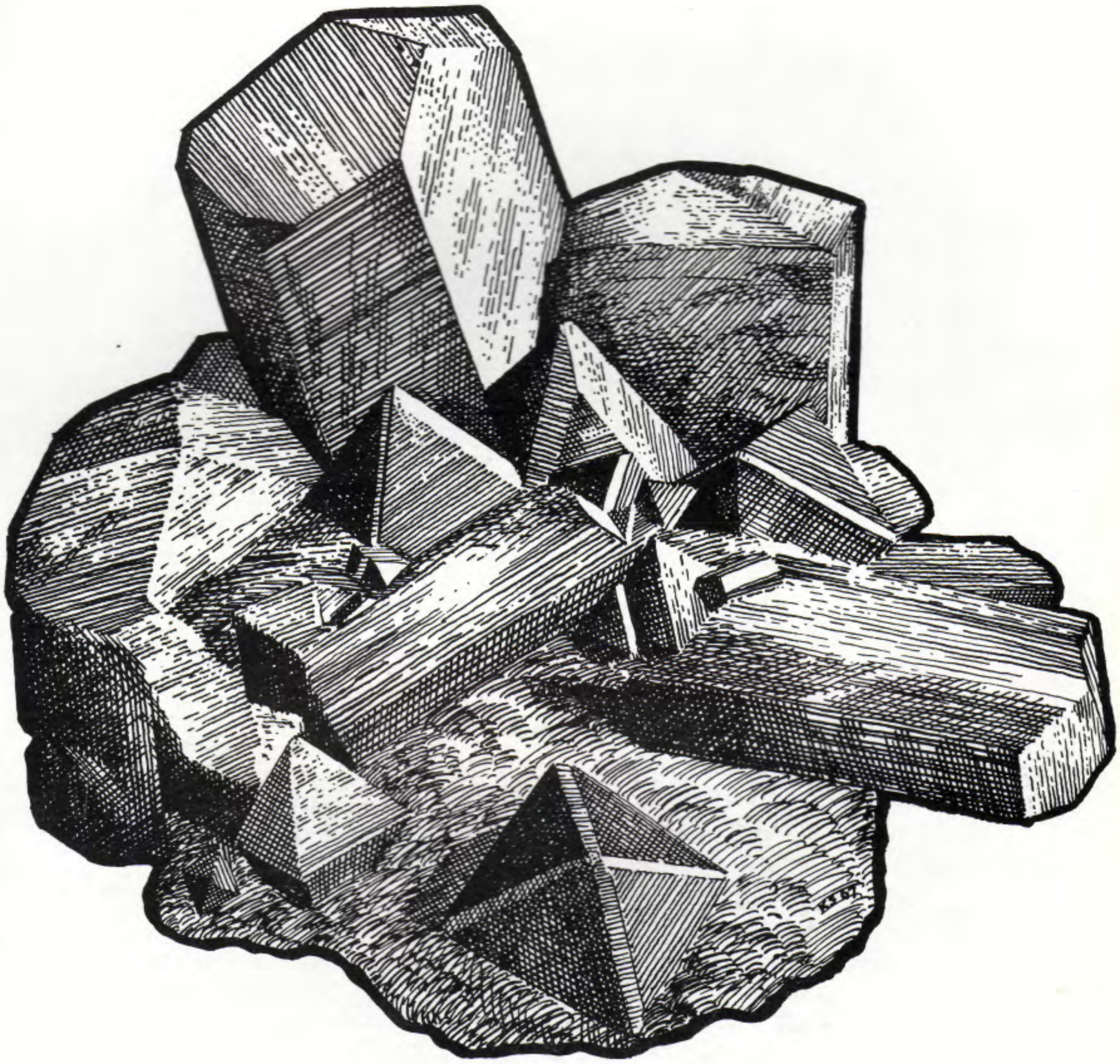
THE

PICKING TABLE



Journal of the Franklin-Ogdensburg
Mineralogical Society, Incorporated

Volume 23
Spring

Number One
1982

from the Editor

HEY PETE!

To DaD
peat
Dope
called
call him
back

I GOT THE MESSAGE.

AUTHORS WANTED - *Inquire Within*

Despite the fundamentally technical nature of this journal, it is quite apparent that much of the success we enjoy in the *Picking Table* can be attributed to the variety of articles we offer our readers. These articles do not, however, materialize from nowhere, they are contributed by people such as yourself.

In most instances, our technical assistance in editing, rewriting and graphics is offered only after an original draft of an article is submitted for publication. The reason for this is simple, we find unencumbered authors to be much more successful, which is ultimately reflected in the overall quality of their articles; the crossing of the *i's* and dotting of the *t's* has it's place later.

We welcome articles which are reasonably conformable with our interests as a Mineralogical Society. The diversity of our interest offers a broad range of subjects. If you have an idea for an article, let us know, if only for a bit of encouragement.

ADVERTISING *in The Picking Table*

Less than a decade ago the *Picking Table* was composed using ten point pica type on a manual typewriter and produced on a mimeographic copier. Today this work is done utilizing an IBM Composer and modern photo-offset techniques. These basic improvements have afforded us a very broad-based graphic potential. In this issue we have been able to approach that potential closer than ever before.

As you read ahead you will encounter a changing format utilizing many graphic forms: multi-type line work, bold-face headlines, pen & ink illustration, and half-tone photography designed to compliment the efforts of those who see fit to contribute to the editorial content of this journal. As we continue to improve those graphic techniques which prove successful, we will also be giving serious consideration to double column justification and, perhaps, a new changing cover.

This new flurry of improvement does bring with it, however, expendatures of time,effort and money. The demands of time and effort are being responded to with our desire to do so. The financial demands will be met with revenues derived from an advertisement program which we have undertaken with this issue.

The fee for each advertisement, as illustrated in this issue, has been established equal to the cost of a family membership in the Society: $10.00. We believe this to be reasonable in view of our limited circulation and frequency of publication.

We presume that advertisements will be aligned with Franklin-Sterling Hill interests. All advertisements must be provided to us "camera-ready." If practical, we recommend some sort of graphic portrayal in addition to straight line work.

The PICKING TABLE

Journal of the Franklin-Ogdensburg
Mineralogical Society, Incorporated

Features:

F.O.M.S. Notes

1981 - "What's been happening in Franklin?"

While looking forward to the year ahead we also glanced back over our shoulder at last year. There is something to be said for insight gained in retrospect, however, our purpose in doing so was much simpler, we thought it might be interesting to just look around and see where the dust had settled. In doing so we developed an interesting overview we feel you might find enlightening.

The year saw the announcement of two minerals, new-to-the-science, as being discovered at Sterling Hill, their respective names: sterlinghillite, for the locality, and, ogdensburgite, for the community. The highlight of our annual dinner was the presentation of the Lawson H. Bauer Award to John L. *(Jack)* Baum, curator of the Franklin Mineral Museum and retired resident geologist for the New Jersey Zinc Company at Franklin. Though it will remain in Franklin for the present, the Gerstmann mineral collection was sold. Four minerals: guerinite, hawleyite, ackrochordite and talmessite were reported for the first time from the Franklin-Sterling Hill mines along with the description of new occurrences of yeatmanite and hodgkinsonite. The F.O.M.S. regained access to the Rudeville quarries for field trips. The Sterling Hill mine, homestead of The New Jersey Zinc Company and last operating underground mine in the State of New Jersey was sold to a group of private investors. A new theory on the Genesis of the Sterling Hill Zinc Deposit was presented which fostered its own big question. The 25th Anniversary Franklin-Sterling Hill Mineral Show was a resounding success.

To fill in the gaps, our Society conducted 9 field trips, 8 lecture programs, an equal number of micro-mineral study sessions, our annual dinner, and participated in the annual Mineral Show by sponsoring the tailgaiting activities at the Franklin Pond, and arranged for the many exhibits and speakers enjoyed during the weekend, and, published two issues of this journal.

From day to day and week to week during the year, a great many people enjoyed the benefits of the Franklin Mineral Museum, the Buckwheat Mineral Dump, the Gerstmann Franklin Mineral Museum, and the Trotter Minera Dump.

MEMBERSHIP

The total number of members in our Society for 1981, based upon the total paid membership at the end of the third quarter of last year, has been set at 310. Though we do experience an increase in membership during the annual mineral show at Franklin during October, we have found that the September figures reflect a very close average.

Considering the fact that ours is a Society which is closely aligned with a particular locality, it is reassuring to note that in total members we number well above the average size of mineralogical societies nationwide.

We are now well into 1982. Treasurer Bill Trost advises usthat a substantial number of members are delinquent in their dues for this year. Are you one of them? If you are, we suggest you renew your membership at once. This issue of the *Picking Table* is being mailed to all of our members, at the request of our Treasurer, to encourage membership renewal. Delinquent members beware! You may never hear from us again.

THE TREASURER

Historically, our treasurers have served extended terms of office averaging three years, which is one year beyond the preferred sequence of just two one-year terms. This year, Bill Trost, will be completing his fourth year in the treasurer's office. Mr. Trost has advised us that he will be unable to serve in this capacity again next year. Accor ingly, he asked us to make this announcement, well in advance of next year, and requests that any member wish to serve the Society in this capacity next year,to please contact the President of the Society, so that a smooth tra ition may be developed before years end.

IN PASSING

Those of us who have worked with the Picking Table were particularly saddened last fall to learn of the passing of s. Louise Borgstrom. A Charter Member of the Society, Mrs. Borgstrom performed the typing and mimeographic rk during the first fifteen years of this journal. We also learned of the passing of another long time member of ne Society, former trustee Alex Knoll. Dr. Knoll was a chemist by profession who pursued mineralogy as an avocation. His deep interest in helping us to understand mineral identification is reflected in "Mineral Identification for Amateurs," a booklet he authored for our Society in 1966.

In Franklin, we learned of the passing of John Palsulich. He and his wife, Marge, have operated a small rock-shop in the basement of their home along Rt. 23 since the early days of the Franklin mineral show. A bit further north on Rt. 23, Stanley Hocking also operates a small mineral business from a shed behind his garage. We learned early last winter of the passing of his wife Cora.

