

# **FRIENDS OF MINERALOGY**

## **Pennsylvania Chapter**

### ***NEWSLETTER***

**Vol. 20, No. 3, Fall, 1992**

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#### **PRESIDENT'S MESSAGE**

##### **The 1992 Fall Symposium**

The Symposium has come and gone. My thanks to the Geology Department at West Chester University for their hospitality, helping to make this one our best Symposiums. The event was well attended and the speakers were excellent (see "News and Views" on p. 2).

Thanks, as well, to the committee who worked with me as chairman: Tania Birice, technical sessions coordinator; Arthur Dorne, Friday evening program coordinator; Jay Lininger, field trip coordinator; Marge and Vince Matula, refreshments; and Bill Yocom, raffle coordinator. Thanks also to the enthusiastic participants for making this a special Symposium.

##### **Colorado Field Trip**

It was my pleasure during the Denver mineral show to be able to host a field trip to the Patch Mine in Central City, Colorado, for those members and guests who attended the Denver mineral show. The group of about fifteen viewed the geology of the Colorado front range and collected some of the area's sulfide minerals. Since the field trip was a last-minute deal, I wish to thank those who spread the word by mouth, and their local club newsletters.

##### **Board Meeting**

The Board will be meeting in November to firm up plans for next year's events. It is also necessary at this time to select a new treasurer. Art Dorne has had to step aside because of health problems. We all wish him well, and thank him for the fine job he has done over several years, as a Board member, Symposium chairman, and, of course, treasurer.

Arnold Mogel  
4829 Belleman's Church Rd.  
Mohrsville, PA 19541

## MEMBERSHIP INFORMATION

**Dues:** Dues for the Pa. Chapter, which include \$5.00 for the National dues, are now \$10.00 or \$8.00 for seniors over 62 and students. Vince and Marge Matula, 10231 Honeysuckle Drive, Walnutport, PA 18088, are the Membership chairmen.

**Address Change:** Jay Lininger, 119 West Ridge Road, Dillsburg, PA 17019

**New Members:** Val H. Collins, R.D. 1, Box 340 C, Johnstown, NY 12095; Brad C. Shoesmith, P.O. Box 60064, King of Prussia, PA 19406-0064; Peter Hoffmann, 7918 Elwaton Ct., Glen Burnie, MD 21061; Eric J. Brosius, 157 Cobalt Ridge Dr., S., Levittown, PA 19057; and Robert Kulp, 2233 Little Rd., Perkiomenville, PA 18047.

**Editor:** Juliet C. Reed, 336 Rockland Rd., Wayne, PA 19087 (215-688-6180)

## NEWS AND VIEWS

### Coming Events

**November 21:** Open House and Auction of donated minerals and fossils, sponsored by the Wagner Free Institute of Science and the Mineralogical Society of Pennsylvania, at the Institute, 17th St. and Montgomery Avenue, Philadelphia, noon to 5 p.m. For further information on this benefit for the Institute, a Victorian National Historic Landmark, call the office at 215-763-6529.

### The 1992 Fall Symposium

The well-attended Friday night social and What's New" review was highlighted by a talk given by Heyward Wharton, on a rediscovered Delaware County chromite occurrence, which will be featured in a future *Newsletter*.

Saturday, Dr. David Gold of Pennsylvania State University, who grew up in South Africa, spoke on the carbonate minerals of the carbonatite rocks crystallized from igneous melts, illustrating the talk with slides of African localities. Ronald Sloto reviewed the mineralogy of the Phoenixville Lead Mines, nearby in Chester County, Pennsylvania, and mineralogist Vandall King, of Rochester, described the Consolidated #1 Pegmatite-Quarry Group, Topsham, Sagadahoc County, Maine, as well as introducing the audience, in another talk, to Benjamin Vaughan, "Grandfather of American Mineralogy and Patron of Cleaveland." Maureen Sherlock, a geologist with the U.S. Geological Survey reviewed the services of the Minerals Information Office in Washington, D.C. (more about that on page 3), and Jay Lininger, publisher of the magazine of historical mineralogy, *Matrix*, spoke about collectors and localities associated with the 100-year-old Philadelphia Mineralogical Society.

