THE SECOND OF TWO

30[TH]

ANNIVERSARY

ISSUES

THE PICKING TABLE

JOURNAL of the FRANKLIN-OGDENSBURG MINERALOGICAL SOCIETY, INC.

FALL, 1989 VOLUME 30, No. 2 PRICE $5.00

THE THIRTIETH ANNIVERSARY

Acknowledgment of Performance

In celebrating this 30th anniversary of the founding of F.O.M.S., it seems appropriate that we go beyond the context of events in which the Society has functioned or its purposes as an organization. A society with a non-participating membership is static. People make the difference. It is people who make an organization "dynamic." The F.O.M.S. has had its fair share of good leaders and hard workers in this thirty year period. It is appropriate that they be acknowledged here.

Persons who have held elected or appointed positions during this period are listed. Most are living, some are dead; all deserve note. Names are in boldface type. Positions are abbreviated.

Names of some positions have changed over the years; the number of positions has varied a great deal also. Committee names are not shown for sake of space. Some examples of the abbreviations used follow: CC=committee chairman; CCC=co-committee chairman; CSec=corresponding secretary; RSec=recording secretary; ATreas=assistant treasurer; SVP=second vice president; Trust=trustee; EdBd=editorial board, etc. The list is arranged alphabetically by last name.

Special thanks for help in finding some of the more obscure information go to Helen Warinsky and Bernie Kozykowski.

Omer S. Dean, President

ALTHOEN,B. CCC73-74; **ALTHOEN,H.M.** Sec.63-65,CSec.66,VP70-71,Pres.72-73,Trust 69,74,CC64-65,70-71,74,CCC74; **APPELD,R.C.** Treas75-78,CC79-82; **ARESON,J.** Sec75, CC70-74; **ARESON,L.** Trust69-76,CC72-74; **ARMAGNAC,P.** CCC63-65; **BARR,B.** Trust70-76,CCC74,CC77-78; **BAUM,J.L.** Trust63-71,75-89,VP72-73,Pres74,CC64-65,70-89, CCC74,EdBd85-89; **BENEDICT,L.,Jr.** Sec69-72,Trust73-74; **BENEDICT,T.** CCC70-74; **BETANCOURT,P.P.** ATreas83,Treas84-86,SVP87-88,VP89,CC89; **BOLTON,V.G.** ASec83; **BORGSTROM,L.W.** CC60-64; **BOSTWICK,R.C.** SVP77-78,81-82,VP83-84,Pres85-86, CC81-89,Trust87-89,AEditor85,EdBd85-89; **BUTLER,J.M.** Treas63-69,CC64-65,68-69; **CHORNEY,P.** Trust59-64,CC65; **CIANCIULLI,J.** Treas89,Trust83-88; **CILEN,J.** SVP80, VP81-82,Pres83-84,Trust85-89,CC81-82,85-86,88-89; **CLINTON,W.** ATreas72,Trust71, 73,CC70-71; **COOK,D.A.** AEdit74-76; **COOK,E.P."SUNNY"** Trust59-62,CCC63-65; **CUMMINGS,W.** Trust79-89,ACC87-89; **DEAN,O.S.** Edit85-89,EdBd85-89,SVP85-86,VP87-88,Pres89,CC87-88; **DeBLOIS,R.** Trust84-87; **DeROO,E.R.** Trust60-63; **DURKOS,J.** Trust60-62; **EDWARDS,F.Z.** Pres60-61,Sec62,ASec68-69,Treas62,Trust63-75,Edit60-78, AEdit79,CCC69,CC65,72-73; **FISHER,K.** Trust59-60; **FREY,E.** Trust66-68,CC65; **GARDENS,J.M.** CCC72; **GERSTMANN,E.** SVP79,Trust74-78,CC63-65,79-85,CCC74; **HasBROUCK,F.DeP.** Trust59-64; **HAUCK,R.** Pres59-60,Trust59-61,63-67,69-70,CC63-65; **HENDRICKS,J.G.** Edit59-60; **HOLUSHA,H.** CC68; **HORR,A.** Trust59-60; **HOWELL,F.H.** CC77-78; **HULL,A.** Trust60-62; **KNOLL,A.F.** Trust63-73,CC64-65,68-69; **KOLIC,J.** Trust76-85; **KOZYKOWSKI,B.T.** Treas70-71,SVP72-73,VP74,Pres75-76,Trust77-78,80-82, Edit79-84,CCC72-74,CC70-74,77-78,87-89; **KRAISSL,A.L.** RSec66,Sec67-68,VP68-69, Pres70-71,Trust72-82,CC68-69,72-73,CCC73-74; **KRAISSL,F.A.** Pres64-65,Trust66-83, CC64,68-73,75,CCC73-74; **KUSHNER,E.F.** Trust72; **LaRUE,J.** CCC68-69; **LEMANSKI,C.S.Jr.** Treas87-88,SVP89,Trust86; **LORD,A.E.** SVP76,Trust74,CCC74; **LYDIATE,MR.& MRS L.** CCC72; **MacDONALD,J.E.** VP79,CC79; **McGLYNN,M.** Trust77-78; **MILLER,W.** VP77-78,Pres79-80,Trust81-82,CC77-78,81-82; **MISIUR,S.** ATreas.87-89,Trust84-88; **MONTERO,H.E.** VP64-65,Pres66-67,Trust68-69,CC64-65; **PHISTER,D.** Trust83-84; **PORTER,W.** Treas83; **RESCH,N.** Trust89,CC89; **SANFORD,S.** Trust75-78; **SCOVERN,P.E.** CC72-74; **SEBASTIAN,J.E.Jr.** VP66-67,Pres68-69,Trust65, 70-86,CCC68-74,CC65,70-71,75-86; **SELEMS, E.G.** CC65; **SPENCER,W.D.** Pres62-63,Trust64-65,69-71,CC63-65; **SPROSON,K.** Trust65-68,CC65,CCC68; **STARKE,M.** Trust67; **SULLIVAN,E.C.** Trust88-89; **SVECZ,R.A.** Trust79-83; **THOMAS,PAT** ATreas73-74,Trust72,CCC71; **THOMAS,R.E.** VP80,Pres81-82,Trust79,83-84,87,CC80, 83-84; **THOMAS,ROBT.** ATreas70-71,Treas72-74,SVP74,VP75,CC72-73,75,CCC71,74; **TROST,W,J.** Treas79-82,SVP83-84,VP85-86,Pres87-88,Trust89,CC83-89; **WARINSKY,H.** Sec76-86,CC79-87; **WELLBROCK,D.** Trust88-89; **WELSH,W.R.** Sec73-74,SVP75,VP76, Pres77-78,Trust79-80,CC76,79-80; **WILK,E.H.** Trust85-89,CC87-89; **WINTRINGHAM,N.** VP62; **WOODS,M.** Sec87-89.

The
PICKING TABLE
Journal of the Franklin-Ogdensburg Mineralogical Society, Incorporated

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THE COVER PHOTOGRAPH

This photograph was taken by Bernard T. Kozykowski, at Sterling Hill, on February, 19, 1989. The following is the caption he supplied: "This open area is where the hanging wall of the east limb was reserved for fill. The footwall, with pillar, is on the right. Note the old stope hole into remaining pillar of ore--it fluoresces like mad!" It is planned that Sterling Hill be given considerable coverage in the next issue. Bernie has promised to provide more of his splendid photos for that occasion.

from the Editor's Desk

Omer S. Dean
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John L. Baum—50 years in Franklin
July 3rd marked the fiftieth anniversary of Jack Baum's arrival on the Franklin scene. At the June 17 meeting of the F.O.M.S., the society presented Jack with a plaque commemorating the occasion. The inscription on the plaque cited his great service to the science of mineralogy, the collector community, and Sussex County. The honor bestowed upon Jack Baum is, as yet, incomplete. It is planned that he be given, at the F.O.M.S. Annual Dinner on the evening of Oct. 7, 1989, a group of letters of appreciation from his peers. Several letters have been received already. It is hoped that many additional ones will arrive. A bound volume for presentation is possible if the response is great enough.

If you wish to have your letter of appreciation become part of this proud moment for Jack, please write it now—don't put it off. Mail the letter to the Editor, at the above address, for appropriate action. Likewise, if you know someone close to Jack, outside the structure of F.O.M.S., please solicit their letter and see that it gets to me. Thank you for your help in making this a success!

Those of you who wish to come to the Annual Dinner, and witness the presentation, can find details on page 6.

Sterling Hill acquisition
June 13, 1989, was the day a group of buyers, including Richard and Robert Hauck (Sterling Hill Mining), acquired the land previously owned by the New Jersey Zinc Company. The Borough of Ogdensburg received a check from the group (Barki Associates, Phillips Enterprises, and Sterling Hill Mining) in the amount of $1,415,000. Some of the plans for the property were touched on in a recent article, written by Bob Jones, entitled "Sterling Hill will Survive!", which appeared in *Rocks & Gems*. We are fortunate to have Dick Hauck as speaker for our September FOMS meeting. Get your information first hand by being there. Dick and Robert, accept a well-deserved "Bravo!" from all of us who appreciate all things 'Franklin/Sterling Hill-ish'.

Potpourri
Memorabilia come in all shapes and sizes. The ones I enjoy most, as Editor, are those which are easily shared with *Picking Table* readers. A few examples of these tidbits follow:

The illustrious Dick Hauck, Bloomfield, N.J., FOMS member and the Society's first president, was kind enough to lend me a couple old copies of *Zinc*, house organ of the New Jersey Zinc Company. An issue dated October, 1938, has a photograph of William "Billy" Ball, millman at the Franklin Mill, who was employed by NJ Zinc back in 1895. This photograph is important to the collector community because it shows Billy Ball looking at his "notorious" mineral collection (See Fig. 1), which was envied by Billy's peers and, via its reputation, by subsequent generations of collectors.

Figure 1. William "Billy" Ball views a specimen from his collection.

Ed Wilk, East Rutherford, N.J., FOMS Field Trip Chairman and Trustee, surprised me with a photocopy of an old, torn envelope, postmarked May 19, 1938. It celebrates Air Mail Week-1938,

See **Editor, page 14**

NOTES FROM THE LABORATORY

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Changes to the list of species from Franklin and Sterling Hill

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Additions to the list

Aurorite: This species, a manganese oxide, is the manganese analogue of chalcophanite and was found as black, dense, very fine-grained layers within layered chalcophanite in stalactitic, concentric aggregrates. It is from the mud-zone at Sterling Hill, and has not been found at Franklin. Much caution is needed in identification; not all material which fits the above description is aurorite, and only one specimen has been verified.

Haidingerite: This species, a calcium arsenate hydrate, was reported without description by Bayliss and Warne (1987). Haidingerite was reported to occur with magnesian chlorophoenicite and willemite from Sterling Hill.

