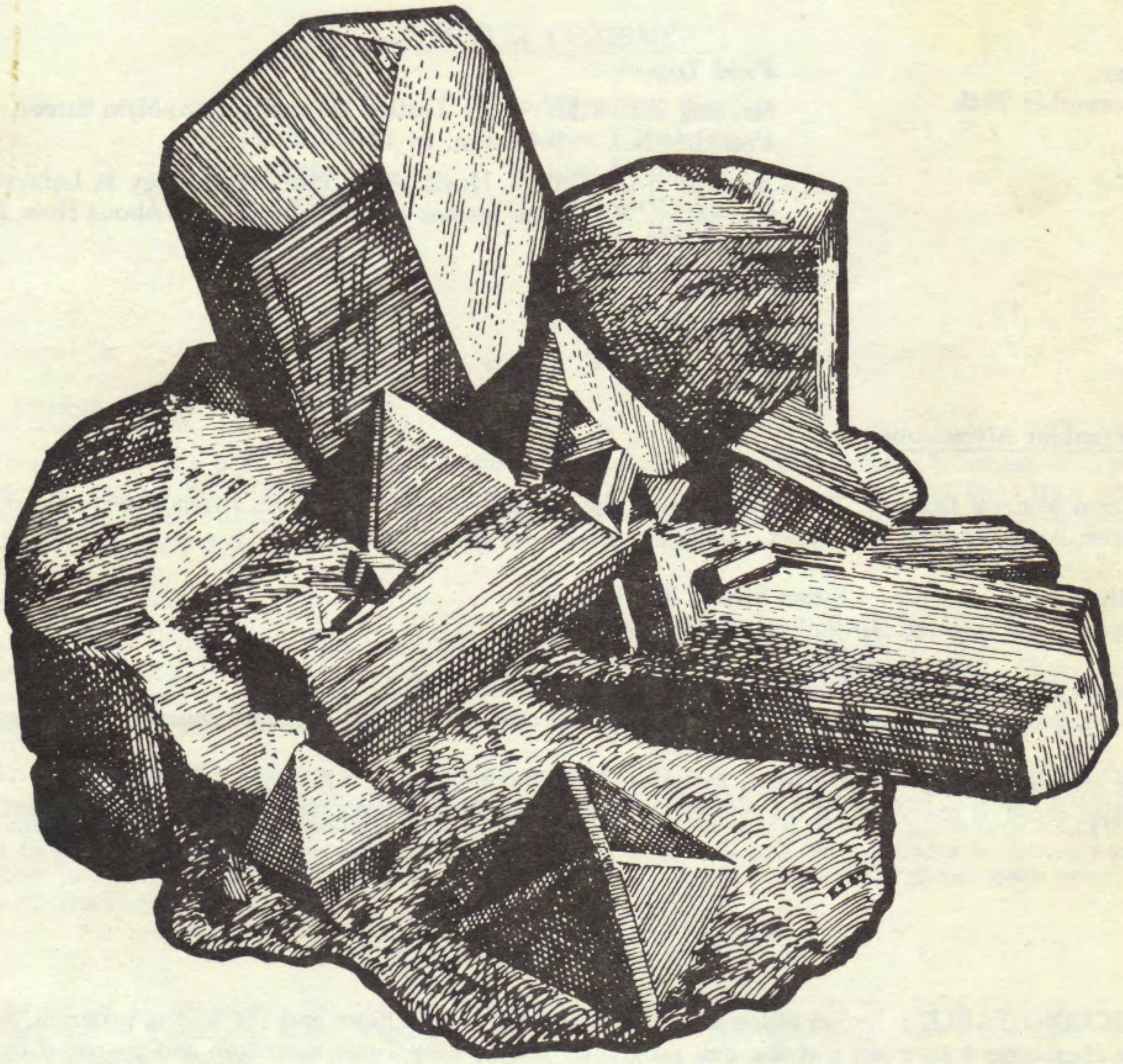
THE PICKING TABLE

JOURNAL OF THE FRANKLIN·OGDENSBURG MINERALOGICAL SOCIETY



Volume 17 September 1976 Number 2

CLUB PROGRAM — FALL 1976

All meetings will be held at the Hardyston School, intersection of Routes No. 23 and 517, Franklin, N.J. Pre-meeting activities start at 1:00 P.M. Speaker will be introduced at 2:30 P.M.

Saturday, September 18th

Field Trip — Cellate (Fowler) Quarry, Cork Hill Road, Franklin, N.J. 9:00 a.m. to 12:00 noon.

Meeting 2:30 P.M. — Speaker: Dr. Kemble Widmer, State Geologist - "The Mining and Extraction of Minerals".

Saturday, October 16th

Field Trip — The Old Andover Iron Mine (opposite Aeroflex Field), Limecrest Rd., Andover, N.J. — 9:00 a.m. to 12:00 noon.

Meeting 2:30 P.M. — Speaker: Dr. James S. Yolton, Asso. Prof. of Geology at Upsala College — "Geology of the Delaware Valley".

Saturday, November 20th

Field Trip —

Meeting 2:30 P.M. — The Trotter Mineral Dump; Main Street, Franklin, N.J. — 9:00 a.m. to 12:00 noon.

Speaker — Dr. Guy L. Hovis, Asso. Prof. of Geology at Lafayette College — "What The Insides of Minerals Tell Us About How They Formed".

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Daily Franklin Attractions

Buckwheat Mineral Dump — Entrance through the Franklin Mineral Museum, Evans Street, Franklin, N.J. Open April through November. Daily fee.

Franklin Mineral Museum — Evans Street, Franklin, N.J. Open April through November. Admission fee.

Gerstmann Franklin Mineral Museum — Walsh Road, Franklin, N.J. Open year round on weekends; on weekdays by arrangement. No charge, courtesy of owners.

Trotter Mineral Dump — Main Street, Franklin, N.J. (behind the Bank). Open most of the year. If no one at the dump, call the manager, Nick Zipco. Daily collecting fee.

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THE PICKING TABLE is issued twice a year; a March issue with news and the Spring program, and a September issue with news and the Fall program. The Picking Table is written and prepared by Frank Z. Edwards, Editor and David A. Cook as Assistant Editor. Cover design by Kenneth Sproson. The Editor welcomes information on Franklin and Sterling Hill and their minerals for publication in this journal. Please write directly to Frank Z. Edwards, 726 Floresta Drive, Palm Bay, Florida 32905.