Before lunch, the audience had the pleasure of seeing Dr. Seymour Greenberg (West Chester State University, retired), our longtime host for the Symposium, win not one, but two, of the Raffle prizes. At noon, members and guests enjoyed a luncheon and a laughter-provoking, cartoon-illustrated talk on how others see geologists and geology, by Dr. William Brice, of the University of Pittsburgh at Johnstown.



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## NEWS AND VIEWS (cont'd)

### The Fall Symposium (cont'd)

After the afternoon lecture session, some very good buys were available at the Auction. Sunday's field trip to Adams County, led by Jay Lininger, was very worthwhile, and ended with the opportunity to see Jay's exceptional Pennsylvania collection, and enjoy Paula's hospitality at their home in Dillsburg.

### F.M., Pa. Chapter, *Newsletter* Back Issues, Index, and/or Reprints?

At the Board meeting in November, the editor will bring up the request of a member for back issues of the Newsletter, as well as the idea of an index for twenty years of the publication, and a reprint volume. Interested? Call or write the editor.

## THE U.S. GEOLOGICAL SURVEY'S INFORMATION OFFICE (1)

### Maureen G. Sherlock, Geologist, U.S.G.S.

The Minerals Information Office (M.I.O.) is the primary Federal clearinghouse for inquiries related to mineral resources and mining. The Office was established in 1988 in Washington, D.C., as a cooperative effort between the U.S. Geological Survey (U.S.G.S.) and the U.S. Bureau of Mines. The U.S.G.S. has subsequently established four other Minerals Information Offices in Tucson, Denver, Reno, and Spokane. All the offices provide a wide spectrum of mineral resource information to government organizations, the exploration and mining industry, other private sector groups, and the general public. Each office is staffed by professional geologists and information specialists, who provide information in formats appropriate for each particular client.

M.I.O.s feature the U.S.G.S.'s Mineral Resources Data System (M.R.D.S.), a continually growing computer data base of geologic and site-specific information for some 91,000 mineral occurrences, prospects, and mines worldwide. The data are part of the Survey's ongoing mineral resource studies and include information for over 76,000 mineral sites in the United States, of which more than 10,000 occur along the eastern seaboard. Information can be extracted from M.R.D.S. by searching for geographic area, commodities, ore mines, host rock, and other geologic information, and can be printed in tables or full descriptions and plotted at various scales.

Additionally, M.I.O.s provide lists of general references by State, indexes to areas where the U.S.G.S. has finished mineral resource studies, and specialized reference searches in U.S.G.S. publications about mineral resources.

Inquiries about mineral resources can be made to a M.I.O. by phone, by mail, or by visiting any office. The Washington, D.C., M.I.O. is located in the main Department of Interior Building, at 1840 C Street, N.W., Washington, D.C. 20240 (use the 18th and E Street entrance), phone 202-208-5512.

(1) Abstract from the "Program with Abstracts," F.M., Pa. Chapter, 1992 Fall Symposium.



## 100 YEARS OF MINERALOGY (1)

**Jay Lininger, 119 West Ridge Rd., Dillsburg, PA 17019**

In 1992, the Philadelphia Mineralogical Society celebrates its one hundredth year of continuous service. This century of activity brings to the Society the distinction of being the third oldest mineralogical organization in the United States (after New York and Rochester). The fact that such an organization could be established and flourish for a century was due in part to several basic reasons.