Clintonite: This mineral, a calcium magnesium aluminum silicate hydroxide, is in the group of brittle micas; it is related to margarite. Clintonite was reported by Struwe (1957) as occurring in Marble from Franklin, New Jersey; the specific site was not given. Franklin clintonite is brown with a bronze luster, and occurs as 3mm crystals associated with spinel, norbergite, pargasite, and minor graphite. The publication by Struwe was first noted by Mr. Steve Misiur. [Collectors will find the flexibility of micas a possible aid in identification; the brittle micas like clintonite are not flexible].

Sclarite: This new mineral is a zinc carbonate hydroxide: the zinc analogue of loseyite. It was reported from Franklin in *The Picking Table,* **30, #1**, 20 (1989), and will be abstracted in more detail following its formal publication in the scientific literature.

Wulfenite: First reported and described from Sterling Hill by Mr. Fred J. Parker, in *The Picking Table*, **30**, **#1**, 22 (1989), this lead molybdate mineral remains a very rare species.

Deletions from the list

Antigorite: A broad investigation of serpentines from both orebodies has resulted in the lack of a valid antigorite. The name was used in the past as a more general term for serpentine, and likely came into common local usage in that manner. Today, antigorite is a specific member of the serpentine group, which has not been found locally.

Chrysotile: Like antigorite, this species name once had a broader and more general meaning. The species clinochrysotile and orthochrysotile are found locally and these replace the more general term in our list.

Changes to the Unique List

Sclarite is added to the unique list. It is known only from Franklin.

References

BAYLISS, P. and WARNE, S. St. J. (1987) Powder X-ray diffraction data of magnesium-chlorophoenicite. *Powder Diffraction*, **2**, 225-226.

STRUWE, H. (1957) Data on the mineralogy and petrology of the dolomite-bearing northern contact zone of the Quérigut granite, French Pyrenees. *Leidsche Geologische Mededeelingen*, **22,** 237-346.

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1010 Stope and the Miner

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1010 Stope was a strange sight to the eyes of the miner; he had been working at Sterling Hill for six months by then and had seen only large working places. Here was a stope where the ore averaged only 2 meters in width, widening from 1 meter at its southern extremity to 5 meters in the center, and narrowing to 2 meters at the north end. On the maps in the mine office the stope's southern boundary was at 1010 co-ordinate, and its northernmost limit at 1190. 1010 Stope was situated on the East Branch of the West Limb of the Sterling Hill orebody, and by the Zinc Company's standards was very rich. The ore was compact, mostly gneissic willemite and franklinite with little included calcite. It often carried 40% zinc. The willemite was red and medium grained (5mm) for the most part.

The miner was 30 years old and brought with him keen powers of observation, a logical mind, and an interest in the bounties of the earth. His goal, as he said later, was "to save fine pieces from the crusher." On this day, 1010's regular drill runner was absent and the miner was about to begin learning how to run a stope. At that time, the spring of 1973, it was just below 800 level, but before the miner left it $2\frac{1}{2}$ years later, 1010 had reached 700 level. The stope was rich, not only for the New Jersey Zinc Co., but also, under the miner's care, in rare and unusual minerals.

Among the first choice specimens to emerge was a large (30cm) mass of dark brown ore whose prime face was liberally sprinkled with pink rhodochrosite rhombs and erect fans of pale yellow barite spearheads. The miner discovered it during his lunch break while turning over muddy blocks of ore beneath the morning's roofbolting operations. This find was about 10 meters above the 800 level.

At another time, when about halfway between 700 and 800 levels, he was handmucking (shoveling) around the crib (a vertical ore passageway), when he noticed a "hairy" rock, one covered with a thick mat (up to 1.5cm long) of white fibrous sussexite. Once the fibers were removed a singular specimen emerged: a light brown 2cm spheroid perched on the vein wall. It proved to be a superlative akrochordite.

Near this same elevation, at the thick knot in the ore in the center of 1010, the miner was "scaling loose" (bringing down weakly attached blocks from the stope's back). On one slab were shining microcrystals (which later proved to be eveite) with reddish-brown balls of sarkinite. The matrix was distinctive: gneissic willemite/tephroite/franklinite with veinlet walls lined with sussexite and kraisslite.

Near this thickened midsection came many pieces of the latter species, the new mineral kraisslite, which occurred persistently from 800 to 700 levels. It was often with white fibrous sussexite and, less commonly, accompanied by either pyrochroite or blue sphalerite. The kraisslite in this phase came in a variety of forms. These ranged from brassy plates embedded in calcite to red plates in veinlets which resembled books of mica. Kraisslite appeared most often as minute plates of a golden hue.

Figure 1. Steve Sanford, the author, views a specimen from his Franklin-Sterling Hill collection.

The blue sphalerite, mentioned above, came in ½" masses in the core of the thick kraisslite/sussexite seams or in the center of pyrochroite/kraisslite veinlets. Elsewhere in the mine, the blue sphalerite was found in crystals up to 5mm in size.

Allactite in good microcrystals was encountered 3 times during those 2½ years. One find occurred as square terminated crystals of a fine red-brown color. These were implanted directly on slips and vugs in gneissic ore. Another of the finds also had the flat ended blades. These crystals, in a habit which looked like leaves in an open book, were associated with brown to gold rosettes of another platy species of uncertain nature.

A consistent feature of the East Branch of the West Limb in the middle levels of the mine was an interesting calcsilicate body in the hanging wall of the ore. Its major minerals were, in approximate order of abundance, zincian diopsidic pyroxenes, pink to purple rhodonite, orange spessartine, slightly barian microcline or potassium feldspar, zincian micas, gahnite, black willemite, and along the contact between the ore and the calcsilicates, serpentine. This serpentine frequently appeared as partial or complete pseudomorphs after small gahnite euhedra. Of interest to collectors was the occasional rhodonite crystal specimen, but also during each cut literally tens of thousands of green gahnite octahedra were encountered ranging from 1 to 5cm in size. More than 99% were smashed by the blasting but several nice specimens could be gotten every slice. This calcsilicate body harbored some other surprises too. Once in the middle of a mass of typical pink rhodonite, gahnite, willemite, and garnet appeared a patch of buff to pinkish mineral mingled with a fibrous green species. These were found to be pyroxmangite, a polymorph of rhodonite, accompanied by green tirodite. Lower down, some specimens of massive yellow axinite were discovered. In another instance, within a narrow veinlet cutting willemite/calcite/rhodonite, there were black plates of manganpyrosmalite. The miner came across numerous veins of friedelite in 1010 Stope and once, just above the 700 level, crystals were found.

Some meters to the south of the thickened central portion of the ore appeared a veinlet system that often yielded lustrous, complex crystals of franklinite, delicate traceries of white calcite blades, now and then micros of green willemite, and, rarely, brown roses of caryopilite. Incidentally, as 1010 Stope worked its way upward, this thickened ore segment migrated to the south, as do most of the major features of the orebody at Sterling Hill.

At 700 Level, not far from the south crib, the miner washed down the muck pile and noticed a 9mm brown zircon-like crystal. Subsequently, other isolated but smaller examples came to light standing on a surface of ore. At still a later date, 8-12mm crystals were found with splendent franklinite microcrystals. These brown prisms were discovered to be retzian-(Nd).

Also to be counted among the stope's bounty were blocky, red willemite crystals with minor franklinite octahedra. These nearly equant, triangular-faced specimens sometimes measured 5 x 5cm.

Chlorophoenicite was uncommon and its rare appearance near the center of the kraisslite area found it associated with knobby yellow zincite and shining black hetaerolite crystals. This association was found much more abundantly in other working places, notably 1420 Undercut Pillar, 7 meters above 1400' Level.

Euhedral galena crystals, 7-8mm in size, were seen now and then in the numerous open secondary veinlets slicing the ore. Both willemite and a light brown botryoidal species often was associated with the galena. These occurrences were scattered sparsely between the 800' and 700' Levels.

The miner made an interesting discovery in the extreme north end of the stope, just below 700 Level. Cutting across the ore and an included calcsilicate body was a vein or trend enriched in chalcocite. In the ore this trend contained vuggy areas in which resided wires of silver. In the horse (non-ore rock within the orebody) of calcsilicates, silver developed as thin sheets along pyroxene grain boundaries.

An interesting observation made by the miner was that brandtite may have been seen only once in 1010 Stope; however, it was never verified. He pointed out that brandtite had been abundant in an analogous segment of the orebody, 1120 Stope, which was situated just 70 meters below.

Stories of minerals found in this stope are plentiful, but there are other tales of 1010. For quite some time the Sterling Mine was managed by a colorful Canadian mining engineer universally referred to by the workers as "Terrible Ted." One day Ted stopped by the miner's area and the two began a discussion revolving around the finer points of drilling patterns. The manager's view was that the fewer holes of a parallel method were preferable to the somewhat costlier fanned holes favored by the miner. Finally, TT said, half in jest, "You know, fella, its my way or the highway." On another occasion Ted had spent some hours at the drafting table, and presented the miner with a laboriously detailed map of the working place showing where every one of exactly 538 holes should be drilled, from one end of the stope to the other. In a planned and controlled environment like a factory, closely detailed designs are workable. However, in the free-style mine, where drills are tough to start at a precisely determined spot and where individuality is a tradition, such meticulous precision is ludicrous.

All in all, the miner spent over 13 years underground at Sterling Hill. It started the night he was poring over the, as yet, unidentified koettigite in the basement of Gene Clyne, the shift boss (who hired him on the spot), and continued until the day the mine closed, Good Friday, 1986.

Through the miner, 1010 Stope produced a wonderful array of specimens, among some of the mineral kingdom's more interesting assemblages. From this beginning in 1010 Stope, he went on to preserve many of the mine's best pieces, and was later honored by science with the naming of a rare, attractive mineral for him. The miner's name? Chances are that you know him -- that quiet and perceptive gentleman, JOHN KOLIC.

Figure 2. John Kolic, the miner, and the mineral collector *par excellence*.

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THE ELEVENTH ANNUAL F.O.M.S. DINNER, OCTOBER 7,1989. DON'T MISS IT!

The Place and the Time:
The Lyceum Hall, Immaculate Conception Church, 75 Church St.(Main St. runs dead into Church), Franklin,N.J. It's less than 5 minutes by auto from the Armory, site of the 33rd Franklin-Sterling Mineral Exhibit. Social Hour begins at 6:30 p.m. & dinner at 7 p.m.

The Food:
Dinner is a buffet, catered by Meyer's Bakery-Cafe, who catered the Newark Mineralogical Society's Xmas Party last year. Those, who attended, will remember the great desserts. The meal includes: assorted salads, bread and rolls, roast beef, roast chicken, kielbassy and sauerkraut, broiled fish, pasta, mashed potatoes, vegetable of the day, assorted desserts, coffee, tea, and soda.

