THE PICKING TABLE

The house built for Robert Mayo Catlin, Manager of Mines, 1906-30.
See feature story on page 7.

JOURNAL of the FRANKLIN-OGDENSBURG MINERALOGICAL SOCIETY, INC.

FALL, 1987 VOLUME 28, No. 2

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

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ABOUT THE COVER PHOTOGRAPH

Beyond Catlin's house, the larger view is westward to the Kittatinny ridge on the horizon. The flat line at the far side of the open fields is the top of the North Church delta, a deposit of Pleistocene age representing lake level when the northward draining Wallkill was dammed by receeding ice. For information about the house itself, see page 7.

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AN IMPORTANT ANNOUNCEMENT FROM THE F.O.M.S. TREASURER:

I suggest that you pay your 1988 dues when you attend the FOMS meetings this fall or during the Franklin-Sterling Mineral Exhibit (Franklin Show) on October 3 and 4, 1987. If your 1988 dues are not paid by February 1, 1988, you will not be sent the 1988 Spring issue of The Picking Table until you do so. Society operating expenses are up and advertising in The Picking Table has declined. This issue of The Picking Table is smaller in size because of these circumstances. Assist the Society in its fiscal budgeting by being prompt in paying your dues. If you prefer, mail your dues to: Chester Lemanski, FOMS Treasurer, 309 Massachusetts Road, Browns Mills, NJ 08015. Individual rate: $10.00; Family rate: $15.00.

from the Editor's Desk

Omer S. Dean
10 Bumble Bee Lane
Norwalk, CT 06851

Standfast donates his mineral photomicrograph slide collection to F.O.M.S.

Dr. Alfred L. Standfast, M.D., has donated over 1500 mineral photomicrograph slides to the Society. This is an event of major proportions. Dr. Standfast's slides represent some 30 years of a "labor of love." The Society has received a true "treasure" in every sense of the word. Ed Wilk has been appointed the Custodian of this slide collection. Duplicates will be made from selected slides in the collection and will be offered for sale individually at $1.50, or in sets of four priced at $5.00. Currently, 5 different sets of 4 slides each are available. The sets represent specific mineral classifications such as Oxides, Native Elements, etc. Profits from the sale of the duplicate slides will go to the Society's treasury. If you miss the promotional display of these slides at the local mineral shows, please write directly to Ed Wilk or Steve Misiur (addresses on inside of the front cover) for specific details.

"Doc" is being honored in this column for the above reason; perhaps, he should be honored for many reasons. After much arm twisting, I succeeded in obtaining the following capsulized autobiography from Al, whose zest for life is inspiring.

The tale of a rockhounding shutter-bug with itchy feet

I obtained my medical degree after eight years at Columbia University in New York. I have the distinction of delivering the first baby in Hell's Kitchen, Manhattan. Following my internship, I took my bride through the Panama Canal and north along the Pacific coast all the way to Alaska. I enjoyed my honeymoon. It was at Fort Yukon Hospital, that I served as resident physician for one and a half years; the only doctor for an area which extended almost to the Arctic Ocean. I can still remember that at Christmas-time the nights were 23 hours long with temperatures down to -70°F. In caring for my patients it was necessary to visit many by dogsled and by canoe. Later, I had a medical practice in the Delaware Valley. Finally, however, I saw the light and became a Radiologist.

Figure 1. Dr. Alfred L. Standfast, M.D. Photograph taken March 1987.

Over the years I have visited most of the high spots on Mother Earth except for Antarctica. I went on tours with nature, geology, and camera groups throughout the world by ship and by airplane. I have over 80 years of fond memories that are still vivid in my mind in addition to the many slides and movies I've taken of remote parts of the world.

As for Franklin, it was over 40 years ago that I first visited there. With my kids at my side and with an ultraviolet lamp in hand, we walked the streets and glowing sandpiles at midnight. I remember also talking with kindly Mr. Bauer at the New Jersey Zinc Company office. On another occasion I saw his collection at his home. It is over 35 years now that I have enjoyed the organized clubs and shows at Franklin. I've seen digging in the area around the wire cage over the Parker Shaft opening. Likewise, I've seen a large Buckwheat Dump gradually disappear in the trunks of cars and on the beds of trucks. I recall, too, that the deep open pit never showed water until the Franklin Mine was closed.

My wife and I recently celebrated our 56th wedding anniversary. The years pass but the objective I've had these last few years is still much the same: to enlighten interested people with the hidden beauty of the "micro" world, which is currently enjoyed by only a dedicated few microscope enthusiasts.

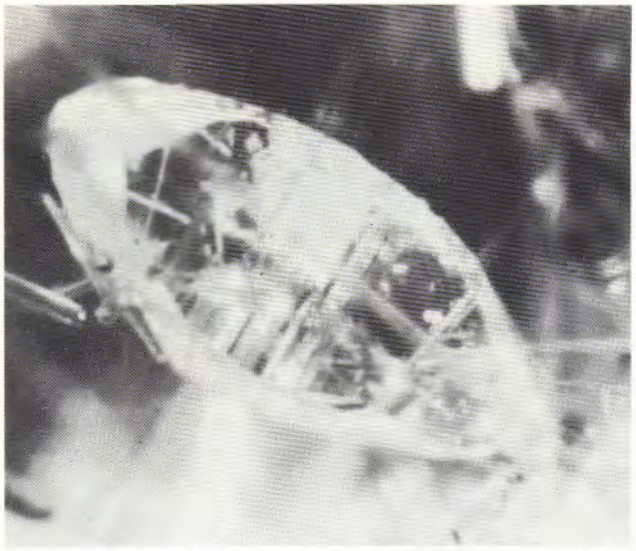

Figure 2. Fluorescent scheelite crystal on actinolite with manganaxinite, Sterling Hill, Ogdensburg, N.J. Photomicrograph taken at 120X by Dr. Al Standfast.

It seems appropriate that one of Al's recent photomicrographs be included in this tribute to his generousity. The scheelite shown in *Figure 2* demonstrates his photographic skills. All of F.O.M.S. says "Thank you, Dr. Standfast!"

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Franklin area material at Tucson (1987)

FOMS members visiting the Tucson Show this last February had a surprise awaiting them. It seems that Dr. David Garske had sent some Franklin-Sterling Hill material to Dr. Sidney A. Williams (GLOBO DE PLOMO ENTERPRISES, P.O. Box 872, Douglas, AZ 85607) for analysis. Two species, new to the deposit, *fluckite* and *otavite*, were identified by Sid. A few specimens of this material were available from dealers (Robert A. Jenkins, of The Adit, is the one with whom I dealt; Joe Cilen dealt with Cureton; Vandall King acquired material for Wards directly, I believe, from GLOBO DE PLOMO).