First, the tradition of Philadelphia as a center of science and culture since the 18th century spawned an impressive array of notable mineralogists and mineral collectors. Among them were men such as Frederick A. Genth, Col. Joseph Wilcox, William S. Vaux, William H. Jefferis, Lewis White Williams, George Vaux, Jr., Charles Wheatley, Charles Pennypacker, Clarence S. Bement, Edgar T. Wherry, Samuel G. Gordon, Harry A. Trudell, and Arthur Montgomery.

Secondly, the complex and varied geology within a hundred mile radius of Philadelphia produced a wide variety of mineral products to be mined and quarried. During the latter part of the 19th century and early part of the 20th century, hundreds of mineral deposits were economically operated within the region, all contributing to the dynamic growth of the new nation.

Among the mineral products to be actively wrought within the region were iron, copper, lead, zinc, silver, gold, cobalt, nickel, chrome, feldspar, corundum, and building stone. The active mining within the region produced an impressive array of minerals for the mineralogist and collector, which numbered over 200 species.

Among the large array of mineral locations found within the Philadelphia region, thirteen locations emerged which produced beautiful or unique specimens that became textbook locations. Several of the occurrences were considered to be world-class locations. During the hundredth anniversary year of the Philadelphia Mineralogical Society, this presentation will take a nostalgic look at the locations and the minerals which comprised these unique occurrences.

The locations are as follows:: the Leiperville/Deshong/Chester Quarry Complex (building stone); the Cornwall Mines (iron, gold, silver, cobalt); the C.K. Williams Quarry (building stone); the French Creek Mines (iron); the Wheatley Mines (lead, zinc, silver); the Brinton's Quarry (building stone); the Friedensville Mines (zinc); the Wood's Mine (chrome); the Gap Mine (nickel); the Trimble Mine (iron); the Keystone Quarry (building stone); the Jones Mine (iron); and the Corundum Hill/Newlin Complex (corundum, feldspar).

(1) Abstract from "Program and Abstracts," 1992 F.M., Pa. Chapter, Symposium.

### **Pa. Chapter Featured in the *Mineralogical Record***

The Friends of Mineralogy column, by Marcelle Weber, former president, in the September-October, 1992, issue of *The Mineralogical Record*, features, as an example of the chapter organization of F.M., the Pennsylvania Chapter, its history, the Symposia (the first was in 1973), and the *Newsletter*, with a sampling of the subjects of research and collecting papers over almost twenty years of publication.



**SIEGENITE FROM THE WHEATLEY MINE,  
PHOENIXVILLE, CHESTER COUNTY:  
A NEW MINERAL FOR PENNSYLVANIA**

**Editor's Note:** Below is an introductory background note on the Phoenixville Mines from Allen V. Heyl, written at the request of the editor, and a letter to the editor from Eugene E. Foord (906 Cole St., Golden, CO 80401 and Allen (P.O. Box 1053, Evergreen CO 80438), on the identification of siegenite from the Wheatley Mine, Chester County. First, some background on the contributors.

Dr. Heyl, a Pennsylvanian and Chapter member, recently retired from the U.S.G.S. in Denver, where he specialized in economic geology, although his background was in mineralogy and petrology. Professionally, he is well-known for his work in economic geology, particularly in lead-zinc districts around the country, as well as the Pennsylvania State Line Chromite District. Allen has a fine collection of Pennsylvania minerals, which he has been collecting since his boyhood in Allentown. Only recently, he had an opportunity to collect at Mineral Hill, where he collected sixty years ago. He has contributed many letters to the editor and articles for the *Newsletter* on Pennsylvania minerals and collecting, and wrote the "Introductions," "Prefaces," and "Appendices" for the volumes by Harold Evans on copper mining in Montgomery County (F.M., Pa. Chapter, 1980) and the life of Charles Wheatley (Mineralogical Society of Pennsylvania, 1984), which are still available (contact the editor) from the Chapter. Allen was elected a Life Member of the F.M., Pa., Chapter for his services to mineralogy and the Chapter.