The Price:
$12.50 per person. Dinner is limited to 100 persons. Tickets will be on sale at the September meeting or by mail. Make checks payable to FOMS. If by mail, enclose a self-addressed, stamped, return envelope to: Joe Cilen, 92 Westervelt Ave., Hawthorne, NJ 07506. Joe can also be reached by phone at (201) 427-4550.

Special Features:
Dr. Charles B. Sclar, Lehigh University, will be the guest speaker. Dick Bostwick will be Master of Ceremonies. There will be an auction of mineral specimens, Franklin memorabilia, books, mining artifacts, photographs, etc. for the benefit of the Society. Your donation of choice items will help support the Society's educational causes. The auctioneer will be Dick Hauck or an "unidentified but notable" accomplice.

* *

Observations of Habits for Franklinfurnaceite Crystals

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Introduction
Franklinfurnaceite is a zincosilicate known only from Franklin, New Jersey, and is found there associated with hetaerolite, clinohedrite, willemite, and hodgkinsonite. It was characterized by Dunn *et. al.* (1987) who in describing its morphology noted the presence of a "...rough face of unknown index subordinate as very thin, serrated edges..." Distinct faces as well as what may be twinning occur on crystals visually identified as franklinfurnaceite on a specimen examined under a scanning electron microscope (SEM).

Specimen description
The specimen came from the collection of the late Frederick and Alice Kraissl. The franklinfurnaceite crystals occur as aggregrates of 20-100 micron individuals clustered in an irregular to faintly radial configuration (Figure 1) in vugs together with hodgkinsonite, hetaerolite, pyrochroite, and clinohedrite. The vugs occur in a 1-5mm seam of calcite which transects the granular green willemite/franklinite ore that comprises the bulk of the sample. Pyrochroite crystals overlie the calcite at the perimeter of some of the vugs, and on their surface hodgkinsonite crystals have grown. Zincite is present both partially recrystallized in the calcite and as darker anhedral grains in the ore adjacent to the seam. Strings of 10-30 micron hetaerolite crystals span several of the cavities. Also present in some vugs are fine druses of franklinfurnaceite coating the hodgkinsonite crystals; under a binocular microscope at low power these have the appearance of reddish-brown velvet (Figure 2). The franklinfurnaceite crystals in one vug are coeval with a mass of this druse and together lie directly on and somewhat infill a cavity in zincite. Franklinfurnaceite is one of the last minerals to crystallize, though some hetaerolite appears to be even later. Note the hetaerolite on franklinfurnaceite in Figure 3 and occurring, in what appears to be contemporaneous formation, with the clinohedrite in Figure 4.

Figure 1. Aggregrate of franklinfurnaceite crystals. 120X

Figure 2. Reddish-brown druse under SEM. 380X

Franklinfurnaceite crystals
The monoclinic crystals are brittle. A sharp needle, used to dislodge clusters of crystals for SEM examination, broke many at the slightest

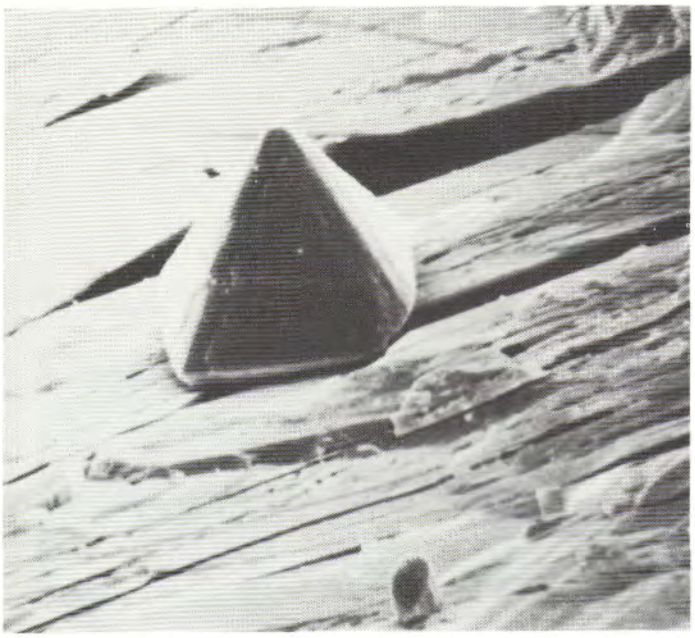

Figure 3.Hetaerolite on franklinfurnaceite.1150X

touch. The deep brown color is apparent only by virtue of their thinness and reflection from faces of the dominant basal pinacoid; seen in other orientations under a binocular microscope they appear black. They are pleochroic and possess an intense reddish-brown absorption.

Clean, distinct faces are visible forming an edge between faces of {001} (Figure 5), but remain

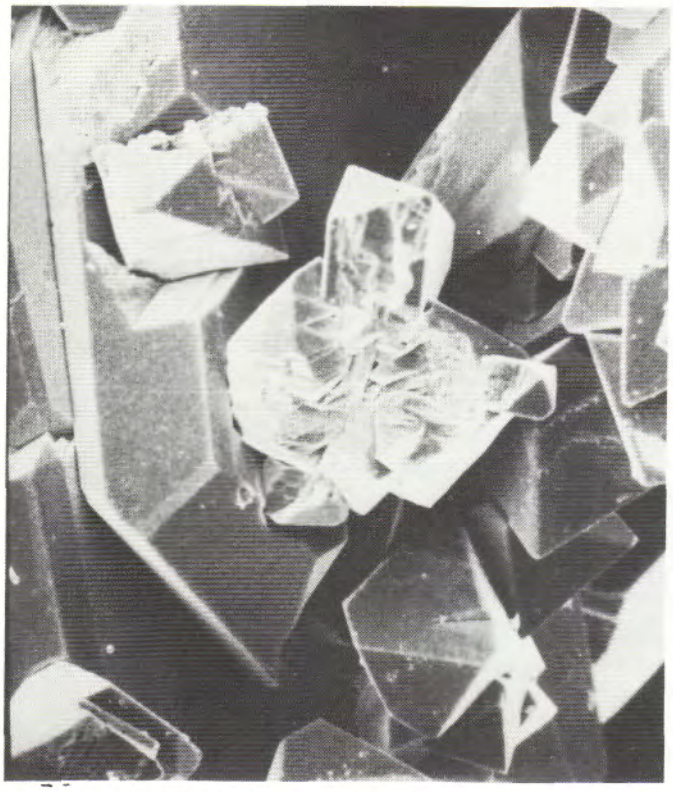

Figure 4. Contemporary growth of hetaerolite in clinohedrite. 600X

of unknown Miller index; the SEM employed had a mechanical stage affording no goniometric capability. However, using the published unit-cell parameters, the interfacial angles for (111) and $(11\bar{1})$ result in an appearance consistent with that seen in Figure 5. Both Figures 5 and 6 show evidence of twinning but this could not be studied in detail due to limitations of the instrument.

It should be emphasized that the SEM used did not have energy dispersive analytic capabilities, nor were microprobe facilities available. There

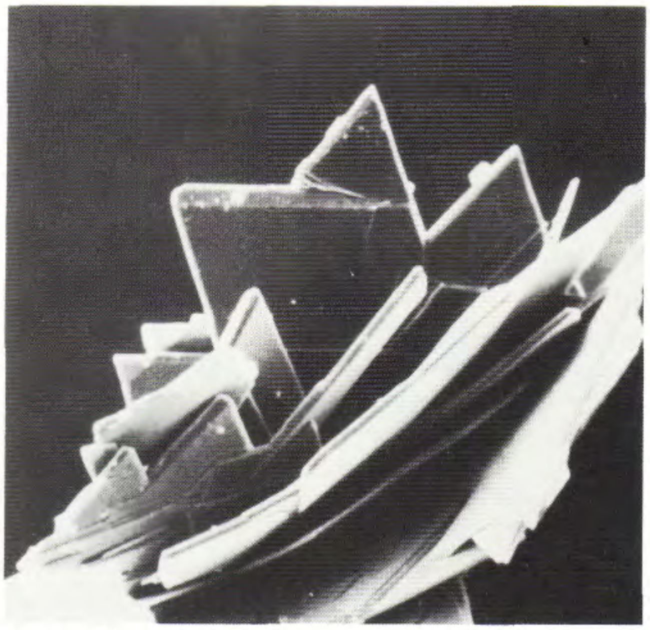

Figure 5. Cluster of well-formed franklinfurnaceite crystals. Crystals at top center show possible twinning. 460X

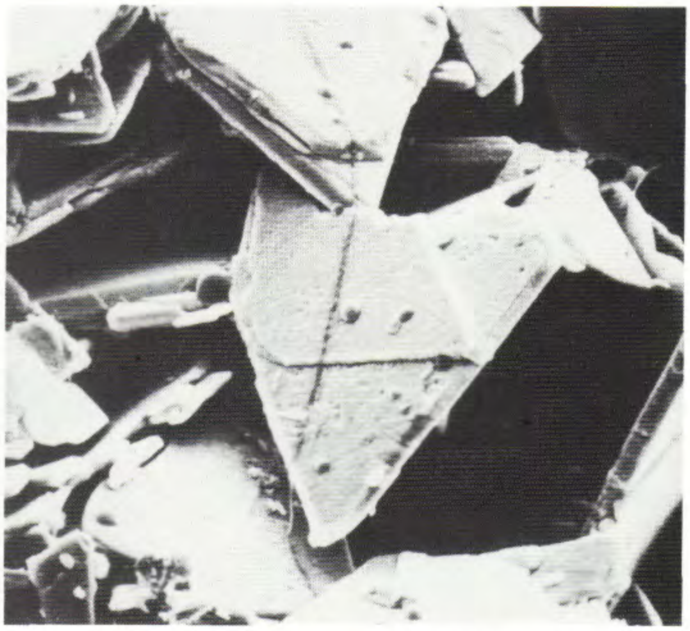

Figure 6. Detail showing possible twinning of franklinfurnaceite. 700X

is a close correspondence with the associations described by Dunn *et. al.* (1987), but the identification is visual.

Acknowledgments
Sincere thanks are expressed to Dr. Pete J. Dunn for constructive criticism, and to Dr. Jan Factor of S.U.N.Y. at Purchase for time on the SEM.

Reference

DUNN, P.J., PEACOR, D.R., RAMIK, R.A., SU, S.-C., and ROUSE, R.C. (1987) Franklinfurnaceite, a Ca-Fe^{3+}-Mn^{3+}-Mn^{2+} zincosilicate isotypic with chlorite, from Franklin, New Jersey. *American Mineralogist*, **72**, 812-815.

