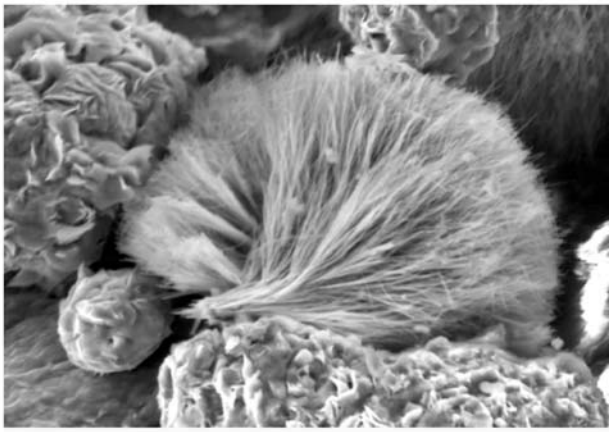
Classic mineral localities covered include the two most prolific localities in Bucks County-the New Galena lead mines in New Britain Township and Vanartsdalen's quarry in Lower Southampton Township. Most mining at New Galena was done by the Neimeyer Brothers in 1862-1863; however, many unsuccessful attempts to re-open the mines took place between 1870 and1930. The Vanartsdalen quarry, located on the Playwicki Farm Park property, is underlain by a unique carbonate unit that produced a suite of minerals unique to Pennsylvania. Mineralogists took an early interest in the minerals from Vanartsdalen's quarry; descriptions were published as early as 1829.

Other major mineral localities include the Edison quarry in Doylestown Township (the location is often given as Chalfont); the Eureka quarry in Warrington Township, which is noted for anatase, weird pyrite crystals, and smoky quartz crystals; the Rock Hill quarry, a diabase quarry in East Rockhill Township known for purple prehnite, yellow epidote, and green titanite crystals; Finny's quarry in Northampton Township, famous for its zircon crystals; the New Hope tourmaline locality, first described by Henry Darwin Rogers in 1843, known for unusual tourmaline crystals and epidote nodules; and the Rush Valley quarries in Wrightstown Township. Other localities also are described.

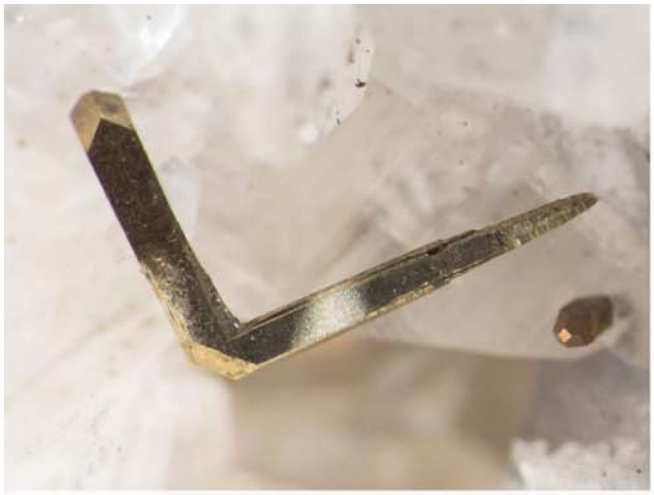
Biography

Ron Sloto is on the research faculty of West Chester University. He serves as the curator for the mineral collection at the University, and is the Director of the WCU Geology Museum. He conducts research on the mineralogy of southeastern Pennsylvania. Ron Sloto 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"), Montgomery County ("The Mines and Minerals of Montgomery County, Pennsylvania"), and recently, Bucks County ("The Mines and Minerals of Bucks County, Pennsylvania"). He is currently working on a similar effort on Delaware County mining history and mineralogy. He is a frequent contributor to the Friends of Mineralogy Pennsylvania Chapter and FM National newsletters. His most recent publication is "Phosphate Minerals from Lime Ridge, Snyder County, Pennsylvania" in the September-October 2022 issue of The Mineralogical Record.

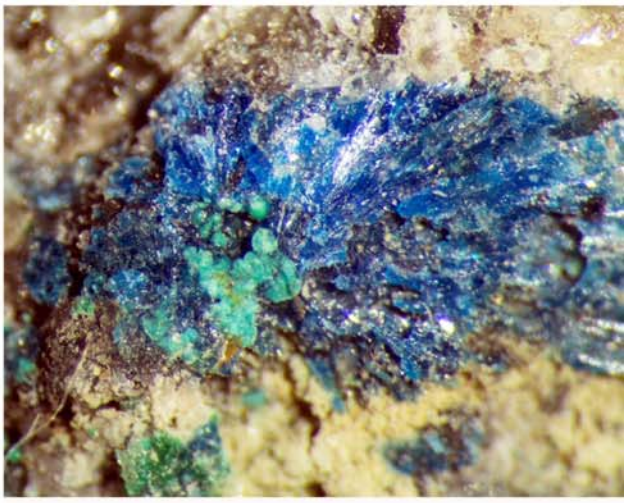
Doubly terminated smoky quartz crystal from the Eureka quarry.