F.O.M.S. OFFICERS FOR THE YEAR 1976

President	Bernard T. Kozykowski, Box 146, Franklin, N.J. 07416
1st Vice President	Wilfred R. Welsh, 67 Lilline Lane, Upper Saddle River, N.J. 07458
2nd Vice President	E. A. "Al" Lord, R.F.D. No. 1, Lafayette, N.J. 07848
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TRUSTEES

COMMITTEE CHAIRMEN

Auditing	Wilfred R. Welsh
Field Trip	John E. Sebastian
Historical	John L. Baum
Identification	John L. Baum
Museum	John L. Baum
Nominating	John L. Baum
Program	Wilfred R. Welsh and David A. Cook

F.O.M.S. NOTES

To round out the year, Field Trip Chairman, John Sebastian, and Program Chairman, Wilfred Welsh, have arranged a fine Fall program for your entertainment and edification. Our field trips produce good specimen material; our speakers are both interesting and informative. Your attendance at these events will be well rewarded. Note the dates on the calendar and plan to attend.

A new slate of officers is scheduled to head the F.O.M.S. for the year 1977. Nominating Committee Chairman, Jack Baum, will present a list of nominees at the October meeting. If you wish to propose any member as a candidate for office, please communicate your wishes promptly to Mr. Baum. Floor nominations may also be made at the October meeting.

With the advent of Autumn it once again becomes necessary for our Treasurer to look to the members and ask that they renew their membership in our Society in order to carry through with our activities in the oncoming year. Though your membership renewal is not due until January 1st, you are asked to submit your dues as soon as possible between now and that date in order to assure your participation in Society activities next year. You will find a renewal form on the inside back cover of this issue of The Picking Table.

Our roving ambassadors, the Kraissls, have won additional honors. At the 1976 Eastern Federation Show at Topsfield, Mass., Fred had an exhibit of Franklin mini-fluorescents and Alice an exhibit of Franklin thumbnails, both in the Master Class. Both were awarded First Place blue ribbons and the Eastern Federation trophy for that particular class. By request, these same exhibits were shown at New Jersey Earth Science Association Show on August 21st and 22nd, at Seton Hall University.

The Kraissl exhibits have been shown all over the East. For many collectors and show attendants, these displays afford a splendid introduction to the beauty and variety of Franklin minerals. Not many collectors are willing to compete in the Federation Shows. We are fortunate that the Kraissls do enter these competitions and that they feature Franklin minerals. It is the finest kind of exposure for us and we thank them.

A new book entitled "Minerals of the World" by Charles M. Sorrell has been added to those already available through our Society.

Published by The Golden Press, it is actually a richly revised and expanded edition of the familiar earlier Golden Press book titled Rocks and Minerals by Herbert S. Zim and Paul R. Shaffer.

This new volume is intended to be used as a field guide and introduction to the geology and chemistry of minerals. Encompassing the latest concepts in mineral science, this book offers outstanding chapters explaining such things as rock formation, solid solution, atomic structure of minerals, crystal systems and habits, properties of minerals and their classification, and lunar mineralogy, all in a manner which encourages rather than inhibits. Chapters pertaining to the minerals themselves present full color illustrations of typical specimens along with infrequently seen unit cell structures and packing models, too important to ignore if one is really to understand mineralogy. Responding to its likely role of inspiring the reader to seek more knowledge of the subject, the book also provides a very comprehensive bibliography.

It is recommended that you add this timely, informative and modestly priced volume to your library. The price per copy is $4.95, softbound (in stock) and $6.95 hardbound (to be made available if demand is sufficient). 280 pp., size 4½" x 7½" softbound.

Franklin Mineral Show

The 20th Annual Franklin-Sterling Mineral Exhibit sponsored by the Kiwanis Club of Franklin will be held on Saturday, October 9th and Sunday, October 10th, 1976. Hours on Saturday — 9:00 a.m. to 8:00 p.m., Sunday, 10:00 a.m. to 6:00 p.m.

The admission price of $1.50 per adult and $1.00 for children provides admission to the Franklin Armory with exhibits and dealer section; to the Franklin Mineral Museum including the Mine Replica and famous Fluorescent Display; and to the Buckwheat Dump for specimen collecting. A shuttle bus will provide free quick transportation to all areas. Free parking will also be provided.

A dealer booth selling Franklin mineral specimens only will be manned by Club members.

Franklin Mineral Museum

A new addition to the Franklin Mineral Museum was dedicated on Sunday, May 2nd, 1976. The following story of this occasion appeared in the New Jersey Herald:

"The annual Spring opening of the Franklin Mineral Museum on Sunday was the occasion for the dedication of a new addition.

'Kraissl Hall', a 28 x 42 foot addition to the museum complex is a sales area and lecture hall donated by Frederick and Alice Kraissl, Jr. of Hackensack in memory of the Kraissl family. Plans are being made for lectures and instructions in lapidary and mineral recognition.

Mr. and Mrs. Kraissl are active in the Franklin-Ogdensburg Mineralogical Society. Kraissl is a past president of the museum while his wife is the current museum secretary. They have made previous contributions of mineral specimens to the museum.

Memorial services for deceased Franklin miners were conducted by the Reverend Andrew Byers of the Franklin Presbyterian Church.

The award winning Franklin Band, under the direction of Walter Hunter, played in concert for the more than 300 visitors who participated in the ceremonies.

Following the unveiling of the dedication plaque, the visitors toured the new addition and the museum mineral display and fluorescent room.

The Franklin Mineral Museum and Buckwheat Dump is open every day, except Mondays, until November 30th. Last year, the museum was host to more than 10,000 visitors."

Additional word on the subject came in a letter from Alice Kraissl:

"The dedication was a very nice affair - good weather, good attendance and the new wing is really a fine job. They plan to move all sales to this room, and have also taken on an extensive line of lapidary equipment and supplies.

Florence Hansen, bless her, is as active as ever and keeps everyone on their toes in keeping up with the high standards she demands in the museum operation.

Fred is chairman of two committees at the Museum. One a committee to plan the best possible uses of the new room, and the other an educational committee. The educational committee plans to present programs of taped lectures with slides, the first of which Fred has nearly completed. Dave and Kay Jensen very kindly supplied the originals of a slide program they had prepared for the Eastern Federation on the Nature of Fluorescence, and Fred made duplicates of the slides and is now making the tape to go with it. There is another program on the Physical Properties of Minerals, and a third which I can't remember, both of which the Jensens have also loaned for Fred to duplicate. These could be hooked up to run automatically at various times, and Museum and Dump visitors could stop in to look at the programs when interested.

