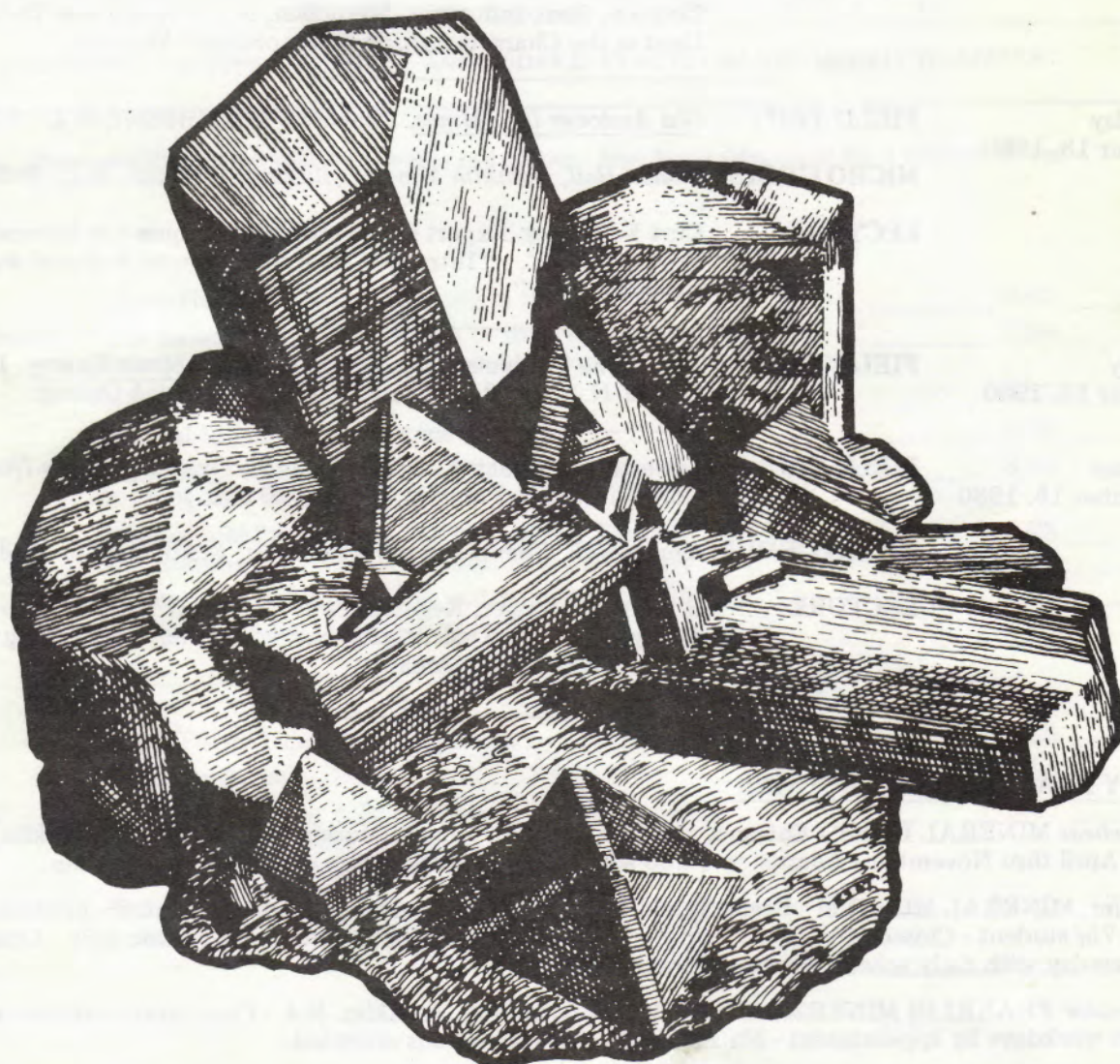


THE PICKING TABLE

JOURNAL OF THE FRANKLIN · OGDENSBURG MINERALOGICAL SOCIETY



Volume 21

September 1980

Number Two



Fall Program

FRANKLIN-OGDENSBURG MINERALOGICAL SOCIETY, INC.

1980

Regular Society activities consist of field trips, micro-mineralogy study sessions and lecture programs. Field trips vary as to time and location according to schedule. Morning micro-mineralogy study sessions take place from 9:30 a.m. to noon in *Kraissl Hall* at the *Franklin Mineral Museum*. Afternoon lecture programs begin at 2:00 p.m. at the Hardyston Twsp. School, Rt. 23, Franklin, N.J. - *pre-meeting activities begin at 1:00 p.m.*

Saturday
September 20, 1980

FIELD TRIP: *Trotter Mineral Dump*; Main Street, Franklin, N.J. - 9:00 a.m. to noon.

MICRO GROUP: *Kraissl Hall, Franklin Mineral Museum*, Franklin, N.J. - 9:30 a.m. to noon.

LECTURE: Dr. Warren E. Miller, Vice-President and Manager, Spectro Chemical Division, Spex Industries, Metuchen, N.J. - "Analytical Techniques Used in the Characterization of Fluorescent Minerals."

Saturday
October 18, 1980

FIELD TRIP: *Old Andover Iron Mines*, Limecrest Rd., Andover, N.J. - 9:00 a.m. to noon.

MICRO GROUP: *Kraissl Hall, Franklin Mineral Museum*, Franklin, N.J. - 9:30 a.m. to noon.

LECTURE: Curt E. Segeler, Expert in Chemical Techniques for Mineral Identification, Brooklyn, N.Y. - "Tetrahedrite, A Mineral with Political and Mineralogical Consequences."

Sunday
October 19, 1980

FIELD TRIP: Limestone Products Corp. of America, *Limecrest Quarry*, Limecrest Rd., Sparta, N.J. - 9:00 a.m. to 3:00 p.m. - *Interclub Outing*.

Saturday
November 15, 1980

FIELD TRIP: Limestone Products Corp. of America, *Franklin Quarry* (formerly Farber), Cork Hill Road, Franklin, N.J. - 9:00 a.m. to noon.

MICRO GROUP: *Kraissl Hall, Franklin Mineral Museum*, Franklin, N.J. - 9:30 a.m. to noon.

LECTURE: Robert W. Metsger, Regional Geologist, G+W Resources Group, The New Jersey Company, Ogdensburg, N.J. - "Geology and Mining History of the Friedensville Mining Area."

DAILY FRANKLIN ATTRACTIONS

Buckwheat MINERAL DUMP - Entrance thru the Franklin Mineral Museum, Evans Street, Franklin, N.J. - Open April thru November - Admission \$1.50 adult; 75¢ student. Hours coincide with museum.