I believe we all share in their sadness as we extend our deepest sympathy to each of the families.

THE 25TH ANNIVERSARY FRANKLIN-STERLING MINERAL SHOW

Last Fall's Annual Franklin-Sterling Mineral Show, sponsored by the Franklin Kiwanis Club, marked it's 25th year. That's quite a demanding milestone to be standing on as you look around to see where you are a quarter of a century later. From all points of view the concensus was the same. The 25th Anniversary Franklin-Sterling Mineral Show was, without doubt, the best "Franklin Show" to date.

Five years ago the Franklin show consisted of numerous dealers and local mineral exhibitors housed in the local State Armory. Shuttle busses provided convenient transportation to the nearby Franklin Mineral Museum and Buckwheat Mine Dump, which together offered several excellent mineral exhibits, a spectacular fluorescent mineral display, a unique guided tour through a replica of a typical underground working place in the now abandoned Franklin mine, and the opportunity to collect mineral specimens on the mine dump of the defunct Buckwheat Open Cut. Very little appeared to have changed in the fifteen years since the dealers and exhibitors had been moved from the former zinc mpany "Neighborhood House" to the then newly completed armory. Nonetheless, a change was occuring, despite virtues, the Franklin show was taking the same downward direction of many other mineral shows across the country. In realization of this trend, Show Chairman Tom Webb, with the full support of the Franklin Kiwanis Club Show Committee, enlisted the assistance of the Franklin-Ogdensburg Mineralogical Society, Inc. In concert, the two organizations not only stemmed this adverse tide of change, they countered it with a program of mutual support which has earned the "Franklin Show" a reputation as one of the best mineral shows in the country.

The 25th Anniversary Franklin-Sterling Mineral Show offered proud testimony to this achievement.

Planning for the Franklin show was actually begun during the previous year. Recent success with moving the show dates to the first weekend in October became permanent policy. This critical decision removed a major conflict with the popular "Detroit Show," and simultaneously placed the Franklin show in a more viable position to improve its attendance, attract new dealers, and encourage participation by prominent speakers. Publicizing the Franklin show began early in the year with the distribution of handbills at the famous "Tucson Show" in Arizona, followed by subsequent distribution at other mineral shows throughout the year. Listing the Franklin show in the calendars of the popular mineral hobby magazines played an important role. Just prior to the show, the emphasis was shifted to the local media, which generated a feature article in one of the regional newspapers.

Following a day which challanged the endurance and patience of everyone involved, the 25th Anniversary Franklin-Sterling Mineral Show, sponsored by the Franklin Kiwanis Club, opened its doors, at 9:00 a.m., right on schedule.

To mark the "silver anniversary," a very well composed commemorative booklet was included with admission to the show. William W. "Bill" Wurst, currently President of the Franklin Mineral Museum and Past-President of the Franklin Kiwanis Club, was responsible for this exceptional piece of work. The booklet provided an excellent look at the "Franklin Show" as it matured over the past quarter-century, noting many of the benefits we enjoy as a result of this show, such as the Franklin Mineral Museum and the Mine Replica, both of which have been sponsored by the Franklin Kiwanis Club. In addition to excellent photographs many of the people involved with the show over the years, the booklet also contained a list of the nearly 300 minerals found at Franklin and Sterling Hill, along with a separate list of those which are unique to these famous mineral deposits, and an additional list of the spectacular fluorescent species which have gained Franklin, New Jersey the title of "Fluorescent Mineral Capitol of the World."

The previous year's decision to change the show dates proved out, in addition to dealers from throughout the Northeast, the "Franklin Show" had enticed dealers from Arizona, California, Florida and New Mexico.

Movement of the mineral displays at the Armory from the main floor to a spacious adjacent exhibiting room, the introduction of contemporary exhibit cases, and a deliberate effort to encourage institutional participation in the show, produced outstanding exhibits from the American Museum of Natural History, the Gerstmann Franklin Mineral Museum, Harvard University and the Paterson Museum. The Harvard University exhibit is featured in a brief article later in this journal. A local theme, developed by Exhibits Chairman John Cianciulli, was exemplified by his display entitled "The 48 Mineral Species First Described from the Franklin and Sterling Mines." His efforts which included a complimentary list of these minerals with the year in which they were first described, by whc the reference, and formula, earned him first prize among the twenty exhibitors.

The rapidly growing interest in the micro-minerals of Franklin and Sterling Hill was met with an excellent Micro-Mount Exhibit and Demonstration provided by Russ deRoo of Totowa, NJ. This exhibit, without doubt the most popular of the show, included several micro-mount displays, microscopes set up for individual specimen viewing, a slide program projecting vastly enlarged photographs of micro-crystals on a screen for general viewing, and a fascinating display of SEM photomicrographs prepared by Tom Peters, Curator of the Paterson Museum.

Door prizes were awarded throughout both days of the show at the Armory, where people could enjoy a light breakfast or lunch in the canteen while they waited for frequently arriving shuttle busses which carried them to the many other "Franklin Show" activities.

First stop on the shuttle bus was the Franklin Mineral Museum which opened its doors with its remarkable mineral exhibits, spectacular fluorescent mineral display, unique mine replica, and mineral collecting on the Buckwheat Mine Dump.

Kraissl Hall, a recently added auditorium at the Franklin Mineral Museum, played host to a number of lecturers. This was one of many new attractions at the Franklin show, begun just the year before, largely through the fine efforts of Richard "Dick" Hauck. Those who attended the show enjoyed an excellent program of speakers with Carl A. Francis of Harvard University describing the long standing relationship between that institution and the mines of Franklin and Sterling Hill; New Jersey Zinc Company Resident Geologist, Robert "Bob" Svecz, employed at the Sterling mine, who presented an excellent talk, with slides, about "Mining at Sterling Hill Today"; John L. "Jack" Baum, Curator of the Franklin Mineral Museum and retired Resident Geologist for the New Jersey Zinc Company at Franklin, discussed the "Micro-Minerals of Franklin and Sterling Hill"; and, Richard C. "Dick" Bostwick, a well known collector of fluorescent minerals, who spoke on the "Fluorescent Minerals of Franklin and Sterling Hill."

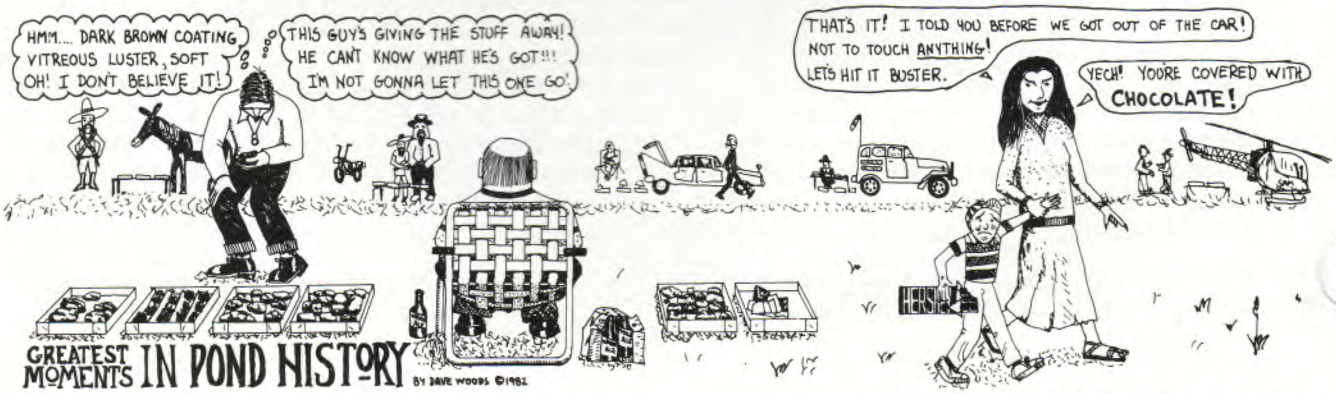
One of the most prominent stops of the shuttle bus circuit was the Franklin Pond, or just "the pond" as it is popularly known to people familiar with the Franklin show. It is here that "tailgaitors" gather to swap or sell mi- erals from the trunks of their automobiles or tailgaits of their trucks. This activity, sponsored by the Franklin-Ogdensburg Mineralogical Society, Inc. to benefit the Franklin Mineral Museum, was resurrected two years ago through the efforts of Mrs. Elna Hauck, following a ten year hiatus.

It is not uncommon to find proverbial "sleepers" at "the pond." This year lived up to expectations as one "tailgaitor" arrived with some very fine "old time" Franklin specimens which were quickly gobbled up at bargain prices. This happened on several occasions throughout the weekend as the gathering "rockhounds" cleaned-out their collections and rid themselves of duplicates from a successful field trip.

It is not just the minerals that attract people to "the pond" during the Franklin show. It is the camaraderie and free spirit enjoyed by the common man. It provides a place for old, and young, "rock busters" to meet and relax. A place within shot of the Franklin mines, a place where history can be distorted and dreams expanded into incredible fantasies. It is a place where the essence of the hobby thrives.

The next stop by the shuttle bus brought mineral collectors to the gate of the Trotter Mine Dump, where for an extra fee, they could enjoy collecting on the largest of Franklin's mineral dumps.

The final stop by the shuttle bus on its way back to the main show at the Armory was the Gerstmann Franklin Mineral Museum which contains the world renowned Spex-Gerstmann Franklin Mineral Collection, considered by many to be the finest collection of minerals from the Franklin and Sterling Hill.



to JOHN LEACH BAUM

The LAWSON H. BAUER Award

from presentation by Pete J. Dunn, Department of Mineral Sciences, Smithsonian Institution, Washington, DC 20560

"The mineral deposits at Franklin and Sterling Hill have been drawing people here for hundreds of years. Some came to study geology, some to study minerals, some to make new mining law, and others to record the local history. Many of those who contributed here were worthy, but most had a rather narrow range of interests, with a few notable exceptions. Because the people who contributed here came from all walks of life, they brought with them a diversity of talents; some were mediocre, some were average and a few were excellent. Tonight I wish to speak with you for a few minutes about one who excelled and continues to do so."

