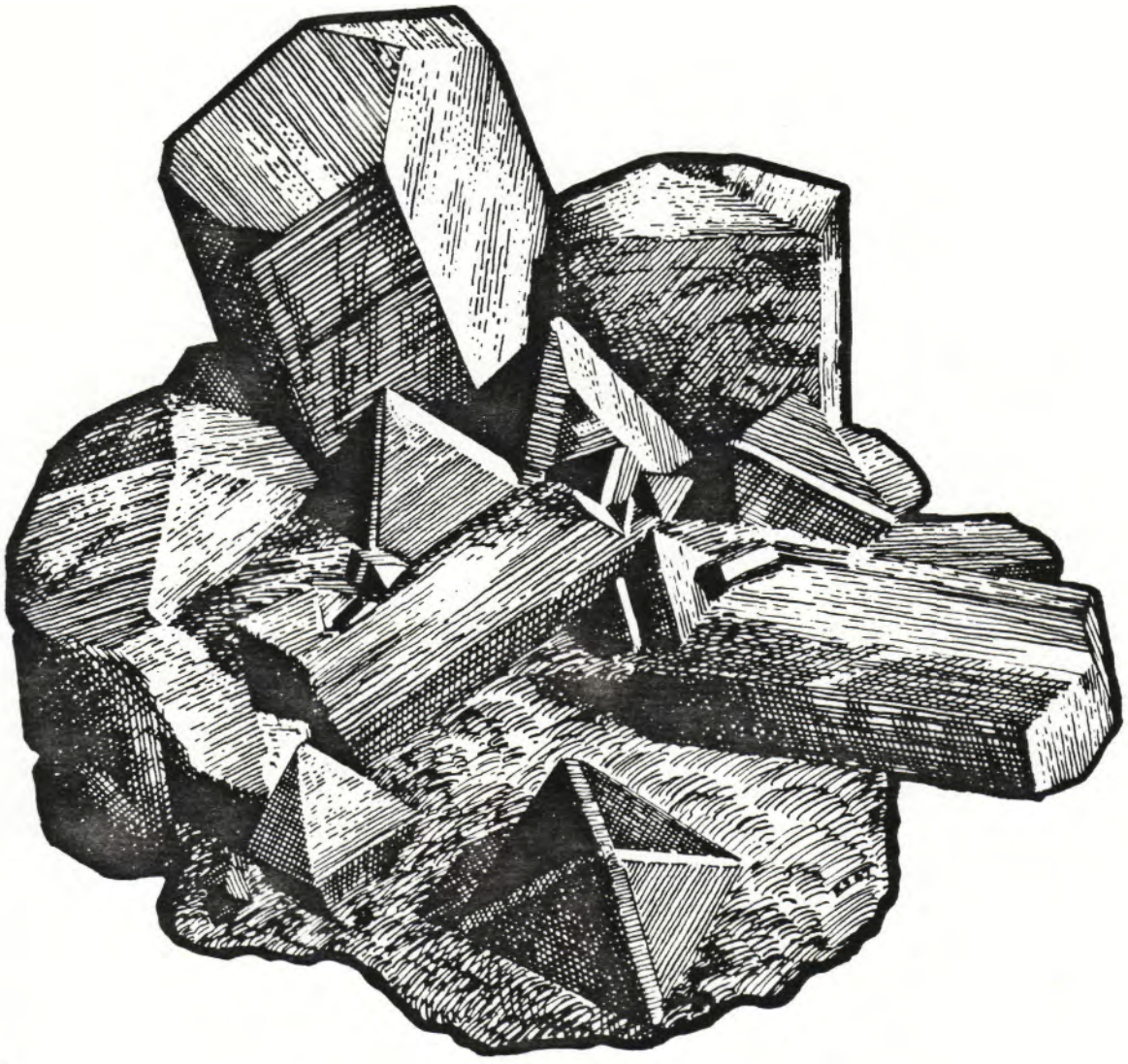
THE PICKING TABLE

JOURNAL OF THE FRANKLIN·OGDENSBURG MINERALOGICAL SOCIETY



Volume 16 AUGUST 1975 Number 2

CLUB PROGRAM — FALL 1975

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

Saturday, September 20th

Field Trip - Cellate Quarry, Cork Hill Road, Franklin, N.J. 9:00 A.M. to 12:00 Noon.
Meeting - 2:30 P.M. - Speaker Dr. Charles Sheer, Dept. Chemical Engineering, Columbia University.
Re: "The Rhodonite Deposits of Silverton, Colorado."