On April 20, I wrote Sid Williams requesting any data he might be able to supply regarding these new finds, so that it might be passed along to you via *The Picking Table*. On May 6th a reply to my inquiry was received. The following are direct quotes of entire paragraphs from Sid's letter:

The fluckite occurred as corroded dull white prisms (ca. 5mm) along a vuggy, leached vein cutting a massive friedelite matrix. A thin section showed willemite replacing the friedelite along the vein selvages. The fluckite was identified by X-ray (Crκα).

The otavite occurred as a botryoidal white crust along an open fracture cutting massive zincite that hosted scattered grains of franklinite. The crust was 2-5mm thick and the zincite immediately adjacent to it did not appear corroded. Identification was by X-ray diffraction and XES (to verify the high Cd/Zn ratio). I believe this is an old specimen judging by its patina.

These two minerals are being added to the official Franklin-Sterling Hill list. Dr. Sidney A. Williams, for those of you who might not know, is a recognized authority in his field and is one of the co-authors(along with John W. Anthony and Richard A. Bideaux) of the excellent and very popular *Mineralogy of Arizona*, (1977), University of Arizona Press, Tucson, AZ. Thank you, Sid, for sharing this information with our readers.

I have not seen the otavite. It could be either Franklin or Sterling Hill material. The fluckite, however, I have seen. It has a typical Sterling Hill matrix. The fluckite crystals are not as attractive as the Haut-Rhin, France material, which has light pink hemispherical aggregates of fluckite with the terminations of individual prisms, here and there, extending beyond the surface of the hemisphere.

Kentrolite, groutite, manganite, and hausmannite from Franklin, New Jersey: some observations

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Washington, D.C. 20560

KENTROLITE

Kentrolite was originally reported from Franklin by Palache (1935). No verified sample was known, however, in either public or private collections. Several purported kentrolite specimens were examined from time to time, but they were found to be other species. Hence, there has been no reference sample of kentrolite for over 50 years. Because kentrolite is a lead manganese silicate, my initial and lengthy searches for it were among the lead silicates, but were unsuccessful.

Franklin kentrolite has now been found, associated with groutite, which occurs associated with cahnite, calcite, and abundant hetaerolite, in a brown garnet matrix. This Franklin kentrolite forms tiny, 0.1 - 0.3 mm crystals, black in color, with a subvitreous luster. It has been verified using X-ray diffraction methods, and microprobe analyses which confirmed it as a Pb-Mn-silicate; the two techniques confirm the species. Two photographs of this kentrolite are given. Figure 1 is a photograph of a thin-section of the assemblage, which was obtained using the microbeam laboratory at the University of Michigan. In this image, kentrolite is shown as bright white euhedral crystals in cross-section, rimmed by hetaerolite (light gray), and associated with euhedral crystals of calcite which are hexagonal in cross-section (dark gray). Figure 2 shows the morphology of these Franklin kentrolites, as they might be seen in a vug. Although many specimens from this assemblage were examined, kentrolite was found in only one. Because Palache (1935) did not mention the very abundant Mn-oxides in this assemblage, a different kentrolite-bearing assemblage may have been known to him. The reference specimen is in the collection of the Smithsonian Institution (#C6587).

Figure 1. **Backscattered-electron image of kentrolite (white), hetaerolite (gray), and calcite (dark gray). Magnification is 150x.**

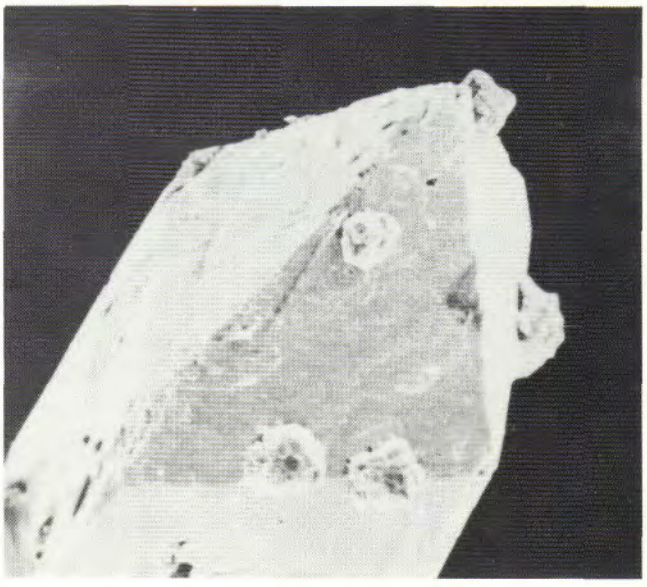

Figure 2. **Euhedral kentrolite crystal from Franklin. True width of horizontal field is 0.13 mm.**

GROUTITE, MANGANITE, HAUSMANNITE

An antimonian groutite (groutite with a minor non-essential amount of antimony) was described by Klein (1967) from Franklin. It must be emphasized that this described groutite is from a much different assemblage than the groutite commonly held in Franklin collections. It is represented by only one sample, which is in the collection at Harvard University (HU-113003). In this assemblage, groutite forms thin, platy, black crystals, in a vug in yellow-green garnet, different from the brown garnet hosting the kentrolite described above. These platy groutite crystals are shown in Figure 3. They are associated with black, radial aggregrates of manganite, cahnite octahedra, franklinite as druse coating, and isolated colorless apatite (Ca-As apatite, likely svabite or johnbaumite). Also present as an associated mineral is dark brown romeite (calcium antimonate), which contains small amounts of non-essential large cations such as Ba, K, Pb, and Mn.

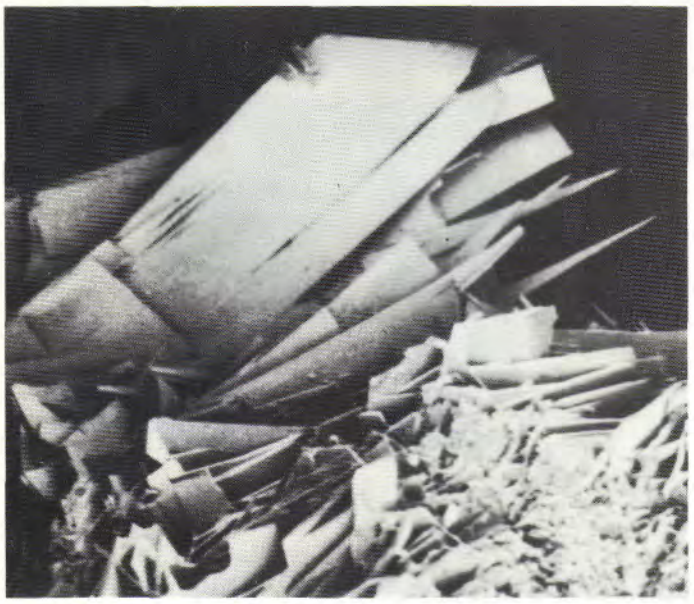

Figure 3. **Antimonian groutite from Franklin. True width of horizontal field is 0.8 mm.**