It is also planned to investigate possible interest in a formal course or courses on Franklin minerals, and it is my pet hope to establish a micro group at the Museum for study of Franklin micros.

Of course this would mean a definite program to solicit annual memberships for the Museum, which would be quite in line with what the American Museum and Smithsonian do, and the planned activities would then be available to members."

Also good news for the Dump collector. The trustees of the Franklin Mineral Museum have approved the expenditure of $500.00 for the use of equipment to overturn the rock piles in the Buckwheat Dump. This work should be completed before the Annual Mineral Show in October.

THE FLUORESCENT CORNER

Golden Sphalerite

For our fluorescence fans, a new response has been noted for sphalerite from Franklin. The report comes from the Reverend Thomas Fitzpatrick of Syracuse, N.Y. His letter states:

"About three years ago I obtained a specimen of Golden Sphalerite from Franklin, N.J. The specimen measures 4" x 5" x 3" and the daylight color is a drab grayish black. Under Short Wave the piece fluoresces a strong orange, almost identical to Pectolite, but it has a strong phosphorescence. The specimen fluoresces a strong golden yellow under Long Wave, unlike any other Franklin material and it has a strong and persistent phosphorescence. The specimen also contains some willemite and cleiophane.

Ewald Gerstmann examined the piece a few months ago and remarked that it was the first piece he had ever seen. I obtained the material from Stanley Hocking, and he is aware of only two other pieces and said that the specimens came out of the mine about 100 years ago.

The material appears worthless in normal light, but it would pay anyone to keep their eyes open for such specimens when and if the opportunity comes up to obtain old collections."

Pectolite/Wollastonite

Final confirmation has been received that much of the specimen material previously called Pectolite (from Franklin) is actually wollastonite. A recheck of such specimens should be made. President Kozykowski advises:

"We have received additional word pertaining to the Pectolite/Wollastonite question. The most recent analysis again confirms the initial findings by Dr. Arnold Fainberg, that the white fibrous specimens of what we have been calling pectolite are not. They are wollastonite. Confirmation of Dr. Fainberg's findings was provided by Fred Parker (See The Picking Table, volume 16, number 2, pages 11-12). Subsequent analysis by Dr. Warren Miller and recent analysis by the Department of Geology at the University of Delaware support these initial findings."

"Do not forget that there is pectolite at Franklin. However, its appearance is quite different from our fiberous wollastonite."

NEW MINERALS

Bassanite/Tilasite

Fred Parker has contributed a very interesting letter including news of two new minerals for the Franklin-Sterling Hill area. We quote this letter. Complete details of these two species will be provided after the publication of the professional papers.

"I want to let you know of some very interesting finds I've been coming up with while working on authenticating my Franklin/Ogdensburg collection. I have confirmed 164 species using x-ray diffraction, probe, various chemical and elemental techniques and spectroscopic means. I'm about 75% through and suspect I'll find another five to ten species. In my work I have found two confirmed new species for Franklin-Ogdensburg which you will be hearing more about soon. The new species are Bassanite ($CaSO_4 \cdot \frac{1}{2}H_2O$) and a very exciting specimen of the rare arsenate, Tilasite ($CaMgFAsO_4$). I have identified both species and they were confirmed by Dr. Peter Leavens of the University of Delaware. We will be getting together shortly to write papers on these finds and you will get a copy for your "Picking Table"."

MINERAL NOTES

Rutile/Gold

We continue with the rest of Mr. Parker's letter:

"I came up with many remarkable finds and would like to tell you about a couple. The first is a specimen of Franklin marble, 2" x 2½", with edenite and some crude dravites. One face contains a remarkable rutile crystal, very shiny, about ¾" long, and well terminated. The other is a large calcite-franklinite slab cut by a vein of chalcocite, altered a bit to copper carbonates on the surfaces. These altered areas on one side exposed many fine spots and flecks of bright native gold. Some are large enough to be easily seen without a loupe and are nicely clustered. However, many tinier flecks are scattered over the surface making this a very significant gold piece. Gold confirmed by physical and acid tests. The specimen came up recently (mid or late June 1976) (from Sterling Hill).

I probably won't make the Kiwanis Show this year as I am returning to grad school for Mineralogy."

It always thrills me when our bright young collectors decide to pursue their education and take courses in Mineralogy. Even if they do not turn professional, they still sharpen their skills and become wiser and better collectors. In the field, we desperately need additional specimen mineralogists; in the hobby, we need and appreciate the educated informed collector. We extend our congratulations to Mr. Parker and wish him well in his studies.

Schallerite

Mr. Daniel McHugh of the Exxon Research Laboratories has submitted a paper covering his research on schallerite for publication in this Journal. We thank him for his thoughtfulness, and we do agree with his findings that schallerite is a much scarcer species than generally considered.

An Examination of the Species Schallerite

Daniel McHugh

The mineral schallerite $(Mn, Mg, Fe)_4 As_7 Si_3 O_9 (OH)_4$ is quite an uncommon species from Franklin. The following data should prove this mineral to be much rarer than previously thought.

After examination of a number of specimens labelled schallerite, very few have indeed proved to be that mineral. Twelve specimens were obtained for analysis including those from the collections of Messrs. Hauck, Gerstmann, Yedlin and Parker. The specimens themselves were a light pink to rose red in color. They were associated many times with green willemite and calcite. These samples were subjected to x-ray analysis using the powder diffraction method. In each case the pattern of the sample proved to be that of rhodonite and not of schallerite. A comparison was then run to establish any differences between this material and the type material from Franklin. The type material described by Frondel was obtained from Harvard and its pattern is totally different from the above twelve samples. This type material also differs in color and luster from the twelve. The confirmed schallerite was a darker red and had the "vitreous luster and waxy surface" described by Palache. An elemental analysis to further establish identity was done using the scanning electron microscope (SEM). The major elements in the twelve samples were manganese and silica with calcium, zinc and arsenic appearing only as traces. This data also shows these samples to be rhodonite with very minor impurities, calcium being the largest and that only as a trace.

Private communication with Mr. Parker tells that he has located and confirmed one specimen to be identical with that of the type material in the Harvard collection.

To the author's knowledge these are the only two confirmed specimens of schallerite. The author would also appreciate any other data from persons with schallerite samples and would especially like to know of anyone with data on the schallerite from Sterling Hill, on which the author has been unable to do any analysis."