Saturday, October 18th

Field Trip - Old Andover Iron Mine (opposite Aeroflex Field) Limecrest Road, Andover, N.J. 9:00 A.M. to 12:00 Noon.
Meeting - 2:30 P.M. - Speaker Mr. David A. Cook, Harvard University.
Re: "The Hancock Collection"

Saturday, November 15th

Field Trip - Trotter Dump, Main Street, Franklin, N.J. 9:00 A.M. to 12:00 Noon.
Meeting - 2:30 P.M. - Speaker Dr. Peter Leavens, University of Delaware.
Re: "Chain Silicates in the Franklin Ore Bodies"

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Daily Franklin Attractions

Buckwheat Mineral Dump - Entrance through the Franklin Mineral Museum, Evans Street, Franklin, N.J. - Daily collecting fee.

Franklin Mineral Museum, Evans Street, Franklin, N.J. - Admission Charge

Gerstmann Private Mineral Museum, Walsh Road, Franklin, N.J. - Open weekends; on weekdays by arrangement. No charge, courtesy of the owners.

Trotter Mineral Dump, Main Street, Franklin, N.J. (behind the bank). Daily collecting fee.

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THE PICKING TABLE is issued twice a year; a February issue to reach members about March 1st, with news and the Spring program; and an August issue to reach members about September 1st, 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; the cover was designed by Mr. Kenneth Sproson.

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F.O.M.S. OFFICERS FOR THE YEAR 1975

President	Bernard Kozykowski, De Kay Lane, Livingston Manor, N.Y., 12758
1st Vice President	Robert Thomas, 802 Lindsley Drive, Morristown, N.J., 07960
2nd Vice President	Wilfred Welsh, 67 Lilline Lane, Upper Saddle River, N.J., 07458
Secretary	Jennie Areson, 21 Irwin Avenue, Middletown, N.Y., 10940
Treasurer	Rudolph C. Appeld, 8 Stockton Street, Hillsdale, N.J., 07642

TRUSTEES

Lee Areson '76
Bruce Barr '76
John L. Baum '76
Frank Z. Edwards '76
Ewald Gerstmann '75
Alice L. Kraissl '76
Frederick Kraissl '75
John E. Sebastian '75

Stephen Sanford '76 (alternate)

COMMITTEE CHAIRMEN

Auditing	Robert Thomas
Field Trip	John E. Sebastian
Historical	John L. Baum
Identification	John L. Baum
Museum	John L. Baum
Nominating	John L. Baum
Program	Frederick Kraissl, Jr.
Publications	Frank Z. Edwards, David A. Cook

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F.O.M.S. Notes

Field Trip Chairman John Sebastian and Program Chairman Fred Kraissl have completed arrangements for our Fall program. Repeat trips have been rescheduled for productive locations within the Franklin area. The speakers scheduled are the finest available and the topics to be discussed are of interest to all Franklin mineral collectors. Your attendance and participation are requested.

At our October meeting, the Nominating Committee, headed by Jack Baum, must present a slate of officers to head the F.O.M.S. during the year 1976. If you would like to nominate any member for office, please communicate with Mr. Baum, or verbally nominate your choice at the October meeting.

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The F.O.M.S. has joined the New Jersey Earth Science Association, a coalition of ten New Jersey Societies, and will participate in the August 1975 Show sponsored by that organization.

Alice and Fred Kraissl, because of commitments and assignments of others, were drafted as delegates and duly appointed by our President, Bernard Kozykowski, to this status and attended the meeting of the Association on Saturday, July 12th, 1975. A report by Fred Kraissl follows:

"Our Society, which for many years, has and still does consider its principle mission the promulgation of information and study concerning Franklin minerals, accepted, at the last Executive Board meeting, the invitation of the New Jersey Earth Science Association, Inc., to apply for membership and was voted unanimously into membership."