The more common groutite assemblage, and the one frequently prized for its cahnite crystals, is described above under kentrolite, and deserves additional discussion. Samples of it are found, always with a brown garnet matrix, in many reference collections of Franklin minerals, but they are commonly mislabeled. The brown garnet matrix, contains vugs, many of which result from the dissolution of pre-existing barite. These vugs are lined with druse hetaerolite, some of it in rectangular patterns, having

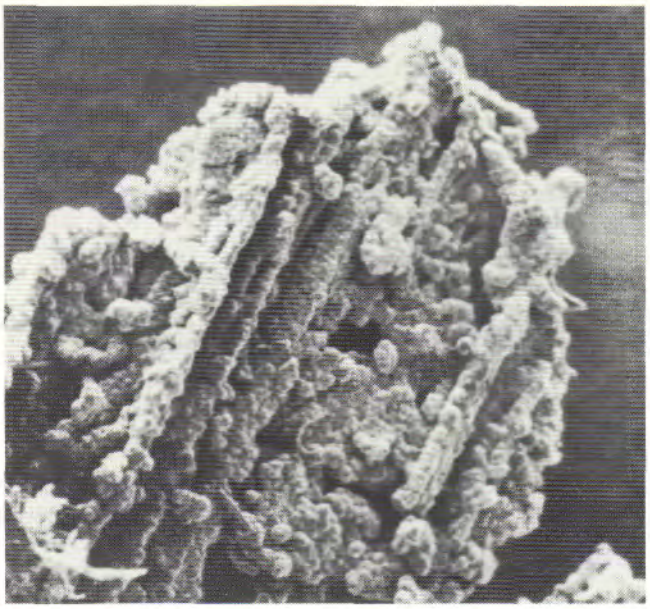

Figure 4. **Hetaerolite druse replacing barite. True width of horizontal field is 0.633 mm.**

formed along cleavages of barite (Figure 4). Upon this druse surface occur a number of manganese oxides, cahnite, and white or pink clumps of secondary barite. The manganese oxides are difficult to verify by simple visual examination, but some general observations are useful.

Groutite forms in several habits:

a) As finely matted aggregrates of whispy reddish-brown fibers (Figure 5).

b) As prismatic crystals, black in color, in slightly divergent sprays; individual crystals are to 4 mm. Some of these black, lustrous sprays (Figure 6) are in part groutite, and in part hausmannite. These groutite crystals are terminated with simple forms.

Manganite forms reddish druses of acicular crystals. It is difficult to identify visually.

Hausmannite forms prismatic aggregrates of acicular crystals (Figure 7). They are clearly more brownish red than groutite, and have a distinctly fibrous appearance.

Some black, grainy-surfaced pseudomorphs have been observed (Figure 8), perhaps after barite. They are in the hausmannite series but have not been studied in detail. They are fragile and hollow. The specimen is in the Franklin Mineral Museum.

All minerals were verified using X-ray diffraction and other methods. This description of

Figure 5. (top right) Groutite crystals in whispy aggregates. True width of horizontal field is 0.8 mm.

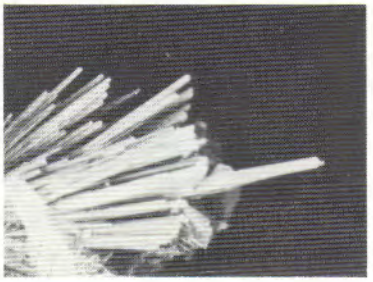

Figure 6. (second from top) Prismatic groutite crystals. True width of horizontal field is 3.0 mm.

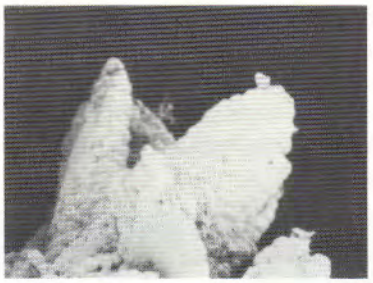

Figure 7. (third from top) Fibrous composite aggregate of hausmannite crystals. True width of horizontal field is 0.425 mm.

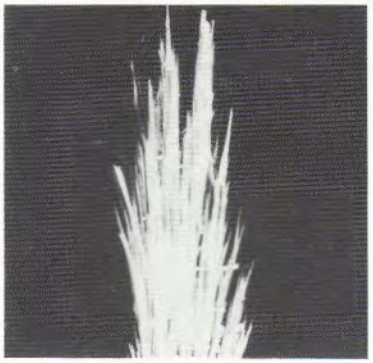

Figure 8. (bottom) Mn-oxide pseudomorphs after barite. True height of vertical field is 2.4 mm.

but two assemblages is not meant to be a complete description of these minerals at this locality; other assemblages have some of these minerals also.

References:

KLEIN, C. Jr. (1967) Antimonian groutite. *The American Mineralogist, 52,* pp 858-859.

PALACHE, C. (1935) The Minerals of Franklin and Sterling Hill, Sussex County, New Jersey. *U.S. Geological Survey Professional Paper 180.*

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Franklin Yesterdays

ROBERT MAYO CATLIN: A VIGNETTE

John L. Baum
70 Route 23 N
Hamburg, NJ 07419

One of the most important men who ever lived in Franklin, New Jersey was Robert Mayo Catlin. The early method of underground mining at Franklin was by means of tunnels which followed the richer layers of the ore within the 4000 foot ore body. The floors of the tunnels were fifty feet apart vertically and on some levels there were four tunnels abreast. It is obvious that such tunnels can be enlarged only so much before the surroundings collapse, and in the early 1900s it became apparent that the mining must cease unless some way was found to bypass the forces of gravity. The aid of important mining engineers was sought and the method selected employed stope slicing and top slicing. The man selected to supervise this rebirth of the Franklin Mine was Robert M. Catlin.

Catlin was born in Burlington, Vermont in 1853. He chose a career in engineering, receiving from the University of Vermont the Bachelor of Science degree in 1872 and that of Civil Engineer in 1873. Beginning in 1875 he served as a mining engineer on the frontier of our West, and worked for Elko County, Nevada as official surveyor. Later he moved to the wild mining town of Tuscarora, Nevada where in 1880 he became superintendent of the Navajo Mining Company's operations. In 1882 Catlin became engineer-superintendent in charge of five mines of the Victorine Gold Mining Company; in 1893 he guided the operations of the Commonwealth and Nevada Queen Mines in the same district. In 1895 he became associated with John Hays Hammond, mining engineer for Cecil Rhodes in South Africa, and became general manager of eight deep-level gold mines in the Johannesburg district.

It was in 1906 that Catlin was brought to Franklin as manager of mines. With his broad experience and reputation backing his demands in a desperate situation, he was able to work miracles. He had required a suitable dwelling, and one was built to order, with servant's quarters, acres of lawns and every amenity of the times. He sought miners with experience in the newly introduced mining methods and brought them to Franklin, building for them a row dwelling of apartments such as the Englishmen among them were acquainted with back in Cornwall. He noted that injured miners lay on a stretcher at the depot until the Paterson train came through, and he demanded and got the County's first hospital.