Daniel McHugh,
Exxon Research Laboratories,
Building No. 16
1600 Linden Avenue
Linden, N.J. 07036

Fluoborite

Just a brief note from Jack Baum: "Abundant fluoborite was found by members at the last field trip to Bodnar's Quarry. This makes the third year in a row. This site is now said to be the finest locality in the world for this mineral."

THE STERLING HILL

We are again fortunate to receive information concerning recent mineral finds at the Sterling Hill mine. Contributing to this issue of The Picking Table is trustee Stephen Sanford. Steve had worked at Sterling Hill over the past several years and is presently working toward his degree in Geology at the University of Wyoming.

Recent Mineral Occurences at Sterling Hill

By Stephen Sanford

A number of interesting and beautiful specimens have surfaced since the March Picking Table last reported on new Sterling Hill finds.

During continuing mining operations in 1010 Longitudinal Stope, more native Silver appeared in a slightly different association than that mentioned in the last issue. Whereas the earlier material consisted of wire Silver developed in joint-related solution cavities within a chalcocite vein, the recent discovery displays Argentian films surrounding pyroxene grains in a calcsilicate body. This mass is contained within the ore at the northern terminus of the stope. While the chalcocite vein itself does not cut this horse of silicates, secondary mineralization follows a path that falls in a plane with the sulfide seam and must be considered a product of the same agent.

Something on the order of 40 meters to the South in the same stope, that veinlet system which produced the splendant, assymmetric franklinite crystals mentions in an earlier issue, has yielded more specimens. This time we see the stepped yellow prisms of Barite xls whose maximum dimensions reach 1 cm. In habit they resemble the barites of Elk Creek, South Dakota. Franklinite and rhombic carbonate crystals are associated. On one specimen a fine, reddish brown, 6 mm long crystal stands upended. It has been described as an orthorhombic pinacoid and is, presumably, a Mn Humite.

Both of the above discoveries were made as 1010 Stope reached the 700 foot level of the mine.

Decending down dip, still following this part of the ore body known as the East Branch of the West Leg, 1120 Longitudinal Stope is encountered. As mining neared the halfway mark between 1000' and 900' levels, two interesting minerals occurences were encountered.

Due to faulting of moderate displacement, gneiss common to the orebody's core has been cast into close proximity with the ore of 1120 Stope. In the shear zone of this fault a vein of Garnet was found which developed, when formed against calcite, as groups of greenish 5 mm dodecahedrons. Through x-ray powder deffractometry these crystals have been determined to have a composition intermediate between Andradite and Grossular.

Ten meters to the South, along another late hydrothermal vein, very fine Brandtite has crystallized in a series of small pockets. One of several good specimens displays crowding, white, free-standing Brandtite blades. They average about 3 mm in length. Scattered beneath the Brandtite are brown to pinkish 1 mm crystals occasionally seen clumped together by themselves. They are, as indicated by an initial series of x-ray powder patterns, probably Sarkinites.

Leaving the West Leg of the ore body, crossing the core, the East Leg of the ore body is encountered. Turning down dip to just above the 1400' Level at the junction of what is known as the Cross Member, 1570 E Longitudinal Stope is intercepted.

This working place is located in a rather complex area of the ore body. Heretofore, activities were directed along the Cross Member as it ran parallel to the East Leg. In recent months, operations have been extended into and South along the leg creating a horseshoe shaped working place. A large boudin or block of pyroxene within the center of this pecular stope has produced a number of unusually fine schorl Tourmaline specimens.

The Tourmaline occurred as jet black crystals up to 6 cm in length and rosettes up to 10 cm in diameter, in a seam of calcite up to 15 cm across which penetrated the pyroxene for a depth of one meter. Due to the effects of blasting only the smaller crystals survived intact. It is common to observe minor amounts of sphalerite and chalcopyrite in association.

The lowest portion of the mine, the kidney shaped North Ore Body, continues to produce a unique and distinctive suite of minerals.

Sussexite, in an unusual guise, has recently come from No. 3 Pillar about 2 meters below 2250 Level. Rather than the usual pods or veins, this new material is seen as deep pink to violet bladed rosettes, mostly about 3 cm across. This effect is due to the cleaving of spherical masses of Sussexite embedded in a dark, tough matrix. The color contrast in good pieces is quite pleasing.

In the same pillar, approximately 7 meters lower than the sussexite, occurred a 70 cm pod of hematitic calcite that indented both ore and hanging wall. The ore here was rich in Fe minerals and the hanging wall strongly infused with secondary hematite. A seam cutting obliquely through the lenticular mass carried finely crystallized hexagonal Pyroaurite (2 mm), delicate uispy balls of Mg-chlorophoenicite and golden mounds of a soft micaceous mineral. The latter has tentatively been identified as Stilpnomelane. All of the above species rise from a white carpet of minute acicular calcites.

While the quality of these recent mineral finds is gratifying, that they have been preserved at all is due solely to the efforts of a handful of mine workers. Of nearly twenty stopes and pillars now producing at Sterling Hill, the specimens noted come from only four. Nearly every working place has the potential to produce material of this quality. It behooves us to encourage and educate those who might continue with this effort. Only in this manner can we hope to preserve our singularly priceless mineralogical heritage — that which could so easily be lost for all time.

THE POST PALACHE MINERALS

A review of the Franklin/Sterling Hill minerals discovered or verified during the period 1934-1959 was started in the last issue of The Picking Table. In this issue we continue with Arsenic, realgar, orpiment, stibnite, johannsenite, and torreyite. Next, we propose to review the minerals Kutnahorite, manganpyrosmalite, pyrosmalite, magnussonite, hydrohausmannite, and woodruffite. Any information concerning the occurrence of these species at Franklin or Sterling Hill would be appreciated. Please write directly to Frank Z. Edwards, 726 Floresta Drive, Palm Bay, Florida, 32905.

Arsenic/Realgar/Orpiment/Stibnite

In 1941, Charles Palache, almost casually, announced three new minerals for Sterling Hill — arsenic, realgar and stibnite. Yet, to date, this has proved to be a one time occurrence and specimens of these species eagerly sought by collectors. The Palache paper was entitled "Contributions To The Mineralogy of Sterling Hill, New Jersey: Morphology of Graphite, Arsenopyrite, Pyrite, and Arsenic" and appeared in the American Mineralogist, volume 26, December 1941, pages 709-717. It dealt very completely with the occurrence of graphite cyrstals. The portion relative to the other minerals is quoted herewith:

"In May 1937 there were found on the 900 foot level of the mine at Sterling Hill, N.J., specimens showing an entirely new paragenesis for this locality. Samples were presented at that time to the Harvard Mineralogical Laboratory by Mr. L. H. Bauer, and repeatedly in the succeeding years the same donor has sent selections of carefully isolated crystals of the several minerals. Description of the material has been so long delayed because only recently were really decisive crystals of graphite found which finally solved the puzzle of its morphology.