The following other Societies are members of this Association. The Bergen County Mineralogy and Paleontology Society, Inc.; the Delaware Valley Earth Science Society, Inc.; The Morris Museum Mineralogical Society, Inc.; New Jersey Lapidary Society, Inc.; North Jersey Mineralogical Society, Inc.; Rock and Gem Society of North Jersey, Inc.; Trailside Mineral Club, Inc.; West Essex Mineral Club, Inc.

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Some of our members have recently made positive contributions in spreading information re: Franklin minerals to other collectors. In describing the 1975 Tucson Gem and Mineral Show, Mr. William Moller of Long Beach, California had this to say:

"Fascinating talks by knowledgeable speakers punctuated the three day program. — — Of particular interest to mineral collectors were comments by Richard Hauck, who spoke on the "Minerals of Franklin, New Jersey". Mr. Hauck's efforts were supplemented by an excellent display in the exhibit area; this presentation included an unusually fine willemite from the famous Eastern locality."

This report appeared in the Mineralogical Record, May/June 1975, volume 6, number 3, page 142. Dick Hauck, our first President, is a fine speaker and tops as a Franklin collector and mineralogist. Those who know Dick are not surprised that he impressed the Tucson audience.

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An interesting article by Paul F. Bechberger entitled "Franklin Fluourescents - Their Invisible World" appeared in the Mineral Digest, volume 6, Winter 1974, pages 6-19. It featured and discussed specimens in the Franklin Mineral Museum, the Ewald Gerstmann Collection and Museum, and the Bechberger collection. The color photographs illustrating this article are particularly noteworthy. The color fidelity of the fluorescent specimens is the finest I have seen to date. Mr. Bechberger, a long time member of the F.O.M.S. is to be heartily congratulated for his effort.

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Congratulations are also extended to Fred Kraissl. His revised exhibit on "The Paragenesis of Franklin Minerals" received the Trophy for the Best Educational Exhibit and First Place in the Masters Class at the Eastern Federation Annual Show at Portland, Maine, in June 1975. For the edification of all Franklin collectors, Fred will display this exhibit at the 19th Annual Kiwanis Mineral Show, October 11th/12th, 1975.

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Mr. Joseph Warinsky was kind enough to send me a copy of the June 1975 Tel-News, an informational circular sent to all subscribers of the New Jersey Bell Telephone Company. A paragraph in this issue is of interest to our members:

"Rockhunter's haven — Amateur prospectors can hunt 200 different minerals found in Sussex County's Franklin Borough area in the town's Buckwheat Dump. Buckets and picks are provided and there's ultraviolet light equipment available to test the glow of fluorescent rock finds. The mine waste dump was named for the Buckwheat Mine of the New Jersey Zinc Company which operated from 1848 to recent years. A dollar fee (less for minor miners) covers admission to a mineral museum and a guided tour of a zinc mine replica. Hours are 9 a.m. to 4:30 p.m., Tuesday through Saturday; 12:30 to 4:30 p.m. Sunday. Call the museum (201) 827-3481 for more information".

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Franklin Mineral Show

The 19th Annual Franklin-Sterling Mineral Exhibit sponsored by the Kiwanis Club of Franklin will be held on Saturday, October 11th and Sunday, October 12th, 1975. 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.

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Farber/Limecrest Quarry

It is always interesting to receive John Sebastian's report on the annual field trip to Limecrest Quarry. This year's comments are more pertinent than ever:

"Our Limecrest trip this year was a huge success, with 576 collectors registered, the largest group we ever had. A few did stray from the regulation path, and, after being warned, were asked to leave. No accidents were reported, which is great. Later, I talked to Mrs. Ogden. She said the Board of Directors (of Limecrest) and Mr. Freas were very pleased with the report given them by some spotters who were present, particularly, a Mr. Hamilton. He went down into the Quarry with his wife and three small children, bypassing everyone. I spotted them on my second trip down into the Quarry and asked them when they came in and how they managed to get past the Registration desk. Mr. Hamilton claimed they just walked in. I then asked them to leave (they had no hard hats) but they just stood there. After a few minutes I again approached them and said that they had to leave immediately. Mr. Hamilton then said that he was an officer in the Limecrest Company. I said that might be so, but that on this date I was responsible and that he would have to leave. He looked at me, said okay and that he understood the situation and left. He later reported to the Board that

"the people that run this outing sure are strict and that they know what they are doing".