Dr. Foord is with the U.S.G.S. in Denver, and is also currently updating Dana's *Textbook of Mineralogy* and revising the volume on Colorado mineral localities. A Californian, Gene attended Franklin and Marshall College; hence his interest in Pennsylvania mineralogy. His Ph.D. dissertation at Stanford University was on pegmatite minerals of the San Diego area. Author of numerous papers on mineralogy, and a frequent contributor to the *American Mineralogist* and *Mineralogical Record* Gene continues to be especially interested in the minerals of pegmatites. A world traveler, he visited Siberia again this summer, hand-carrying, as he wrote the editor, a computer for the geochemical lab in Irkutsk. A co-author of several letters to the editor on Pennsylvania minerals for the *Newsletter*, Gene has recently been investigating the suite of minerals at Huff's Church, Berks County, with very interesting results.

The find described below came while Allen Heyl, as he was cleaning up his Denver U.S.G.S. office prior to retirement, was looking over a specimen from the Rand Collection (acquired in 1903) of Bryn Mawr College, preparatory to packing the specimen for mailing back to the College. He had brought back the specimen to Denver years before for the identification of a pink mineral, which he thought might be cobaltocalcite, but which turned out to be the cobaltian variety of calcite. When he wrote up the cobaltian calcite for the *Newsletter* (Heyl, 1979), Allen mentioned the need to identify the silvery metallic mineral, which he thought might have been the gersdorffite (NiAsS) mentioned in Genth (p. 249) and Gordon (1922, p. 44). It all came back to him as he looked at the Bryn Mawr specimen once again, so he arranged for Gene Foord's participation and the identification procedure.



## An Introduction to the Phoenixville Lead-Zinc District Mines

Allen V. Heyl

The Wheatley Mine vein and the Brookdale and Phoenix Mines to the southwest, were discovered by Charles M. Wheatley in 1850, while he was a successful mine manager at the new Perkiomen and Ecton Mines in Audubon, Montgomery County. About 1850, the adjacent Chester County Mine was also opened, to the northwest of the Wheatley Mine. A northeast-trending lead-silver vein and a copper vein, mostly in granitic gneisses, were opened and operated until 1853. The ores mined are very similar to those in the nearby Wheatley Mine fissure vein, which was opened in 1851, and operated until 1855 (Evans, 1984, p. 13). Both mines produced hundreds of tons of silver-bearing pyromorphite concentrates, probably the only place in the country where this type of concentrate was produced. The Wheatley Mines were reopened in the 1860's, and both mine groups again in 1919-1920.

The Phoenixville District mines were known in the 19th century as one of the country's great mineral localities. Only a few people today realize that this was the "Tsumeb" of North America at that time. The green crystallized pyromorphite is the finest and most beautiful of its species in the United States. Many crystals have pale yellow-green mimetite caps. Wheatley did collect and sell many fine specimens of pyromorphite, giant anglesite crystals mimetite crystals, 2 cm sphalerite and 1 cm galena crystals, large calcite crystals, white fluorite, azurite crystals to rival Tsumeb, to 1.5 cm, and colorless to red wulfenite crystals. Many of these minerals are illustrated in Gordon (1922). Rarities such as ankerite (Heyl, 1980); silver (Heyl, in Evans, 1984, p. 37); linarite (Heyl, in Evans, 1984); leadhillite, in hexagonal, platy, white crystals (Heyl, in Evans, 1984, p. 37), descloizite (Smith, 1855; Reed, 1976; Heyl, 1982), mottramite (Reed, 1976; Heyl, 1982), and wheatleyite (Rouse et al, 1986) have been identified in recent years. A summary of these minerals may be found in the *Appendix* to Harold Evans' *Highlights on the Life of Charles M. Wheatley* (Heyl in Evans, 1984) and in Ron Sloto's article on the Phoenixville mines in the *Mineralogical Record* (1989).