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Peters, *et al.* (1983) described in detail a variety of minerals found in the vuggy dolomite at Franklin, N.J. In the fall of 1983, while collecting on the Buckwheat Dump, the author first encountered small cream-white radiating spherules associated with goethite, in vuggy dolomite. The response of these spherules to short-wave ultraviolet irradiation, using an Ultra-Violet Products H4-S lamp, was a strong white with a faint bluish hue. The response to long-wave ultraviolet irradiation, using an Ultra-Violet Products UVL-21 lamp, was a warm, pale cream-white of strong intensity (but slightly less so than the short-wave response). No phosphorescence was observed. The exteriors of these spherules have a slightly brighter intensity in their UV responses than the interior portions. The hydrozincite appears to be the last mineral to form in this assemblage, with the goethite sprays having preceded it in the depositional sequence.

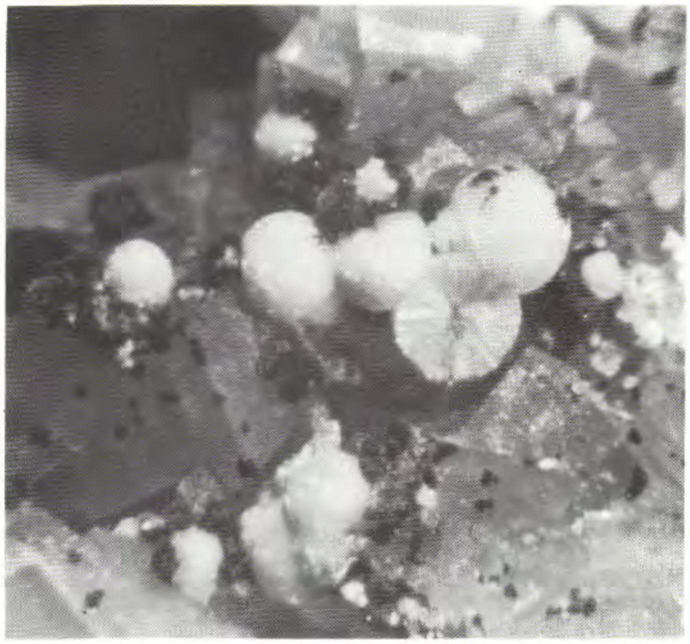

Figure 1. Hydrozincite spherules with goethite on dolomite, Buckwheat Dump, Franklin, N.J.

The preliminary analysis, performed by Gerald J. DeMenna, yielded the following: ZnO 68.6%, CO_2 14.4%, H_2O 8.6%, plus traces of Mn, Fe, Ca, Pb, Cu, Al, and phosphate. Verification of these spherules as hydrozincite was carried out by Dr. Pete J. Dunn using X-ray powder diffraction techniques.

Again, in the fall of 1987, the author found more hydrozincite spherules in the vuggy dolomite. This time the group of associated minerals was quite large and included: albite, brookite, calcite, (blue) celestine, dolomite, (blue) fluorapatite, goethite, microcline, pyrite, quartz, rutile, smithsonite, and sphalerite. This second find was also more aesthetic. The hydrozincite spherules and the smithsonite were often pierced and skewered by rutile. Undoubtedly, more of this material is to be found on the Buckwheat Dump if one takes the time to dig down deep enough.

The author is indebted to Gerald J. DeMenna, the Paterson Museum, and Dr. Pete J. Dunn of the Smithsonian for their assistance, and to Steven Misiur for his photomicrograph of the specimen from the 1983 find.

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* *

Franklin Yesterdays

Part 1 Early Attempts at Labor Organization in Franklin, New Jersey

John L. Baum, Curator
Franklin Mineral Museum
Evans Street
Franklin, NJ 07416

Among the industrial labor unions, none was more feared by the mining industry than the IWW--The Industrial Workers of the World. Dedicated to replacement of the capitalist system and employing violence, sabotage, and strikes to this end, their efforts unfairly made mention of the word "union" strike terror into the hearts of mine operators everywhere. In attempts to protect itself, the Franklin-Sterling plants of the New Jersey Zinc Company established an intelligence network whose operatives functioned wherever employees congregated. The following letter indicates that the threat was not entirely imaginery. It was removed from a miner's boarding house while he was at work, copied and the original returned to its place.

YOUNG WORKERS COMMUNIST LEAGUE
93 Mercer Street,
Newark, N. J.
Aug. 31, 1928.

Dear Comrade Petrasek:

Received your letter with detailed conditions of the zinc mines. I believe that you have given us enuf information to start off our propoganda work with a leaflet. I shall take the question up with our District Executive Committee and inform you.

I have sent your application to the District Organizer and was waiting for it before writing you again. He has evidently forgotten to mail it at once so I am writing you and will send the card in later. The initiation fee for the League is 50¢ which you will please send to me.

In the meantime, I think you should start looking around and trying to get more members for the Young Workers Communist League. Perhaps it will be possible to get a few miners together to form a mine committee which will be a basis for the organization of a union. I am making plans with the state election campaign director to go with him to Ogdensburg to talk things over with you. I'll notify you when we expect to be there.

I sent you a small bundle of our literature. Did you receive it?

Comradely,
Lottie Bloomenthal
State Sec. YWCL

Part 2

The J. A. Van Mater Report

[Editor's Note: John L. Baum, Curator, Franklin Mineral Museum, provided this report from the FMM Archives. It is transcribed here in its entirety. He also provided background information of interest: 1) J. A. Van Mater was superintendent at Franklin, and sank the Parker Shaft after drilling the discovery drill holes. Van Mater was then transferred to other properties, notably Austinville, Virginia, where he sank the Van Mater Shaft. He ended up in New Jersey Zinc's New York office in charge of all their mining. He was the quintessential "company man". 2) The addressee of the Van Mater report is S. S. Palmer, father of Edgar Palmer (Princeton, Class of 1903, for whom Palmer Square and Palmer Stadium are named).**]**

Mr. S. S. Palmer, President,
Mr. A. Heckscher, Gen'l. Mgr.
The New Jersey Zinc Company

Gentlemen:

In compliance with your request, I made a trip to Franklin Dec. 15th, and in company with your Superintendent, Mr. James B. Tonking, made an inspection of both the North and South mines.

North Mine Parker Shaft:
Since my visit of May the 7th the work in this mine has been confined to development entirely and above the 950' level it has been mostly to the South of the "Parker triangle." There is still some development work as well as prospecting which should be done above this level and to the North of the "Parker triangle" which is postponed for the present for lack of power, as it requires the full air capacity of the plant to furnish the necessary output of the ore for the mill. Some of the ground to be drifted through to connect headings being largely in low grade material, would produce an ore unprofitable to treat at present at least, in the mill, so that the prosecution of this work has been deferred until such time as there should be spare power and less demand upon the mill for ore. On all four of these levels to the North, Viz: the 900', 850', 800', and 750' the deposit seems to have narrowed down and broken up, as though it would shortly terminate. As the narrowing has in each case been caused by a body of rock, but vein matter, crowding out from the foot wall and extending diagonally across toward the hanging wall, it cannot be taken for granted that this is the termination of the ore body until prospecting in towards the foot wall has been made in a number of places and the foot wall definitely located. How this had best be done, whether by actual cross cutting, or by diamond drilling, can be determined later, when there is sufficient spare power to do this work. In the North face of each of these levels there is yet, however, a considerable width of dark ore, carrying manganese minerals. It is wider and better in some than in others, as indicated in my last report. On these same four levels the development work has been well prosecuted South of the "Parker triangle" by exploration drifts driven respectively on the hanging wall and foot walls of each level, the plan being to drive the first cross cut on each level on the South side and close to the Parker South line.

750' Level:
On this level the hanging wall drift has been in lean ore, while the drift on the foot wall was in good ore. Between these two is a lense of rock thick on the North end, but narrowing down as it extends South and will probably disappear entirely as these headings are extended. The ore in the hanging wall heading, while very low grade, is a good concentrating proposition, the gangue being mostly calcite.

800' Level:
Here the foot wall drift has been driven through from the North side of the "Parker triangle" to the South side, passing behind or West of a verticle line from the apex of said triangle. This drift has been and still is in fine ore, likewise the first crosscut from same to the hanging wall. 100 ft. or more South of this a second cross cut has been started and is now well over to the Hanging Wall. This has likewise passed through good ore for the most part. The Hanging Wall

drift on this level is in the best of ore.

850' Level:
Here a Hanging Wall drift going South has just been started, likewise a cross cut to the foot wall along the South line of the "Parker triangle". Both of these faces are in excellent ore.

900' Level:
The Hanging Wall drift going South on this level has been in rather lean ore, and at the time of my visit, the heading appeared to be in the rock bordering the Hanging Wall. In this portion of the mine no distinct Hanging Wall has so far been found. The first cross cut to the Foot Wall drift, like those above, has been driven just on the South side of the line and has gone through fine ore. The second cross cut is vertically under the second cross cut on the levels above and is nearly through to the Foot Wall and in good ore. The Foot Wall drift is likewise in the best of ore. As the main level (950') developed good ore under the present headings, a large body of excellent ore is here blocked out, with some exceptions, on the 750' level, but these are of minor importance. All of the ore broken in the headings is dumped into the North Raise of the "Parker triangle" and drawn out through a chute into tram cars to be hauled to the shaft by mules and hoisted to the surface.

Development Below 950' Level:
When I last visited the mine two levels had been started, one from the slope at a point under the South line of the"Parker triangle" and driven North, one to the Hanging Wall and the other to the Foot Wall; these have been extended beyond the North Parker line, intersecting in their course, a cross cut which had been driven two or more years ago from the Hanging Wall to the Foot Wall and about 30' above the bottom of the winze. A cross cut is now being driven on this level (1100') just North of the North line of the "Parker triangle" and vertically under the first cross cuts on the levels above the 950' level. This cross cut is nearly through and these two drifts will not probably proceed very far before they encounter the bed rock rising from the bottom of the basin, unless the latter should take another downward pitch, which now seems rather improbable. Though the ore developed at this point is strong and wide and shows no immediate signs of terminating, the foot wall drift on this level and South of the winze has not yet been connected; the headings having been driven from opposite directions, one from the slope North and the other from the cross cut at the winze South, each encountered a lense of rock which caused an offset in the ore. The headings, however, overlapped each other and only require a short amount of cross cutting to connect them. The exploration work on this level has developed a very large body of high grade ore.