Charging ahead, Catlin paved the streets of the town and built a water system. The school was in need of improvement and he saw to it that a vocational school was built to teach the youth of the town various trades to their advantage. The lawless character of Franklin merited attention and Catlin imported Chief Herbert Irons, who was the friend of the law abiding. Chief Irons was completely without fear and a holy terror to those he deemed unappreciative of the merits of a peaceful Franklin. Catlin caused the Zinc Company to organize a modern fire department and to donate a suitable engine to replace the hand drawn hose cart. A bank was founded and it in conjunction with a general store put an end to the usurious practices of the local merchants. Social services were introduced which included a neighborhood house containing bowling alleys, a library, meeting rooms and quarters for personnel to visit the ill and instruct in child care. A separate meeting building was furnished the eastern Europeans who might feel uncomfortable for a time upon their arrival.

At the mine, the latest practices were introduced. The miners were accustomed to dressing for the mine at home. Now a change house

was built for them which had lockers, showers, and drying facilities for mine clothes. This change house was kept abundantly supplied with soap and towels. Drinking water and electric lights were introduced into the mine, and as safety features were developed their use was made mandatory. A miners' mutual relief society was founded, a forerunner of workmen's compensation, and in time, a pension plan was introduced (long before social security). Catlin's mining plans were so well prepared that in the end all of the ore at Franklin was mined, the inevitable subsidence of the surface was controlled, and what approached disaster in 1906 became a mining success story.

Catlin's later days at Franklin were occupied in experiments with oil shale. The end products of these experiments were tested in his chauffeur driven touring car, in which Catlin delighted in conveying house guests such as Herbert Hoover about the countryside. The shale oil was analyzed at various stages of its use for acids and residues but the process was no more economical then than it is now. However, the tests gave Catlin the opportunity of strolling through the chemistry laboratory, where he delighted in watching the college trained chemists at work on the ore, and observing "In Africa, the natives did the analyses." Catlin retired to California in 1930. He died there in 1934.

References:

Northwestern New Jersey, A History, Lewis Historical Publishing Co., 1927

SHUSTER, E.D. (1927) Historical Notes on the Iron and Zinc Mining Industry in Sussex County, N.J.

New York Times, November 24, 1934

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FRANKLIN MINERAL MUSEUM

CURATOR'S MESSAGE

The Franklin Mineral Museum is doing well as regards attendance. Repair work, updating the safety aspects of the mine replica, is proceeding slowly. Nearly half of the Spex-Gerstmann collection is on view, including the fluorescent minerals. Indeed, the museum's fluorescent display, now over 500 specimens, is probably unique and is certainly impressive. It stands 4 feet high and extends for 32 feet. Floor and wall cases exhibit the Spex-Gerstmann specimens, mentioned above which are not part of the fluorescent display. Likewise, recently purchased material shows most of the recent local discoveries of minerals new to the area. In addition, several of these new items are loans from loyal friends of the museum. Steve Sanford, our popular Manager, continues to offer good specimens at reasonable prices as they become available from our local suppliers.

It is with sorrow, that I announce for those of you who might not have heard, that on Monday, July 13, 1987, a good friend, as well as a member, of the Franklin Mineral Museum died after a short illness at Wallkill Valley General Hospital in Sussex, New Jersey. Emanual "Manny" Honig, age 77, was not a mineral collector. He served as general counsel for the Museum from its inception. Manny, as advisor, was a guiding light in the museum's expansion program. Manny founded the firm of Honig and Honig in 1939. He was president of the New Jersey State Bar Association from 1977 to 1978. He was past president of the Franklin Kiwanis Club. He will be sorely missed.

John L. Baum

PALACHE, THE MAN,

AS REVEALED BY HIS FILES

F. W. Miller
7 Centre Street, #24
Cambridge, MA 02139

Whenever I look in Palache's great paper about the minerals of Franklin, I am intrigued by an interesting feature of this man's work. It is his frequent acknowledgment of an individual to whom he owes a debt of gratitude for a specimen or for something called to his attention about the ore body. Whether it was a distinguished person or one of the mine people made no difference to Palache. If that person had helped in some way, then he was mentioned. Now remember, this was a Harvard professor who, after all, as noted by Clifford Frondel (in his Memorial of Charles Palache which forms the introduction to the FOMS 1974 reprint of Professional Paper Number 180), was "stern in attitude and almost forbidding in appearance. He was not easy to approach...." However, as Frondel goes on to remark, "...an effort (to approach) was always rewarding." This stern and forbidding figure who cast such a large shadow in the professional world of mineralogy was also a responsive human being and, in many ways, a thoroughgoing teamplayer. For evidence of this read again the first two pages of Paper #180. Once through the initial abstract, Palache's introduction consists almost entirely of salutes to the mining people, collectors, dealers, and colleagues who made his work possible in the breadth and depth it achieved. He welcomed information and specimens, whether gifts, loans, or for purchase, from knowledgeable people who were as eager as he to learn. He had earnest and cordial correspondence with a number of people who were actively involved in the study of the Franklin minerals and the ore body, and some who because of their situation in the zinc company, were in a position to be helpful. Three letters in Palache's Franklin papers cast light on this aspect of Professional Paper #180.

The first is a letter from Frederick A. Canfield, president of the Morris County Machine & Iron Company, located at 78-86 North Sussex Street, Dover, New Jersey. The letter is handwritten on company letterhead stationery and is dated February 9, 1909. The following is the complete text:

Prof. Charles Palache
Cambridge, Mass.

Dear Professor,

I have just packed a small box containing your two specimens with a number of mine. I expect to send it to the express office tomorrow (Wednesday). Mr. Cahn made me a visit last week. His keen eyes detected the face on the type willemite that you saw, but which I could not find. By holding the crystal in one position I can see nothing but vertical striations where the face should be, but in another position I can see three smooth surfaces in line which are the remains of a continuous face. Of course they are microscopic. I suppose this will be the s plane. I can find nothing nearer than s in Dana. I am sorry that I did not find this face when I wrote my "Note" for the Journal of Science. If you care to, you are quite welcome to add this face to the drawing.

I think you will say the calcite in the box is new. It is the only specimen that I have seen.

Yours truly,
Fred^K A. Canfield

P.S. Kindly return my specimens by express "collect" when you have examined them.

Canfield's reference to his "Note" for the Journal of Science is interesting. This was 'A brief note correcting the figure of willemite published by Penfield' *(Am. Journ. Sci., 4th Series, Vol. 23,* pp. 20-23, 1907) which was Palache's Reference #192 in Professional Paper #180. The subject of this particular letter is a crystal of willemite which showed a microscopic *s* face (1123). Is this the *s* face shown in illustration #127 on page 86 which details a group of crystals described on page 85 which had vertical striations on the prism faces? Or is it illustrated in #126 where *s* is a much less obvious face?