Franklin MINERAL MUSEUM - Evans Street, Franklin, N.J. - Open April thru November - Admission \$1.50 adult; 75¢ student - Closed Monday. Open Tuesday and Wednesday by group reservation only. Open Thursday thru Sunday with daily schedule except Sunday morning.

Gerstmann FRANKLIN MINERAL MUSEUM - 14 Walsh Rd., Franklin, N.J. - Open year round on weekends, and on weekdays by appointment - No Admission fee - Donations accepted.

Trotter MINERAL DUMP - Main Street (behind Boro Hall), Franklin, N.J. - Open year round except during inclement weather - Admission \$2.00 - Mr. Nick Zipco on call.

The Picking Table is published semi-annually by the Franklin-Ogdensburg Mineralogical Society, Inc., P.O. Box 146, Franklin, N.J. 07416, a non-profit organization. *Editor Emeritus* - Frank Z. Edwards; *Editor* - Bernard T. Kozykowski, 305 Avenue L, Matamoras, Pennsylvania 18336. All rights reserved. Subscription: \$7.00 per year which includes membership in the Society. Contributed articles and news items are welcome. Acceptance is subject to the approval of the editor.

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F.O.M.S. NOTES

An EDITOR

This journal began briefly under the stewardship of John Hendricks, one of the founders of our Society. Within two years time, however, John's work forced him to move on. In doing so he turned to then President Frank Z. Edwards for his replacement.

Reluctantly at first, Frank assumed what he considered to be an "interim" editor's post. While seeking a "permanent" editor over the next two decades, Frank raised the *PT* from infancy and guided it onward as it grew to become one of the most significant amateur mineralogical publications of its type in the nation. Along the way he provided our members with nearly forty issues of the *PT* which stand out as one of the most successful achievements of our Society. In doing so, Frank authored many important articles pertaining to local mineralogy while abstracting numerous technical papers from more sophisticated publications as he edited many other short notes and papers, all of which contributed to establishing this journal as a legitimate repository for knowledge of Franklin and Sterling Hill.

Early in his second decade as Editor, Frank retired to Florida. Fortunately, he decided to continue on as Editor of the *PT* despite the vast distance between his new home and our area of interest. About that time Frank drafted your present Editor as his assistant. Other things changed too. We soon lost the typing and mimeograph skills of Louise Borgstrom who had been with us from the beginning. At Frank's direction we turned to photo-offset techniques to produce the *PT*, which also introduced us to formal composition. This enabled us to greatly improve our efficiency in production while vastly improving our image. At that point this work was done privately. This too soon changed: the party whom we used for composition retired. Yet another crisis! With Frank's encouragement and the support of our membership we were able to acquire the composing machine and thus assure the effective composition of future issues of the *PT*. These events brought us up to present times.

Recently, Frank announced his retirement as Editor of the *PT*. Initially, he agreed to stay on as Assistant Editor, however, he soon retired from that position as well, citing practical considerations in doing so.

The fine work of Frank Z. Edwards in serving our Society from its inception over twenty years ago has provided us with a wealth of knowledge and a journal which holds a position of responsibility and respect. We are pleased to announce that the name of Frank Z. Edwards shall remain with the *PT* as *Editor Emeritus*, at the unanimous direction of the Executive Committee of the Franklin-Ogdensburg Mineralogical Society, Inc. We look forward to his continued contribution of articles for publication in future issues of the *PT*.

THE 24th ANNUAL FRANKLIN-STERLING HILL MINERAL SHOW

SATURDAY October 4, 1980 – 9 A.M. to 8 P.M. • SUNDAY October 5, 1980 – 10 A.M. to 6 P.M.

It's back,

THE POND IS BACK!

and, THAT'S NOT ALL.

21 DEALERS AT THE ARMORY

*Rock Swap at THE POND**

FRANKLIN MINERAL MUSEUM

The BLACK LIGHT Room

MINE REPLICATOR TOUR

Collecting on THE BUCKWHEAT

PRIVATE EXHIBITS

Micromount DEMONSTRATIONS

SCORES OF DOOR PRIZES

Lapidary DEMONSTRATIONS

FREE SHUTTLE BUS SERVICE

Ample FREE PARKING

FOOD SERVICE

and more

Gerstmann MINERAL MUSEUM**

INSTITUTIONAL EXHIBITS from:

The American Museum

The Paterson Museum

Rutgers University

The Smithsonian Institution

LECTURES by:

Pete J. Dunn

Richard Hauck

Robert W. Jones

Joseph J. Peters

Thomas A. Peters

R. William Selden

COLLECTING on THE TROTTER***

This year marks the 24th Annual Franklin-Sterling Hill Mineral Show sponsored by the Kiwanis Club of Franklin. Traditionally the "Franklin Show" has been one of the most successful and enjoyable mineral shows in the East. At one point in its history this show registered the largest attendance of any show in the country. Within the last decade we experienced a serious waning of activities and interest in the show. Two years ago the Kiwanis Club of Franklin wisely sought out the advice of those intimately familiar with mineral shows as it moved to reverse the downward trend that began to plague all mineral shows nationwide. Today, the effort being made to improve the "Franklin Show" is remarkable. The cooperative effort being made between the Kiwanis Club and other organizations such as the Franklin-Ogdensburg Mineralogical Society, Inc., along with several public and private institutions as well as the Boro of Franklin, promises to make the 24th Annual Franklin-Sterling Hill Mineral Show the turning point, upward, of mineral shows everywhere.

The POND*

The *Rock Swap* at the *POND* is sponsored by the Franklin-Ogdensburg Mineralogical Society, Inc. in cooperation with the Kiwanis Club of Franklin and the Boro of Franklin. Admission is open to the public. Tailgators will be required to pay a daily fee for selling or swapping, the proceeds of which will benefit the Franklin Mineral Museum, Inc. Shuttle buses serving other show activities will also stop at the *POND*.

FEES: Selling @ \$15.00 per day or \$25.00 for both days. Swapping @ \$10.00 per day or \$15.00 for both days. Selling or swapping space is limited to the width of each automobile parking space.

SWAPPER DOLLARS: Swapper dollars may be obtained from the swap committee. Swapper dollars are to be used to obtain specimens from persons who are swapping in lieu of specimens. They are redeemable in specimens at participating dealers in the ARMORY.

The purpose of the tailgating activities at the *POND* is to supplement the activities at the Armory for the benefit of the Franklin Mineral Museum, Inc. Regular mineral dealers are encouraged to seek selling space in the Armory. Preference will be given to those not eligible to participate in the Armory.