"Many years ago, a man came here to work for the New Jersey Zinc Company. He contributed to the local geology and mineralogy in many ways and retired as Resident Geologist a little over ten years ago. It would be interesting to continue to speak of an unnamed person and leave you wondering of whom I speak, but that is not possible in this part of New Jersey. This room is too small; this society is too small; indeed, this county is too small to permit that. I speak tonight of John L. Baum, affectionately known to most of us as Jack Baum."

Pete J. Dunn *(l)* presents Lawson H. Bauer Award to John L. Baum *(r)* at Annual F.O.M.S. Dinner.

"John Baum's career with the New Jersey Zinc Company is a matter of record, and his contributions to the geological and mineralogical literature are likewise carefully enscribed in the literature of science and this society. Choosing from Jack's contributions and trying to decide what to mention here is a difficult task. I have chosen to call to your attention his continued willingness to contribute after retirement and his diversity of interests."

"Many have come here, worked, retired, and left. Such is the normal sequence of events. Jack Baum did not leave. He has contributed to the sciences, to the community, to the county, and to this Society, in many diverse and wonderous ways. Not one to pack up and slumber, Jack has enriched our lives by contributing to them and to our heirs via the written word. There is more to come and we look forward to it with excitement and anticipation."

"What I would emphasize, however, is not just the strength and number of his contributions, but the extraordinary diversity of them. Most who have contributed here involved themselves in but one or two aspects of geology or mineralogy. John Baum has not had such limitations and his contributions span almost all possible domains. If one considers what were the needs, what were the contributions, and how we all benefited, then the breadth of Jack's gifts to us becomes quite evident."

"There was a need for leadership in this Society. He provided it and is *your leader.* There was a need for geology. He did it and he is *your geologist.* There is a need for local mineral expertise. He does it, and he is *your expert.* There is a need for the recording of local mining history. He does it and he is *your historian*. There is a need for geological expertise on County Commisions. He does it and he is *your civic-citizen.* There is a need for a teacher to lecture to the novice and experienced. He does it and he is *your teacher.* There is a need for a curator of devotion, He does it and he is *your curator*. The foregoing represents the aggregate contributions of a rare individual, one of very few who could correctly be referred to as a Franklin Rennaisance Man."

"Many years ago, this Society, cognizant of the fact that some who came here would contribute far more than others, instituted an award in recognition of such contributions. The award is known as the Lawson H. Bauer award, named after Lawson Bauer, deceased now some 27 years, after a distinguished career with the New Jersey Zinc Company. Lawson Bauer and John Baum knew each other and I am quite sure that Lawson Bauer would be pleased if he were here tonight."

"It is my honor that the Society has asked me to present the Lawson H. Bauer Award to John Baum, and I take great pleasure in doing so."

A Small Part of Harvard at Franklin

HARVARD UNIVERSITY EXHIBIT
Ernest A. Duck Photo - Hamburg, NJ

Many of the finest mineral specimens of their type from the Franklin and Sterling mines have found their way to Harvard University where they have played a leading role in assuring Franklin its place in the pages of mineral science. This recognition was secured largely at the hands of one of the world's most respected mineralogists, the late Prof. Charles Palache, who made his home at Harvard and the minerals of Franklin, New Jersey a major part of his life's work.

Last Fall, many of these unique specimens returned to Franklin, on exhibit, at the 25th Anniversary Franklin-Sterling Mineral Show, through the gracious effort of Carl A. Francis, Curator of the Harvard Geological Museum. Despite the incomparable character of each of these specimens, we feel several of them demand special mention.

(center-rear)	- Zincite - this specimen is pictured on Plate 3 of *USGS Professional Paper 180* by Palache. Its size *(4 cm)*, form, deep-red color, high luster and matrix are unusually well developed.
(center)	- Corundum - this specimen is pictured on Plate A of the *Minerals of Franklin and Sterling Hill - a check list* by Frondel. Exceptional size *(2.5 cm)* and classic crystal form.
(right-rear)	- Sphalerite - superb group of transparent oil-green crystals for which Franklin is famous.
(right-ctr.)	- Tourmaline *(uvite)* - this specimen is pictured on Plate 17 of *USGS Professional Paper 180* by Palache. Its hemimorphic form and dark-to-light-green multi-zoning are very unusual.
(right-front)	- Niccolite - euhedral crystals in vug *(solution cavity)*. Unique exposure of a rare mineral.

MINERAL NOTES

A Mineral New To Science

JAROSEWICHITE

In recent issues of the Picking Table we have been privileged to announce the discovery of over half a dozen minerals new to the scientific world; marsturite, kolicite, lawsonbauerite, hauckite, johnbaumite, sterlinghillite and ogdensburgite as being found at the Franklin or Sterling Hill mines. Advances in modern analytical science have fostered the announcement of yet another mineral new to science as having been found at the Franklin mine. We quote from recent communication with Pete J. Dunn of the Department of Mineral Sciences, Smithsonian Institution, Washington, DC 20560.

"We have a species new-to-the-science, from Franklin. It was what you formerly knew as carminite. Carminite is still a valid species, but not for Franklin. The new mineral is a complex managnese arsenate which is related to chlorophoenicite. It shall be known as jarosewichite (*pronounced* Yaro´se-vitch-ite). It has been named in honor of a great chemist, Eugene Jarosewich, Chief Chemist at the Smithsonian Institution, in recognition of his contributions to the analysis of minerals, most particularly to microprobe analysis and standards. The new species and the name have been approved by the Commission on New Minerals and Mineral Names, IMA."

"Subsequent to its formal description, further details will be presented on this new species in the Picking Table."

Research Reports

OGDENSBURGITE - $Ca_3ZnFe_6^{+3}(AsO_4)_5(OH)_{11} \cdot 5H_2O$

In the Fall 1981 issue of the Picking Table we announced the discovery of a mineral new to science as being found at the Sterling Hill mine, Ogdensburg, New Jersey. It was named ogdensburgite for the locality. The formal description of ogdensburgite has been published and the following abstract is quoted from the describing article entitled "Ogdensburgite, a new calcium-zinc-ferric iron arsenate mineral from Sterling Hill, New Jersey," by Pete J. Dunn, which appeared in the Mineralogical Record, Vol. 12, pp. 369-370, (1981).

Introduction

"In 1972 and 1973, some suites of secondary arsenate minerals were encountered in the Sterling Hill mine, Ogdensburg, Sussex County, New Jersey. Many of the rare arsenates known only from localities in Sweden, such as synadelphite, magnussonite, akrochordite, retzian, manganese-hoernesite and allactite, have been found at the Sterling Hill mine in recent years, and more species may be forthcoming. The assemblage described here contains three compounds which were referred to locally as pitticite. Two of these, one waxy in texture and the other as remnant laths after parasymplesite, are very likely related to pitticite or yukonite and are still under study. A third one, possessing a perfect cleavage and micaceous appearance, is a new species, here named ogdensburgite after the town of Ogdensburg."

"The new mineral and the name were approved by the Commission on New Minerals and Mineral Names, IMA. Holotype material is preserved in the Smithsonian Institution under catalog No. NMNH 146880. Cotype samples are preserved in the Spex-Gerstmann mineral collection in the town of Franklin, New Jersey."

Physical and Optical Properties

"Ogdensburgite occurs as thin encrustations of dark brownish red platelets, arranged with the direction of cleavage normal to the surface of the specimens. On all samples examined, the crusts are exceedingly (0.1 mm) thin, in some cases forming botryoidal knobs or protuberances. In hand specimen ogdensburgite resembles dark red velvet. This dark surface color is likely the result of oxidation; the true color is a very bright reddish orange. The streak is light orange; the luster is resinous on cleavage surfaces; the hardness (Mohs) is approximately 2; the density, determined with heavy liquid techniques, is 2.92 g/cm^3 (meas.). There is one perfect cleavage, easily developed but with undetermined orientation."

"Optically, ogdensburgite is biaxial (+) with 2V approximately 25°. The refractive indices are $\alpha = 1.765$, $\beta = 1.775$ and $\gamma = 1.800$ (all ± 0.005). Pleochroism is moderate, absorption X ⟨ Y = Z. Extinctions are undulatory; β and γ are in the plane of the cleavage. Ogdensburgite is not fluorescent under ultraviolet light."

Chemistry

"Ogdensburgite was chemically analyzed using an ARL-SEMQ electron microprobe. There was too little material for the direct determination of water. Ogdensburgite gave a strong reaction for Fe^{+3} by microchemical test and a very weak one for Fe^{+2}. Accordingly, all the iron was calculated as ferric. The formula must be considered tentative in the absence of the direct determination of water, or a crystal structure determination."

"Ionic radius considerations and the geochemical environment at Sterling Hill suggest that zinc may be essential to ogdensburgite. The preferred formula would assume limited substitution of manganese for calcium, and ideally appear $Ca_3ZnFe_6^{+3}(AsO_4)_5(OH)_{11} \cdot 5H_2O$."

"Ogdensburgite is chemically homogeneous and analysis of a cotype specimen (presumably from the same occurrence) indicated the composition is relatively invariant for the two samples."

X-ray Powder Diffraction Data

"No single- crystals of ogdensburgite were found. Those examined were of mosaic texture and unsuitable for single-crystal studies."

Occurrence

"Ogdensburgite was found in 1972 in the Sterling Hill mine, Ogdensburg, Sussex County, New Jersey. The specimens were reported to have come from the 960 stope at the 340 level of the mine. Ogdensburgite is associated with parasymplesite, koettigite, a mineral similar to pharmacosiderite, and several ill-defined ferric iron arsenates possibly related to pitticite or yukonite. These minerals encrust a low-grade willemite-franklinite-calcite-sphalerite ore which has been severely weathered. Ogdensburgite, together with the associated koettigite, may have been locally abundant, and at least a dozen specimens are estimated to have been preserved in public and private collections."