Some good specimens were found. I saw a 3/4" pyrite crystal in matrix; some nice pieces of blue corundum; a beautiful scapolite crystal cluster and the nicest sphene crystal group that I have seen from this Quarry. There were reports of other good pieces but I did not see them. Every collector seemed to be just happy to be there on this beautiful day."

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The Limestone Products Corporation of America, owners of the Limecrest Quarry did participate more fully in this field trip than ever before. After registering, every collector was given a one page informational bulletin providing geological and mineralogical data on the Quarry. This information is worth repeating. We quote

The limestone deposit being quarried is a detached mass of white marble limestone which is part of the Franklin limestone formation. The Franklin limestone is metamorphic in origin and dates back to the Pre-Cambrian era. The main band is about 22 miles long and from one-half to two miles wide extending northeast from Sparta, New Jersey into New York State. High calcium, or "calcitic", limestone and high magnesium, or "dolomitic", limestone are selectivity quarried on a daily basis depending on the desired end products. Bordered by the Kittatinny limestone formation to the northwest — a blue, magnesium limestone — and granite gneiss to the southeast, there are over 20 years of known reserves of limestone to be quarried at Lime Crest. The granite gneiss, which overlays the east side of the quarry, is also mined so every ton removed ends up as a final products.

MINERALOGY

A partial listing of minerals which can be found at this quarry location in addition to Calcite ($CaCO_3$) and Dolomite ($MgCO_3$) are:

CHONDRODITE-NORBERGITE — Both minerals are commonly found as shapeless grains and imperfect crystals imbedded in the crystalline limestones. CHONDRODITE is a reddish-brown to dark yellow, and NORBERGITE is a very pale yellow.

GRAPHITE — Abundent in the limestones. Soft, black cleavage scales and plates up to ½".

Several varieties of MICA are common — MUSCOVITE, BIOTITE, and PHLOGOPITE. Well formed crystals can be found embedded in the limestone.

SPINEL — Dark gray to black actahedral crystals 1/8" to 1/2" can be found in the limestones associated with MICA and CHONDRODITE.

The most common AMPHIBOLE found is EDENITE. Usually in solid masses of slender intergrowing crystals, it is white to bright green, to dull gray-green and can be confused with ACTINOLITE and TREMOLITE.

Black HORNBLENDE is found, both granular and in large complex crystals.

Purple FLUORITE is occasionally found in the limestone, usually in massive or imperfect isometric crystals.

The following varieties of PYROXENE can be found: DIOPSIDE, JEFFERSONITE (a brown variety found in the limestone contact areas), either in coarse, granular masses or crude crystals, and LEUCAUGITE, SPHENE, QUARTZ, CORUNDUM, RUTILE, PYRRHOTITE, PYRITE, SPHALERITE, ARESNOPYRITE, TOURMALINE, SCAPOLITE, GARNET (common in the granite gneiss), and various Feldspars.

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On March 7th, 1975, the following item appeared in the New Jersey Herald, the Sussex County, N.J. newspaper.

"Amalgamation of Farber White Limestone Co. and Limestone Products Corp. has been announced by the two local firms.

Dana C. Farber, owner of the Farber plant, said the transaction has been under consideration for some time. He said the merger was eyed as permitting "greater flexibility in meeting changing demands of industry, agriculture and lawn and garden markets."

Farber will be Vice President under the new arrangement. He said the Farber White Limestone Co., with operations in Franklin, Ogdensburg and Sparta will continue to operate under the same name with present management and employees. Milton Wolfenden will be President under the amalgamation and Sherred Willis, Executive Vice President. Both now hold the same offices with Limestone Products Corp.

During the past year, Limestone merged with Penn Virginia Corp. of Philadelphia, described as a holding company with varied interests in mining and related fields.

The 55 year old Limecrest Corp. has a 99 year lease with the Cox estate for rental of acreage where its plants are located on Limecrest Road in Andover, Sparta and Lafayette. Additional acreage owned by the Corporation borders Sparta and Lafayette.