As members of the F.O.M.S. we ask you to donate two hours, or more if you wish, of your time to us as we supervise activities at the *POND*. We NEED as many volunteers as we can get. In addition to the *POND*, manpower will also be needed to supplement the activities at the Armory, Franklin Mineral Museum and Buckwheat Dump. Please, if you can give of yourself, do so, all of us will benefit from your efforts. Show us that you really GIVE A DAMN.

FOR FURTHER INFORMATION: Write to - Mrs. Elna Hauck, 8 Rowe Place, Bloomfield, N.J. 07003

Gerstmann MINERAL MUSEUM

The *Gerstmann* Mineral Museum will be participating privately in the 24th Annual Franklin-Sterling Hill Mineral Show. Tentative plans call for a Bus Stop near the museum. Presently, some technical problems in the transportation pattern for the show must be resolved before precise details are known. Hopefully they can be eliminated in time to assure everyone an opportunity to see the *SPEX / GERSTMANN COLLECTION* during the show. We remind you that admission to the *Gerstmann* Mineral Museum is free-of-charge.

The TROTTER MINERAL DUMP

The *Trotter* Mineral Dump will be participating privately in the 24th Annual Franklin-Sterling Hill Mineral Show. Tentative plans call for a Bus Stop near the dump. Presently, some technical problems must be resolved before final plans can be established. Hopefully, they too can be satisfied in time to assure everyone an opportunity to visit the *Trotter* Mineral Dump. NOTE: *There will be a separate admission fee that must be paid to collect minerals at the Trotter dump. Admission to this collecting site is not included with the general admission to activities at the Armory, Franklin Mineral Museum, Buckwheat Dump or the POND.*

ANNUAL SOCIETY DINNER

Last year our Society celebrated its twentieth anniversary with a celebration dinner at the Perona Farms Restaurant in Andover, New Jersey. The dinner was attended by nearly one hundred members and guests. The evening's activities proved so popular that we now plan to hold an Annual dinner in the Fall of each year.

This year's dinner is again planned at Perona Farms Restaurant, on the evening of October 4, 1980, the weekend of the 24th Annual Franklin-Sterling Hill Mineral Show. The social hour will begin at 6:30 p.m., dinner will be served at 7:30 p.m. The evening's meal will feature an appetizer, salad, soup-du-jour, main course of Roast Chicken with vegetable, dessert, and beverage. The cost will be \$12.00 per person including gratuities. Drinks may be ordered from your table. Please forward your reservations to: *F.O.M.S. Dinner c/o Mrs. Helen U. Warinsky, Secretary, 695 Suffern Road, Teaneck, N.J. 07666. Make checks payable to the F.O.M.S.*

The evening's activities will begin with what promises to be a very entertaining auction conducted by the grand auctioneer-of-the-evening, Richard "Dick" Hauck. Last year this auction produced a substantial amount of money for our treasury while presenting many of our members with very desirable mineral specimens and related items of interest. This year we again ask for your support of this effort by your donating specimens or related items of interest which may be desirable. To encourage your participation, we will return one-half of the proceeds obtained in the auction to those persons who make the donation should they so desire. Minimum bids may also be considered in such cases.

The highlight of this year's dinner will, without a doubt, be our guest speaker, Mr. Robert W. "Bob" Jones, known to all of us for his book on fluorescent minerals "Nature's Hidden Rainbows." Bob spent many of his early years collecting minerals in and writing about Franklin. Since going "west" to Arizona many years ago he has been able to keep in contact with things back "east." In fact just a short while ago, Bob authored yet another article on Franklin which appeared in *Rock & Gem* magazine. The subject of his talk has not yet been decided, however, if past experience is any criteria for judgement at all, the program he offers us will be outstanding.

We strongly urge you to attend and participate. The evening will be one of good cheer and friendly times.

The Photography of Minerals - ULTRAVIOLET FLUORESCENCE
by Alfred L. Standfast, M.D.

One of the great attractions of New Jersey's Sussex County is the unique occurrence of a variety of fluorescent minerals in the zinc mines at Franklin and Ogdensburg. The dumps of these mines still contain such minerals and occasionally a "one of a kind" specimen is found. This article offers a few suggestions to give this aspect of the mineral hobby added interest as we begin to develop fascinating color photographs of this very unusual phenomenon. We begin with an array of attractive mineral specimens, an ultraviolet lamp or two, and a 35 mm. camera.

Photographs start with the light-sensitive salts of precious silver. Almost all of the sensitivity of these halides lies in the ultraviolet and blue end of the spectrum. The recording of different colors, therefore, must start there with the help of dyes and other chemicals. In addition, filtering out the excess of blue and violet of ultraviolet fluorescence is essential to faithfully record the other colors. This requires some knowledge of the basics. We begin in a darkened room.

Ultraviolet generators commonly consist of a fused quartz tube containing a drop of mercury and an inert gas. In shortwave ultraviolet lamps (2537 Angstroms), those which offer the most spectacular response in specimens from the Franklin area, a special *Corning* exciter filter No. 9863 is required to cover the generator tube. These shortwave rays are dangerous to our eyes which must be protected from prolonged exposure. (*Ordinary glass screens out shortwave ultraviolet.*)

As the filtered ultraviolet rays strike the specimen, the now visible fluorescence can be picked up by the camera. A prism reflex camera with a macro lens is a big help, but not absolutely necessary. The camera must be equipped with a *BARRIER* filter to screen out unwanted excess of scattered ultraviolet and some blue color waves. Barrier filters may vary from *2B* to *2E*, or stronger ones such as yellow *K2* or even *G15*; the latter two take out all blue light if the specimen does not have any blue fluorescence. If the filter itself fluoresces, a *2E* must be placed in front of it and shaded from the *UV* scatter. If some visible blue is in the specimen, and most of the Franklin minerals are mixtures of colors generally speaking, then a *2B* barrier filter is fine. With smaller specimens and shorter working distances, accessory lenses such as *+2* or *+3* will give larger images and shorter distances without increasing the time exposure. If extension tubes or bellows are employed; the time must be increased.

$$\text{Exposure Increase} = \frac{\text{film to lens center}}{\text{focal length of lens}} \times \frac{v}{F} \times 2$$

A tripod or table top and a cable release are part of the equipment because exposures will vary from a few seconds to many minutes. Exposure depends on the intensity of the lamps, the age of the *exciter* filter and the magnification. Short wave filters have a limited life because they solarize and gradually become opaque. They are not cheap. Also, the longer the exposure time, the more blue color will show up in the resulting slide.