SCHALLERITE - $Mn_{16}Si_{12}O_{30}(OH)_{14}[As_3^{3+}O_6(OH)_3]$
CARYOPILITE - $Mn_8Si_6O_{15}(OH)_9(OH)$
FRIEDELITE - $Mn_8Si_6O_{15}(OH)_9Cl$

These three minerals were the focus of a recent scientific study by Pete J. Dunn of the Department of Mineral Sciences, Smithsonian Institution, Washington, DC 20560, Donald R. Peacor of the Department of Geological Sciences, The University of Michigan, Ann Arbor, MI 48109, and, Joseph A. Nelen and Julie A. Norberg of the Department of Mineral Sciences, Smithsonian Institution, Washington, DC 20560, the results of which appeared in a paper entitled "Crystal-chemical data for schallerite, caryopilite and friedelite from Franklin and Sterling Hill, New Jersey," which was published in the American Mineralogist, Vol. 66, pp. 1054-1062, 1981. The following abstract has been prepared therefrom:

Abstract

"Five chemical analyses of schallerite from Franklin, New Jersey, yield the new formula, $Mn_{16}Si_{12}O_{30}(OH)_{14}[As_3^{3+}O_6(OH)_3]$*. These data are consistent with arsenic present in stochiometric quantities. The schallerite formula can be derived from that of friedelite by the substitution of two O for two* (OH)*, coupled with the addition of* $As^{3+}(OH)$*. Schallerite is apparently not a true polytype of manganpyrosmalite. A second paragenesis of spherulitic schallerite in rhodonite is described in detail."*

"Caryopilite is reported from both Franklin and Sterling Hill. Both occurrences are arsenian: Franklin material containing from 1.2 to 1.4 percent As_2O_3 *and Sterling Hill material containing 5.1 to 6.9 percent* As_2O_3. *The limited As content is probably due to the presence of schallerite-like layers. Caryopilite occurs in rosette-like aggregates."*

"Friedelite from Franklin and Sterling Hill is shown to be the (OH) *analog of mcGillite inasmuch as both phases have the same layer sequence, with* $c = 86$Å, *but with considerable disorder in the sequence of tetrahedral layers. There appears to be a solid solution series between friedelite with compositions of* $Mn_8Si_6O_{15}(OH)_9Cl$ *and* $Mn_8Si_6O_{15}(OH)_9(OH)$, *but it is not represented by available analyses."*

Introduction

"Schallerite was discovered in early 1924 by R.B. Gage and was subsequently described as a new species from the Franklin mine, Franklin, Sussex Co., New Jersey, by Gage *et al.* (1925). It was later studied by Bauer and Berman (1928) who demonstrated a chemical relationship between schallerite and friedelite and, using type material, established that the arsenic reported as pentavalent in the original description was in fact trivalent. Bauer and Berman also noted a second occurrence of schallerite which they termed *schallerite type II*, while giving the designation *schallerite type I* to the original material."

Schallerite description

"Schallerite has been found in two parageneses in the Franklin mine but has not been found at Sterling Hill or elsewhere. Samples from each of the two parageneses are unique, suggesting that they occurred only in two localized areas. The first occurrence was noted by Gage *et al.* (1925) who mentioned that it was found at approximately the 700 level of the Franklin mine, but that no attempt was made to deliberately collect schallerite samples and much of the material was crushed in the mining process. The type material consists of dense, dark, reddish-brown layers of schallerite which occur on banded willemite-franklinite ore devoid of calcite. On all the samples we examined, the ore matrix is identical and the schallerite is deposited on a fracture surface at nearly right angles to the banding of the ore. Another feature common to the samples is the presence of a coating of slightly pinkish-white, botryoidal calcite. These three features (the identical ore, the parallelism of the angle of the ore bedding, and the identical calcite coating), further support the hypothesis that this was a very localized occurrence. The schallerite is 1.0 to 5.0 cm thick according to Gage *et al.* (1925), and the same is true of the samples of this study. The schallerite was deposited as a fine-grained massive material on the ore surface, followed by the deposition of a thin layer of calcite. Dissolution of this overlying calcite reveals a cellular corroded boxwork of schallerite at the schallerite-calcite interface. The dissolution, with dilute 1:1 hydrochloric acid, revealed schallerite crystals for the first time, only massive material having been previously described. The crystals are up to 2.0 mm in length and are markedly hemimorphic with dull [0001] and [000$\bar{1}$] pedions. Their morphology is similar to that of the related friedelite, but with a steeper pyramid. The schallerite crystals were positively identified using X-ray powder diffraction and Weissenberg and precession techniques. The schallerite crystals did not exhibit parallel growth but were randomly emplaced on the boxwork of the fine-grained schallerite. This schallerite is the kind described as *schallerite type I* by Bauer and Berman (1928) and by Palache (1935), but we discard this terminology because we show later that it serves no useful purpose. A scanning electron photomicrograph of one of these schallerite crystals is shown in Figure 1."

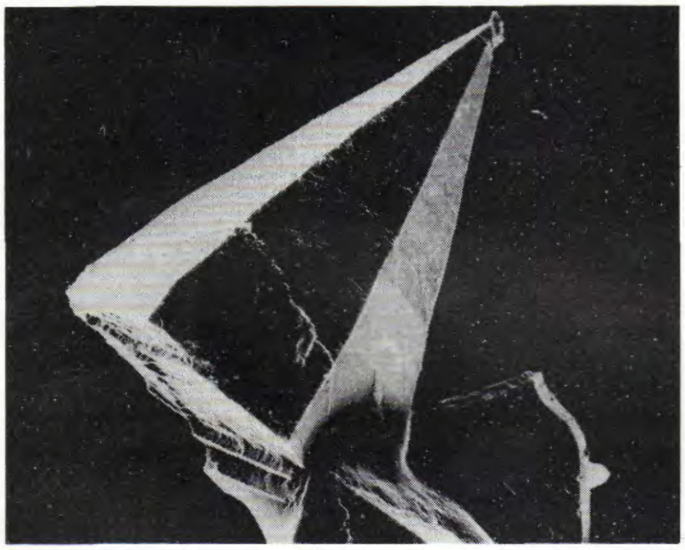


Figure 1. **Pyramidal hemimorphic crystal of Schallerite** - SEM photomicrograph

"The second distinct parageneses of schallerite was noted by Bauer and Berman (1928) but undescribed by them except for chemical analysis. It was known to them and Palache (1935) as *schallerite type II*, (Samples C5834 and S-G 1017). This second occurrence is quite rare; few specimens exist. There are two in the Smithsonian collection, two in the Harvard University collection, and one in the Gerstmann Mineral Museum in Franklin, New Jersey. We have no knowledge of what part of the Franklin mine it came from, and there is little evidence of the mechanism of emplacement due to the fact that little ore matrix is attached to the specimens."

"In this assemblage, schallerite occurs as spherical to slightly rectangular aggregates resembling "augens" in a fine-grained matrix of light pink rhodonite. The overall appearance of the specimens vaguely resembles that of a mylonite, which we use only as a descriptive term without genetic implications. A photograph of a representative sample is shown in Figure 2. The samples are layered;

the most obvious layered units are franklinite and non-contiguous layers of barite and schallerite (not shown in Figure 2). The bulk of the sample is composed of rhodonite and reddish-brown "augens" of schallerite, which are randomly distributed throughout the rhodonite. These "augens" are also found within the associated fi grained, bedded franklinite, but they are quite small (1 2 mm). These schallerite spherules are actually aggregates of schallerite crystals and rhodonite. The majority of them are coatings over angular, small fragments of barite, calcite, willemite or franklinite."

"In thin-section, the schallerite spherules are seen to be composed of many discrete crystals, each similar in morphology to those shown in Figure 1. The individual crystals are oriented so that their apices point toward the center of the spherule and their bases (pedions) form the outside of the spherule. Rhodonite is moderately abundant as micro-crystalline interstitial fillings between the schallerite crystals."

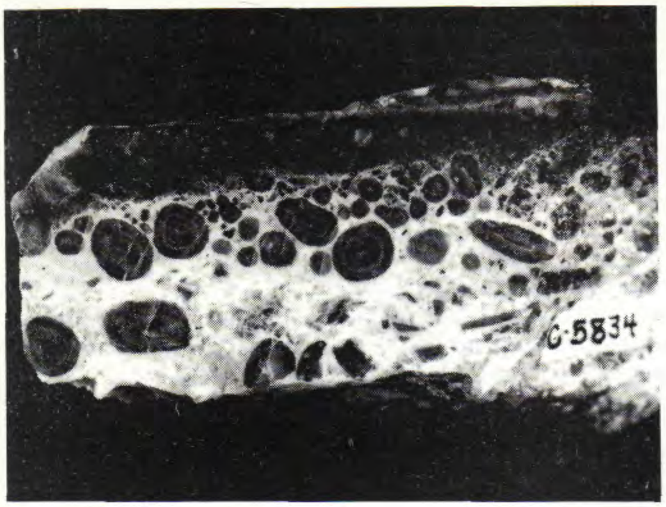


Figure 2. **Schallerite "augens"**

Caryopilite

"In 1978, Mr.Steven Sanford, Mr. John Kolic and Mr. Ewald Gerstmann submitted to us interesting samples of reddish-brown rosettes from Sterling Hill, New Jersey. The X-ray powder patterns of these rosettes matched that of caryopilite. We included samples of these and other rosettes in our microprobe analyses and found that they contained As. This led us to examine many specimens labelled schallerite or friedelite and, as a result, additional samples of caryopilite, from both Franklin and Sterling Hill, were found."

"The 'Sanford' caryopilite occurs as reddish-brown rosettes composed of hexagonal plates slightly offset from one another. Scanning electron microscope photc micrographs of these crystals are shown in Figure 3. Th individual crystals are composed of only prism and pinacoid or pedion forms."

"Caryopilite was recently shown by Peacor and Essene (1980) to probably have a friedelite-family-like structure rather than that of the serpentine family. We have obtained both chemical analytical and X-ray powder diffraction data for a number of additional samples. The X-ray patterns are quite distinctive and duplicate those of Peacor and Essene. Indeed we note that schallerite, friedelite, pyrosmalite and caryopilite all yield distinctive and unique powder patterns. The powder pattern of mcGillite is extremely similar to the pattern of friedelite, and will be discussed in a later section."