The company recently completed a new blending plant for production of a stabilized road base.

Willis told a Sparta zoning board that the company was planning new operations and moving away from emphasis on agricultural products. He said the new road building material was reportedly stronger and more economical than crushed stone. Last year a bituminous concrete plant went into production.

Woolfenden was named President in 1964 after the retirement of Harry C. Bixler, son of one of two founders. Willis, associated with the company since 1951, moved from Second Vice President to Executive Vice President the same year."

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Franklin Mineral Museum

On October 9th, 1975, the Franklin Mineral Museum will celebrate its 10th birthday. In that short period this institution has become the premier attraction in the Borough of Franklin and a great source of pride to its citizens. It has also become essential to the Franklin mineral collector. The F.O.M.S. and its members are proud to be associated with the Franklin Mineral Museum and salute it on its 10th anniversary. We asked Jack Baum, first and only Curator of the Museum, to give us a history of the Franklin Mineral Museum to date. His report follows:

"The Franklin Mineral Museum was originated by the Franklin Kiwanis Club to boost the fortunes of the town of Franklin. Following the close of the Franklin mine in 1954, the area underwent a change from industrial to suburban and Franklin lost population for a number of years. People came to Franklin to collect minerals and once a year to attend the Kiwanis Mineral Show, started in 1956, and the Museum was founded as a permanent attraction adjacent to the popular Buckwheat Dump, a noted mineral collecting area.

The Founding Father of the Mineral Show and later of the Museum, was Ed Selems, and the success of the Shows encouraged the development of the Museum. Meetings were held and interested individuals were invited to contribute ideas. Kiwanis had earlier obtained the mine replica building in which it had installed the replica and a modest mineral collection which was originally a gift to the Franklin School, going later to the local Community Center, before it came to the Kiwanis Club. Land was obtained adjacent to the replica mine building and the Museum was on its way.

An architect and builder were engaged, a fund drive undertaken, and a mortgage negotiated. Display cases were built to order and mineral loans were obtained to fill the cases. The Museum opened and was dedicated on October 9th, 1965. Members of the Franklin Ogdensburg Mineralogical Society have been active from the start and the Museum owes much to their enthusiasm and generosity. The initial collection was that of Mrs. E. Packard (Sonny) Cook, donated to the Mineral Society and later presented to the Museum. It is rich in the number of species and in fluorescent specimens.

About halfway through the first ten years, it became obvious that more space was needed. The mortgage was renegotiated and the building enlarged by the fluorescent display, needed storage space and additional lobby area. Arrangements were also made to operate the Buckwheat Dump for the Borough of Franklin and improvements were made to that attraction as well.

Operation of the Museum is financed through admissions and sales, and the mortgage is paid by the Kiwanis Club from proceeds of the Annual Mineral Shows. The Museum could not operate without the dedicated staff and the generosity of those who have given or loaned specimens as well as the consideration of those who have made available through purchase, often at very low prices, specimens for acquisition or resale. Florence Hansen is known to all who have visited the Museum and as Manager she has devoted nearly all her time to the venture. Space prevents acknowledgement of all who have contributed their time to the operation; either paid or volunteer including Trustees of the Corporation. The venture owes them a great debt.

Collections or display items continue to be received. Among them, in no special order of merit or priority, some as gifts and others through purchase or loan are the following: The Kraissl-Lemanski comprehensive wall display; the Kraissl collection of mounted gem stones; the Kraissl prize winning collection of micromounts; the Convery and Haight mining diagrams; the Lord Stirling indenture from the Sussex County Historical Society; the Cherepy historical items; the Hauck miniatures; the Hauck mine lamps; the Hauck coppers; the Hauck specimens and photos; the J. B. Gouger, Jr. specimens; the Bolitho-Gouger wall display; the Edwards Palache specimens and 21 identified mystery minerals; the Phillips fluorescent artwork and the new mineral they discovered; the Fisher specimen memorial to Bauer and Ball; the Prall specimen memorial to Ross and Prall; the Smith specimens; the Klem specimen; and the Chorney memorial collection. Other names to be seen are Knoll, Frondel, Down, Chapman, Sheldon, Sedlock, Leonhard, Merics, Clyne, Riebman, Anderson, and the New Jersey Zinc Company.