COLOR FILM

The richest, truest, color is obtained from slower daylight film, such as *Kodachrome 64*, but a long exposure is usually necessary and so a faster daylight film such as *Ektachrome 200* is generally used. There is also *Ektachrome 400*, but, I find the resulting color slides are not as attractive as are the slides from the slower speed films. Transparencies are always richer than paper prints and they can be projected on a screen. Tungsten type film is seldom used for fluorescent photography; though it may possibly bring out some blue color better. The speed of *Ektachrome* may be doubled or quadrupled by special development, but there is an increase in contrast and some sacrifice in color quality. Long exposures usually pose further risks due to reciprocity effect. The three color layers of the film react differently and will result in color shift and delay. Color compensation (*CC*) filters may be necessary at the barrier filter to give a correct final picture.

EXPOSURE METERS

If you are fortunate enough to own a very sensitive exposure meter, you can attempt a reading, but you will generally register only the most brilliant fluorescents. Because exposure meters are sensitive mainly in the blue end of the spectrum, they pick up scattered violet light in excess. Possibly a pale yellow filter on the meter can screen this out for a truer reading, however, visible estimation of the intensity with trial and error is almost as good.

Try to position the ultraviolet lamp(s) as close to the specimen as possible. Keep them out of the field of vision and make sure they do not shine on the camera lens or barrier filter. As a start, you can try something like an *f*-5.6 lens setting on a calcite-willemite specimen for several seconds with *Ektachrome 200* film. Make other adjustments in *f* settings and time after your first film results are obtained (*record your results for reference*). Focusing does not differ from the usual procedure with ordinary illumination, as the fluorescing mineral is part of the normal visible spectrum. For prolonged work use sun glasses or protect your eyes with *2E* filters. Even the reflected scatter can injure your eyes or conjunctiva. (*Editor's note: Contrast Control Goggles which are designed to protect your eyes may be purchased from Ultra-Violet Products, Inc., San Gabriel, California. These devices are inexpensive and are strongly recommended for any activity involving ultraviolet light.*)

LONGWAVE ULTRAVIOLET (3660 Angstroms)

The *BLB (blacklight)* fluorescent tubes are the cheapest and will fit into ordinary desk lamps. Aluminum reflectors improve the intensity. However, the quartz tube mercury generators can be fitted with longwave *UV* filters which are cheaper than the *Corning 9863* and will last indefinitely. I have made these lamps using a sun-tan bulb mounted in an outdoor housing equipped with a *Corex* long wave filter (*blacklight*) such as used for stage shows. It is intense - 250 watts - long wave illumination which is not harmful, but rather hot.

INTERESTING NOTES

In the past I have fluoresced minerals with 200 *Kv* X-rays. The resulting visible fluorescence resembled results with longwave *UV*, more than shortwave *UV*.

Fluoroscope screens originally were willemite. X-ray intensifying screens are mainly scheelite.

Keep accurate notes and experiment with different time exposures. Remember, your work must be done in a severely darkened room.

HELPFUL BOOKLETS

Ultraviolet and Fluorescent Photography, Kodak M-27, 1968

Here's How, Kodak AE-81, 1964

(*Editor's note: for further information pertaining to this article, you may write directly to the author:*

Alfred L. Standfast, M.D., 32 Oak Street, Binghamton, New York 13905.

A MINERAL NEW TO SCIENCE

JOHNBAUMITE

In the last issue of the *Picking Table* we were fortunate to again announce the discovery of a mineral, new to science, at the Sterling Hill mine. We are again pleased to announce the discovery of yet another mineral, new to science, from the Franklin mine. Your editor quotes the following, intact, from recent communication with Pete J. Dunn, of the Department of Mineral Sciences, Smithsonian Institution, Washington, D.C. 20560.

"A new mineral has been found in the Franklin mine. It was found by John Baum many years ago and preserved for posterity. The specimen is the one which provided the second paragenesis for Franklin yeatmanite. The new mineral is white, a member of the apatite group, and rare. It is a calcium arsenate hydroxide and has been named johnbaumite in honor of John L. Baum, curator of the Franklin Mineral Museum, and retired resident geologist of the New Jersey Zinc Company. Additional information on this new mineral will appear in the Picking Table subsequent to its formal publication later this year."

We congratulate John L. "Jack" Baum and extend our thanks to Mr. Dunn for providing the Picking Table with this announcement.

MINERAL NOTES

Research Reports

Hauckite $\text{Fe}_3^{+3}(\text{Mg},\text{Mn})_{24}\text{Zn}_{18}(\text{SO}_4)_4(\text{CO}_3)_2(\text{OH})_{81}$

In the Spring 1980 issue of the Picking Table we were able to announce the discovery of a mineral new to science as being found at the Sterling Hill mine, Ogdensburg, New Jersey. It was named hauckite in honor of Mr. Richard "Dick" Hauck of Bloomfield, New Jersey, who was the first president of the Franklin-Ogdensburg Mineralogical Society, Inc.

The formal description of hauckite has been published and the following abstract has been prepared from the describing article entitled "Hauckite, a new mineral from Sterling Hill, New Jersey." by Pete J. Dunn, Donald R. Peacor and B. Darko Sturman, which appeared in the American Mineralogist, Vol. 65, pp. 192-195, (1980).

Introduction

In January 1978, an unidentified orange platy mineral was submitted to us for identification and subsequently found to be a new species. The mineral had been found some years before and is from the Sterling Hill mine in Ogdensburg, New Jersey. It was noted as unique by some mineral collectors in the area, notably John Baum, Alice Kraissl, Richard Hauck, and Fred Parker. Since this mineral is not easily detected, it might never have been characterized if it were not for the dedication and diligence of these collectors in preserving samples for examination, calling it to our attention, and providing whatever samples were needed for our study.

We take pleasure in naming this new species hauckite in honor of Richard Hauck, mineral collector of Bloomfield, New Jersey. Mr. Hauck has done much to promote awareness of the mineralogy of Franklin and Sterling Hill, and has taken pains to preserve specimens of uncommon parageneses which are frequently overlooked by the unsophisticated collector. The new mineral and the name were approved by the Commission on New Minerals and Mineral Names, IMA, prior to publication. Type material is preserved in the National Museum of Natural History, Smithsonian Institution, under catalog number T45495, and the Royal Ontario Museum, Toronto, under catalog number M35860. The name is pronounced HOW-KITE.

Morphology

Hauckite forms simple euhedral hexagonal crystals, which are extremely flattened on [001]. The only forms present are the pinacoid [0001] and the second-order hexagonal prism [0110]. Examination of the crystals with the scanning electron microscope failed to reveal any additional forms. The crystals occur gathered in highly irregular clusters which resemble rosettes (*fig. 1*). They are imperfect and composed of layers which are slightly offset from each other; they showed no striations, etch pits, or epitaxial relationships with other species.