"The analytical data support the conclusions of Peacor and Essene (1980) that caryopilite is friedelite-like rather than being related to serpentine."

Figure 3. **Caryopilite crystals**

Relationship between mcGillite and friedelite

"McGillite was described by Donnay *et al.* (1980) as a chlorine-rich member of the friedelite family (*ideally* $Mn_8Si_6O_{15}(OH)_8Cl_2$) having a value of c = (85.66Å) which is four times that reported for friedelite. We present here both chemical analytical and single-crystal X-ray diffraction data which clarify the relation between friedelite and mcGillite."

"In conjunction with our study of schallerite we obtained analyses of a number of samples of friedelite from Frar lin and Sterling Hill. All of the analyzed samples yielded X-ray powder diffraction patterns in basic agreement w those of friedelite and mcGillite. Donnay *et al.* (1980) have shown that the patterns of the latter phases are "extremely similar.""

"Palache (1935) observed that there is a chlorine-deficient friedelite in addition to the more abundant chlorine-containing friedelite. Of our analyses none exceeds 3.4% Cl, as consistent with older analyses in the literature. This corresponds to the composition $Mn_8Si_6O_{15}(OH)_9Cl$. Considering all available friedelite analyses, the chlorine content thus varies from a maximum of one per formula unit to none, with apparent solid solution with (OH) to $Mn_8Si_6O_{15}(OH)_9(OH)$."

"Donnay *et al.* (1980) note that mcGillite appears to be characterized by ordered Cl relative to (OH), giving rise to the formula $Mn_8Si_6O_{15}(OH)_8Cl_2$, and they state that because of the composition difference due to ordered chlorine, mcGillite is not, *sensu strictu*, a polytype of friedelite. These relations carry the additional implication that it may be the compositional difference that leads to the difference in super structure, much as we propose above that the As^{3+} content of schallerite may be essential to the stacking sequence in that mineral."

"Certain so-called friedelites with low Cl-contents relative to mcGillite yield a mcGillite-like, relatively well-ordered superstructure. They therefore may represent a separate species with composition approaching $Mn_8Si_6O_{15}(OH)_{10}$. In addition, there is no really firm evidence for the existence of friedelite of these compositions having a value of $c \sim 21.4$Å. The friedelite may be the OH-rich equivalent of mcGillite, but simply with a superstructure of widely variable order. The latter interpretation is more probably the correct one."

Additional Information
on
SCHALLERITE and FRIEDELITE and CARYOPILITE

by

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The paper abstracted above is admittedly technical. The true chemical nature of schallerite has been the subject of much confusion and additional work remains to be done. The editor has chosen only those parts of the paper which are pertinent to the collector. This additional note is to provide additional information not published in the above-abstracted study, and to emphasize certain matters.

There has existed, in the collector community, much confusion as to which specimens are or are not schallerite. Most of this confusion has arisen from the mislabeling of rhodonite and friedelite specimens. A note to this effect was published by Daniel McHugh in The Picking Table, 17, 2, 4-5. Detailed examination of a large number of mislabeled "schallerites" by the present author confirmed McHugh's observations. All I examined were mislabeled rhodonite or friedelite.

There exist two parageneses for true schallerite and they are described in the above abstract. There are no others known.

Of special interest to me was a specimen in the Hauck collection consisting of dark red blebs in a fine-grained orange friedelite. It was called to my attention by Mr. Hauck because the material has been known to some as "schallerite" and was host for microcrystals of allactite. The combination of silicon, manganese and arsenic in the specimen warranted further investigation. This material was known locally as "the matrix for Franklin allactite." Additional specimens repose in the Spex-Gerstmann collection and in the Kraissl collection now in the Franklin Mineral Museum. There is no schallerite on these specimens. The dark red blebs are caryopilite and the orange, fine-grained mineral is friedelite. The author does not wish to examine additional specimens which might have been labelled schallerite. The above descriptions, plus the ready availability of specimens of both occurrences of schallerite in the Franklin area (at the Franklin Mineral Museum and the Gerstmann Mineral Museum) preclude the need of additional examinations.

HOLDENITE - $Mn_6Zn_3(OH)_8(AsO_4)_2(SiO_4)$

This mineral long considered unique to the Franklin mine was reported as occurring at Sterling Hill by Parker (1977). Subsequent occurrences prompted a study by Pete J. Dunn of the Department of Mineral Sciences, Smithsonian Institution, Washington, DC 20560, the result of which has been published in a paper entitled "Holdenite from Sterling Hill and new chemical data," which appeared in the Mineralogical Record, Vol. 12, pp. 373-375, (1981). The following is quoted from that paper.

Previous work

"Holdenite was first described by Palache and Shannon (1927) as a new manganese-zinc arsenate from Franklin, Sussex County, New Jersey. The original analysis was of admittedly impure material and the authors discounted the silica content as being due to admixed willemite. Holdenite was later re-investigated by Prewitt-Hopkins (1949) but the data she presented were corrected by Moore and Araki (1977) who solved the crystal structure, provided the new formula, $Mn_6Zn_3(OH)_8(AsO_4)_2(SiO_4)$, and gave new X-ray powder data. They proved that the silica reported by Palache and Shannon (1927) was indeed essential to holdenite, but questioned parts of the original analysis. To date there exist no good chemical analyses of holdenite and the present study was initiated to obtain such data and describe new parageneses of holdenite."

Franklin holdenite

"I have visually examined the type specimens in both the Smithsonian collection and the Harvard University collection. There is little to add to the original description except to state that they both have kolicite (Dunn *et al.*, 1979) as an associated mineral, in very small quantities. This kolicite appears to have formed subsequent to or at the same time as the holdenite. Kolicite was thus found in the Franklin mine some 50 years ago but its characterization awaited the Sterling Hill occurrence which provided very beautiful crystals."

Figure 1. Holdenite from Franklin.

"Yet another paragenesis for holdenite was noted by Charles Key of Sarasota, Florida. On Key's specimen, the matrix is a granular, slightly banded willemite-franklinite-rhodochrosite ore. The surface of the specimen consists of light orange willemite, followed in sequence by euhedral light green willemite and rhodochrosite, which in turn is followed by dull white barite. The last minerals deposited are light gray subhedral hemimorphite, holdenite and sphalerite. The sphalerite occurs as colorless, parallel, acicular crystals which appear to be overgrowths on rhodochrosite and holdenite."

"All holdenite seen previously has a glassy luster. Although Palache noted a weak cleavage, it is seldom evident. The above described holdenite crystals are quite unusual in that they are fibrous. Although there is fibrous sphalerite intimately associated with the holdenite, none was detected in holdenite during microprobe analysis, and no diffractions attributable to sphalerite were evident on a long-exposure X-ray powder diffraction pattern of holdenite."

"The crystals *(fig. 1)* are a very rich pink color, much lighter in hue than previously known holdenite. The habit of the crystals is highly irregular. There is no significant chemical distinction between this material and other holdenite specimens studied."

"Subsequent to the completion of the analytical section of this paper, a third assemblage for Franklin holdenite was found on a Smithsonian specimen which had been labeled "allactite." On this specimen. NMNH C6278, holdenite occurs as massive pink to orange material along a shear in franklinite ore. Zincite and barite are abundant and predate the holdenite. Sussexite and calcite are present in minor amounts and appear to be coeval with holdenite."

Sterling Hill holdenite

"Holdenite was identified in 1977 from the Sterling Hill mine by Fred Parker using the newly published X-ray powder diffraction data of Moore and Araki (1977). Given the fact that the new occurrence has provided hundr of specimens, and holdenite is now known from both Franklin and Sterling Hill, the apparent paucity of materi previous years may have been due to the older, erroneous X-ray powder data. Material from the recent find was widely dispersed; holdenite specimens now repose in many systematic collections."

Figure 2. Holdenite from Sterling Hill

"The Sterling Hill holdenite occurred in the 1340 and 1380 pillars, between the 1200 and 1300 foot levels of the Sterling Hill mine. Holdenite occurred on slip surfaces on rather rich willemite-franklinite ore which is notable for the absence of calcite. The holdenite also occurs in veinlets which cross-cut the ore-banding and as interstitial fillings in fractured willemite and franklinite ore. In this occurrence as interstitial fillings, the holdenite sometimes comprises up to 10 percent of the volume of some specimens. On samples where veins are evident, holdenite occurs in very small, highly irregular microcrystals *(fig. 2)* which bear little or no resemblance to the original Franklin crystals described by Palache and Shannon (1927). In massive material, fine-grained, randomly-oriented holdenite occurs in layers which alternate with layers of fine-grained secondary willemite. Kraisslite occurs within the massive holdenite as warped folia. On one specimen of Sterling Hill material, the holdenite is in contact with kolicite, a relationship to be expected in view of the close structural similarity of these two species (Peacor, 1980). The unique association among the many Sterling Hill specimens was noted by John Kolic."

"Application of the Gladstone-Dale relationship to holdenite using the constants of Mandarino (1976) yields a value K_c from the chemical composition of 0.191 for an average of values obtained from five analyses. This compares favorably with the value K_p of 0.188 from the refractive indices of Palache and Shannon (1927) and the observed density of 4.11 of Prewitt-Hopkins (1949). The campatibility of the data (Mandarino, 1979) is 0.016 indicating superior agreement."

Chemistry

"The holdenite samples studied herein were chemically analyzed with an ARL-SEMQ electron microprobe. The resultant data indicates that the composition of holdenite is remarkably constant and in excellent agreement with the composition derived by structural methods by Moore and Araki (1977). The magnesium reported in the original analysis is likely accurate. Indeed, none of the holdenite samples examined is free of magnesium."