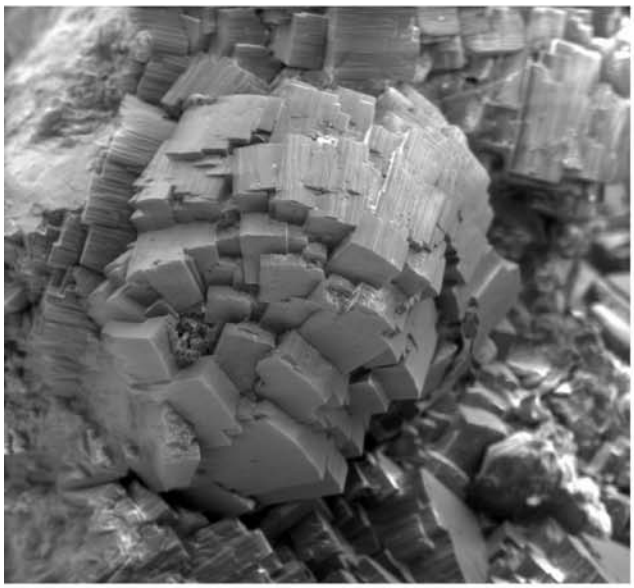
SEM image of goethite "bush" from Eureka quarry.



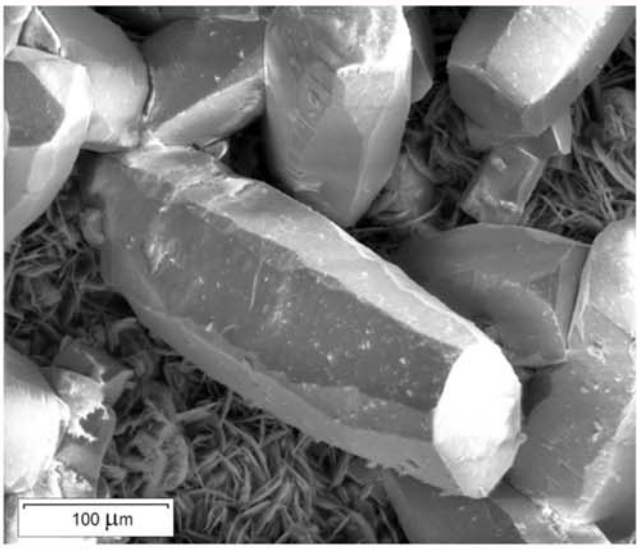
Pyrite crystal from the Eureka quarry.



Linarite and malachite from the New Galena mine.

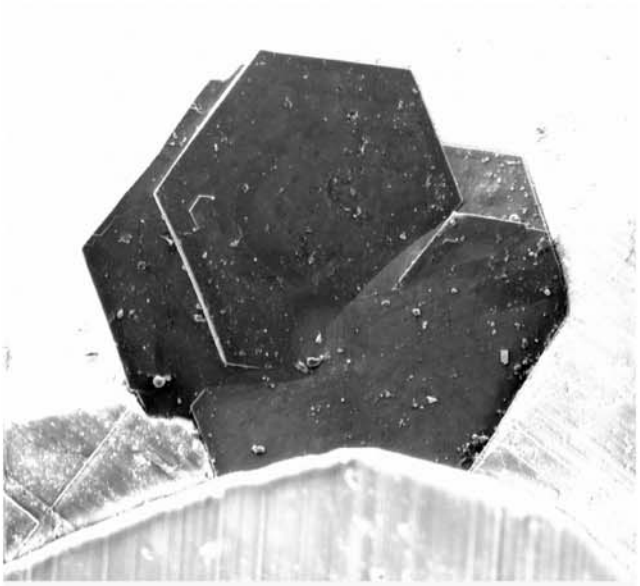


SEM image of prehnite
from the Rock Hill quarry.



SEM image of synchysite-Ce on siderite from
Rush Valley quarry #1.

Wulfenite and pyromorphite from the
New Galena mine.

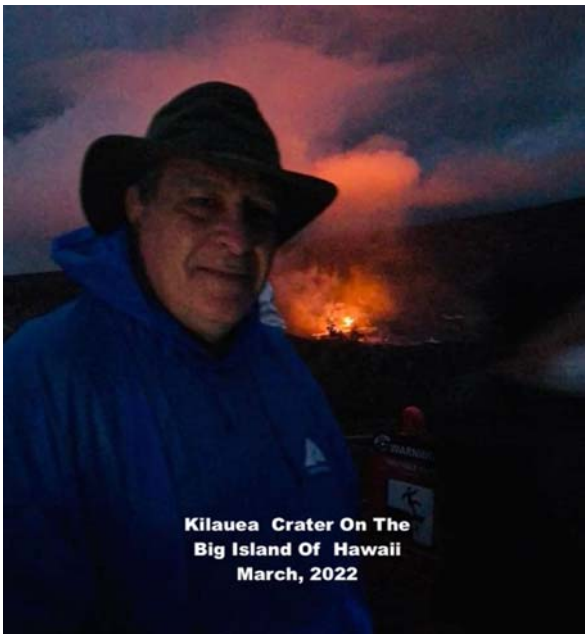


SEM image of pyrrhotite from the Eureka quarry.