The reference to a visit by Mr. Cahn refers, of course, to Lazard Cahn, an outstanding dealer of the time, and one of the primary suppliers of Franklin specimens to Dr. Palache. This letter also offers an excellent example of the attitude of rigorous attention to detail and careful study that Canfield brought to his interest in the Franklin minerals, an attitude for which Cahn was also known and respected. It was undoubtedly, an important part of their relationship with the 'Professor'.

A second letter, one from Gilbert L. Morse, a member of the survey team employed by the mining company, was written April 10, 1914, and concerns an occurrence of manganosite, to which Palache makes reference (p. 37). The Morris letter is handwritten on folded stationery and reads as follows:

Franklin, N. J.
April 10, 1914

My dear Prof. Palache,

The specimen of manganosite is indeed rare and the place it was found in is on the 900 foot level in a narrow (30') part of the vein at the extreme north end of the deposit. It occurs as you see with ZnO and Mr. Hodgkinson says the large crystals are magnetite (Fe_3O_4) so all the oxides of which Franklin is composed seem to be in individual form here.

The pocket where all of the foliated zincite and the manganosite occurred was in a rich stringer in a rather poor ore. The stringer was about two feet wide and the distance thruout which the manganosite was found was only about eight feet. The stringer also is midway between the hanging and foot walls.

As regards the work at Sterling Hill - no explorations have been made since I have been here. The work there is now confined almost entirely to sinking a three compartment shaft at 57 degrees between the two legs. I'm on the surveying corps here and so we take trips down there once a fortnight or so. I am glad to be of any service to you and I hope in the future to be able to furnish you with more specimens and information.

Sincerely,
Gilbert L. Morse

Morse's news about Sterling Hill is too unspecific to be of much more than general historical interest to us, but I do like the way so many names like Hodgkinson's blink out at us in these letters. Note the manner in which Morse closes his letter to Palache; such words could be uttered only by a disciple!

A curious addendum here is Palache's own handwritten note about this manganosite occurrence. It is Palache's restatement of Morse's information with some additional data from his own examination of the specimen. The note reads:

In 1914 Manganosite was found in place in the mine in workings on the 900 level at the extreme northern end of the mine. In this occurrence it is in very large grains up to 3/4 in. across interspersed with strongly magnetic franklinite and coarsely bladed zincite. The cleavage is prominent but the color is masked by the black coating which marks the beginning of oxidation. I am indebted to Mr. G. L. Morse for the first specimen of this new find.

A third letter, this one from E. D. Shuster of the New Jersey Zinc Company, dated June 4, 1910, concerns the presence of silver in the Franklin ore body. Palache refers to this (p. 26) using most of Shuster's words describing the occurrence. The following is handwritten on inter-office stationery with the New Jersey Zinc Company letterhead:

Franklin Furnace
June 4, 1910

Mr. Chas. Palache
My Dear Sir,

I beg to acknowledge receipt of your inquiry of the location of the silver ore specimens. I have neglected to reply with the hope that I might find something new for you. I am however, sending you under separate cover a duplicate specimen of the willemite that you were kind enough to tell me presented

some rare faces.

I am selfish enough to keep the best of perhaps the only 2 specimens of their kind, but if this I send you is of scientific interest it is better in your hands than mine.

Now as to the location of the silver specimens. They came from the foot wall side of the deposit about 400 south of Parker Shaft and from the 1050 ft. level. This was a few feet from the wall or country rock and was associated with the ore, not having any of the rare species in the vicinity of this find.

I hope to be able to send you some material that may interest you in the near future. The only new find that I know of is apatite which Mr. Fred Canfield has located among the dealers that he says came from Franklin recently. I do not know of the finding of this material.

Trusting you will pardon my delay in reply to you, I am,

Yours very truly,
E. D. Shuster

An additional note of interest here is the enigmatic reference to 'a duplicate specimen of the willemite that you were kind enough to tell me presented some rare faces. I am selfish enough to keep the best of perhaps the only 2 specimens for their kind, but if this I send you is of scientific interest it is better in your hands than mine.' There is no mention of Shuster in the section about willemite. Could this have been one of those willemite crystals that later turned up in quantity?

Another curious note in Shuster's letter is the reference to Canfield's discovery of apatite among the dealers. Here again we see the writer's assurance to Palache that he hopes to be able to send 'some material that may interest you.' It appears that we have found another disciple, which demonstrates something of Palache's humanness and appeal.

In 1910, Charles Palache was 41, and not yet the celebrated Franklin mineralogist he was to become in later years. He was emerging then as a crystallographer and mineralogist but, in 1910, he had published 33 contributions to geological literature (not counting his three "Jottings from Russia"), and only two of these were about Franklin. These two appeared in the *USGS Geological Atlas, Folio 161.* One was entitled 'Mineralogy of the Franklin Furnace Quadrangle, N.J.' (1908), and the other, with A. C. Spencer, was entitled 'Description of Franklin Furnace Quadrangle, N. J.' In the year in question, 1910, he would publish one more Franklin piece "Contributions to the Mineralogy of Franklin Furnace, N.J." in the *American Journal of Science* (and also in the *Zeitschrift fur Kristallographie*).

He didn't publish again on Franklin until 1913, this time with W.T. Schaller on 'Hodgkinsonite, a New Mineral from Franklin Furnace, N.J.' in the *Journal of the Washington Academy of Science* (and again in the *Zeitschrift fur Kristallographie*). A supplementary note on this mineral came in 1914, but not until 1926 was there anything more on Franklin. In the years between 1914 and 1926, he published quite steadily, including his works on crystallography (1920) and on meteorites (1926). The period of 1926 - 1930 was the most productive of articles about Franklin: eleven published on Franklin minerals, (seven co-authored), a memorial to F.A. Canfield, and an article comparing the Langban ore deposits with those of Franklin. It wasn't until 1935 that #180 was published. All in all, his Franklin publications numbered just 19 papers over a period of 27 years, out of a total number of 120 published (not counting the duplication of papers printed in two or more journals), 48 of which were co-authored. Interestingly, he worked with co-authors on Franklin 67% of the time. We can look at this as part of his team-playing, because his co-author, in most, if not all cases, did chemical analyses or other work to supplement Palache's crystallographic expertise. (This is something we shall see more of in the next article on Harvard's Franklin collection.)

To say that there were long hiatuses in Palache's publication of Franklin articles is <u>not</u> to say there were such evident hiatuses in his <u>work</u> on the minerals of Franklin. For one thing, he had prepared the basic work on Franklin (which was to become #180) in 1914-1915 and had sent it to the USGS, only to have it returned with so many suggestions for changes that he put the whole project in the back drawer of his desk until he was urged, early in the '30s to resuscitate it. Then, with the great help of associates like Lawrence La Forge (who had done the key study of the Boston Basin) and Harry Berman, he was able to bring it up to date, incorporating all the work which he had accomplished over the intervening years. It was in this period that many of the great private collections (of Canfield, Hancock, Holden, Losey, and Stanton) came to Harvard and these alone would demand a lot of the

curator's attention. This all contributed to the depth of #180, when it was published finally in 1935.