Physical and optical properties

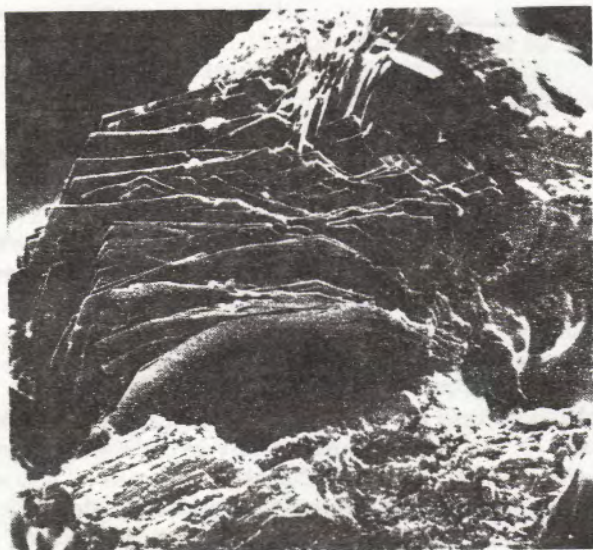


Fig. 1. Scanning electron microscope photomicrograph of hauckite crystal cluster (50 \times).

Hauckite is bright orange to light yellow in color. The luster of both external crystal faces and cleavage fragments is vitreous to slightly pearly. The streak is variable, depending on the color of the mineral; in most samples it is light yellow. Hauckite is quite brittle. The clusters are attached quite firmly to the matrix on the type specimens. The Mohs hardness is approximately 2-3. The density, determined using heavy-liquid techniques, is 3.02 g/cm³; the calculated value is 3.10 g/cm³. The disparity in values is very likely due to the presence of air or liquid trapped between hauckite plates. The cleavage is perfect and very easily produced, parallel to [0001]. Hauckite is neither fluorescent nor phosphorescent in ultraviolet radiation.

Optically, hauckite is uniaxial (+) with refractive indices $\epsilon = 1.638(2)$ and $w = 1.630(2)$; pleochroic with $O =$ golden brown, $E =$ pale yellow, absorption: $O > E$.

(Editor's note: refer to original article for further optical information.)

Chemistry

Hauckite was chemically analyzed with an ARL-SEMQ electron microprobe, operating voltage 15 kV and beam current 0.15 μ A. A wavelength-dispersive microprobe scan indicated the absence of any elements with atomic number greater than nine, except those reported herein. A scan by ion microprobe indicated the absence of any elements with atomic number less than ten except for abundant hydrogen, carbon, and oxygen. Microchemical tests indicate that the iron in hauckite is predominantly ferric with only a very weak reaction for ferrous iron. The standards used for the microprobe analysis were hornblende for Fe, Mg, and Al; manganite for Mn; synthetic ZnO for Zn; and celestine for S. The data were corrected using Bence-Albee factors. The analysis is presented in Table 1. (*Editor's note: refer to original article for Table 1*). Hauckite is homogeneous over 10 μ sample spots.

Analysis by DTA-TGA yielded results in good agreement with the proposed formula. The weight loss up to 810°C is 28.0 percent, which compares favorably with the 27.6 percent weight loss expected from the volatilization of the hydroxyl, carbonate, and sulfate components of hauckite. Hauckite is easily soluble in hydrochloric acid.

The resultant analysis yields the following empirical formula based on unit-cell parameters and the density calculated from the end-member composition: $(\text{Fe}_{2.6}^{+3}\text{Al}_{0.4})(\text{Mg}_{13.5}\text{Mn}_{9.9}\text{Fe}_{0.5}^{+2}\text{Zn}_{0.2})\text{Zn}_{18}(\text{SO}_4)_{3.8}(\text{CO}_3)_2(\text{OH})_{80.8}$. This empirical formula is in excellent agreement with the proposed formula of $\text{Fe}_3^{+3}(\text{Mg},\text{Mn})_{24}\text{Zn}_{18}(\text{SO}_4)_4(\text{CO}_3)_2(\text{OH})_{81}$.

Carbon could not be determined quantitatively due to the paucity of material, but its presence was confirmed by the effervescence of hauckite in HCl. The amount of carbonate in hauckite, and the $(\text{CO}_3):(\text{OH})$ ratio, were assigned by difference in order to bring the total of components to 100 percent, using the comparison of the specific refractive energies K_p and K_c as a guide. Because we could not unambiguously determine a space group due to the poor quality of the crystals, requirements of equipoint ranks could not provide unambiguous guidelines to the amounts of (CO_3) and (OH) per cell. The $(\text{CO}_3):(\text{OH})$ ratio could vary from 1:83 to 6:73 and still be within analytical error. The above chemical formula is therefore tentative pending the discovery of adequate hauckite to permit a complete chemical analysis, or the discovery of better quality crystals which might permit a determination of the crystal structure.

X-ray crystallography

Hauckite was studied using Weissenberg and precession single-crystal techniques. Unfortunately, all the crystals were imperfect, giving rise to broad reflections, and subject to a one-dimensional stacking disorder which caused diffuseness, which made an unambiguous determination of the space group impossible. The Laue symmetry appeared to be $6/m2/m2/m$, however, the lattice parameters were determined to be $a=9.17(4)$ and $c=30.21(9)\text{\AA}$. The only extinctions which could be reasonably well-defined were for $00l$, $l = 2n + 1$. There are several space groups consistent with this relation. We can be only reasonably sure that the Laue symmetry is $6/mmm$ and that there is a 6_3 screw axis. There is a pronounced diffuseness of reflections parallel to c^* , as is consistent with disorder in a layered stacking sequence. The lattice parameters were obtained by least-squares refinement of data obtained using a 114.6 mm diameter Gandolfi powder camera. The powder-diffraction data are reported in Table 2. (*Editor's note: refer to the original article for Table 2*).

Occurrence

Hauckite is found in the Sterling Hill mine, Ogdensburg, Sussex County, New Jersey. The type specimen was found in 935 stope, between the 700 and 800 foot levels. On this specimen, hauckite is implanted as almost spherical rosettes on a very vuggy and altered calcite and serpentine matrix. The associated minerals are mooreite and phlogopite, but it is not clear which was the first species to form. At least 12 samples of this paragenesis have been preserved; in addition to the type sample, others repose in the Baum, Hauck, Kraissl, and Parker collections, all in northern New Jersey.