SJÖGRENITE - $Mg_6Fe_2^{+3}(CO_3)(OH)_{16} \cdot 4H_2O$

PYROAURITE - $Mg_6Fe^{+3}(CO_3)(OH)_{16} \cdot 4H_2O$

A recurrence of pyroaurite at the Sterling Hill mine has revealed the occurrence of sjogrenite, its dimorph, for the first time. The paper describing this new occurrence, entitled "Sjogrenite on Pyroaurite from Sterling Hill, New Jersey," by Pete J. Dunn of the Department of Mineral Sciences, Smithsonian Institution, Washington, DC 20560 and Peter B. Leavens of the Department of Geology, University of Delaware, Newark, Delaware 19711 recently appeared in the Mineralogical Record, Vol. 12, pp. 371-372, (1981). The following is quoted from that article:

Sjögrenite on Pyroaurite

"Pyroaurite crystals have been found in the Sterling Hill mine in years past, and the aluminum analog, hydrotalcite, was found on old specimens from the Franklin mine several years ago."

"A new occurrence of pyroaurite was found in the spring of 1981 by John Kolic, a miner in the Sterling Hill mine. The specimens were found in the 1020 stope on the 1300 foot level. The vein assemblage described here coats willemite-franklinite ore containing abundant calcite. The secondary minerals on the surface of the specimen are tetrahedral crystals (2 mm) of light yellowish green sphalerite, white clumps of chlorophoenicite, light brown and dark green clumps of barite crystals, and small spherules of unidentified clays. The last minerals to form are acicular crystals of secondary willemite and pyroaurite. The pyroaurite crystals are white, opague, with pearly luster, and occur as "floaters" perched among willemite crystals *(fig. 1)*.

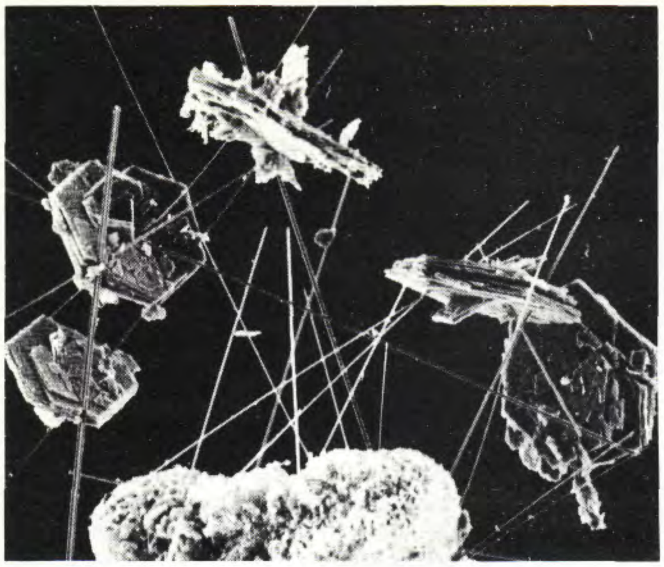


Figure 1. Pyroaurite on willemite.

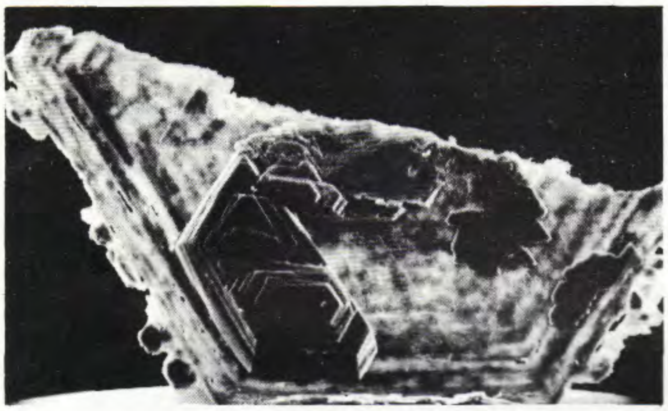


Figure 2. Sjögrenite on pyroaurite.

"Bright orange platy crystals were observed epitaxially overgrown on the white pyroaurite and were identified on the basis of X-ray powder diffraction and microchemical tests as sjogrenite, $Mg_6Fe_2^{+3}(CO_3)(OH)_{16}\cdot 4H_2O$, a dimorph of pyroaurite. Sjogrenite crystals encrust etched and slightly decomposed puroaurite crystals *(fig. 2)* and are quite sharp and euhedral, in co trast to the underlying corroded pyroaurite. The congruency of the symmetry is obvious from the photograph. Sjogrenite crystals are formed of stepped, platelike units which exceed the thickness of the underlying pyroaurite. Some smaller crystals were too small for testing, but appear to be composed of epitaxially oriented sjogrenite crystals on uncorroded pyroaurite."

"Parallel intergrowths of sjogrenite and pyroaurite from Langban, Sweden, were discussed by Frondel (1941). The minerals are prone to intergrowths because they are stacking polymorphs; sjogrenite is hexagonal (a = 3.113, c = 15.61Å) and pyroaurite is rhombohedral (a = 3.1094, c = 23.4117Å) (Allmann, 1968). Hence, it is not surprising that the two form oriented intergrowths. Indeed, Allmann (1968) suggested that one might expect mixed layer structures to form, but found none during his determination of the crystal structure of pyroaurite. Instead, he found intergrowths formed of an inner zone of sjogrenite and outer layers of pyroaurite. He attributed this pattern of intergrowth to decreasing temperature during deposition of the two minerals. Certainly in polymorphic transformations the high-temperature form commonly has the higher symmetry."

"In the present case, however, the relationship is sjogrenite on corroded pyroaurite, which would require rising temperature according to Allmann's model. There might be other chemical factors such a pH which could play a part in determining which polymorph is deposited, as is the case for calcite and aragonite in low temperature environments."

MAGNESIUM - CHLOROPHOENICITE - $(Mg,Mn)_3Zn_2(OH)_6[As_{0.5}H_{0.5}(O,OH)_3]_2$

CHLOROPHOENICITE - $(Mn,Mg)_3Zn_2(OH)_6[As_{0.5}H_{0.5}(O,OH)_3]_2$

Refined analytical data have been provided by Pete J. Dunn of the Department of Mineral Sciences, Smithsonian Institution, Washington, DC 20560 in a paper entitled "Magnesium-chlorophoenicite redefined and new data on chlorophoenicite," which appeared in the Canadian Mineralogist, Vol. 19, pp. 333-336 (1981). The following abstraction is quoted from that article.

Introduction

"Chlorophoenicite was first described from Franklin, Sussex County, New Jersey, by Foshag & Gage (1924); it was given a more comprehensive treatment by Foshag *et al.* (1927), who proposed the formula $10(RO)\cdot As_2O_5\cdot 7H_2O$, wherein R was essentially Mn and Zn with minor amounts of Ca, Mg and Fe. Additional data were given on the species by Bauer & Berman (1930); the crystal structure was solved by Moore (1968) who presented the structural formula $(Mn,Mg)_3Zn_2(OH)_6[As_{0.5}H_{0.5}(O,OH)_3]_2$."

"Magnesium-chlorophoenicite was first described from the Franklin deposit by Palache (1935) in his now-famous monograph on the Franklin and Sterling Hill ore deposits. He proposed the formula $10(Mg,Mn)O\cdot As_2O_5\cdot 7H_2O$ for this mineral, and noted that it was similar to chlorophoenicite except for the apparent substitution of magne for zinc. It was decided to investigate the compositions of magnesium-chlorophoenicite and chlorophoenicite because *(1)* neither species had been re-analyzed since the original descriptions and *(2)* the single analysis on the former mineral had been performed on admittedly impure material."

Integrity of the Type Specimens

"All of the studied specimens are from the Franklin orebody. The non-type samples are associated with manganese silicates, chiefly either leucophoenicite, hodgkinsonite or gageite, together with willemite, zincite and calcite. Sterling Hill chlorophoenicite is much more widespread in occurrence; it accompanies pyrochroite assemblages, and s associated with many of the numerous arsenates discovered since 1972. Indeed, at Sterling Hill, chlorophoenicite s likely the most ubiquitous arsenate mineral."

Analytical Results

Chlorophoenicite - "An examination of the data indicates that all chlorophoenicite samples contain some magnesium, and that the pure manganese end-member has not been found in nature. The CaO content of 3.36% reported by Foshag *et al.* (1927) is not confirmed. This high value was likely due to admixed calcite, which is abundant on the specimens. The compositions of the most manganese-rich samples conform to the structural formula of Moore (1968)."

Magnesium-chlorophoenicite - "The analysis by Gonyer (*in* Palache 1935) is clearly in error. Although there is some gross inhomogeneity in the type sample, it cannot account for the 29.95% MgO reported by Gonyer in his analysis of an admittedly impure sample weighing only 0.4g. An attempt to explain the extremely high magnesium content prompted analyses of the associated minerals. However, the associated willemite contains only 2.5% MgO; the associated andradite and calcite, which might have been present as impurities, contain even less. Hence, no precise determination can resolve the disparity between the old analysis and the new data, which range from 7.6 to 10.6% MgO. Although it may be fortuitous, it is interesting to note that if the MgO and ZnO figures of Gonyer are switched, they become 8.90% MgO and 29.95% ZnO, much closer to the composition of a magnesium-chlorophoenicite. These reversed figures also give good agreement between the new and old data for MgO inasmuch as the reversed figure (8.90) is in good agreement with the mean of 9.1% MgO obtained for the holotype sample. However, this is conjecture; it does not account for the zinc content (still too low) and does not rigorously explain the matter. One is left with a poor analysis which cannot be explained satisfactorily."

"Magnesium-chlorophoenicite is redefined as the magnesium analogue of chlorophoenicite. Re-analysis of the holotype specimen indicates that zinc is essential to magnesium-chlorophoenicite, and confirms the species relationship to chlorophoenicite."

"Among collectors, there has long been the assumption that the stout prismatic crystals of this series are true chlorophoenicite and that the extremely acicular, radiating crystals are magnesium-chlorophoenicite. Based on examination and semiquantitative analyses of a large number of specimens from both Franklin and Sterling Hill, this former distinction is found to be invalid. The specimens examined have widely varying parageneses. There is no correlation between the Mg:Mn ratio and the acicular or stout habit of the species. The extremely acicular habit may be related to some compositional variations, however, inasmuch as some acicular crystals do contain up to 0.8 weight % P_2O_5, presumably in substitution for As_2O_5."