Mr. Tonking informs me that the Parker tonnage for this year has been filled. Following out the same plan of development on the 1050' and 1100' levels will supply the necessary tonnage from the Parker property for at least two or three years to come and will leave his ore body well blocked out, as indicated in my last report. All of the above development work has been done well and systematically carried out and follows closely the lines indicated some three or more years ago. During the coming year the development of the Hanging Wall on the 1050' level on the Parker both to the North and to the South will throw much light upon the character of that rich body of ore 40' wide in the Hanging Wall which was shown up by a Cross Cut from the winze which was driven at the time this winze was sunk. Whether it be a local fold or something of a more permanent nature will be determined. The coming years work in this portion of the mine will therefore be important.

Suggestions:
As to the present development of this portion of the deposit, I do not see that there is anything additional to suggest. I am glad to see that the Company is pursuing the policy of confining its work to development entirely. The benefits to be derived later from this policy will more than make up for the present additional cost of the ore now produced. Since it is probable that after two or three years more the development on Parker will be completed, some other provision must be made for supplying his tonnage, unless in the meantime his interests be purchased or emerged, one of which courses would seem desirable, if it could be consummated upon equitable terms; but barring any such arrangement, then it would seem wise to shortly make provisions for mining ore from his territory, rather than from development, whenever such necessity may arise. As a preliminary to this I deem it wise to first determine what amount of ore exists in your own territory overlying that of Parker, together with the character and shape of same. With this knowledge in your possession, you can determine what plan will probably be most successful to adopt in taking out the Parker ore. This development, from its nature, must, of necessity, be slow and the sooner it can be started the better.

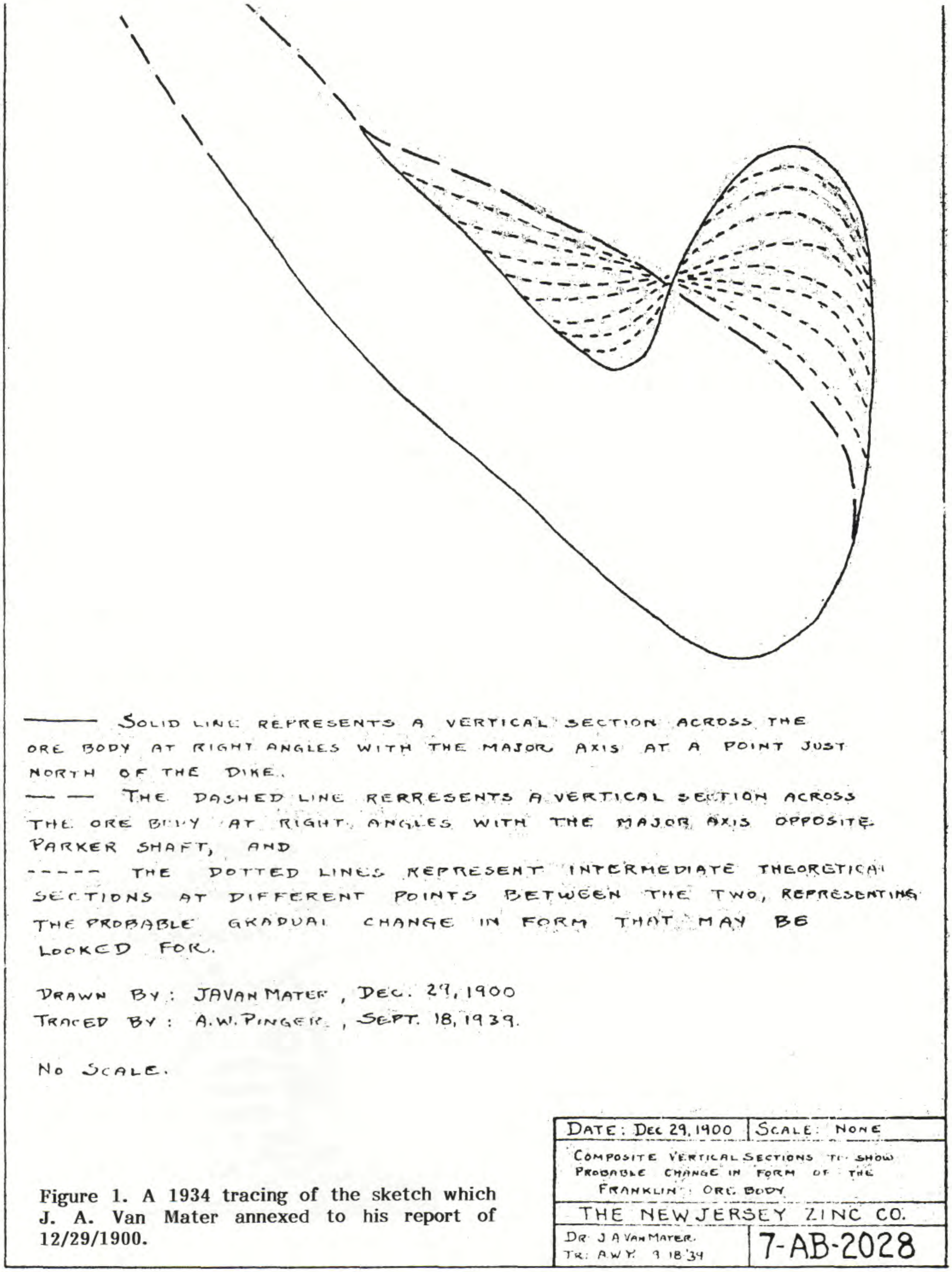

Figure 1. A 1934 tracing of the sketch which J. A. Van Mater annexed to his report of 12/29/1900.

Additional Air Power:
I was pleased to learn from Mr. Tonking that the subject of additional air power was under consideration and that the plan of putting in a pair of two stage cross compound condensing compressors in the engine room at #2 mill was the one favored. It was only about a month ago that I was discussing with a friend the desirability of such an arrangement, for there you have ample boiler capacity with high pressure, also water for condensing, so that you could furnish air for about one-half your present cost and of ample volume for both mines. This would relieve the boiler plant at the North mine which, for some time past, it has not been thought best to increase. The result is that both your boiler plant and the compressors there have been much overworked for several years past, and the recent breakdowns are not to be wondered at, but are a natural consequence. In this connection I would call your attention to the fact that the main air pipe going down Parker shaft is only 4" and should be replaced by a larger one not less than 5", or 6" would be better.

South Mine- Taylor Mine:
The slope which is being driven down under the crown of the arch to the North has, within the last 100', been forced down very fast by the roof rock, so that the lower portion looks as though it might be as much as a 50° pitch. I do not think that this sudden change is to be wholly accounted for by the change of pitch of the roof rock, but rather that the East wall is curving around to the left, or West much faster than the line of the slope and consequently is forcing the present line of slope down much nearer vertical than should be. The work has not progressed far enough to speak with any degree of certainty yet, but some test holes to the West would indicate whether the arch was disappearing, and if so, then the line of slope should be deflected to the left. Otherwise the slope will be borne down by the hanging wall until it strikes the Easterly side of the basin instead of being over 300' above that point where it should be to maintain its proper relation with the basin. I annex a sketch which will show my idea of how the fold on the South end gradually widens as it extends North, so that the crown of the arch gradually disappears. The method of driving the slope depends somewhat upon what you expect to accomplish with it. If merely for a second outlet and for air for the North mine, then it does not make much difference about the line, either vertically or horizontally, but if for the hoisting and lowering of ore, rock, tools etc., then the line is important. For this latter purpose a slope at the bottom of the basin would be far preferable and will need to be driven even after the top one is completed; the top one will give relief much more quickly.

Method of Handling Limestone and Ore:
The present method of handling ore and limestone at this end of the property could, it seems to me, be improved, not only greatly increasing the hoisting capacity, but also materially cheapening the cost per ton handled by substituting 3 ton self dumping cars for 1 ton gunboats now in use and running the slope cars up to the foot of the ore and limestone piles, thus dispensing with all the carts and all of the horses but two, which would probably be needed later for tram purposes. Your engine is amply strong to hoist 5 tons at a time and would suffer much less from a 5 ton load, hoisted slowly, than from a one ton load, hoisted rapidly. The expenses of making this change would not be great and would soon pay for itself. Besides the men would load more material into a low car than into carts where it must all be thrown in from the back end to the front, or else over the high wheels at the side. The efficiency of each loader would be increased from 20% to 30%. If it seems desirable, the same style of cars, but of smaller capacity, could be used in the slope inside the dike. All of which is respectively submitted.

J. A. Van Mater
December 29, 1900

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Editor (Continued from page 2)
and honors Franklin, N.J., which it calls "The Model Mining Town of the East" (See Fig. 2).

Figure 2. A Franklin commemorative.

See **Editor, page 23**

New Habit for Datolite

R. Peter Richards
Morphogenesis
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Oberlin, Ohio 44074

In April 1988, a trade with Vandall King brought me a specimen from Franklin with many narrow veins containing manganaxinite and hancockite crystals. After breaking it into smaller pieces, I discovered that a number of the veins also contained curved crystals of a colorless material, usually associated with spherical clusters of a fine-grained white mineral. These were sent to Dr. Pete J. Dunn, who identified them using Gandolfi camera X-ray techniques. Both turned out to be datolite, and Dr. Dunn reports that the larger crystals are of a habit which is new in his experience. Typical crystals are shown in the SEM photograph (**Figure 1**).

Figure 1. Datolite, Franklin, N.J., exhibiting the new habit. Note spherical aggregrates at lower right and top center. Associated minerals are not shown. Horizontal field is 0.56 mm.

The datolite appears to be the last mineral to crystalize in the vugs, since it grows over both manganaxinite and hancockite. When the datolite is broken away, the earlier-formed minerals have well-formed faces underneath, indicating that their growth was complete before the datolite began to grow. The crystals seen in this specimen are uniformly small, never exceeding 0.5 mm in longest dimension. All crystals are somewhat tabular and would be diamond-shaped if complete, with large flat faces bounded by curved lateral faces, which meet at the peak in an edge which is inclined to the large faces. The acute angle of the diamond always projects upward, and the obtuse angle is usually not seen.

The Gandolfi technique does not provide information on crystallographic orientation, nor can the orientation of these crystals be unambiguously established by studying their morphology. The inclination of the edge between the large diamond-shaped faces indicates that the b-axis is parallel to these faces, and passes through the (undeveloped) obtuse edges. In the interpretation shown in the drawings (**Figure 2**), the large flat faces are {100}, and a series of faces in the zone between {011} and {010} are used to approximate the curved lateral faces. This interpretation was arrived at by experimentation using the crystal-drawing program SHAPE, and provides a better match to the form of the real crystals than other alternatives which were tried, including ones in which the large flat face was assumed to be {001}. It should be pointed out that these drawings are not based on goniometric measurements. While they appear reasonable, they are based on the unproven assumption that the larger flat faces are {100}, and not {001}.