A second and quite different paragenesis was subsequently found by John Kolic, a miner in the Sterling mine. This occurrence is also near the 700 foot level in 935 stope, but the specimen bears no similarity to the type material. In this paragenesis, hauckite is associated with severely altered sussexite, pyrochroite, and zincite. The sequence of deposition is pyrochroite followed by sussexite, followed by zincite, followed by hauckite.

A third and quite different assemblage was found by Richard Bostwick, then a miner at the Sterling mine. This occurrence was at the 2350 level of the north orebody. In this assemblage, hauckite is deposited on chlorophoenicite which in turn coats a decomposed calcite-serpentine rock.

It is indeed quite uncommon to find a new mineral in three different parageneses in the same mine. Hauckite is among the last minerals to form in each assemblage. The apparent diversity of parageneses and spatial distribution of hauckite might suggest that it is a mineral which has been overlooked in previous years.

In summary, hauckite is a rare sulfate mineral which occurs in a variety of different parageneses in the Sterling Hill mine, and adds one more to the list of 24 species (including kolicite and lawsonbauerite) known to occur only at this deposit, certainly one of the most remarkable ones in North America.

Yeatmanite $[\text{Mn}_5\text{Sb}_2][\text{Mn}_2\text{Zn}_8\text{Si}_4]\text{O}_{28}$

New information about this mineral has been provided in an article entitled "Yeatmanite: new data," by Pete J. Dunn of the Department of Mineral Sciences, Smithsonian Institution, Washington, D.C. and Peter B. Leavens of the Department of Geology, University of Delaware, Newark, Delaware, published in the American Mineralogist, Vol. 65, pp. 196-199, (1980). An abstract follows:

Introduction

Yeatmanite was originally described by Palache *et al.* (1938) from Franklin, Sussex County, New Jersey. It is a very rare manganese zinc antimonate silicate which is known only from the Franklin mineral deposit. Its crystal structure was discussed by Moore (1966) and Moore *et al.* (1976) who showed that it is closely related to katoptrite (catoptrite) and is probably a stuffed pyrochroite-type structure.

The original yeatmanite specimen (HU No. 92878) was found intimately associated with pink sarkinite, $\text{Mn}_2(\text{AsO}_4)(\text{OH})$, and light green willemite, Zn_2SiO_4 , in the Franklin mine. The dark brown easily-cleaved yeatmanite occurs as euhedral crystals and laths imbedded in both sarkinite and willemite, but only where they are in mutual contact. In this assemblage, yeatmanite is likely the first phase to have formed.

The second paragenesis was found in 1944 by John Baum, then resident geologist (now retired) for the New Jersey Zinc Company, but a description has never been published. According to Baum, the second occurrence was found in a small lenticular body located at 830S, 170E, elevation -760 in the 730S Palmer shaft pillar, in the third sub-level below 750 level. On either side of this lenticular body was franklinite-willemite ore containing limy bands. The sample was taken 52 feet from the hanging wall contact and 54 feet from the footwall contact.

In this paragenesis, yeatmanite occurs as euhedral crystals in a fine-grained massive matrix. Thin-section examination indicates that other minerals are present in small amounts, among them diopside and andradite (both containing about 8.5% MnO) and romeite (containing small amounts of lead, zinc, iron, and manganese in addition to calcium and antimony). The sequence of formation appears to be diopside, followed by andradite and romeite, followed by yeatmanite. Only the yeatmanite is euhedral; the others occur as formless blebs and rounded grains.

Few specimens of yeatmanite are known, and some have possibly been overlooked in the past due to the lack of X-ray diffraction data. The paucity of specimens requires some comment on their locations. Only one specimen is known from the second occurrence described by Baum. It was sliced in three pieces, one which remains in the Baum collection, the others repose in the Harvard University collection (HU No. 116461), and the Smithsonian collection (NMNH No. 144444). Of the original yeatmanite, associated with sarkinite, type specimens have been preserved at Harvard University (HU No. 92878), the Smithsonian Institution (NMNH No. C6290), and the Academy of Natural Sciences of Philadelphia (ANSP No. 22631).

Subsequent to the completion of this study, a third paragenesis for yeatmanite was discovered. This occurrence originally labeled bannisterite, consists of a 1.0 cm vein of willemite and calcite in massive franklinite. The yeatmanite occurs as warped foliae admixed with the willemite and calcite.

Physical and optical properties

The density of yeatmanite was given by Palache *et al.* (1938) as 5.02 g/cm^3 . We determined the density, with a Berman balance, to be 4.91 g/cm^3 . Inasmuch as the value obtained by Palache is in excellent agreement with the value of 5.04 g/cm^3 for the formula proposed by Moore *et al.* (1976), our value may be low due to air or liquid trapped along incipient cleavages.

(Editor's note: refer to original article for optical properties.)

X-ray powder-diffraction data

X-ray powder-diffraction data are not available for yeatmanite, and this has likely been a factor contributing to the small number of specimens identified to date. The diffraction pattern of a type specimen was recorded using a 114.6 mm diameter Gandolfi powder camera. The diffraction maxima were indexed by the computer program of Appleman and Evans (1973). The unit-cell dimensions of Palache *et al.* (1938) were used as starting parameters. The X-ray powder-diffraction patterns of all yeatmanite specimens examined are nearly identical, with no measurable change in cell dimensions with slight variations in the Mn:Zn ratio.

(Editor's note: refer to original article for further X-ray powder diffraction data.)

Chemistry

Two analyses of yeatmanite were given by Palache *et al.* (1938). They proposed the formula $(\text{Mn},\text{Zn})_{16}\text{Si}_4\text{Sb}_2\text{O}_{29}$, noting that manganese and zinc were present in approximately equal amounts. Moore *et al.* (1976) proposed the formula $[\text{Mn}_5\text{Sb}_2][\text{Mn}_2\text{Zn}_8\text{Si}_4]\text{O}_{28}$ to demonstrate the close relationship to katoptrite, $[\text{Mn}_5\text{Sb}_2][\text{Mn}_8\text{Al}_4\text{Si}_2]\text{O}_{28}$.

(Editor's note: refer to original article for further chemistry data.)

Kolicite $Mn_7(OH)_4[As_2Zn_4Si_2O_{16}(OH)_4]$

In the Spring 1979 issue of the Picking Table we announced the discovery of this mineral from the Sterling Hill mine, Ogdensburg, New Jersey. We subsequently published an abstract of the formal description of kolicite in the Spring 1980 issue of the Picking Table. In that abstract it was noted that the crystal-structure analysis was in progress; the results of which would most likely give us the final form of the formula for kolicite.