Geology of the New Paris Limestone Quarry, Napier Township, Bedford County, Pennsylvania

Stephen R. Lindberg
Energy And Earth Resources Dept.
University of Pittsburgh at Johnstown

Formerly owned and operated by the New Enterprise Stone and Lime Co., the New Paris limestone quarry exposes an exceptional series of upper Silurian and lower Devonian limestone units. The quarry provides a wealth of stratigraphic and depositional sequences that enable a reconstruction of the paleo-environment of the region during the middle Paleozoic Era. Abundant fossils that include brachiopods, corals, bryozoans, trilobites, and stromatoporoids offer a clear picture of invertebrate life that flourished within the shallow seas. Evidence of low temperature hydrothermal activity is substantiated by the presence of mineralized veins that contain calcite and fluorite. Now privately owned and maintained as an educational site, the New Paris quarry is a unique geological location.



Biography

Steve Lindberg is an adjunct professor of geology in the Energy and Earth Resources Department at the University of Pittsburgh at Johnstown Pennsylvania. He began teaching at Pitt-Johnstown in 1997; his college courses there include Physical Geology, Prehistoric Life, Earthquakes and Volcanoes, Astronomy, Meteorology and Geologic Field Methods. After retiring from public education in 2012, Steve was able to increase his course load at Pitt-Johnstown and spend more time pursuing his interests in geology; especially paleontology and the regional geology of western Pennsylvania. Steve has

been a member of the National Association of Geoscience Teachers since the early 90's, and has twice served as president for the association's eastern section. In 1992 Steve was awarded the eastern section's Outstanding Earth Science Teacher for Pennsylvania by the National Association of Geoscience Teachers. He is a member of the Geological Society of America and attends the northeastern section meetings with his geology students on a regular basis. As a regular participant in the annual Field Conference of Pennsylvania Geologists; Steve served as a field trip leader during recent conference field trips. As a geologist and geoscience educator; Steve maintains a strong commitment to bring the geoscience experience to others and routinely arranges field trips for his college classes and other interested groups. The New Paris Limestone Quarry in Bedford County is frequently used as a geoscience educational site to help accomplish these goals. Some of his more recent geologic excursions include assisting on a March 2016 geology club spring break trip to Iceland, a 2018 trip to Scotland, and a March 2022 trip to Hawaii.

Journey to Greenland Ilímaussaq Alkaline Complex, Kujalleq, South-west Greenland

C. Lee McIlvaine IV, Professional Geologist

The Ilímaussaq Alkaline Complex has been the subject of study by professional and amateur mineralogists, geologists and others for more than two centuries. Located in southwest Greenland, it is part of the Gardar province which includes ten alkaline intrusive bodies formed between 1.2 to 1.1 billion years ago. The three more well-known intrusions are Ilímaussaq, Ivigtut (cryolite deposit), Narssarssuk (Igaliko). All ten intrusions lie with an area approximately 200 km (east-west) by 70 km (north-south). The Ilímaussaq complex is roughly 8 km by 17 km long spanning across two fjords.

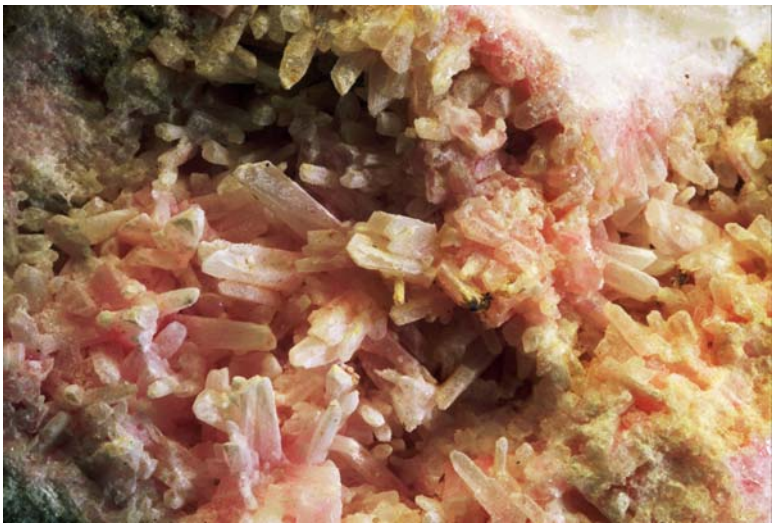
The first well documented and methodical study of Greenland for potential mineral resources was conducted by the German Karl L. Giesecke (1761-1833). He arrived in Greenland on May 31, 1806 and stayed until August 16th, 1813. For 7 years he visited many of the well known deposits in Greenland today, several of them twice. The material he collected from the Ilímaussaq complex resulted in the new minerals species sodalite, eudialyte, and arfvedsonite.