So, if we look at Charles Palache in 1910, we see a youngish man of 41 who knows his way around the Franklin scene, who has a growing reputation among professional mineralogists, and who is able, through his personality and his knowledge of the Franklin ore body, to command the respect and to elicit the willingness of others to cooperate, even participate, in his studies of the great zinc locality. He gives credit where it is due, and keeps a running correspondence with his friends and suppliers. It was just an exterior manner which was forbidding. We can understand Frondel's remarks much better if we look behind that facade.

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IN MEMORIAM

HOWARD BELSKY (1958-1987)

This year when you walk past Booth 19 at the Franklin-Sterling Mineral Exhibit (Franklin Show), you will miss a young, yet familiar, face. Howard Belsky, 28, proprietor of Howard Minerals and an FOMS member, died of cancer on February 18, 1987, after an illness of only three months.

Howard Belsky, summer of 1986 in Switzerland, examines his newly acquired Swiss quartz.

Howard became interested in minerals at age five. One of Howard's earliest field trips was to the Buckwheat Dump in Franklin with his family. He became very interested in fluorescent minerals and collected willemites from many unusual localities for study. In 1979, Howard graduated from CUNY-Brooklyn College, *cum laude*, with honors in Geology. He went on to SUNY-Stony Brook where, in 1982, he received his M.S. degree in Geochemistry/Crystallography. His endeavors, other than those as mineral dealer, include: working as Research Assistant, Dept. of Earth and Space Sciences, SUNY-Stony Brook, where he did basic research using X-ray, diamond cell, and electron microprobe techniques; serving as volunteer and curatorial assistant, Dept. of Mineral Sciences, American Museum of Natural History, New York, N.Y. Howard authored or co-authored three scientific articles dealing with divalent chromium and with sugilite. He traveled widely and established close professional relationships with many European museums and collectors. Howard's interest in new and rare species is well known to us all, as was his ongoing love for Franklin minerals. I am aware that Howard had been a dealer at the Franklin Show since 1979--his participation may have begun even earlier than that. Yes, you will be missed, Howard. You did a lot in your 28 years!

The Howard Belsky Memorial Fund (P.O.Box 56, Vanderveer Station, Brooklyn, NY 11210) has been established in his memory. Donations will be used to support an aspect of mineralogy related to Howard's interests. The exact format is still under study; advice and counsel are being sought from professionals in the field.

Mineral Notes

New To Science

WENDWILSONITE

$Ca_2Mg(AsO_4)_2 \cdot 2H_2O$

An article entitled "Wendwilsonite, the Mg analogue of roselite, from Morocco, New Jersey, and Mexico, and new data on roselite" appeared in the American Mineralogist, Volume 72,(1987), pp 217-221. The authors are Pete J. Dunn, Department of Mineral Sciences, Smithsonian Institution, Washington, D.C. 20560, U.S.A.; B. Darko Sturman, Department of Mineralogy and Geology, Royal Ontario Museum, Toronto, Ontario M5S 2C6, Canada; and Joseph A. Nelen, Department of Mineral Sciences, Smithsonian Institution, Washington, D.C. 20560, U.S.A. The following is an abstract of that article.

Introduction

An examination of a pink material from Sterling Hill, New Jersey, in early 1985 yielded an X-ray pattern nearly identical to roselite, $Ca_2(Co,Mg)(AsO_4)_2 \cdot 2H_2O$. Cobalt minerals are rare at Sterling Hill but Mn-Mg solid solution is common. Analyses show this pink material to be Mg-dominant. Because the Sterling Hill material is exceedingly sparce and because "roselite" from near Bou-Azzer, Morocco, is known to occur with magnesium arsenates and had never been analyzed, the authors also studied samples from Morocco. Roselite from the type locality of Schneeberg, East Germany, and roselite from Coahuila, Mexico, were included in the search of a sample with Mg >> Co, which would serve as a suitable type sample. The results of the investigation proved the Schneeberg material is true roselite (Co > Mg). The Coahuila, Mexico, and the Sterling Hill material, however, are Mg-dominant, representing the new endmember,

$$Ca_2Mg(AsO_4)_2.2H_2O.$$

This new mineral is named *wendwilsonite* in honor of Dr. Wendell E. Wilson, editor of the *Mineralogical Record*, in recognition of his contributions to mineralogy. Type material is preserved at the Smithsonian Institution, catalogue #NMNH 136288 and at the Royal Ontario Museum under catalogue #M42119.

Physical & Optical Properties

Wendwilsonite varys in color from pale to intense pink, or even red. The streak is pink. It has a vitreous luster on crystal faces and on cleavage and fracture surfaces. Crystals are transparent. Hardness is in the 3 - 4 (Mohs') range. Cleavage is perfect on (010), the fracture is uneven, and no parting was observed, although there are lamellar structures within the crystals. Density was measured at 3.52(8) g/cm^3 as compared to the calculated value of 3.57 g/cm^3. There is no discernible fluorescence in ultra-violet radiation. See Table 1 for the optical properties.

Chemical Composition

An ARL-SEMQ electron microprobe was utilized in the analyses of wendwilsonite. Examination of the analytical data indicates that there is extensive solid solution between roselite (up to 89 mol% of the Co endmember) and wendwilsonite (up to 82 mol% of the Mg end-member). The chemical analyses of the Sterling Hill wendwilsonite yield the following percent by weight data: ZnO 1.1; MnO 0.2; MgO 5.6; CaO 26.6, CoO 5.4; As_2O_5 51.5; and H_2O 9.4; total 100.0.

Table 1. Crystallographic and optical data for wendwilsonite.

Formula:	$Ca_{2.03}(Mg_{0.82}Co_{0.15})_{\Sigma 0.97}(AsO_4)_{2.09} \cdot 1.77H_2O$				
Unit cell:	a = 5.806(1) Å	β = 107°24(1)'			
	b = 12.912(2)				
	c = 5.623(2)				
	Space group: $P2_1/c$				
Forms:		measured		calculated	
		phi	rho	phi	rho
	010	0°	90°	0°00'	90°00'
	110	66°	90°	66°46'	90°00'
	011	36°	28°	35°44'	28°13'
	$\bar{1}11$	−58°	39°	−58°10'	39°33'
Optical data:	α = 1.694(3)	$Y \parallel$ **b**			
	β = 1.703(3)	**c** $\wedge$ Z = 92° in obtuse β			
	γ = 1.713(3)	X = violet pink			
	$2V_z$ = 87(2)°	Y = rose pink			
	$r < v$	Z = colorless			
		$X \geq Y > Z$			

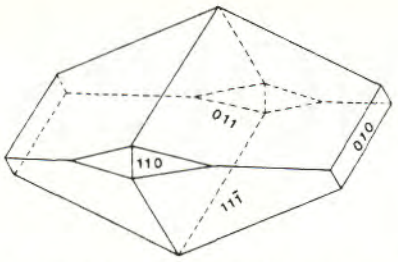

Figure 1. Crystal drawing of wedwilsonite from Bou-Azzer, Morocco.