This study has been completed by Donald R. Peacor of the Department of Geology and Mineralogy, The University of Michigan, Ann Arbor, Michigan. The paper on this study appeared in the American Mineralogist, Vol. 65, pp. 483-487, (1980). The published abstract of that article follows:

"Kolicite, $Mn_7(OH)_4[As_2Zn_4Si_2(OH)_4]$, is orthorhombic, space group *Cmca*, $a = 18.59(3)$, $b = 8.789(5)$, $c = 12.04(1)\text{\AA}$, with $Z = 4$. The structure is based on cubic-closest-packing of anions with As, Zn, and Si tetrahedra linked to form a continuous vertex-sharing slab oriented normal to *c*, with composition $As_2Zn_4Si_2O_{16}(OH)_4$. These link units of seven edge-sharing Mn octahedra to form a three-dimensional structure. A basic unit of structure is common to the structure of holdenite, $Mn_6Zn_3(OH)_8(AsO_4)_2(SiO_4)$."

Gageite $(Mn,Mg,Zn)_{40}Si_{15}O_{50}(OH)_{40}$

The following is the abstract of a paper entitled "The chemical composition of gageite: an empirical formula," by Pete J. Dunn of the Department of Mineral Sciences, Smithsonian Institution, Washington, D.C. which appeared in the American Mineralogist, Vol. 64, pp. 1056-1058, (1979). We quote:

"Gageite from Franklin, New Jersey has been restudied analytically. Seven new analyses confirm the original analysis, and suggest that magnesium and zinc may be essential. The new data, together with a new density of 3.46 g/cm^3 , and a suggested treading of the *c* axial dimension of previous work, lead to a new proposed formula for gageite of $(Mn,Mg,Zn)_{40}Si_{15}O_{50}(OH)_{40}$, with Mn:Mg:Zn about 28:10:2. Previous formulae are presumed to be incorrect."

Sarkinite $Mn_2^{+2}(AsO_4)(OH)$

The following is abstracted from an article by Pete J. Dunn of the Department of Mineral Sciences, Smithsonian Institution, Washington, D.C., which appeared in the Mineralogical Magazine, Vol. 43, p. 681, (1980). We quote in part:

"The occurrence of very fine sarkinite crystals in the Sterling Hill Mine, Ogdensburg, Sussex County, New Jersey, prompted an analysis of their chemical composition. The crystals occur along fracture seams and slickensides in willemite-franklinite ore in a number of varied parageneses, which include baryte, manganese oxides, and kraisslite (Moore and Ito, 1978).

The study of the Sterling Hill sarkinite afforded an opportunity to re-analyse some of the yellow to orange sarkinites found in Sweden. Xantharsenite (Igelström, 1884), polyarsenite (Sjögren, 1885), and chondrasenite (Igelström, 1865) all occur as seams and irregular segregations at the Sjo Mine, Grythyttte Parish, Sweden, and at the Harstig mine, near Pajsberg, Sweden. Type material for xantharsenite was unavailable, but samples Nos. 143555 and 143556 from Igelstrom's mineral collection, likely to represent what he considered to be xantharsenite, were used. The polyarsenite sample (R10794) is from the Sjo mine and not from the type locality in Pajsberg.

The samples were analysed using an ARL-SEM-Q electron microprobe utilizing an operating voltage of 15 kV and a beam current of $0.15\text{ }\mu\text{A}$.

X-ray powder patterns of all the samples studied herein are in good agreement with the data for sarkinite published by Welin (1968). There are no discernible differences among the powder patterns.

The analytical data clearly show that all of the samples have very similar compositions and, together with the X-ray powder patterns, demonstrate that they are all sarkinite. It should be noted that none of the specimens examined herein are type material, and that the term 'xantharsenite' should stand until type material is found."

(Editor's note: refer to the original article for further information.)

Bementite $Mn_8Si_6O_{15}(OH)_{10}$

This mineral played a significant role in the study of another mineral, caryopilite, by Donald R. Peacor and Eric J. Essene of the Department of Geology and Mineralogy, The University of Michigan, Ann Arbor, Michigan. A subsequent paper entitled "Caryopilite - a member of the friedelite rather than the serpentine group," appeared in the American Mineralogist, Vol. 65, pp. 335-339, (1980). It is noted here as a point of reference on bementite.

Big Jim Stephens and the FRANKLIN IRON MINES
by John L. Baum

James C. Stephens arrived in Franklin in 1875 at the age of eight from his native England. His father was imported as a mine foreman having had wide experience in the occupation in England and held that position for forty-eight years, or well past present day retirement age. Young Jim, it is reported, received a thorough education in the public schools of Franklin. During vacations he served as water boy at the Franklin iron mines, and following graduation, he was employed in various capacities by the Franklin Iron Company for thirteen years, or until 1892. A little arithmetic shows that his formal education was completed at the age of twelve, or at the eighth grade which makes his subsequent career the more astounding because he was for several years president of the local Board of Education when it sponsored the Franklin vocational high school. He had earlier been appointed to that Board by the County superintendent of schools. He was a Councilman and a director of the local Presbyterian Church as well as one of the organizers, stockholders and directors of the new local bank. His other affiliations were many and honorable, and he was employed in the Zinc Company shops for over forty years.