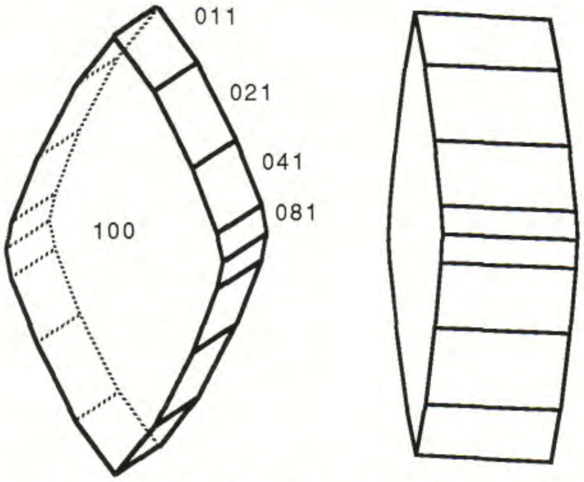

Figure 2. Interpretive drawing of the morphology of the datolite, assuming that the large flat faces are {100}.

The specimen shown in the SEM photograph has been sent to the Smithsonian Institution for preservation. I thank Dr. Pete J. Dunn for identifying this mineral, and the Biology Department of Oberlin College for use of their scanning electron microscope.

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Mineral Notes

Research Reports

Villyaellenite

An article entitled "End-member villyaellenite from Mapimi, Durango, Mexico: Descriptive mineralogy, crystal structure, and implications for the ordering of Mn and Ca in type villyaellenite" written by Anthony R. Kampf, Mineralogy Section, Natural History Museum of Los Angeles County, 900 Exposition Blvd., Los Angeles, CA 90007 and Charles R. Ross II, Dept. of Earth and Space Sciences, University of California at Los Angeles, Los Angeles, CA 90024, appeared in the American Mineralogist, (1988) Vol. 73, pp1172-1178. The following is part of the authors' abstract of that article.

The second occurrence of villyaellenite, at the Ojuela mine, Mapimi, Durango, Mexico, has yielded the nearly pure end member of the species. The mineral occurs as a compact spray of orange-pink prismatic crystals up to 4cm in length, associated with ogdensburgite, arseniosiderite, adamite, and chalcophanite. Crystals are elongate parallel to [001] with forms {100}, {110}, and {$\bar{1}$01}. There is good {100} cleavage, and the hardness is about 4. Optically, it is biaxial (-) with refractive indices α=1.713(2), β=1.723(2), and γ=1.729(2); $2V_{meas}$=70(5)° and $2V_{calc}$=75°; X=**b**, $Z \wedge$ **c**=40°. The specific gravity is 3.69, and the density (calc.) is 3.72 g/cm^3.

Chemical analysis by electron microprobe yielded CaO 0.5, MnO 36.2, FeO 0.1, ZnO 2.9, and As_2O 50.6, and moisture evolution analysis gave 9.9 H_2O, total 100.2 wt%. The empirical formula based upon 20 oxygens is

$$(Mn_{4.63}Zn_{0.32}Ca_{0.08}Fe_{0.01})_{\Sigma 5.04}(H_2O)_{4.04}(AsO_3OH)_{1.92}(AsO_4)_{2.08}\ (Z=4),$$

close to pure $Mn_5(H_2O)_4(AsO_3OH)_2\ (AsO_4)_2$.

Single-crystal X-ray precession data indicate space groups Cc or $C2/c$; the latter is confirmed by structure analysis. Cell parameters determined during crystal-structure analysis are a = 18.015(5), b = 9.261(2), c =9.770(3) Å, β = 96.238(7)°, V = 1620.3 Å^3.

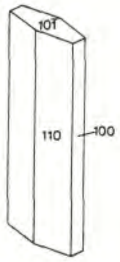

Fig. 1. Crystal drawing of villyaellenite from Mapimi.

The refractive indices, specific gravity, chemistry, and cell parameters differ markedly from those of type villyaellenite from Sainte-Marie aux Mines, France, which is near the midpoint of the villyaellenite-sainfeldite series. A third occurrence of villyaellenite at Sterling Hill, New Jersey, consists of material nearly identical chemically to the villyaellenite from Mapimi.

Villyaellenite is isostructural with sainfeldite and hureaulite. The abnormally large a cell parameter in type villyaellenite relative to the Mn and Ca end members of the series and its structural and paragenetic relationships to fluckite further suggest that Mn and Ca are at least partially ordered in type villyaellenite.

Editor's Note: Within the article itself, there are specifics of interest regarding the villyaellenite from Sterling Hill: the material appeared to be a seam occurrence on calcite-bearing willemite-franklinite ore from the same area in the deposit which had yielded previously such minerals as ogdensburgite, sterlinghillite, wallkilldellite, and (Mn-bearing) adamite. The Sterling Hill material was described as being orange-pink, flattened crystals, in radial aggregrates measuring up to 7mm in diameter.

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Zincian, manganoan phlogopite

From the Centre de Recherches sur la Synthèse et Chimie des Minéraux, G.I.S. BRGM-CNRS, Orléans, France, and the Laboratoire de Minéralogie-Cristallographie, associé au CNRS, Université Pierre et Marie Curie, Paris France, comes an article entitled "Crystal structure refinement of hendricksite, a Zn- and Mn-rich trioctahedral potassium mica: a contribution to the crystal chemistry of zinc-bearing minerals", written by J.L. Robert and M. Gaspérin.

This article appeared in TMPM Tschermaks Min. Petr. Mitt., ***34,*** *1-14 (1985). The following is an opinion by Dr. Pete J. Dunn, Department of Mineral Sciences, Smithsonian Institution, Washington, DC.*

This is a fine study of a zincian, manganoan phlogopite, but not of hendricksite, which must be Zn-dominant. The title, therefore, is misleading. The paper also contains a crystal-chemical discussion of the coordination of zinc in crystal structures.

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Kutnohorite

An article entitled "Petrologic and crystal-chemical implications of cation order-disorder in kutnahorite [$CaMn(CO_3)_2$]" written by D.R. Peacor and E.J. Essene, both of the Department of Geological Sciences, The University of Michigan, Ann Arbor, MI 48109, and A.M. Gaines, Division of Earth Sciences, National Science Foundation, Washington, DC 20550, appeared in the American Mineralogist, ***72,*** *319-328 (1987). The authors' abstract of that article follows.*

The crystal structures of kutnahorite from Bald Knob(BK), North Carolina, and Sterling Hill(SH), New Jersey, have been refined. The BK kutnahorite ($Ca_{49}Mn_{50}Mg_1Fe_0$) is disordered in Ca-Mn distribution, but the SH kutnahorite is substantially ordered: ($Ca_{0.84}Mn_{0.16}$) ($Ca_{0.27}Mn_{0.73}$) $(CO_3)_2$. Long-range cation order in kutnahorite is not detectable using conventional powder X-ray diffraction techniques, but it may be measured by single-crystal techniques. The large ionic radius of Mn relative to Mg in dolomite leads to coupled distortion of the Ca and Mn octahedra that may result in a low ordering potential. Thus, the BK kutnahorite lacks significant cation order despite slow cooling from amphibolite-facies regional metamorphic conditions. Long-range cation order in SH kutnahorite is compatible with a low-temperature solvus between calcite and kutnahorite as well as between kutnahorite and rhodochrosite. Two-phase intergrowths of manganoan calcite ($Ca_{88}Mn_{12}Mg_0$) and calcian kutnahorite ($Ca_{62}Mn_{35}Mg_3$) from SH are interpreted as due to primary coprecipitation of calcite and ordered kutnahorite from solution in the two-phase region at temperatures below the solvus crest. Data on metamorphic Ca-Mn carbonates indicate complete solid solution between calcite and rhodochrosite at 600°C with solvi between kutnahorite-calcite and kutnahorite-rhodochrosite forming at lower temperatures.

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Zincian actinolite asbestos

An article entitled "Zincian actinolite asbestos", written by Maria Dorling and Jack Zussman, Dept. of Geology, University of Manchester, Manchester M13 9PL, England, appeared in Mineralogia Polonica, ***15,*** *#1-2, 11-20 (1984). The authors' abstract appears below.*

A naturally occurring Zn-rich amphibole has been investigated by optical, X-ray, electron probe and electron microscopic methods. It contains approximately 6 wt.% ZnO and is asbestiform in character. The asbestos fibrils show abundant Wadsley defects on (010) and multiple twinning on (100). Fibrils with an ordered triple chain structure have been observed.

The main text indicates the studied material is from Franklin, New Jersey, and was obtained for study from the collection of the Geology Department, University of Manchester. Reference is made to KLEIN, C.,Jr., and ITO, J. (1968) Zincian and manganoan amphiboles from Franklin, New Jersey. Amer.Min., ***53,*** *1264-1275 and to PALACHE, C. (1928) Mineralogical notes on Franklin and Sterling Hill, New Jersey. Amer. Min.,* ***13,*** *297.*

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Zincian Spinel

An article entitled "Zincian spinel and staurolite as guides to ore in the Appalachians and Scandinavian Caledonides", written by Paul G. Spry and Steven D. Scott, Department of Geology, University of Toronto, Toronto, Ontario M5S 1A1, Canada, appeared in the Canadian Mineralogist, ***24,*** *147-163 (1986). The authors' abstract appears below.*

Zincian spinel or gahnite $(Zn,Fe,Mg)Al_2O_4$ occurs in metamorphosed massive-sulfide deposits, aluminous metasediments, pegmatites, quartz veins, and metamorphosed oxide-silicate deposits in at least forty localities within the Appalachians and Scandinavian Caledonides. Most occurrences are associated with metamorphosed massive-sulfide deposits, in which gahnite is considered to form predominantly by desulfurization reaction involving a member of the system Fe-S-O and either sphalerite and garnet or sphalerite and aluminosilicate. Spinel in quartz veins and pegmatites is thought to be a product of metamorphic-hydrothermal solutions and magmatic processes, respectively. Spinel in aluminous metasediments was probably derived from the metamorphism of metalliferous shales, in which rocks Zn may originally have been linked to organic material. Although gahnite in some sulfide deposits coexists with zincian staurolite, textural evidence suggests that staurolite did not act as a precursor to spinel. The high Zn content in staurolite is likely the result of desulfurization reactions. Staurolite from the Bleikvassli deposit (Norway) contains up to 8.77 wt.% ZnO and is thought to be the most Zn-rich yet recorded. Both gahnite and staurolite are most Zn-rich where associated with sulfides and may constitute an exploration guide for massive-sulfide deposits in metamorphosed terranes.