The specimens consist of massive, coarsely crystalline limestone, with irregular impregnations of the following minerals: graphite, native arsenic, realgar, pyrite, aresenopyrite, diopside, and a few needles of either stibnite, or a lead sulphantimonide. Since all of these minerals are set free without sensible injury by solution of the limestone in dilute hydrochloric acid, an abundance of the crystals of most of them can be obtained with ease. Arsenic, realgar and the antimony compound are quite new to the Franklin region.

The chief interest centered in the brilliant scales of graphite which were found in considerable numbers in the solution residue. The scales range in size from minute specks to plates 2 mm. in diameter and 0.5 mm. in thickness. The base is extremely brilliant and the edges of the hexagonal plate show many facets. The details of their crystal form have already been presented. Most of the graphite crystals are distorted, having suffered from movements in the embedding calcite which has caused the development numerous gliding plane twin lamellae in both calcite and graphite. Occasionally, however, the graphite has escaped all distortion or at least shows only a simple twin lamella. The graphite crystals are generally quite free but may be partly embedded in arsenopyrite, in arsenic or in diopside.

Next in abundance and beauty of the isolated crystals is arseonpyrite. The crystals, while minute, are of amazing brilliance and perfection of form. They present few crystal forms but range in habit from needles of hair like fineness to stout prisms or flattened plates. In dimensions they commonly range from 0.5 by 1 mm. to 1 x 2 mm.

Pyrite, much less abundant in the residues than arsenopyrite, is present in model perfect crystals of varied habit.

Arsenic is present in but few grains and crystals. However, one was found to be measurable which yielded the forms c(0001), e(1014), f(2021) and p(0112).

Realgar is in rude prismatic individuals with ragged terminations which admit of no measurement.

Needles of an antimony compound have been mentioned. Too little was secured to enable its satisfactory determination.

Diopside is the most abundant of the residue constituents. It forms irregular clusters of round crystals, white in color and identified only by its optical properties, since the crystals were too ill defined to be interpreted.

In the writer's genetic classification of the Franklin minerals (Palache, 1929) a subgroup was set up called "pneumatolytic products" which was stated to be practically confined to the Franklin deposit. This new paragenesis appears to belong to this group and extends its range to Sterling Hill."

Realgar — It is quite evident that Palache's interest was primarily with the graphite crystals imbedded in the calcite. It is also probable that the specimens submitted by Dr. Bauer were all consumed by acid. At any rate, very few pieces of this occurence may be found in collections today.

In 1958, lo cal miners and collectors knew of only one realgar specimen then in the collection of Paul Chorney, formerly a chemist in the New Jersey Zinc Company laboratory. Since that time additional specimens have been found in old collections including three from the Billy Ball collection. Nevertheless, I believe that no more than ten specimens of realgar can be found in Franklin collections today. After his death, the Chorney specimen was donated by Mrs. Chorney to the Franklin Mineral Museum, where it may be seen on exhibit. It is approximately the size of an orange and the largest of the realgar specimens known.

Realgar (arsenic sulphide, AsS), is found at Sterling Hill as small masses and thin films on cleavage planes in calcite. The color is bright red and it is resinous in luster. It does not vary in appearance from massive realgar in other locations. In the dusty, dim light of the miner's lamp it is almost impossible to distinguish from zincite. How much of this material was ignored because it could not be recognized, we will never know.

Orpiment — I do not know of any orpiment specimens that came up directly from the mine. Realgar does alter to orpiment after exposure to light. The Chorney specimen in the Franklin Mineral Museum has been on exhibit for about three years. The last time I inspected this piece, in October 1975, at least half of the surface realgar had already altered to orpiment. It is probable that other realgar specimens have also undergone such alteration.

Arsenic has been found as isolated small blebs of dull black metallic on about half of the type specimens. The only noteworthy specimen of native arsenic that I have seen is in my own collection via Billy Ball. In this piece the arsenic breaks out through the surface of the calcite for an area of 1/2" x 1". Most of the material is massive but there are several small distinct crystals.

Stibnite is the rarest mineral in this assemblage. The micro needle crystals mentioned by Palache have been verified by x-ray as stibnites. The only specimens known are micromounts in the Alice Kraissl and David Cook collections.

It should also be mentioned that equally scarce and much unappreciated are the graphite crystals which so intrigued Dr. Palache. The entire assemblage seems to be a one time occurrence since no new specimens have surfaced since the late 1930's.

Johannsenite

From the September 1938 issue of The American Mineralogist, volume 23, number 9, pages 575-582, Walddemar T. Schaller author. "Johannsenite, a New Manganese Pyroxene". Portions of interest to Franklin enthusiasts are quoted herewith:

"Johannsentite, named in honor of Professor Albert Johannsen of the University of Chicago, is the manganese analogue of the monoclinic pyroxenes diopside and hedenbergite, with the formula $MnO.CaO.2SiO_2$, containing theoretically 28.68% of MnO. X-ray powder photographs show that it has the same structure as diopside and hedenbergite. (Later refined by Freed and Peacor (1967) to $4(CaMnSi_2O_6)$).

The new mineral has been determined to occur at the following localities: Bohemia mining district, Lane County, Oregon; at the Empire Zinc Company's mine near Hanover, New Mexico; Franklin, New Jersey; near Schio, Venetia, Italy; Campiglia, Tuscany, Italy: Tetela de Ocampo, Puebla, Mexico; Pachuca, Hidalgo, Mexico; and probably at Rezbanya, Hungary; Elba; and Algeria.

Johannsenite forms columnar, radiating, and spherulitic aggregates of fibers and prisms, generally of a clove brown, grayish, or greenish color, and in appearance resembles some grayish diopside and light colored hedenbergite. The presence of black stains of oxide of manganese however is indicative of the presence of manganese. The columnar and radiating prisms from Venetia, Italy, are several inches long and the greenish spherulites from Puebla, Mexico, are an inch and a half thick. The minute brown crystals from Franklin, New Jersey are embedded in bustamite.