"There are presently inadequate data to discredit magnesium-chlorophoenicite. The apparent ratio of octahedral cations clearly has Mg > Mn > Zn. The species should remain valid until a crystal-structure analysis of highly magnesian material can determine the actual site-populations of Mg and Mn, and validate or discredit the species. Magnesium-for-manganese substitution, although uncommon in most parageneses, is the rule and not the exception at Franklin and Sterling Hill; samples will likely be found in which Mg exceeds Mn."

BANNISTERITE - $CaKMn_{20}(Si,Al)_{32}O_{76}(OH)_{16} \cdot 12H_2O$ - *idealized formula*

New chemical data on bannisterite has been presented in a paper entitled "Bannisterite: new chemical data and empirical formulae" by Pete J. Dunn of the Department of Mineral Sciences, Smithsonian Institution, Washington, DC 20560, Peter B. Leavens of the Department of Geology, University of Delaware, Newark, Delaware 19711, Julie A. Norberg of the Department of Mineral Sciences, Smithsonian Institution, Washington, DC 20560 and Robert A. Ramik of the Royal Ontario Museum, Toronto, Ontario, Canada, which appeared in the American Mineralogist, Vol. 66, pp. 1063-1067, (1981). The following is quoted from that article:

Introduction

"Bannisterite was first found in the Franklin mine prior to 1933 and was described as an uncommon form of ganophyllite (Foshag, 1936). Subsequent examination of this material by Smith and Frondel (1968) established t as a new species, related to ganophyllite and the stilpnomelane group."

Sample descriptions

"At Franklin, bannisterite occurs as broad plates up to 6 cm in breadth with a dark brown color similar to yeatmanite and lamprophyllite. The bannisterite, with intimately associated barite and calcite, composes masses up to 250 cm^3. Other associated minerals are rhodonite, sphalerite, quartz, zincian amphibole, manganoan calcite, and several fine-grained manganese silicates which may be mixtures of bementite, caryopilite and some ill-defined manganese silicates."

Discussion

"Although the original analysis of bannisterite (Foshag, 1936) indicated many octahedral cations were present (Mn, Fe, Zn, Mg, Ca), the recent description of Broken Hill bannisterite by Plimer (1977) indicates Zn and Mg are non-essential. The abundance of Zn and Mg at Franklin in general, and the associated amphibole, explain their presence in bannisterite. The other elements reported for bannisterite may be essential constituents."

"Examination of the data indicates that Franklin, New Jersey, bannisterites are remarkably consistent in chemical composition. This might argue for a localized occurrence within the Franklin mine, but the associations and textures of the available specimens are too varied to support such an argument."

"Aluminum and calcium are present in bannisterite, except for the previously mentioned altered specimens, in nearly constant amounts. The rather consistent abundance of Ca, Al and (K and Na) suggests they are essential constituents. Their concentrations in terms of numbers of ions per unit cell approximate multiples of equipoints 4 and 8 as required by space group. Although Plimer (1977) has shown that Zn and Mg are not essential to bannisterite, and Threadgold (1979) has suggested, for Broken Hill material, that the octahedral cations are completely disordered, their concentrations in Franklin material in multitudes of 4 and 8 atoms per unit cell does suggest that Zn and Mg, together with Fe, might have preferences for certain sites in bannisterite. The role of Fe^{3+} is ambiguous. It is present in the four analyses in which it was sought and may substitute for aluminum or divalent cations, or may play some other role, as yet unclear. In all the bannisterites examined in this study, the dominant M^{2+} cation is Mn, but it is not known to exceed 50 of the reported 80 atoms per unit cell. Franklin bannisterite has an average M^{2+} cation content near $Mn_{12}Zn_2Mg_3Fe^{2+}_3$ and that of Broken Hill bannisterite is approximately $Mn_{11}Fe^{2+}_8Mg_1$. The calculated densities for the compositions are 2.8 g/cm^3 (Franklin) and 2.84 g/cm^3 (Broken Hill), in good agreement with the value of 2.83 g/cm^3 observed for specimens from both localities."

"If we assume the formula of Threadgold (1979) is largely correct, we derive a formula, on the basis of 168 negative charges, and with Al totally in tetrahedral coordination, of: $Ca_{0.86}(K_{0.82}Na_{0.11})_{\Sigma 0.93}(Mn_{12.21}Fe^{2+}_{2.92}Mg_{2.85}Zn_{2.0}$ $Fe^{3+}_{0.66})_{\Sigma 20.73}(Si_{28.53}Al_{3.05})_{\Sigma 31.58}O_{76}(OH)_{16} \cdot 12.2\ H_2O$."

LOSEYITE - $(Mn,Mg)_4Zn_3(CO_3)_2(OH)_{10}$ - *idealized formula*

The crystal structure of loseyite has been described by Roderick J. Hill of the CSIRO Division of Mineral Chemistry, Port Melbourne, Victoria 3207, Australia in a paper entitled "The Structure of Loseyite," which was published in Acta Cryst., B37, pp. 1323-1328, (1981). The following is quoted from that article:

Abstract

"Loseyite, $Mn_{3.48}Zn_{2.99}Mg_{0.53}(CO_3)_2(OH)_{10}$, from Franklin, New Jersey, crystallizes in space group $A2/a$ with a = 16.408 (7), b = 5.540 (3), c = 15.150 (4) Å, β = 95.48 (3)°, and Z = 4. The crystal structure has been determined by direct and Fourier methods."

Introduction

"The rare mineral loseyite occurs as transparent, white lath-like crystals elongated parallel to [010] and flattened normal to [100] in cavities and small veinlets in massive ore at Franklin, Sussex County, New Jersey (*Bauer & Berman*, 1929). Associated phases include altered pyrochroite, sussexite, chlorophoenicite and calcite. The crystal class and cell dimensions were determined by Wolfe & Frondel from X-ray photographs (private communication in *Palache, Berman & Frondel*, 1951). The only analysis reported by Bauer & Berman (1929) corresponds to the formula $Mn_{3.52}Zn_{2.88}Mg_{0.60}(CO_3)_2(OH)_{10}$, with Mn:Zn:Mg ≃ 1.0:0.82:0.17."

Experimental

"The mean ratio of Mn:Zn:Mg determined from seven spot analyses was 1.0:0.862:0.151, close to the ratio determined by Bauer & Berman (1929), and corresponding to the formula $Mn_{3.48}Zn_{2.99}Mg_{0.53}(CO_3)_2(OH)_{10}$. Howe individual elemental concentrations in different loseyite crystallites were observed to vary as much as 10% and i clear that the structure can accomodate a limited range of cation substitutions. No evidence was found for the presence of Fe or other elements in significant amounts."

Mine Captain George H. Rowe

by **John L. Baum**

One of the rarest minerals ever found in the Franklin-Sterling area of New Jersey is roweite described in 1937 by Harry Berman and F.A. Gonyer, both of Harvard University, in a paper published in *The American Mineralogist* and named therein after George Rowe, Mine Captain of the Franklin Mine. Berman was a Research Associate at the time and Gonyer was an analytical chemist. There was but a single specimen of roweite which Rowe offered Professor Palache for identification sometime prior to 1937. Remnants now reside in the Harvard and Rutgers collections.

George H. Rowe was born in Cornwall, England on December 24, 1868. His father, George Rowe, a merchant, was a lifelong resident of Cornwall. Son George went to work in the mines aged eleven. We can speculate on the reason for this departure from education, but it was common in that day and place, and George does not seem to have suffered from it. When he was eighteen he came to America because there were greater opportunities in the mining field, according to an interview he granted in 1926. In northern Michigan he worked in the iron mines and after what he described as a short time he was promoted to mine foreman, and he held this position until 1905 when he was 37 years old.

George Rowe was what was known in American mining lore as a Cousin Jack. Cornwall has been a mining area since Phoenician times when it was important in the Bronze Age. A favorite toast among the Cornish was "fish, tin and copper." So accomplished were Cornish miners that they were sought by mine managers in many countries. Emigration was vigorous in the mid 1800's, and periodic recessions in the local mining activities encouraged this in more recent times. Cornwall miners in America, whether in Nevada, Montana, Michigan or elsewhere sought positions for their male relatives, and since a predominant Cornwall given name was John or Jack, it was common to seek a job for one's cousin Jack, so common in fact that the title came to fit the entire fraternity. Adaptible, skilled in mining, always resourceful and a hard worker, the Cornishman was welcome wherever there was need to move hard rock. A good proportion of them achieved supervisory positions.

In 1905, George Rowe became a mine superintendent on the Mesaba Range in northern Minnesota. At this time, the New Jersey Zinc Company was seeking good men to supervise the consolidated mining of the several interests which made up the operation following the reconstruction of 1897. George Rowe was persuaded to leave his new position and to come to New Jersey in 1906 as Mine Captain. Henceforth he was to be known as Captain Rowe or in verbal shorthand Cap. Rowe. The position was one inherited from the Cornish mining industry and applied to the individual in charge of the shift bosses and reporting to the mine superintendent. His patrols covered the entire mine, although not necessarily in one day, and a good captain could do any job that the miners could do and as well or better, or loose the respect of the men and the bosses.

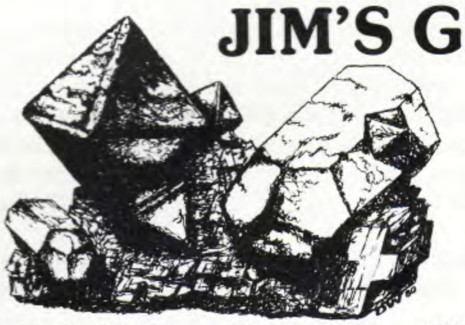
Captain Rowe had married Mary Harvey, daughter of a coal and lumber dealer of Iron Mountain, Michigan, in 1889 and all their five children were born in Michigan, three daughters and two sons. One of the girls died in the influenza epidemic of 1918 and the other two married Franklin men, one being Chief Irons, the one man Franklin police department. The Rowe home was situated on Rowe Place, a testimony to the Captain's position in the community of Franklin.