The above abstract is presented for the sake of completeness. Franklin and Sterling Hill were listed as metamorphosed zinc-oxide deposits in the study. Bibliographic references were made to: FRONDEL, C. and KLEIN, C., Jr.(1965) Amer.Min., ***50****, 1670-1680 and also to CARVALHO, A.V.,III & SCLAR, C.B. (1979) Geol. Soc. Amer. Abstr. Programs,* ***11****, 6.*

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Leucophoenicite crystal structure

An article entitled "The crystal structure refinements of two leucophoenicites", written by Toshio Kato, Institute of Earth Sciences, Faculty of Liberal Arts, Yamaguchi University, Yoshida, Yamaguchi 753, Japan, appeared in the Yamaguchi University, College of Arts Bulletin, ***22****, 29-39 (1988). The following is the author's abstract of that article.*

Two refinements of two leucophoenicite structures have been decribed. Samples used are from Franklin, N.J., its type locality. One sample does not contain Ca, and the other contains 4.2% CaO. The final R were 0.048 and 0.067, respectively. The positive proof of Ca ordering in the leucophoenicite structure could not be obtained.

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Yeatmanite crystal structure

Toshio Kato, Institute of Earth Sciences, Faculty of Liberal Arts, Yamaguchi University, Yoshida, Yamaguchi 753, Japan, has written an article entitled "The crystal structure of yeatmanite" which appeared in Mineralogical Journal, ***13****, #2, 53-64 (1986). The following is the author's abstract of that article.*

The crystal structure of yeatmanite

$[Mn_5Sb_2]^{VI}[Zn_6Mn_4(Si_{3.8}Fe^{3+}_{0.2})]^{IV}O_{28}$; $P\bar{1}$,

a= 5.443(3), b= 11.683(5), c= 9.134(4)Å, α= 92.06(4), β= 101.19(4), γ= 76.34(4)°, Z=1] from Franklin, New Jersey, has been refined to an R = 0.100 using 1881 reflections. The structure scheme proposed by Moore *et al.*[(1976); Neues Jahrb. Abh., **127**, 47-61] was proved to be correct. The octahedral sheet consisting of 5Mn and 2Sb is sandwiched by the upper and the lower tetrahedral sheets consisting of $Zn_3Mn_2Si_2$, respectively. Along the a-axis, there are two rows of Si tetrahedra, one of which is surrounded by $4ZnO_4$ and $2MnO_4$, and the other by $3ZnO_4$ and $3MnO_4$. A small portion of the latter is replaced by trivalent iron. The mean distances of M-O as follows: Sb^{VI}-O 2.00, $Mn(1)^{VI}$-O 2.24, $Mn(2)^{VI}$-O 2.19, $Mn(3)^{VI}$-O 2.22, $Mn(4)^{VI}$-O 2.12, $Mn(5)^{IV}$-O 2.08, $Zn(1)^{IV}$-O 2.03, $Zn(2)^{IV}$-O 1.95, $Zn(3)^{IV}$-O 1.99, $Si(1)^{IV}$-O 1.64 and $Si(2)^{IV}$-O 1.66Å.

In the text of the article it is revealed that the Franklin material used was NMNH #C6290, supplied by P.J. Dunn of the Smithsonian Institution, and the same as described by Dunn and Leavens, Amer.Min., ***65****, 196-199 (1980).*

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Franklinfurnaceite

An authors' abstract of a paper entitled "The franklinfurnaceite crystal structure: the missing link between chlorites and micas", appeared in The Picking Table, ***29****, #2, 12 (1988). Another treatise by these same authors, Donald R. Peacor and Roland C. Rouse, Department of Geological Sciences, University of Michigan, Ann Arbor, MI 48109, and Sturges W. Bailey, Department of Geology and Geophysics, University of Wisconsin-Madison, Madison, WI 53706, has appeared in Amer. Min.,* ***73****, 876-887 (1988) under the title "Crystal structure of franklinfurnaceite: A tri-dioctahedral zincosilicate intermediate between chlorite and mica." This new reference is mentioned here for the sake of completeness.*

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Pyroxmangite and Rhodonite

Readers, who want to keep their Franklin and Sterling Hill reference list up to date, should add the following: BENNINGTON, K.O., BROWN, R.R., BELL, H.E., and BEYER, R.P. "Thermodynamic properties of two manganese silicates, pyroxmangite and fowlerite." U.S.Department of the Interior, Bureau of Mines, Report of Investigations #9064. This is extremely technical and has little of interest to the collector community.

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Franklinite-gahnite exolution intergrowths

"Experimental determination of the $ZnFe_2O_4$-$ZnAl_2O_4$ miscibility gap with application to franklinite-gahnite exsolution intergrowths from the Sterling Hill zinc deposit, New Jersey" is the title of an article written by Antone V. Carvalho III, Sun Exploration and Production Company, 12121 Wickchester Lane, P.O. Box 1501, Houston, TX 77251, and Charles B. Sclar, Department of Geological Sciences, Lehigh University, Bethlehem, PA 18015. The following is the authors' abstract of that article.

The Sterling Hill zinc deposit is a regionally metamorphosed stratiform oxide-silicate deposit enclosed in the Precambrian Franklin marble. Spinels, which consist of oriented exsolution intergrowths of gahnite (G) (ideally $ZnAl_2O_4$) and franklinite (F) (ideally $ZnFe_2O_4$), were collected at four locations in the Sterling Hill mine. The bulk chemical composition of these spinels and the composition of the phases which constitute the intergrowths were determined by broad beam and point analysis, respectively, with the electron microprobe. These data show that the original homogeneous high-temperature spinels were as aluminous as $F_{80}G_{20}$.

The miscibility gap in the system $ZnFe_2O_4$-$ZnAl_2O_4$ was determined experimentally by hydrothermal methods. Homogeneous synthetic spinels on the join $ZnFe_2O_4$-$ZnAl_2O_4$ were prepared by dry reaction of the oxides at 1,350° ± 50° C. Equimolar mechanical mixtures of two synthetic homogeneous spinels with the compositions $F_{90}G_{10}$ and $F_{10}G_{90}$ were sealed with water in separate platinum capsules. These, in turn, were sealed in gold capsules and subjected to P_{H_2O}= 1 kbar between 700° and 900° C for a maximum period of 72 and 11 days respectively. The oxygen fugacity was controlled by the hematite-magnetite buffer (hematite packed between the gold and platinum capsules). Equilibrium was approached from two directions, namely, by exsolution of synthetic homogeneous spinels and by reaction of the spinels to the mechanical mixtures. An excellent fit with the experimental data was obtained by solution modeling (asymmetric Margules model) which gives a miscibility gap with a calculated consolute temperature of 957.4° C at $X_{gahnite}$= 0.525.

Integration of the electron microprobe analyses of the natural intergrowths with the experimentally determined miscibility gap indicates that the minimum peak temperature attained during regional metamorphism at the Sterling Hill mine was 760° C.

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Haidingerite
Magnesium-Chlorophoenicite

An article entitled "Powder X-ray diffraction data of magnesium-chlorophoenicite" written by Peter Bayliss, Department of Geology and Geophysics, University of Calgary, Alberta, Canada T2N 1N4 and Slade St.J. Warne, Department of Geology, University of Newcastle, N.S.W., Australia 2308, appeared in Powder Diffraction, 2, #4, (1987) 225-226. The following is the authors' abstract of that article.

Magnesium-chlorophoenicite may be differentiated from the Mn-analogue chlorophoenicite, because $I_{001}>I_{\bar{2}01}$ for magnesium-chlorophoenicite at 7Å, whereas, $I_{001}<I_{\bar{2}01}$ for chlorophoenicite.

Of particular interest to the Franklin-Sterling Hill collector community, however, was the mention of haidingerite in the main text. This species, new to the area, was discovered during their studies. The Sterling Hill specimen, AMNH 28942, showed haidingerite associated with willemite and magnesian chlorophoenicite. The primary author indicates (personal communication dated 1/13/89) that, unfortunately, no details regarding the haidingerite are on file. This study was performed back in 1982.

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Element Dispersion Studies

Patricia Buis submitted a thesis entitled "Geochemistry of fluorite from the orebody of the Sterling Hill Mine in Ogdensburg, New Jersey" in partial fulfillment of the requirements for the M.A. degree in Earth and Environmental Sciences, Graduate Division of Queens College of the City University of New York. The following is the author's abstract of that 1983 thesis.

A fluorite mineral band characterized by greenish fluorescence, located within a manganese-zinc orebody at Sterling Hill, New Jersey, was analyzed for its minor element geochemistry in an attempt to account for the fluorescence and to gather information as to the mineral's origin. The Tb/Ca and Tb/La ratios in fluorites from three of the mine levels sampled suggest a possible hydrothermal origin for the mineral. Fluorites from a fourth level, however, according to their rare earth element ratios, seem to be associated with a pegmatitic intrusion.

Further work will have to be done in order to resolve the question of the fluorite genesis but, at present, it does not appear likely that the fluorites from all four mine levels constitute a single mineral band. This discrepancy in minor element concentration content for the different mine fluorites tends to support an origin for the orebody through submarine volcanic-exhalational processes.

* * * * * * * * * *

Patricia Buis submitted a thesis entitled "A geochemical study of minor and trace elements in the carbonate country rock surrounding Sterling Hill, a zinc-iron-manganese ore deposit in Ogdensburg, New Jersey" in partial fulfillment of requirements for the Ph.D. degree, Graduate School of Arts and Sciences, University of Pittsburgh. The author's abstract of that 1987 thesis follows.

The Sterling Hill zinc deposit at Ogdensburg, New Jersey, exhibits a dispersion halo of trace and minor elements in the Franklin marble country rock. Manganese, iron, zinc, magnesium, cadmium, and lead were the elements chosen for detailed study to determine affiliations with the zinc silicate-oxide ores. Chemical analysis, semi-quantitative spectrofluorometry, and X-ray diffraction were among the techniques used on samples largely derived from horizontal drill cores taken from mine entries underground.

Concentrations of the reference elements in the country rock as a function of distance to the orebody are above background for each element up to forty meters from known ore. Such dispersion distances are more typical of infiltration (movement of a fluid transporting metals) than diffusion (movement of a fluid through a stationary fluid or solid rock). However, the Precambrian (Grenvillian) age of the ore deposit and its subsequent tectonic history (Taconic, Acadian, and Alleghenian) are the factors which are adequate to produce the observed dispersion distances through diffusion mechanics alone.

Trends in the distribution of the elements around the orebody indicate that the manganese content of the carbonates could help find more carbonate hosted zinc silicate-oxide ores. The red-orange colored fluorescence of the carbonate is a rapid means of identifying anomalous manganese-bearing carbonates in the field.

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During the 1988 North American Conference on Tectonic Control of Ore Deposits and the Vertical and Horizontal Extent of Ore Systems, held at the Univeristy of Missouri-Rolla, Rolla, Missouri, a paper entitled "The dispersion of ore elements into the surrounding country rock of the Sterling Hill Mine, Ogdensburg, New Jersey" was presented. The authors were Patricia Buis, Gary A. Cooke, and Michael Bikerman, all representing the Department of Geology and Planetary Science, University of Pittsburgh, Pittsburgh, PA 15260. The following is the authors' abstract of that article.