Crystallography
Wendwilsonite is monoclinic, space group *P2,/c* (see Figure 1). Determinations were made using X-ray diffraction (the precession and Weissenberg methods) and by optical goniometrical and spindle-stage optical methods.

Occurrence
The wendwilsonite from Sterling Hill occurred as 0.5-mm crystals with calcite crystals on serpentine, which encrusts manganoan calcite with very sparce franklinite and willemite. The mineral is rare at Sterling Hill with only a few known specimens.

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PETEDUNNITE

$CaZnSi_2O_6$

An article entitled "Petedunnite ($CaZnSi_2O_6$), a new zinc clinopyroxene from Franklin, New Jersey, and phase equilibria for zincian pyroxenes" appeared in the American Mineralogist, Volume 72,(1987), pp 157-166. The authors are Eric J. Essene and Donald R. Peacor, both of the Department of Geological Sciences, University of Michigan, Ann Arbor, Michigan 48109, U.S.A. The following is an abstract of portions of that article. The sections dealing with petrology and phase equilibria have been omitted because they are beyond the scope of interest of the collector community.

Introduction
Dr. Pete J. Dunn sent the authors an unusual-appearing hand specimen, which he had tentatively identified as a Zn-rich clinopyroxene from Franklin, New Jersey. The Zn content, per microprobe analysis, was sufficiently high to define this material as a new mineral species. Other Franklin and Sterling Hill zincian pyroxenes (jeffersonite and zinc-schefferite) do not have Zn as the dominant M1 cation. The authors, therefore, proceeded with detailed studies and confirmed that the amount of Zn in the M1 site warranted new species status. They named this mineral *petedunnite* in honor of Dr. Pete J. Dunn, Department of Mineral Sciences, Smithsonian Institution, Washington, D.C., in recognition of his many contributions to mineralogy, especially at Franklin and Sterling Hill, New Jersey. The holotype specimen is in the Smithsonian Institution, catalogue # NMNH 162211.

Occurrence
Petedunnite is known in a single hand specimen from Franklin, New Jersey, which is roughly 10 cm in diameter. It consists of dark green, anhedral clinopyroxene surrounded by light green clinopyroxene and massive calcite. The clinopyroxene is variable in composition with replacement of Zn by Mg and Mn. The areas with dominant Zn (petedunnite) may have formed by exchange of original diopside-hedenbergite-johannsenite solid solutions with the Zn-rich fluids that also caused precipitation of willemite, gahnite, genthelvite, and sphalerite. Because of the variable chemistry of the clinopyroxene, it was necessary to obtain analytical, optical, and X-ray data only on those portions with the highest Zn content.

X-ray crystallography
Weissenberg and precession photographs were obtained on a fragment of Zn-rich clinopyroxene from a polished thin section. Petedunnite is monoclinic. The photographs depict symmetry consistent with space group *C2/c*. Ribbe and Prunier (1977) showed how the parameters *a*, *b*, and *c* sinβ vary as a function of the radii of the M1 and M2 cations in pyroxenes for space group *C2/c*. Using the Ribbe and Prunier regressive equations and assuming the site occupancies, the authors calculated the following values for natural petedunnite: a = 9.82, b = 8.99, and $c \sin \beta$ = 5.09 Å.

Chemistry
Natural petedunnite was analyzed by Dr. Dunn using an ARL-SEMQ electron microprobe. The chemical composition of petedunnite (by weight %) is SiO_2 48.4, Al_2O_3 1.2, Fe_2O_3 3.8, FeO 5.7, MnO 5.8, MgO 2.4, CaO 21.3, ZnO 12.6, and NaO 0.7; total = 101.9%.

Physical Properties
Petedunnite is dark green in color and is translucent. The density and hardness could not be accurately determined because of the abundant foreign inclusions. The theoretical density was calculated as 3.68 g/cm^3 based on unit

cell information and chemical analysis. Petedunnite exhibits {110} cleavages and has a vitreous luster. There is no response to either short or long wave ultraviolet radiation. Optical properties of petedunnite were difficult to measure because of the turbid nature of the sample and its strong dispersion. Approximate refractive indices measured on cleavage fragments (from the thin section) are: α = 1.68(1), β = 1.69(1), γ = 1.70(1).

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Research Reports

ROEBLINGITE

An article entitled "Roeblingite: a revised formula from infra-red and thermal analysis data" appeared in the Mineralogical Magazine, Volume 49, December 1985, pp 756-758. The author is R. S. W. Braithwaite, Department of Chemistry, University of Manchester Institute of Science and Technology, Manchester M60 1QD, England. The following is an abstract of that article.

Roeblingite was first decribed in 1897 by Penfield and Foote. At that time it was considered to be the first sulphite-containing mineral. Blix (1931) re-analyzed roeblingite and found sulphite to be absent. Scotlandite, described in 1984 by Paar, *et al.*, now holds this distinction. Revisions to the roeblingite formula were made by Foit (1966) and by Dunn *et al.* (1982). The late Dr. M. H. Hey suggested to the author that the infra-red spectrum of roeblingite be studied as an additional means of confirming the absence of sulfite and the presence of sulfate.

The infra-red spectra of two samples of Franklin, New Jersey roeblingite (British Museum 83806 and one from the W. H. Paar collection) were measured under similar conditions, in the 400-4000 cm^{-1} range. The samples gave similar spectra. The author suggests the infra-red spectrum of roeblingite provides reasonable evidence for the presence of sulfate, but insufficient evidence for the absence of sulphite. The H-O-H deformation vibration is strong evidence for the presence of H_2O in the roeblingite structure. The author stresses the point that the formula should be revised to include H_2O as well as hydroxide.

The accuracy implied by the consistency of the analyses of roeblingite reported by Dunn *et al.* (1982) leaves little leeway for removing cations in order to restore charge balance when transforming hydroxyl ions into water molecules since the removal of any one cation appreciably upsets agreement with the analytical results. The empirical formula, and hence the fit of the analyses, remain unchanged if, for every hydroxyl transformed into water, another hydroxyl oxygen becomes an oxygen in the silicate system.