At all of the occurences except Franklin, New Jersey, some of the johannsenite is in places changed to rhodonite and at Puebla, Mexico, the released calcium silicate has been redeposited as xonotlite.

In one specimen from Puebla, Mexico, the development of massive pink rhodonite embedded in the brownish and grayish johannesenite and as a pink border along the ends of the johannsenite prisms is very well shown. Some specimens from both Oregon and New Mexico have altered to impure black oxide of manganese, and in one thin section of the material from Mexico, long prisms of johannsenite have been replaced by calcite. Like many silicates of manganese, johannsenite is prone to incipient alteration, and oxidation, hydration, and carbonatization products are common.

Isomorphous mixtures of johannsenite and hedenbergite, known as manganhedenbergites, are not rare. Small quantities of the diopside constituent are usually present. Schefferite is dominantly diopside with Mn, Fe, and Mn substituting for part of the Mg, and CaO free components of the $Ro.SiO_2$ type are present to a small extent.

The bustamites have a different structure. They are of the wollastonite type, and are a homogeneous solid solution of $CaO.SiO_2$ (wollastonite) with $MnO.SiO_2$.

Bustamite with a 1:1 ration of MnO and CaO, is the high temperature modification, johannsenite the low-temperature form with the transition temperature about 830°C. Johannsenite, on ignition, inverts to bustamite.

In April 1960, John S. Albanese in his "Notes on the Minerals of Franklin and Sterling Hill" provided additional information on the occurence of johannsenite at Franklin. We quote:

"In the Nicholas Trofimuk collection were a few dozen fine specimens of johannsenite, some with radiated crystals almost two inches long. None of this johannsenite was imbedded in bustamite, as in the type specimen. This was an entirely different occurrence. All the johannsenite was in a matrix of axinite, crystalline and compact, with brown to yellow garnet, also in compact form, together with nasonite, clear green willemite, datolite, biotite and many other silicates peculiar to the Parker Shaft.

All the johannsenite showed a radial structure, the color was light gray to green, and a few showed a faint brown color. One specimen showed a blue color. Some of the johannsenite was translucent; only the blue johannsenite was opaque. In two specimens were single small cavities with minute individual crystals of johannsenite, terminated, standing upright in the cavity, and not radiated, and as micromount specimens, would surely win first prize at any show. These are at Harvard, and I have the third and possibly the last known specimen of individual terminated johannsenite crystals from Franklin, N.J. These crystals are white in a pure axinite matrix. No other association.

All of these specimens were found by Trofimuk in pillar 910 on the 900 foot level, 20 to 25 feet from the hanging wall."

In 1965, Dr. Frondel published a paper entitled "Johannsenite and Manganoan Hortonolite from Franklin, N.J." appearing in the American Mineralogist, volume 50, numbers 5-6, May-June 1965, pages 780-2. Evidently he used specimens provided by Albanese for his research. His report follows:

The occurrence of johannsenite, $CaMn(SiO_3)_2$, at Franklin as "minute brown crystals embedded in bustamite was noted by Schaller (1938). In 1952, johannsenite was found abundantly on the 900 level during the removal of pillar 910 adjacent to the Palmer Shaft. It occured as V shaped divergent fibrous aggregates up to 2 cm. in length. The color usually ranged from colorless or white to pale brown, rarely bluish green, or the terminal portions of the fibers graded from pale brownish into greenish shades. The johannsenite occured chiefly with massive granular nasonite and calcite that filled the interstices of a breccia composed of fine grained masses of andradite and fragments made up of manganophyllite (now hendricksite) with smaller amounts of calcite, franklinite, axinite, hancockite and willemite. The mangano-phyllite (hendricksite) aggregates generally have a reaction rim of fine grained andradite a millimeter or so in thickness. Neither bustamite or rhodonite is immediately associated, but bustamite occurred abundantly as coarse crystals in nearby parts of the ore body. Chemically, the virtually colorless johansenite analyzed lacks iron and has a much higher manganese content than the material of Schaller. An effort to obtain single crystal x-ray photographs from the microscopically subparallel groups of fibers was not successful; the fiber elongation is the c-axis and identity period is approximately 5.3 A. Schiavinato (1953) obtained a 9.81 b 9.02, c 5.26 A. B 105 on chemically similar material from Monte Civillino, Italy. The x-ray powder spacings are close to those reported by Hutton (1956) for material from Broken Hill, New South Wales."

Discussion: There have been two occurrences of johannsenite reported from Franklin (none from Sterling Hill). The first specimen of small brown crystals embedded in bustamite referred to by Schaller has not been duplicated. Either this was an isolated occurrence or else it has been overlooked by collectors and students. I believe that the latter case is likely and that a restudy of bustamite specimens from Franklin would reveal additional johannsenites of this type.

The second occurrence described by both Albanese and Frondel has yielded much more specimen material. The johannsenites from the Trofimuk collection were all sold by Albanese before I became a serious collector. I am sure these choice specimens are dispersed in international collections. None that I know of were acquired by local collectors. In the last 15 years, several johannsenite specimens have been found and catalogued. All of these were in the Parker Shaft material with the johannsenite occurring as small sprays, 1/4" to 3/8" long, a dull grey green in color. Yellow massive axinite is the common matrix. Collectors should check their Parker Shaft specimens for this type of occurrence.

Johannsenite is rated a scarce mineral for Franklin. Although it is not imposing in appearance, it is still desired for collections.

Torreyite

Included in his description of Mooreite, Charles Palache in Professional Paper No. 180, briefly mentions a variety called Delta-Mooreite. His description is quoted:

"A bluish white variety of slightly different composition was found in some of the crevices but not in crystals. The variety called Delta-Mooreite is bluish white and granular and its cleavage less perfect. Its specific gravity is 2.665; hardness about 3."

Later, Mooreite and Delta Mooreite were reexamined by newer and more sophisticated equipment by Joan Prewitt-Hopkins and found to be two distinct species — Mooreite and Torreyite. Her paper entitled "X-Ray Study of Holdenite, Mooreite and Torreyite" appeared in The American Mineralogist, July 1949, volume 34, pages 589-95. Re Torreyite she wrote:

"Delta Mooreite was first described by Bauer and Berman as a very basic, hydrous sulphate of magnesium, manganese and zinc, differing somewhat from Mooreite in ratios. It was also observed to be formed earlier than mooreite. It occurs only at Sterling Hill. No crystals have been found but an optical study indicated that is monoclinic. There is a good (010) cleavage.