Briefly, there are two local connections to Greenland. The mineral ralstonite found in cryolite at the Ivgtut deposit was named after the Reverend James G. Ralston (1815 - 1880), an amateur mineralogist from Norristown, PA. And the more well-known Samuel Gordon of the Academy of Natural Sciences visited twice in the 1920's. He visited both Ilímaussaq and the cryolite mine at Ivigtut further up the coast.

In the mid-1950's the Ilímaussaq complex was the subject additional scientific studies to evaluate uranium resources. The work included advancing a shallow test adit for uranium into the side Kvanefjeld. The studies also measured the beryllium concentrations and beryllium minerals in the complex. Some of the research publications referenced specific measurement points which were still able to be re-located in the early 2000's, some 50 year later. In 1960 a new mineral species called "beryllium sodalite" was described in a paper by H. Sorenson from the Ilímaussaq complex and at almost the same time a "beryllo-sodalite" was described by Semenov and Bykova from the Lovozero massif, Kola Peninsula, Russia. The IMA approved this new mineral species as tugtupite in 1965. The type locality for tugtupite is tugtup agtakôrfia along the Tunullarfik Fjord in the Ilímassauq complex. Tugtupite is one of the most sought-after gemstones in Greenland due to its rarity.

In the 1977-1980 era, additional drilling and exploration work was completed by the Danish at Kvanefjeld including the digging of a 1,000 ft long adit into the side of Kvanefjeld. Additional work was completed to evaluate the economics and methods to extract the uranium ore from the surrounding rock. This effort was ended in 1983 during the "no nukes" era for fear the uranium would be used to make atomic weapons.

For approximately the last 15 years renewed efforts have been made by Greenland Minerals Ltd. (formerly Greenland Minerals & Energy) at and near the Kvanefjeld section of the Ilimassauq complex to assess the economic value of the deposit for critical minerals (rare earth elements). The economic assessment was completed after several summers of core drilling. They estimate up to 1 billion tonnes of mineral resources are in the Ilimaussaq complex in three areas including up to 108 million tonnes of ore. Additional health risk assessment work was completed to assess potential health impacts from mining at Kvanefjeld. These potential impacts divided the town of Narsaq (pop. ~1,500). And with a recent change in the national Greenland governance, the plans to obtain a mining exploitation permit recently hit a road block when the company's draft mining permit for their Kvanefjeld Project was denied. Only time will tell if this mineral rich alkaline deposit will be mined. Until then it is a beautiful place to visit and view the geology. This presentation will share the highlights of five visits to the Ilímaussaq complex between 2002 and 2015.



Tugtupite crystals. *Jeff Scovil photo*

Tugtupite crystals.

Lee collecting in Greenland.

Tunuliarfik Fjord by helicopter.

Biography

Lee was awarded Bachelor of Science and Master of Science degrees in Geological Science from Lehigh University in 1996 and 1998. He worked in environmental consulting for 23 years before joining USACE in the Philadelphia District's Geo-Environmental Section in October 2021. He holds Professional Geologist licenses in Pennsylvania, California, and Washington State. Lee lives just outside of Philadelphia with his wife Charlotte and their daughter Noël (8) who attended her first Tucson Gem and Mineral Show® this year.

Lee's interest in rocks and minerals started at an early age, including hikes in the Wissahickon Valley and a long weekend in 1998 attending a family wedding near Franklin, New Jersey. He has been a member of the Philadelphia Mineralogical Society (PMS) since 1988 and the Fluorescent Mineral Society (FMS) since 1994. He recently became the President of the FMS and is a board member of PMS. He also runs the Fluorescent Mineral only Show "Ultraviolation" for the Rock and Mineral Club of Lower Bucks County (RMCLBC) which is held on the last Saturday in October in Fairless Hills, PA. When Lee is not busy supporting these societies, he enjoys field collecting trips. He has collected minerals in 13 states and 3 countries.

In the summer of 2002, Lee took a new opportunity to expand his field collecting internationally to collect minerals in southwest Greenland. The trip truly felt like an expedition. During this trip, Lee was fortunate enough to find a small vug of rare tugtupite crystals. He has returned to SW Greenland four additional times over the last 20 years. His presentation will share the highlights of these five journeys to collect fluorescent minerals within the 1.2-billion-year-old Illímaussaq Alkaline Complex in SW Greenland near the town of Narsaq.

Report on Re-opening the Mount Pleasant Mills, Snyder County, Pennsylvania, Wavellite Occurrence

Bill Stephens, PG
Stephens Environmental
EFMLS President, Webmaster & Region IV RVP and FM-PA Chapter President

Many of you are aware of the wavellite deposit at the National Limestone Quarry at Mount Pleasant Mills (NLQ-MPM), Pennsylvania, located approximately 40 minutes north of Harrisburg in Snyder County, PA. Many of you have seen my power point presentation at least once ☺. For those of you that haven't and by way of refresher for those that have, green was discovered by the Quarry owner Eric Stahl in the early 2000's while clearing a perimeter roadway on the southerly, upper bench of the quarry along the southerly property line. He invited a local rockhound/expert collector or two to investigate, they did some digging and confirmed the species to be wavellite. They mined a bit, word got out and clubs began asking permission to come and dig.