Fortunately, J. Lawrence Smith (1855, 242-243) described many of the finest specimens, and Charles Wheatley provided many fine specimens to collectors and museums. Many are preserved now in the collections of the American Museum of Natural History, Yale and Harvard Universities, Bryn Mawr College, the Academy of Natural Sciences of Philadelphia, and the Smithsonian. Wheatley's own fine and valuable collection was given to Union College. Unfortunately, many of the finest specimens were stolen some years ago.

Although Dana, in his 6th edition of his work on mineralogy (Dana, 1892), included, with italics and exclamation points, the list of minerals by J. Lawrence Smith (1855), he added that the mines were long closed and very little remained to be collected. This is far from true. Very fine specimens have been found on the mine dumps by persistent collectors, including Robert Walker, Arthur Dorne, Martin Anne, Donald Schmerling, Joseph Varady, Robert C. Smith, II, Bryon Brookmyer, and myself. The collecting efforts of these people, especially Phoenixville resident Bob Walker, who walked the dumps weekly for years, have resulted in finds of mineral specimens.



**SIEGENITE: A NEW MINERAL FOR PENNSYLVANIA (cont'd)****An Introduction to the Phoenixville Lead-Zinc District Mines (cont'd)**

Several mine dumps are still accessible, but only with the permission of the owners. These include the dumps of the Chester County Mine and the Southwest Chester County Mine (Smith, 1977, p. 229-234). The Brookdale Mine, marked by a chimney, and the Phoenix Mine dumps are owned by the Thompson family, who carefully designed a golf course around them on their dairy farm property. Bring a specimen for their collection, ask permission at the clubhouse, follow the Thompson's rules, and watch for flying golf balls.

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**The Identification of Siegenite from the Wheatley Mine:  
A Letter To The Editor From Gene Foord and Allen Heyl**

"This letter will provide the main mineralogical data on the Pennsylvania siegenite. The sample we had was in the little box you, as Associate Curator of the Bryn Mawr College Mineral Collections, provided for a small research specimen of the cobaltian calcite (#8436) from the Rand collection, described in the *Newsletter* (1079, Vol. 7, No. 3 and 4, p. 7 and 8). With the 5 mm by 5 mm cobaltian calcite



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**SIEGENITE: A NEW MINERAL FOR PENNSYLVANIA (cont'd)****Identification (cont'd)**

specimen were a few small metallic, silver-white, fairly lustrous octahedrons of a mineral, which I thought might be gersdorffite, identified many years ago at the Wheatley mine by J. Lawrence Smith (1855), and mentioned in Gordon (1922, p. 44). The largest crystal was just under 1 mm, but most of the crystals were smaller.

"Gene Foord ran samples on an S.E.M. instrument with E.D.S. (Energy Dispersive Spectrometry) capability, and also did X-ray diffraction work, using a 114 mm-diameter Gandolphi camera. A good film of a single crystal was obtained. The E.D.S. spectrum showed that the mineral has major S and also Co and Ni, with a little more Co than Ni. The X-ray film pattern matches the linnaeite group of minerals and very closely matches that of siegenite, which can have a little more Co than Ni, or a little more Ni than Co (as in southeast Missouri), but is always close to the 50-50 Ni:Co ratio. Minerals of the linnaeite group have very similar unit cell sizes, and thus the X-ray patterns alone are not definitive. Chemistry and X-ray data are necessary to positively identify individual species. The d-spacings and intensities that Gene Foord obtained were very close to those reported for siegenite, with the lines shifted slightly below the standard siegenite (Joint Commission on Powder Diffraction Standards card #20-782). Although an internal standard was not included, the pattern fits the same J.C.P.D.S. card, #20-782, for siegenite, very well.