At Franklin Cap. Rowe was not long in becoming interested in minerals if indeed he was not already in the hobby. Palache's Franklin Furnace Folio was published that year and Rowe in his position at the mine was bound to come in contact with the visiting mineralogists. In 1914 he was sending specimens to Palache, as mentioned in his letter of May 11 which covers the express prepaid shipment of "that large biotite" crystal, two specimens of chalcophanite and an unknown pink mineral in crystals which following identification he would like returned. He offers also a good specimen of goethite. We can see from this that a firm relationship had been established which was to continue for many years.

There are a number of reasons why George Rowe was in a position to assemble an important collection which as mentioned in *The Picking Table, volume 17, number 2, page 11* was to number 2400 specimens, 246 species and varieties, 36 states and 26 foreign countries. From the area there were ultimately 129 of the known 151 species, many of them with identifications by L.H. Bauer or Charles Palache. There was as indicated Rowe's contact with important mineralogists. Restrictions that supposedly applied to collecting by miners never applied to those who collected for scientific purposes. An interest and dedication characteristic of the man applied as we to collecting minerals as it did to his mining career. And not to be overlooked was Rowe's - Captain Rowe's - position as boss of bosses and super-boss of the men.

Man is a social animal and has learned that the way to get along, and perhaps to advance, is to cooperate. There was a lot of cooperating going on underground and in the surface workings. Captain Rowe had the bosses as well as the men on the lookout for specimens, and preferably not just one of each kind. One miner related that when spectacular zincite was encountered, a special mining operation was organized by order from on high. He may have been mistaken as to the source of the order, as zincite was of interest in experimental work, but the order was not an isolated instance and there is no doubt concerning a brisk flow of specimens in Cap. Rowe's direction.

The Rowe collection went to Rutgers in 1941. The Captain had retired at the age of 68 in 1937, the year roweite was described, and he requested that the University would regard with favor applications for admission from such of his grand children as cared to apply. The Captain himself went to his reward not long after following a lifetime of service to the mining industry, to his community where he was active in banking, to his church, the school board, the volunteer fire department and numerous fraternal organizations, and to mineralogy. He will live forever in the unique mineral roweite and in the history of his community.



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Spring Program

FRANKLIN-OGDENSBURG MINERALOGICAL SOCIETY, INC.

1982

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
March 20, 1982

FIELD TRIP: *Mineral Exchange Program SWAP & SELL* - FOMS Members Only - Hardyston Twsp. School - 10:00 A.M. to 2:00 P.M.

MICRO-GROUP: *Hardyston Twsp. School* - 10:00 A.M. to Noon - THIS MEETING ONLY. Micro-mineralogy study sessions will resume at Kraissl Hall next month.

LECTURE: *A Casual Look at the History of Mining in Franklin and Sterling Hill* by John L. Baum, Richard Hauck and Bernard Kozykowski.

Saturday
April 17, 1982

FIELD TRIP: *Old Andover Iron Mines* - Limecrest Road, Andover, NJ - 9:00 A.M. to Noon.

MICRO-GROUP: *Kraissl Hall* - Franklin Mineral Museum, Franklin, NJ - 9:30 A.M. to Noon.

LECTURE: *Subject to be Announced* - by Mr. Robert W. Metzger, Geologist for the New Jersey Zinc Company, Inc., Ogdensburg, NJ.

Saturday
May 15, 1982

FIELD TRIP: *Buckwheat Mineral Dump* - Evans Street, Franklin, NJ - 9:30 A.M. to Noon.

MICRO-GROUP: *Kraissl Hall* - Franklin Mineral Museum, Franklin, NJ - 9:30 A.M. to Noon.

LECTURE: *Minerals of the Buckwheat Dolomite* - by. Mr. Thomas A. Peters, Curator of the Paterson Museum, Paterson, NJ.

Sunday
May 16, 1982

FIELD TRIP: *Limecrest Quarry* - Limestone Products Corp. of America, Limecrest Road, Sparta, NJ - Interclub Outing - 9:00 A.M. to 3:00 P.M.

Saturday
June 19, 1982

FIELD TRIP: *Franklin Quarry (formerly Farber)* - Limestone Products Corp. of America, Cork Hill Road, Franklin, NJ - 9:00 A.M. to Noon.

MICRO-GROUP: *Kraissl Hall* - Franklin Mineral Museum, Franklin, NJ - 9:30 A.M. to Noon.

LECTURE: *Subject to be Announced* - by Fred J. Parker, Exxon Research Corporation, Linden, NJ.

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 DAILY. No admission fee - Donations accepted - Mr. Ewald Gerstmann, Curator, in daily attendance.

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.

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MEMBERSHIP FORM

New Membership or Renewal

I would like to (apply for / renew my) membership in the Franklin-Ogdensburg Mineralogical Society, Inc. Individual membership payment in the amount of $7.00 is enclosed or Family membership payment in the amount of $10.00 is enclosed in lieu of individual membership. It is understood that family membership permits participation in all Society Activities. Receipt of the Picking Table will be limited to one per family.

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NOTE : Please add 50 cents per item for handling and postage - New Jersey sales tax of 5% is included below.

Frondel-Baum	The Structure and Mineralogy of the Franklin Zinc-Iron-Manganese Deposit, New Jersey *(reprint)*.	___	$1.84	______
Kushner	A Guide to Mineral Collecting at Franklin and Sterling Hill, New Jersey.	___	$4.50	______
Palache	**Professional Paper 180** - The Minerals of Franklin and Sterling Hill, Sussex County, New Jersey *(reprint)*.	___	$5.25	______
Shuster	Historical Notes on the Iron and Zinc Mining Industry in Sussex County, New Jersey *(reprint)*.	___	$1.05	______
FOMS	*The Picking Table* - Back issues by number - *Please note alternate choice.* NOTE: Vol. 18, No. 1 & 2, Vol. 20, No. 2 *(index)* and Vol. 23, No. 1 - $2.00 ea.	___	$1.50	______
FOMS	Lapel Pin or Lapel Button *(specify)* ______	___	$5.00	______
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NOTE: An FOMS Mineral Exchange Program directed by Richard C. "Dick" Bostwick, the purpose of which is to encourage the exchange of mineral specimens between members of the Society, will include an auction just prior to our lecture programs. Feel free to contact Dick at RD 1, Box 71A, Lebanon, NJ 08833, telephone (201) 735-7190, for further details.

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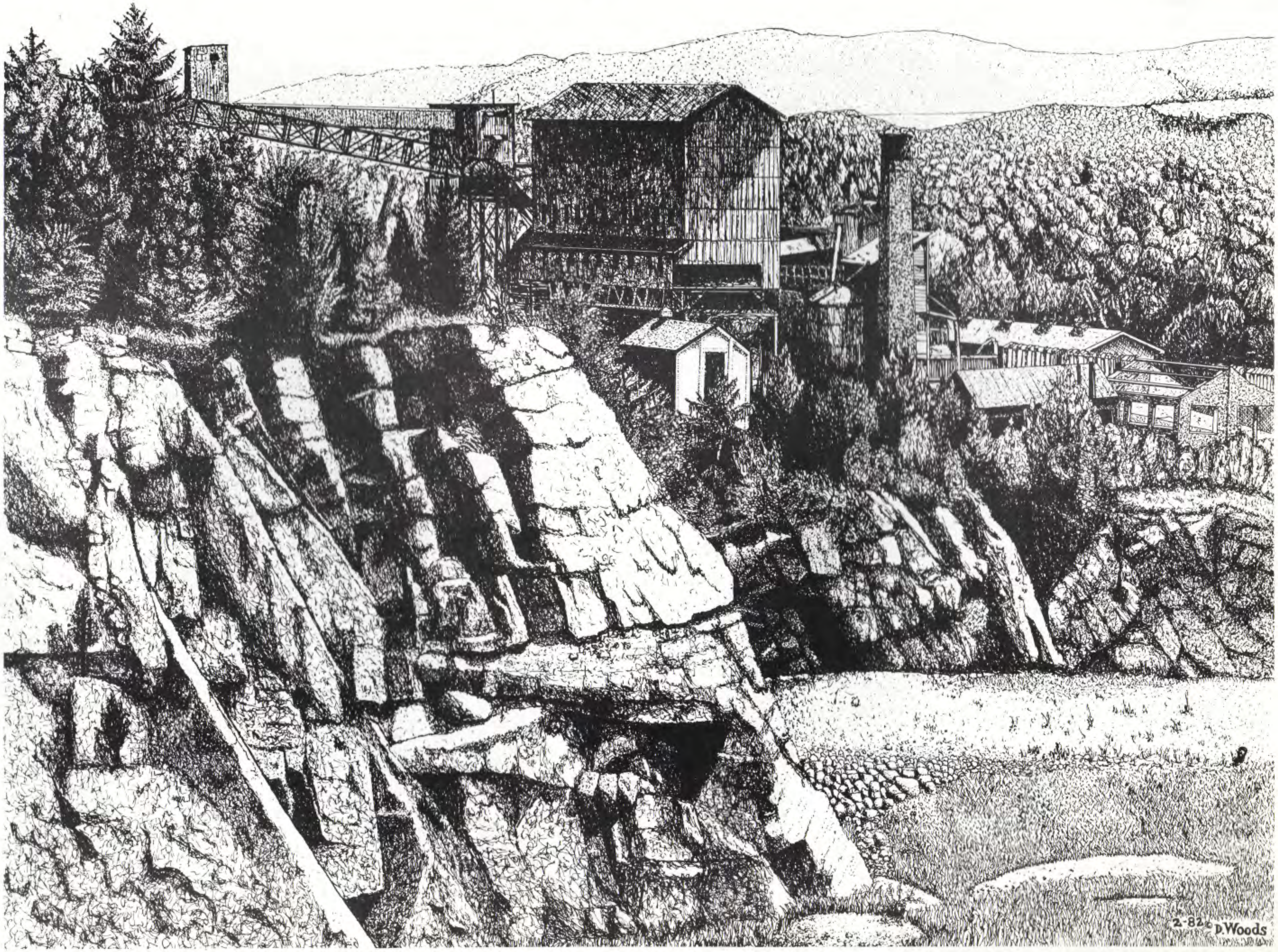
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