Thermogravimetric analysis was performed to determine the value for *n* preceding H_2O in the formula. Mr. Roy Adams did this task in the Metallurgy Department at UMIST, using a Stanton Redcroft TG 770 thermogravimetric balance fitted with a Pt-Rh thermocouple. The results corresponded to the measured and theoretical water loss given by Dunn *et al.* (1982). The formula for roeblingite should read:

$$(Ca,Sr)_{12}(Mn,Ca)_2Pb_4(SO_4)_4Si_{12}O_{36}(OH)_4 \cdot 8H_2O.$$

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CU-BEARING VESUVIANITE

A paper entitled "Crystal structure of a Cu-bearing vesuvianite" appeared in the American Mineralogist, Vol.71,(1986), pp1011-1014. The authors are Sharon Fitzgerald, 22 Vassar Drive, Newark, Delaware 19711; Arnold L. Rheingold, Department of Chemistry, University of Delaware, Newark, Delaware 19716; and Peter B. Leavens, Department of Geology, University of Delaware, Newark, Delaware 19716. The following is the authors' abstract of that article.

The crystal structure of a Franklin, New Jersey, blue, Cu-bearing vesuvianite, commonly referred to as cyprine, was determined. The sample of tetragonal space group *P4/nnc* had cell parameters of *a* = 15.532(3) and *c* = 11.776(3) Å. An *R* value of 4.22% was reached for 1520 unique reflections with $(F_o) > 3\sigma (F_o)$.

Although the basic structure is the same as found in previous studies, there are some significant differences. The Franklin vesuvianite shows Jahn-Teller distortion of Cu^{2+} in the B position, the irregular fivefold site on the *c* axis, with elongation along the *c* axis, the B-O(10) direction, and compression in the B-O(6) direction. In addition, both oxygens not bonded to Si, O(10) and O(11) are hydroxyls.

(Continued on Inside Back Cover)

THE FALL ACTIVITY SCHEDULE--1987

The FRANKLIN-OGDENSBURG MINERALOGICAL SOCIETY, Inc.

The regular activites of the Society consist of lecture programs, field trips, and micro-mineralogy study sessions. The regular meetings of the Society are held at the Hardyston Township School, Route 23, Franklin, New Jersey, on the third Saturday of March, April, May, June, September, October and November. Pre-meeting activities begin at 1 p.m. and the meetings begin at 2 p.m. Lecture programs are part of the regular meetings. Visitors are welcome at the Society's meetings and lecture programs. The hours and location for field trips and for micro-mineral study group activites may vary; it is best to consult the Society's seasonal schedule, shown below, for specifics.

* *

Saturday **September 19, 1987**	Program:	**"Choice Franklin micros in the William W. Pinch Collection"** by Omer S. Dean.
	Field Trip:	**Franklin Quarry** (formerly Farber Quarry) on Cork Hill Rd., between Franklin and Ogdensburg, N.J. 9 a.m. to 12 noon.
	Micro-Group:	Kraissl Hall, Franklin Mineral Museum, Franklin, N.J. 10 a.m. to noon.
Saturday **October 3, 1987**	**Dinner:**	**9th Annual F.O.M.S. Dinner.** For all details see the next page.
Satuday and Sunday **October 3 & 4, 1987**	**Show:**	**31st Annual Franklin-Sterling Mineral Exhibit,** Franklin Armory, Franklin, N.J. One of the guest speakers, the celebrated **Peter Bancroft**, will give a talk entitled, **"Crystal deposits in remission."**
Saturday **October 17, 1987**	Program:	**"The fluorescent minerals of Franklin, New Jersey"** by Henry Van Lenten.
	Field Trip:	**Bodnar/Edison Quarry**, Rudeville, N.J. 9 a.m. to 12 noon.
	Micro-Group:	Kraissl Hall, Franklin Mineral Museum, Franklin, N.J. 10 a.m. to noon.
Sunday **October 18, 1987**	Field Trip:	**Lime Crest Quarry**, Sparta, N.J. 9 a.m. to 3 p.m.(weather and attendance permitting).
Satuday **November 21, 1987**	Program:	**"Two years in the Sterling Mine"** by Chester Lemanski
	Field Trip:	**Franklin Quarry** (formerly Farber Quarry) on Cork Hill Rd., between Franklin and Ogdensburg, N.J. 9 a.m. to 12 noon.
	Micro-Group:	Kraissl Hall, Franklin Mineral Museum, Franklin, N.J. 10 a.m. to noon.

DON'T MISS THE NINTH ANNUAL F. O. M. S. DINNER, SATURDAY, OCTOBER 3, 1987.

The Place:	The Lyceum Hall, Immaculate Conception Church, Main and Church Streets, Franklin, New Jersey (less than 5 minutes by auto from the Armory, site of the 31st Franklin-Sterling Mineral Exhibit)
The Time:	Social Hour begins at 6:30 pm; Dinner begins at 7:00 pm
The Food:	CATERED BUFFET DINNER--Your choice of Appetizers: Fruit punch, sausage puffs, crabmeat mousse, liver pate, vegetables with dip, etc. Hot Entrees: Baked chicken, Swedish meatballs, Ziti,etc. Cold Entrees: Meat-Cheese platters (3 meats & 3 cheeses), Gelatin & Fruit platters, Coleslaw Bread or rolls Dessert: Jelly rolls or sheet cake; coffee or tea
The Guest Speaker:	The renowned Peter Bancroft talks about "Producing Gem and Crystal Treasures".
The Auction:	Items for auction include: mineral specimens, books, mining artifacts, and Franklin memorabilia
The Auctioneers:	The notorious Richard Hauck and an "Unidentified Accomplice"
The Price:	$10.00 per person
Space is Limited:	100 persons maximum (act now, avoid disappointment)
Reservations:	Joseph & Helen Warinsky 695 Suffern Road, Teaneck, NJ 07666 Phone (201) 836-4048

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(Continued from Page 15)

The formula of the Franklin vesuvianite can be written

$2[(Ca_{18.28}Mn_{0.68})Al_4(Fe_{0.29}Cu_{0.71})(Al_{6.36}Mg_{0.56}Ti_{0.03}Zn_{0.97})(Si_{17.51}Al_{0.49})O_{68}(OH_{8.5}F_{1.5})]$.

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JERRYGIBBSITE

An article entitled "Jerrygibbsite-leucophoenicite mixed layering and general relations between the humite and leucophoenicite families" appeared in the American Mineralogist, Volume 71,(1986), pages 985-988. The authors are Yu-Chyi Yau and Donald R. Peacor, both of the Department of Geological Sciences, University of Michigan, Ann Arbor, Michigan 48109.

The following is their own abstract of the article.

TEM images of jerrygibbsite from Franklin, New Jersey, reveal random and ordered mixed layering with leucophoenicite on (001) and periodic twinning that gives rise to complex superperiodicites within the leucophoenicite. The differences between the structures of Mn-humite and leucophoenicite families, as defined by the cation-stacking relations of White and Hyde (1983, *Acta Crystallographica*, B. 39, 10-17), are shown to be generally due to simple unit-cell twinning. Ordered twinning sequences in leucophoenicite can therefore be viewed as due to periodic mixed layering of leucophoenicite and manganhumite. Leucophoenicite and Mn-humite family members are characterized by an absence of F and significant F contents, respectively.

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