The Sterling Hill Mine displays a symmetrical lateral dispersion of its ore-associated elements, extending out as much as 40 meters for Mn, 30 meters for Fe, and 20 meters for Zn from known ore. No vertical variation in dispersion of these three elements was observed in samples taken from different mine levels (the 152 meter level, the 244 meter level, the 396 meter level, and the 533 meter level). Such a symmetrical pattern in the ore-associated element dispersion suggests that diffusion, rather than infiltration was the primary agent of ore element migration into the surrounding rock at Sterling Hill. However, Mg-rich zones within the host rock appear to have served as limited conduits for ore element migration. These zones occur in slips and fractures which were generated by the regional tectonic regimen.

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Research in Mineralogy (1889–1890)

Dr. Pete J. Dunn
Department of Mineral Sciences,
Smithsonian Institution
Washington, D.C. 20560

The last decade of the 19th century was a period of intense study. The science of mineralogy was approaching full stride, and the excitement that Franklin offered was being recognized. The 1890s would witness the publication of twice as many scientific papers on Franklin as did the previous decade. Collectors, too, were much more focused on Franklin, and Frederick Canfield had in 1889 published his catalogue of the minerals of New Jersey listing some 74 species (not all valid). The stage was set. In Franklin itself there was much activity, especially with the 1890-1891 drilling of exploratory holes to attempt to define the northward extensions of the orebody.

Among the more significant notes was the description of the 1889 find of the nickeline assemblage, which Koenig published in 1890. His initial report of chloanthite (now known as a mixture of rammelsbergite and gersdorffite), nickeline, annabergite, and fluorite must have been puzzling given the limited mineralogical knowledge of Franklin at the time. Indeed, it would be just as puzzling today; this very anomalous assemblage has never fit the rest of the deposit well. Koenig reported 30 pounds of material; Palache (1935) later reported several hundred pounds. The total is unknown but likely nearer the higher value.

Much of the mineral work done in this period was of a chemical analytical nature, including studies of Trotter mine willemite by Clarke (1890), Franklin rhodochrosite by Browning (1890), and a really superb study of Franklin rhodonite, including morphological and chemical analyses, done by Pirsson (1890) under the supervision of Professor Penfield at the Sheffield Scientific School in New Haven. Geologic work was underway also. Nason (1890b) described a scapolite-bearing rock from Franklin, and then began what would become a long and substantial debate in the literature concerning the age of the Franklin marble (1890a).

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BROWNING, P.E. (1890) Analysis of rhodochrosite from Franklin Furnace, N.J. *American Journal of Science, 3rd Series*, **40**, 375-376.

CLARKE, F.W. (1890) Report of work done in the division of chemistry and physics, 1887-1888. Willemite from the Trotter Mine, Franklin, N.J. *U.S. Geological Survey Bulletin 60*, 130.

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PIRSSON, L.V. (1890) On the fowlerite variety of rhodonite from Franklin and Stirling, N.J. *American Journal of Science, 3rd Series,* **40**, 484-488.

NASON, F.L. (1890a) The post-Archean age of the white limestone of Sussex County, N.J. *Geological Survey of New Jersey, Annual Report for 1890,* 25-50.

NASON, F.L. (1890b) Scapolite rock. *American Journal of Science, 3rd Series,* **39**, 407.

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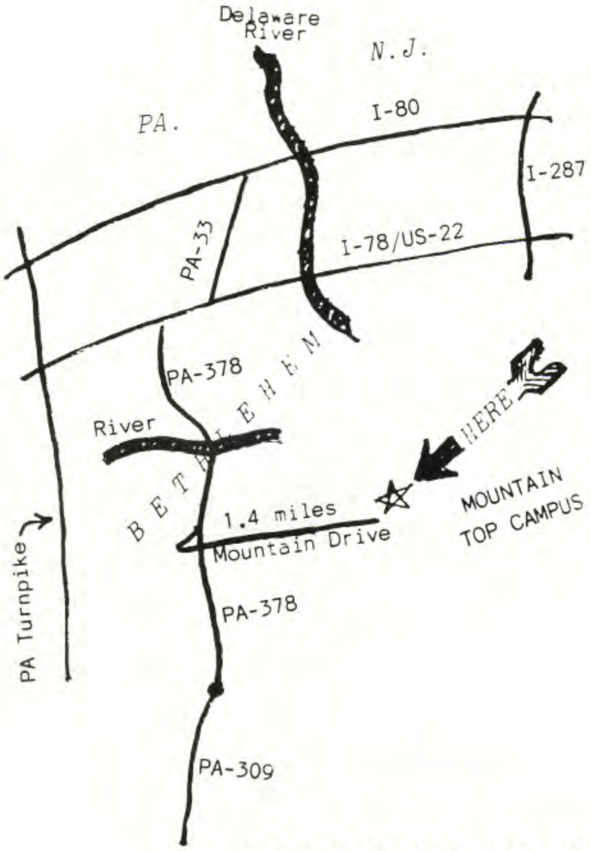

MAP IS NOT TO SCALE

NOTE: Mountain Drive is 5.0 miles south on PA-378 from I-78/US-22 and 4.8 miles north on PA-378 from PA-309. Follow the PA Route 378 signs.

Editor (Continued from page 14)

Doubtless, this honor would have been impossible without the efforts of such individuals as Robert Mayo Catlin, George Rowe, and Chief Herbert C. Irons.

Speaking of Chief Irons (See Fig. 3), I am indebted again to Dick Hauck for this fine photograph. It appeared in a copy of *Zinc* dated Autumn, 1939 (part of the forementioned loan). The caption accompanying the original photo reads "On the firing line. Extreme right, Chief Irons of Franklin watching his son draw a bead."

The last item, thanks to the thoughtfulness of FOMS member, Robert H. Stephens, Dover, N.J., is a picture of the Franklin residence of George Rowe (roweite). George was the Mine Captain at Franklin for 28 years. The photograph, which comes from an old, unused post card on which a price of $4.50 was pencilled lightly on the reverse, indicates Rowe could easily walk to work--the mine property can be seen in the background (Fig. 4).

Obsolete pyroxenes

The newsletter of the Mineralogical Society of America is named *Lattice*. *Lattice*, **5,#1**, 6-7 (1989), contains an article of interest to FOMS members. The title is "A farewell to obsolete pyroxenes" written by Robert M. Hazen. The author tells of visits to Franklin in his youth, his Franklin collection, and of his association with Wilfred and Mary Welsh. These are pleasant memories, indeed. Then Robert Hazen refers to the article with brought about all this nostalgia--"Nomenclature of pyroxenes", Morimoto, N. *et al.* (1988) *Amer.Min.*, **73**, 1123-1133. In a nutshell, the names of 105 pyroxenes have been formally discarded by the Subcommittee on Pyroxenes, Commission on New Minerals and Mineral Names, International Mineralogical Association. Per the subcommittee, the following would apply to the current Franklin-Sterling Hill mineral species: acmite becomes aegirine, jeffersonite becomes zincian manganoan diopside or augite, and schefferite becomes manganoan diopside.

Figure 3. (Above) Chief Irons, in uniform, and his son at target practice.

Figure 4. (Right) George Rowe's residence in Franklin, New Jersey.

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The FRANKLIN-OGDENSBURG MINERALOGICAL SOCIETY, Inc.

The regular activities of the Society consist of lecture programs, field trips, and micro-mineralogy study groups. The regular meetings of the Society are held on the third Saturday of March, April, May, June, September, October, and November. Unless otherwise specified, lecture programs will be followed by business meetings. The seasonal schedule below shows **time** and **place** in **bold face** for all activities. Except for the March meetings, held at the Hardyston Township School, all others take place at **Kraissl Hall, Franklin Mineral Museum, Evans Street, Franklin, N.J.**

* *

SEPTEMBER 16, 1989 (Saturday)

Field Trip:	**10 a.m.-12 noon**	**Specific details will be posted at Franklin Mineral Museum.**
Micro-Group:	**10 a.m.-noon Kraissl Hall**	**"Viewing the Dr. William B. Thomas Franklin micromount collection."** The group leader is Ralph E. Thomas.
Program	**1:30 p.m. Kraissl Hall**	**"The Sterling Mine Update"** by Dick Hauck, Past President, F.O.M.S.

OCTOBER 7, 1989 (Saturday)

Dinner:	**7 p.m.**	**11th Annual F.O.M.S. Dinner. For details, see page 6.**

OCTOBER 7 & 8 (Saturday and Sunday)

Show:	**Usual Hours Prevail**	**The 33rd Annual Franklin-Sterling Mineral Exhibit, Franklin Armory, Franklin, N.J. The guest speaker will be Charles B. Sclar, Professor of Geology, Lehigh University.**

OCTOBER 21, 1989 (Saturday)

Field Trip:	**9 a.m.-noon**	**Bodnar/Edison Quarry,** Rudeville, N.J.
Micro-Group:	**10 a.m.-noon Kraissl Hall**	**"The Pegmatite Minerals of the Black Hills, South Dakota."** The group leader is Steve Fritz.
Program:	**1:30 p.m. Kraissl Hall**	**"Willemite/Calcite and other Neat Things from the Far West"** by Manuel Robbins, author, and *Rocks & Minerals* columnist.

NOVEMBER 18, 1989 (Saturday)

Field Trip:	**10 a.m.-noon**	**Buckwheat Dump**, Evans Street, Franklin, N.J.
Micro-Group:	**10 a.m.-noon Kraissl Hall**	**"Alpine Cleft Minerals (ferro-axinite, epidote, albite, etc.) from Bridgeville, N.J."** Warren Cummings, a State of New Jersey geologist, is the group leader. This presentation leads naturally into his afternoon feature program.
Program:	**1:30 p.m. Kraissl Hall**	**"The Buckwheat Dolomite - Fissure Mineralization of Paleozoic Age"** by Warren Cummings.

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PUBLICATIONS AVAILABLE FROM THE FRANKLIN-OGDENSBURG MINERALOGICAL SOCIETY

TITLE		PRICE
PALACHE, Charles: The Minerals of Franklin and Sterling Hill, Sussex County, New Jersey. *U.S. Geological Survey Professional Paper No. 180.* Soft back edition, FOMS reprint 1974		$10.00
FRONDEL, Clifford and BAUM, John L.: Structure and Mineralogy of the Franklin Zinc-Iron-Manganese Deposit, New Jersey. *Economic Geology.* Only photocopies are available		$ 2.50
The Picking Table		
Vol. 1, #1 through Vol. 23, #2	each issue	$ 2.50
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