The diffraction data of the Wheatley Mine siegenite, with all the measured lines, are given in Table 1, as well as J.C.P.D.S. diffraction data for the standard siegenite (#20-782) and standard linnaeite (#11-121). A copy of the E.D.S. spectrum is also shown in Figure 1, and you can see that the main cations are Co and Ni, with Co slightly more abundant than Ni. You can also see small amounts of Cu and Fe, which are due to admixed chalcopyrite and pyrite. The presence of these two minerals was verified by X-ray diffraction study, and the chalcopyrite and pyrite lines are indicated on Table 1. A trace of Zn is also present on the E.D.S. spectrum, and may represent a minor amount of sphalerite. The chalcopyrite and pyrite were intergrown with the single crystal of siegenite. The chalcopyrite and pyrite lines are indicated on Table 1. Linnaeite,  $\text{Co}^{+2}\text{Co}^{+3}_2\text{S}_4$ , has a very similar X-ray pattern to siegenite, but all of the lines have slightly higher d-spacings. Polydymite,  $\text{NiNi}_2\text{S}_4$ , is even more so.

"In addition, there was a small amount of fine-grained metallic powder in the box with the siegenite. The powder was determined to be pyrite by Ted Botinelly (U.S.G.S., August, 1991), by X-ray diffraction methods."

(continued, see Table 1 and Figure 1)



# SIEGENITE, A NEW MINERAL FOR PENNSYLVANIA (Cont'd)

## Table I: X-ray Data

Bryn Mawr College. Rand Coll. # 8436 Siegenite (Co,Ni) <sub>3</sub> S <sub>4</sub> (1)		J.C.P.D.S. (2) Card #20-782 Siegenite (Ni,Co) <sub>3</sub> S <sub>4</sub>		J.C.P.D.S. Card #11-121 Linnaeite Co <sub>2</sub> +Co <sub>3</sub> S <sub>4</sub>	
D-spacing	Intensity (3)	D-spacing	Intensity (4)	D-spacing	Intensity
5.28	W	5.42	14	5.47	20
3.29	W+	3.32	35	3.34	40
3.13 **	W	----	----	----	----
3.10 *	S	----	----	----	----
3.00 *	VW	----	----	----	----
2.83	M+	2.83	100	2.83	100
2.70 **	M-	2.71	2	----	----
2.44 **	W	----	----	----	----
2.33	S	2.347	50	2.36	70
2.21 **	W	----	----	----	----
1.90	W	1.916	12	1.926	30
1.85 *	W	----	----	----	----
1.80	M	1.807	40	1.815	60
1.65	M+	1.659	80	1.670	80
1.63 **	M	----	----	----	----
1.61 *	M	----	----	----	----
1.58 *	VW	1.584	2	----	----
1.48	VW	1.484	4	1.493	10
1.43	VW	1.432	10	1.439	20
1.35	W+	1.355	12	1.362	20
1.310	VW	1.315	4	1.321	10
1.250	VW	1.254	8	1.260	20
1.235	W	----	----	----	----
1.220	W	1.222	20	1.227	30
1.170	W	1.173	18	1.179	30
1.100	W	1.106	6	1.112	20
1.080	VW	1.084	20	1.090	40
1.050	M	1.0	30	1.055	40
1.036	W	1.030	4	1.036	5

(1) X-ray film lines by E. Foord; not corrected for internal standard; Co>Ni, .74 to .72.

(2) Joint Commission on Powder Diffraction Standards.

(3) (S) Strong, M (Medium), W (Weak), VW (Very Weak) intensities.

(4) Intensities relative to 100.

\* Chalcopyrite lines: main line at 3.038; strong line at 1.591; \*\* Pyrite lines.