Wavellite and associated species identified at the site including planerite are phosphates, largely of mineralogical interest, though non-specimen grade wavellite had been mined around the turn of the 20th century at another site in PA for matches (Stefanic, Michael, Master's Thesis). The type and classic locality for specimen quality wavellite in the US is in Arkansas, and pretty much any mineralogy/mineral book you pick up that has examples of wavellite will show a color specimen from Arkansas. What we now realize is that specimens from NLQ-MPM rival any from Arkansas in size and quality, and the deposit is just being explored. MPM wavellite is not documented in the literature beyond an abstract two paragraphs long in a proceedings book from the mid-2000's.

I first visited this site in 2015 (I think) and had great success. I went back several times as the first time the adit was open and we were able to get at the veins in solid rock, not spoils. I and others got some killer specimens. I prepared my first Power Point Presentation that year and have updated and amended it every year since. In 2017 I started considering developing a peer-reviewed article, probably for Mineralogical Record and teamed up with Ron Sloto, formerly of the USGS and now retired but doing independent research at West Chester University on PA minerals, to work toward the goal of publishing the definitive guide to MPM Wavellite. A death in the family while onsite followed by other work-related commitments and the COVID forced me to post-pone my efforts until this year. Ron had already submitted his article, which has been accepted for publication in the Mineralogical Record.

I spoke with Eric again after several years, explained what I wanted to do and paid to conduct excavation work for specimen recovery and geological work before the first club was scheduled to arrive April 9th, 2022. Over the last few years, the site and road have become overgrown, and fresh specimens unobtainable on short half-day club trips, and as productivity dropped off to near nothing, so did the digging. As part of the excavation mission, I had Eric's son clear the road, so it was passable for any vehicle, and remove the waste overburden and expand the hole first downward, and then forward. We built up the ramped portion of the roadway with waste spoils to soften the grade change which left room to place new spoils in the old mined-out section and allow room to build a pad for the track hoe over the mined-out area.

Machine-assisted excavation and documentation of wavellite veins was conducted 5 days over a period of about a month, with other geologic work ongoing. Take a look at the images below showing the quarry and westerly wavellite pit as of April 13, 2022.

Check out the pictures on the next page of specimens that have only been pressure washed.

My geological work is on-going and you may see me up there some Saturday during a club dig. The quarry produces nice calcite crystals, strontianite "balls", some fluorite and occasional celestite, but the wavellite is only on the upper bench at MPM. No individuals are permitted in the quarry and safety gear as well as insurance and sign-in sheets are required. Our field trip this year will be to the quarry and I'll be your guide to all things green. Happy Hunting!

Wavellite "Astroturf" ??

"Pina Colada" wavellite

"Peas Popping"

Needs some cleaning but greening. Love the shimmer.

Biography

Bill Stephens is a licensed Professional Geologist (DE, NC, PA, SC, VA, UT), Current President of FM-PA Chapter, EFMLS President, Region IV RVP & Webmaster, 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, Hogg Mine, Mount Pleasant Mills and Area 52 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.

Geology & Mineralogy of the National Limestone Quarry, Mount Pleasant Mills, and the now famous Wavellite Occurrence

By

Bill Stephens, PG, President

Stephens Environmental Consulting, Inc.

EFMLS President & Region IV RVP

FM-PA Chapter President

Many of you are aware of the Wavellite deposit at the National Limestone Quarry at Mount Pleasant Mills (NLQ-MPM), Pennsylvania, located approximately 40 minutes north of Harrisburg in Snyder County PA. This quarry mines limestone mainly of the Keyser and Tonoloway Formations that occur within Lime Ridge. Like many quarries exploiting these formations, minerals such as calcite, dolomite, strontianite, celestite and fluorite are found at this quarry and have been of interest to collectors for decades. The discovery of Wavellite in 2000 by the owner has piqued interest in this particular location.

Many of you have seen my power point presentations on Wavellite at least once 😊. For those of you that haven't and by way of refresher for those that have, "green" was discovered by the Mount Pleasant Mills quarry owner Eric Stahl in the early 2000's while clearing a perimeter roadway on the upper bench of the quarry along the southerly property line. He invited a local rockhound/expert collector or two to investigate, they did some digging and confirmed the species to be wavellite. They mined a bit, word got out and clubs began asking permission to come and dig.

Wavellite and associated species identified (and confirmed by laboratory testing by Ron Sloto) at the site including planerite, turquoise, variscite, vauxite and cacoxenite, are phosphates, largely of mineralogical interest, though non-specimen grade wavellite had been mined around the turn of the 20th century at another site in PA for matches. That small processing facility blew up and that was that (Stefanic, Michael, Masters Thesis). The phosphates occur in siliciclastic rocks of the Ridgeley member of the Old Port Formation, which is younger than the Keyser Formation it overlies. The beds of the Ridgeley that contain Wavellite occur in a relatively narrow zone of near vertical dipping beds that run roughly parallel to this perimeter road.