When a powder photograph of Delta-mooreite was taken it was found to be quite different from mooreite. Thus, the two minerals are structurally unlike and are distinct species. A new name, Torreyite, is proposed to replace the name delta-mooreite. This in honor of John Torrey, 1796-1873, a natural scientist with special interests in botany, chemistry, and mineralogy. Naming the mineral for him seems appropriate as he was one of the earliest workers at Franklin, publishing a paper on franklinite, willemite and rhodonite in 1822.

The material used for x-ray work was from the type specimen and was checked optically by its specific gravity and spectrographically. The chemical analysis by Bauer follows: MgO 17.27; MnO 17.98; ZnO 26.30; SO_3 11.64; H_2O 26.39; B_2O_3 present; SiO_2 0.08; total 99.66%.

Formula for torreyite — $(Mg, Mn, Zn)_7 (SO_4) (OH)_{12}.4H_2O$ with Mg:Mn:Zn = 5:3:4. Monoclinic. Perfect clinopinacoidal cleavage.

Formula for mooreite — $(Mn, Mg, Zn)_8(SO_4) (OH)_{14}.4H_2O$ with Mg:Mn:Zn = 4:1:2. Monoclinic holohedral. Perfect clinopinacoidal cleavage."

In 1974, John L. Baum provided another description of the torreyite occurrence. We requote his findings:

"The Sterling Hill torreyite is rare, but is probably more abundant than the collector realizes because it does not attract attention to itself by occurring in coarse crystals, or being glass clear, or of an attractive color. It is likely, however, that a number of specimens exist unrecognized in collections and the purpose of this message is to lessen the chance of this rare mineral being overlooked.

To begin with, torreyite occurs in cavities in or adjacent to pyrochroite. Pyrochroite isn't too abundant but it does turn up frequently enough so that one should watch out for it and the less attractive specimens should be carefully inspected.

Having secured a pyrochroite specimen with lighter colored material mixed with the black, or with open cavities, or with a rotten porous appearance, the collector should examine the specimen for areas of milky blue white color especially on broken surfaces which are relatively dull. Crystals are elongate to chunky and some are compound, with a smaller crystal shape on top of a layer of identical shape on top of still another layer, like the step backs of a city as seen from above. Some pyromorphite also has an appearance like this when the crystals are viewed from the side. Three specimens were examined in this review of which one, a Bauer type specimen had clean cut compound crystals, one had so many smaller crystals it appeared granular like a cinder and the third displayed curved bands of torreyite showing obvious polysynthetic twinning in reflected light. The bands were a millimeter wide and seven millimeters long and a laminated succession of these made up much of this specimen from the Edwards collection.

The crystals examined in this study have a brownish coating or stain, and their sparkle depends on the amount of coating which dulls them. All three specimens exhibit platy pyrochroite and two showed the characteristic rhodochrosite-zincite-fluoborite association. One bore mooreite crystals.

The foregoing description is probably adequate to segregate a lot of the torreyite in collections but it may also inadvertently pick out mooreite which is more common in the pyrochroite association. Here is where optics come into play unless x-ray is available. The indices of refraction of mooreite are lower than those of torreyite, and mooreite crystals tend to show a diamond shaped section, to be glassy, and to be platy rather than chunky."

Discussion — While torreyite is unquestionably one of the rare minerals from Sterling Hill, I do agree with Mr. Baum that some specimens remain unrecognized. Torreyite is described as bluish white; however, like so many other manganese bearing minerals, torreyite is much more likely to have a brownish coating. In the pyrochroite matrix, brown black crystals become difficult to differentiate and the massive or vein material virtually impossible to distinguish. The specimens recently identified are well described by Mr. Baum. The major clues are the pyrochorite matrix, compound crystals not diamond shaped, occurring in clusters like stepped pyramids. Likely candidates should then be verified by optics or x-ray. Check your pyrochroite specimens carefully and bear in mind that mooreite is usually a younger associate.

Also a word of caution. All bluish crystals in a pyrochroite matrix are not torreyite. In November 1964, crystal specimens from the 2350 ft. level aroused considerable interest. The crystals were sky blue in color, 1/8" to 1/4" long, and sharp in outline. Because they did not darken quickly, claims were made for torreyite. However, in June 1965, a reinspection of some of these specimens revealed that they were darkening and a year later all of them were a glittering black and unquestionably good pyrochroite crystals. Not many specimens came up from this occurrence but I am sure that some remain in collections marked torreyite.

Torreyite has not been reported from any other locations, and remains on the Franklin-Ogdensburg exclusive list.

RESEARCH REPORTS

Roweite

Paper "Crystal Structure of Roweite $Ca_2(Mn_{0.52}Mg_{0.48})_2B_4O_7\ 6(OH)_2$" by N. A. Yamnova, M. A. Simonov and N. V. Belov. Soviet Physics - Doklady, volume 20, 1975, pages 264-6. Mineralogical Abstracts, volume 27, number 2, June 1976, page 133. Abstract as follows:

"Roweite from "Sologne" was examined. It crystallizes in the space group Pmcb, with a 8.290 (2), b 13,341 (3), c 9.009 (2), Z = 4. The formula given here corresponds to that given in a recent structure determination (M. A. 74-2475) but with a major substitution of Mg for Mn. The orientation here used is changed from the standard orientation of the previous structure determination by (001/010/100). The principal features of the structure, as previously reported, are confirmed and there is generally good agreement, e.g.mean Ca-O distance, Ca being in 8-coordination, is now given as 2.458, previously 2.462 A."

Note — The MA reference number cited is incorrect. The correct reference is to a paper by Moore and Araki — "Roweite — Its Atomic Arrangement", in the American Mineralogist, volume 59, numbers 1 and 2, pages 60 - 65 and The Picking Table, August 1974, page 18.

We have never heard of Roweite from "Sologne" or any other location other than Franklin. Can anyone enlighten us as to this reference?

The Rowe Collection

Reference has been made several times in these pages as to the Rowe Collection. While researching through my old journals, I came across the following description of this collection. I thought it would be of interest to our readers. Note that a number of species found only at the Sterling (Hill) Mine, Ogdensburg, N.J. are labelled Franklin. This article appeared in The American Mineralogist, August 1941, volume 26, number 8, pages 507-8.

The Rowe Collection

by Albert S. Wilkerson, Rutgers University, New Brunswick, N.J.