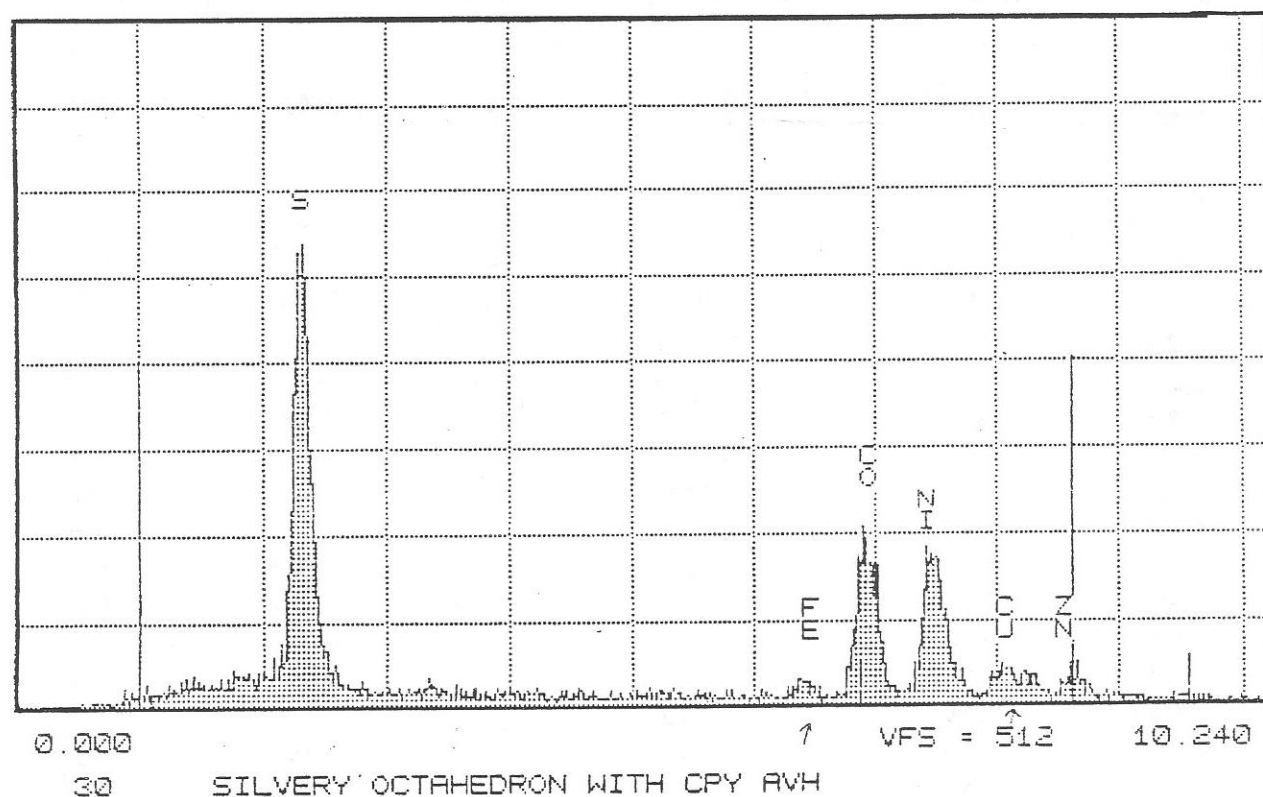
**A NEW MINERAL FOR PENNSYLVANIA; SIEGENITE (cont'd)****Figure 1: Energy Dispersive Spectrometry (E.D.S.) Data**

U.S.G.S. SEM LAB

FRI 16-FEB-90 16:35

Cursor: 0.000keV = 0

ROI (0) 0.000:20.480



Bryn Mawr College Rand Collection # 8436, Unknown from the Wheatley Mine,  
Phoenixville Lead and Zinc District, Chester County, Pa.

Interpretation: Vaesite,  $\text{CoS}_2$ ; Cattierite,  $\text{NiS}_2$ ; or Pyrite,  $\text{FeS}_2$ ;  
Linnaeite,  $\text{Co}^{2+}\text{Co}^{3+}_2\text{S}_4$ ; Polydymite,  $\text{Ni}_2\text{S}_4$ ; or  
Siegenite  $(\text{Ni}, \text{Co})\text{S}_4$  or  $(\text{Co}, \text{Ni})\text{S}_4$ .