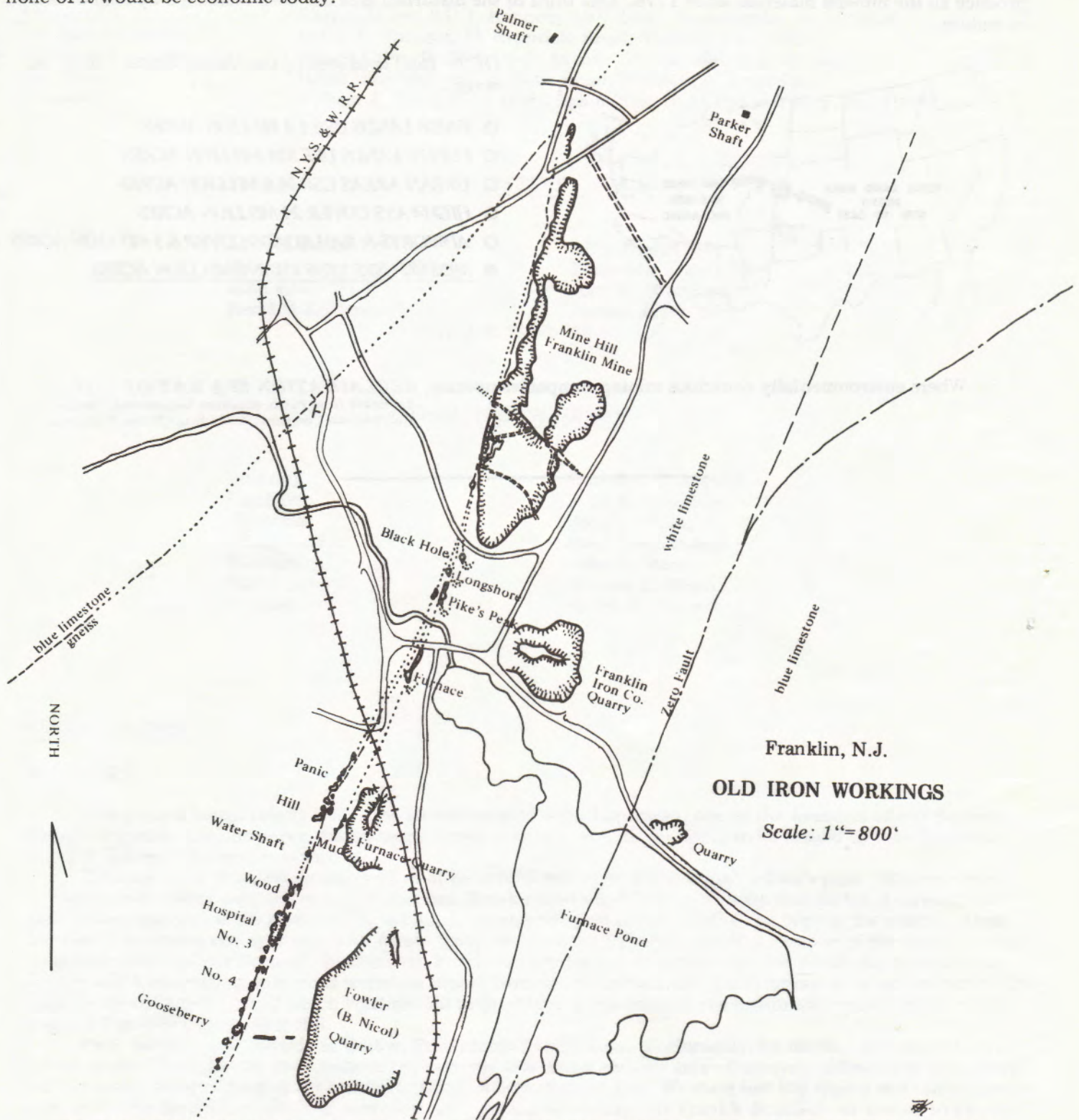
Our acquaintance with Big Jim as he was known in testimony to his size came about not only because he was long a fixture at firemen's parades and in the lead car at patriotic processions but also because he had a sense of our impermanency and was resolved that not all his knowledge and experience should vanish. As a result of his thirteen years service with the Franklin Iron Company during the latter part of which he was engineer in charge of the power department of the company's blast furnace, and as a result of his earlier water boy activities, he was well acquainted with the line of iron mines which extended for a half mile south of the now flooded Franklin mine open pit.

Frank Nason of nasonite fame, a noted consulting geologist to the Zinc Company, had visited the former mine openings in company with Big Jim in 1927 and left us observations on his tour together with comments derived from his contacts with the New Jersey Geological Survey. These were on file in my office at the Zinc Company and Big Jim being a mere 82 at the time was drafted in 1949 to cover the ground once more while we took down his recollections. Just in case, we were attended by the Company safety chief experienced in first aid.

The magnetite iron ore followed the gneiss-limestone contact southward from the Franklin zinc ore body where it was well exposed in mine openings and exploratory drill holes. The first four openings were all in limestone, and those farther south in gneiss. Beginning at the Franklin Mine open pit, now under Evans Street and the Buckwheat Dump and situated alongside what was formerly a gristmill pond now long filled in, the group starts with the Black Hole, a pit on a trough-shaped ore body which roughly parallels the adjacent trough of the Franklin zinc ore body on a smaller scale, as did the other beds in limestone. Dimensions are not at hand for this pit and it may have been already covered in Big Jim's time. Next southward was the Longshore Mine. It went down on the slope 135 to 140 feet and mined a large mass of magnetite in limestone, also arc shaped. The Pike's Peak mine was entered initially by a shaft which was vertical for a way and then inclined under the present site of the Museum's replica mine building, and recovered ore down dip from beneath the Longshore Mine to which it was connected by a drift or tunnel. A drift to the south failed to locate minable ore. The Furnace Mine was a vertical shaft 100 feet deep and then an incline down to the east fairly steep but not enough so to require ladders. At one time Big Jim was pumpman in the shaft which was located beside Dr. Samuel Fowler's colonial blast furnace, ruins of both of which were visible in my time and now covered by Mitchell Park near the millstone monument. The ore was mined to the north and contained a fold similar to those already mentioned. An exploratory drift put out under the pond encountered good ore but a heavy flow of water put an end to the operation.

South of Maple Road was the Panic Mine, the northernmost of the mines in gneiss bordering the limestone contact. The pit is full of junk including radioactive Brazilian monazite beach sand and there is an opening in the rock wall looking into an underground working full of water. The mine was reported to be about 150 feet deep, and apparently was worked with the adjacent Hill Mine, making one elongated working. The Mud Mine next to the south was the oldest pit, soft weathered limestone ore, an exception to the others in gneiss, and no figures are available. The Water Shaft drained all the other mines through a pipe to the river. The Wood Mine was more shallow than the others and was succeeded southward along the little valley by the Hospital Mine followed by Number 3 Mine where Big Jim's father sank a shaft and found a small body of ore. Number 4 Mine was probably of little consequence, overshadowed by the Gooseberry Mine to the south, last of the line, and noted for its

mineral specimens. Its dump was hauled away for fill and the shaft is caved. No figures are available regarding depth of this mine but it was probably no deeper than the others, or less than 200 feet. Deep exploration drilling in my time encountered disseminated magnetite a mile down dip, indicating the extent of the mineralization, but none of it would be economic today.



We returned Big Jim to his home, and we saw him there often, sitting on his porch, cane in hand, waiting perhaps for the next parade and another brief moment of glory. Then we heard he was taken off to a home, too much for his daughter to attend any longer, and eventually he was gone, but not before he had contributed greatly through a lifetime of service to the mines and his community.

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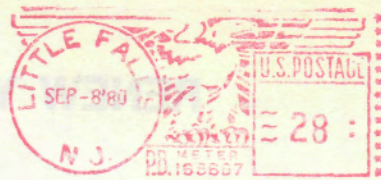
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