The type and classic locality for specimen quality Wavellite in the US is in Arkansas, and pretty much any mineralogy/mineral book you pick up that has example photographs of Wavellite will show a color specimen from Arkansas. What we now realize is that specimens from NLQ-MPM rival any from Arkansas in size and quality, and the deposit is just being explored. MPM Wavellite was not documented in the literature beyond an abstract two paragraphs long in a proceedings book (Rochester I believe) from the mid-2000's until Ron Sloto published his article on the Phosphate Minerals of Lime Ridge in the most recent issue of the Mineralogical Record.

I first visited this site in 2015 (I think) and had great success. I went back several times as the first time the adit was open and we were able to get at the veins in solid rock, not spoils. I and others got some killer specimens. I prepared my first Power Point Presentation that year and have updated and amended it almost every year since. My interest in studying the structural geology, phosphate mineralogy and paragenesis and specifically the wavellite occurrence began in 2015 with a mapping mission terminated abruptly due to family emergency but was renewed this year with a machine dig and preliminary mapping effort.

I spoke with Eric Stahl early this year and explained that I wanted to conduct excavation work for specimen recovery and geological work before the first club was scheduled to arrive April 9th, 2022. Over the last few years, the site and road had become overgrown, and fresh specimens were unobtainable on short half-day club trips, and as productivity dropped off to near nothing, so did the digging. As part of the excavation mission, I had Eric's son clear the road, so it was passable for any vehicle, and remove the waste overburden and expand the hole first downward, and then forward to the east. We built up the ramped portion of the roadway with waste spoils to soften the grade change which left room to place new spoils in the old mined-out section and allow room to build a pad for the track hoe over the mined-out area.

Machine-assisted excavation and documentation of wavellite veins was conducted 5 days over a period of about a month, with other geologic work ongoing. Look at the images below showing the quarry and westerly wavellite pit as of April 13, 2022. [see my article on the machine dig on the efmls.org website]

Mapping of the entire quarry was accomplished by drone mapping mission following the machine dig, with surveyed ground control points employed to constrain the 3D model and orthomosaic. There were some problems with the model due to the relief and some contours are off a few feet, but the mission was largely a success and yielded very high-resolution color orthomosaic and snapshot of the quarry just before the latest shot.

Additional structural data including strike and dip measurements on bedding, joints and fractures were taken remotely by Total Station and calculated using a spreadsheet developed by Oneida University and modified by myself for field application. This "proof of method concept" was also applied at the New Paris Quarry with great success and demonstrates how structural measurements can be taken with the corresponding position coordinates for those areas inaccessible for direct measurement. The structural analysis is ongoing, but what has become clear, and what we will show is that mineralization of collectible crystals in both the quarry and the Ridgeley member of the Old Port Formation is controlled by brittle deformation events. Calcite, minor fluorite, strontianite and celestine mineralization in the carbonate rocks of the quarry appears to be syntectonic, corresponding to the Alleghenian orogeny. Phosphate mineralization appears to be a post-Alleghenian epigenetic event, associated with renewed tectonism of undetermined age.

This presentation has been prepared to accommodate the field trip and future field trips to this locality, to aid in an understanding of the collectible minerals at this quarry. The reader is referred to the article on the Phosphate Minerals of Lime Ridge by Ron Sloto for phosphate mineralogy as the most current a definitive lab testing and confirmation of phosphate mineral species. Also, on you next visit to the quarry, be sure to checkout my poster and all the mineral specimens at the Middleburg Quarry, particularly the large and handsome celestite specimen collected this year. Thanks to Eric Stahl for his incredible generosity allowing rockhounds access to this quarry for collecting. Now that access to many locations has been restricted or permanently terminated, Mr. Stahl's singular generosity stands out.

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EXHIBIT_1: Digital Drone Orthoimagery
Sources: USGS, Cecil County GIS Dept., SECI, USDA

STEPHENS
W.O. 1854.SA
0 5 10 20 30
FIGURE_2: Digital Drone Orthoimage MPM 04-13-2022
West (upper) Wavelitte Pit Post-Dig
COPYRIGHT 04-13-2022
Sources: USGS, Cecil County GIS Dept., SECI, USDA

Photograph 1: View looking easterly at the conclusion of the limited Machine-Assisted Geologic Exploration of the Westerly (Upper) Wavellite Adit/Pit. Previously existing spoils that were used to build up and berm the road. New spoils that do contain specimens of Wavellite overlooked during the exploration. The active workings extend below the cardboard box easterly into the wall. The westerly side of the pit contains no Wavellite. Wavellite extends from the lower left (westerly, exposed) shoulder of the excavation to 3 feet off the southerly wall (road), down about 16 feet and easterly toward the easterly pit.

Check out some of these pictures of specimens that have only been pressure washed.