"Last October Rutgers University was the recipient of a locally well known collection of minerals. The donor was Mr. George Rowe of Rowe Place, Franklin, N.J. The Rowe Collection is now on display in the Museum of Geological Hall, Rutgers University. The Collection is of interest because of its many rare minerals and the large number of Franklin mineral species.

George Rowe was born in Cornwall, England, in 1868. At the age of eleven years he started to work in the mines near his home. He came to the United States when he was eighteen years old and obtained employment in the iron mines of Michigan and Minnesota. In 1906 Rowe became identified with the New Jersey Zinc Company of Franklin, New Jersey. Rowe was mine captain from 1906 until 1937, when he retired.

Although not a trained mineralogist, Rowe possessed a keen eye for rare crystal forms and rare minerals. Most of the specimens in the Collection were found by Rowe, although many were given to him by his associates, and a few were purchased from mineral dealers.

Many of the rare minerals were identified by L. H. Bauer of the chemical laboratory of the New Jersey Zinc Company at Franklin, and by Dr. Charles Palache. Palache acknowledges the Rowe Collection as one of the collections that furnished valuable data for his study of Franklin minerals.

Approximately 2400 specimens, consisting of 246 mineral species and varieties make up the Collection. Thirty States and twenty six foreign countries are represented. About half of the specimens are from New Jersey, 931 from Franklin. Of the 151 known species from Franklin, 129 are in the Collection. Roweite - a light brown, lath-shaped orthorhombic mineral, 5 in hardness, a hydrous borate of manganese and calcium - will soon be added. Mr. Rowe owns one of the three specimens named in his honor and has stated his intention of giving it to Rutgers. . . . .

HISTORY

The First Years of the New Jersey Zinc Company

John L. Baum

In 1852, A. C. Farrington, a mining engineer, set out to record in detail the early history of the New Jersey Zinc Company (and its predecessors) which at that time was a scant three years and eight months old. Farrington started with the mystery diggings at Sterling Hill, the origin of which has never been determined (other than mere speculation) and continued to provide a review of great value to historians. He relates that the charter of March 1848 was issued to the Sussex Zinc and Copper Mining and Manufacturing Company. In 1849, in order to secure more money and mining properties, a charter was obtained for the New Jersey Exploring and Mining Company. This action provided an additional $600,000.00. By the time of Farrington's report dated November 1st, 1852, these companies were consolidated into the New Jersey Zinc Company with a capitalization of $1,200,000. But, the venture now well on its way was to be continuously plagued in later years by law suits arising from Col. Sam Fowler's division of mineral titles.

Founders of the parent company believed that the abundant mineral visible at Franklin was indeed an ore and that it could be treated to produce a marketable product at a reasonable rate of profit. This had never been done before but they felt that money, talent, and patience would triumph. Mining, at that time, had a poor reputation and it was necessary to demonstrate reserves and methods to substantiate promises. Elsewhere treatment of zinc ores was limited to calamine and sphalerite, which had no bearing on the reduction of a mixture of zincite and franklinite, the only ore proposed to be treated.

Studies were made of European smelting methods but to no avail as attempts to use foreign procedures resulted in what Farrington called "serious embarrassments". And the problems were financial as well as metallurgical. Nevertheless, furnaces were erected as early as the Spring of 1848 and workmen set about separating the franklinite from zincite by use of magnetic machines in the plant at Newark, N.J. The ore was conveyed by cart from Franklin to the Morris Canal and then by barge to the Newark plant site. At Franklin, miners were digging the rich zincite bands and also exploring for additional reserves. By this time the entrepreneurs knew that they could find no help elsewhere and that they would have to rely on their own talents. The needs of the Company were no secret and to the plant came a parade of adventures and dreamers, all of whom were sure that they had a solution to the Company's problems, provided that they were granted a little time plus Company funds to develop their ideas. As Farrington relates - "One individual in particular was so far successful in his own estimation, as to propose undertaking the management of the Company works upon condition that a large portion of stock be transferred to him, with a permanent Directorship, absolute control of the manufacturing department, besides having his personal expenses borne, and a life annuity of $1,500. secured to his wife." His offer was rejected.

During 1849, experiments were continued at Newark and a product was successfully developed, remarkable for its purity. At Franklin, the distribution of the ore was being outlined and the Exploring Company previously referred to brought in additional ore reserves and capital. In late 1849, a 41.39 acre tract was purchased at Newark, about where the Penn Central Railroad Station is now located and the public was invited to subscribe to Company stock. On that site, a large commercial plant was built to replace the earlier experimental plant and expectations were that in 1850, the new products would be introduced. Alas, progress was slow as furnaces, bins, transport, machines, and the mixing and grinding of pigments, the Company's new business, all had to be developed from scratch. And, expenses exceeded cost estimates as a result of the delays, development and corrections.

Never before had zinc oxide been produced in commercial quantities directly from ore. Also, there was no market for the zinc oxide until its value as a pigment was demonstrated. Lead oxide was the paint pigment of commerce. It was inferior in quality; it was poisonous; it cost more per unit of area covered; but it was accepted. Through 1850 and 1851 development of machines, methods and products continued. Pigments were marketed where they could be seen by the public and tested by the trade. It was necessary to produce ready mixed paint, the first ever sold, in order to seek wider acceptance of the product. Not only zinc white but crushed ore and apparently even pulverized franklinite were also offered as pigments.

By 1852 the plant was working well, producing zinc oxide at 2½ cents per pound. Testimonials citing the superiority of this product were on hand and a successful venture was fully underway. Meanwhile, outside the plant door lay an ever increasing pile of franklinite - waste from the removal of the accompanying zincite. Experiments indicated that the zinc could be recovered from the franklinite and the iron as well. Sales of the zinc would pay much of the cost of the recovery expenses. Other companies then became interested and zinc ore sold at $30. per ton and the franklinite at $15. per ton. Mining and transportation costs to Newark ran about $5. per ton but there were plans to lower that cost and it looked as though franklinite minus zincite could also be mined at Franklin for sale to iron producing companies, further reducing costs.

There were great days in which the young company went from an ore outcrop of no proven value and the source of many past disappointments, through a trying period of original research and development, finally to the threshold of success with the promise of a market limited only by the ability to gain acceptance of a product that would be a blessing to the developing nation. As Farrington concluded "the progress and success of this Company can now only be impeded by mismanagement or neglect, and while we who have been concerned in the management of its affairs from the commencement can point with gratified pride to its present position, achieved by years of arduous labor and intense application, we feel well assured that in the future all our reasonable expectations will be fully realized."

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