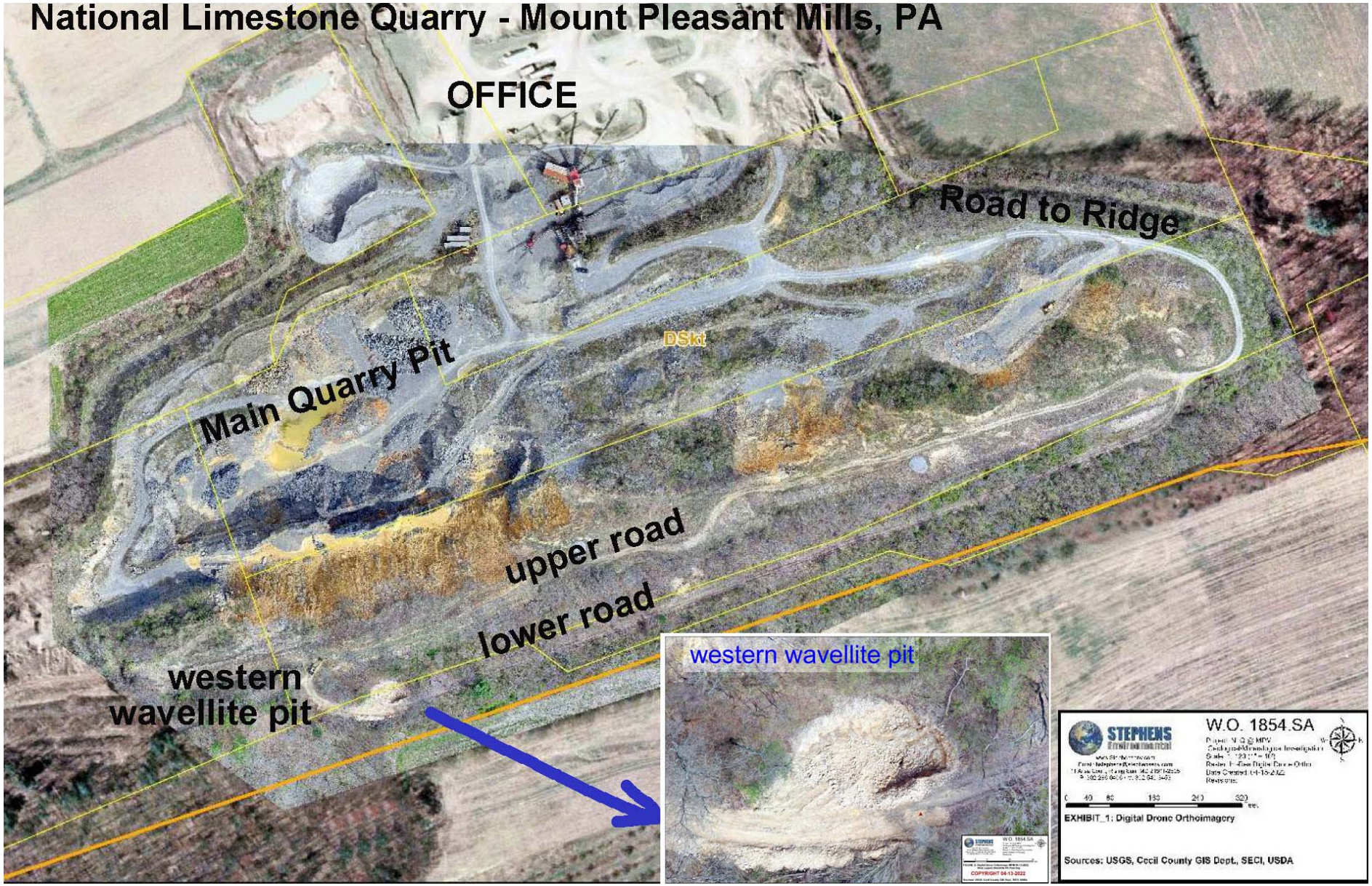
Wavellite “Astroturf” 😉

“Pina Colada” Wavellite

Needs some cleaning but greening. Love the shimmer.

“Peas Popping”

My geological work is on-going and you may see me up there some Saturday during a club dig. If you are interested in going, you must belong to or join a club that is scheduled to or can schedule a trip with the quarry owner. Safety meeting and the owner’s orientation and Christian testimony usually take place at the Middleburg quarry and collecting usually starts at Middleburg and ends up at MPM. Both quarries produce nice calcite, Strontianite, some fluorite and occasional Celestite, but the Wavellite is only on the upper bench at MPM. No individuals are permitted in the quarry and safety gear as well as insurance and sign-in sheets are required. If you want to know more about this site, feel free to shoot me an email, check out my Facebook page. Contact the National Limestone Quarry, Inc. quarry owner Eric Stahl at 570-837-1635 to schedule your club for a trip. Happy Hunting!


National Limestone Quarry - Mount Pleasant Mills, PA
OFFICE
Road to Ridge
DSkt
Main Quarry Pit
upper road
lower road
western wavellite pit
western wavellite pit
STEPHENS
W.O. 1854.SA
EXHIBIT_1: Digital Drone Orthoimagery
Sources: USGS, Cecil County GIS Dept., SECI, USDA

217 Quarry Rd,
Mt Pleasant Mills,
PA 17853
National Limestone
Quarry, Inc.
PA Rt 35
PA Rt 104
8 miles from US 15
N of Liverpool PA
Hilly Ridge
Sales & Service
Martins Family Hardware
Howell's Ice Cream King
Cruiser's Cafe
Fremont Automotive
German Diesel
Motorwerks
Fremont Social Hall
Pyle's Garage Doors
Mt Pleasant
Mills
George P. Garman
Funeral Homes
Shade Mountain
Mennonite Church
Family Practice
Center, PC
North Branch Mahantango Creek
Hiester Valley
Mill Race Rd
Willow Ridge Ln
Hiester Valley Rd
Flint Valley Rd
Kreiders Ln
St John's St
Jonathan Dr
Fremont Rd
Center Rd
Health Center Rd
Fairview Dr
Quarry Rd
Crossing Rd
Cluck Ridge Rd
Glen Wise Dr
Terrain
View topography and elevation
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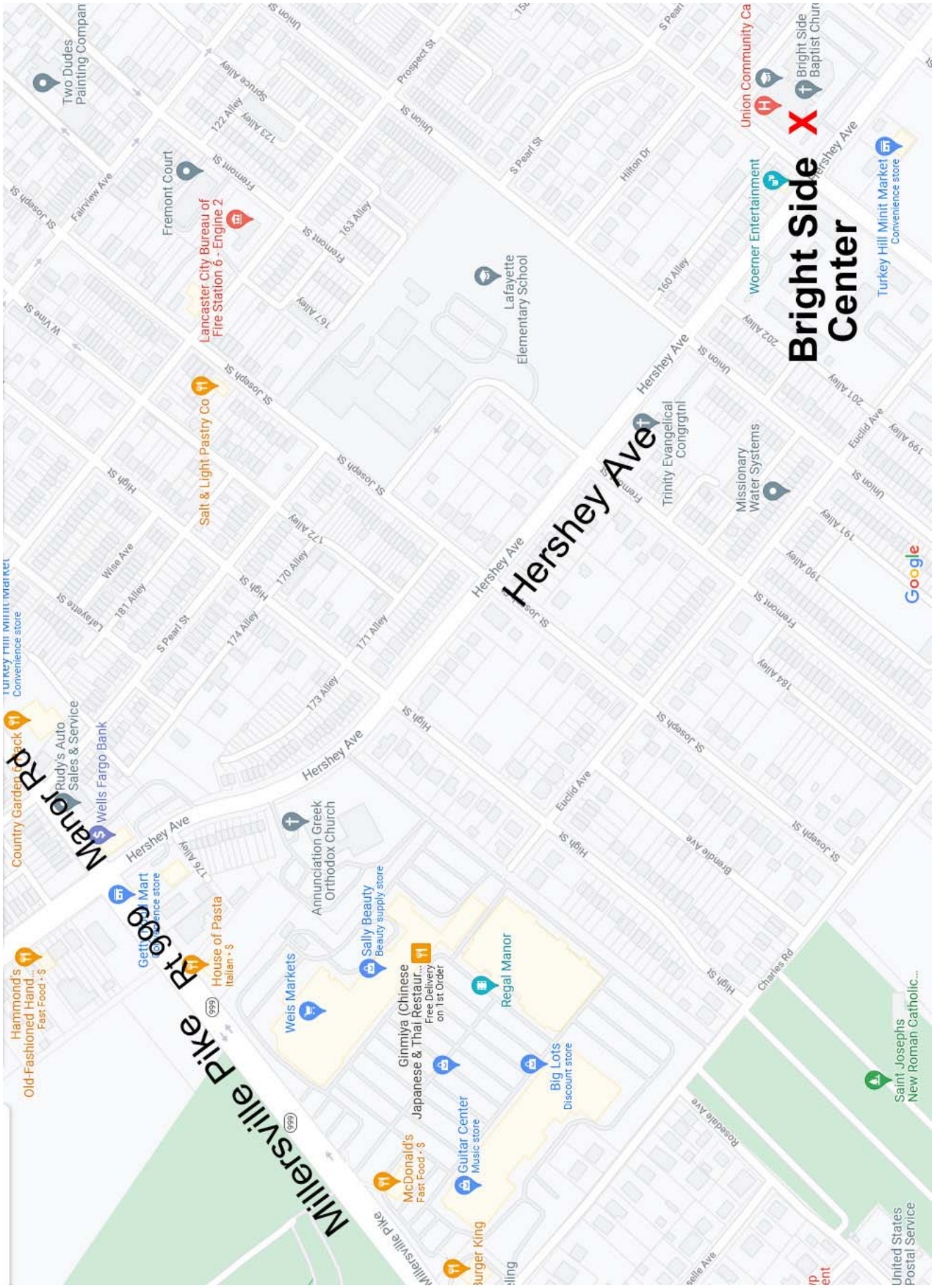
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Rt 999
Manor Rd
Lafayette Elementary School
Lancaster City Bureau of Fire Station 6 - Engine 2
Fremont Court
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Salt & Light Pastry Co
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Turkey Hill Minit Market
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Beauty supply store
Ginmiya (Chinese Japanese & Thai Restaur...
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