Important purchases of sales material of quantity and generally of quality, from which specimens may have been selected for display, include the following: The Hauck-Hendricks specimens; Hauck calamine and fluorescent bulk; the Jack Rowe collection; the Gouger-Dolan material; the Totten and Melson collections; the Edwards specimens and bulk material. In addition, Alice Kraissl has made available specimens in quantity from numerous collections which she has acquired in the process of upgrading her own collection and that of the Museum. Fred Kraissl was an important contributor to the fluorescent collection.

Executives of the Museum corporation have rendered distinguished service. The Presidents have been Ed Selems, Alfred Littell, Fred Kraissl, Robert Meyers and Warren Walters. Under the guidance of these men continued improvement has taken place, a favorable tax status as a New Jersey Historical Site was established and with the encouragement of Mayor Hodas, excellent relations have been maintained with the Borough.

Behind the scenes the Museum continues to grow. The archives contain literature on the area from the early 1800's to the present, old and modern maps, pictures from many sources including Kushner and the Harri-Ann Studio, and old correspondence as well as records from the New Jersey Zinc Company laboratory covering analyses. Equipment includes a spectroscope, binocular and petrographic microscopes and a diamond saw. In cooperative investigations with Harvard University, seven minerals have been added to the Franklin list of which four are new to science.

In short, the Franklin Mineral Museum which has specialized exclusively in the mineral heritage of the Franklin-Ogdensburg area of Sussex County, New Jersey, has accumulated and preserved Franklin minerals, has helped to improve knowledge of them, has exposed thousands of adults and school children to the wonders of minerals and the joys of collecting, and has made specimens available to others. The officers, staff and friends of the Museum can justly take pride in the Museum's first ten years.

John L. Baum

New Minerals — Baumite

Another new mineral for the Franklin area has been announced by Dr. Clifford Frondel and Jun Ito in a paper entitled "Zinc-Rich Chlorites From Franklin, N.J. With a Note on Chlorite Nomenclature" appearing as Mineral Contribution #494 in the N. Jahrbuch f. Mineralogie, volume 123, number 2, pages 111-115, Stuttgart, February 1975. Abstract and pertinent portions of the discussion are quoted herewith:

Abstract: "A new septechlorite (Baumite) and varieties of pennine and brunsvigite containing

large amounts of Zn and Mn are described from Franklin, N.J. It is suggested that new mineral names be applied to compositional variants in the chlorite-septechlorite groups only when the substituting 6-coordinated cation is dominant in atomic per cent over Mg or Fe."

Discussion: "The two chlorites and the new septechlorite (baumite) here described from Franklin, N.J. are unique in containing large amounts of both zinc and manganese.

Chlorites occur very sparingly and inconspicuously at Franklin, chiefly as scaly coatings in low temperature hydrothermal veinlets that locally cut the orebody, and have not hitherto been analyzed. The zincian and manganoan brunsvigite of analysis # 1 occurs as a crust of tiny crystals overlying and in part intergrown with sonolite in an open veinlet cutting franklinite ore. The mineral is translucent and pale rose in color. The zincian and managanoan brunsvigite of analysis # 2 occurs as crudely radial aggregates of greenish black scales in thin veinlets cutting the dense, dull black septechlorite of analysis # 3. This material was found as masses up to a foot in size on the dump of the Buckwheat open pit. It contains angular fragments of willemite and calcite, and may have formed along a brecciated fault zone in the orebody. In thin section, the septechlorite is translucent with a brownish yellow color and is free from inclusions. It is isotropic at low magnifications, but under the highest magnification it is seen to be composed of minute birefringent fibers. These appear to have parallel extinction. The mineral is slightly bleached immediately adjacent to the cross cutting veinlets of brunsvigite.

The high content of Zn and Mn in these chlorites parallels that of other common silicates, including micas, pyroxense and amphiboles that occur in the skarn zones of the orebody (Frondel and Ito, 1966). The Zn/Mn atomic ration in the chlorites, 0.45 to 0.78 is considerably less than that of the trioctahedral micas of the locality, which range from about 1.3 to 4.2. Minerals from the locality called serpentine by Palache (1935) and others have been found to contain up to 7% Mn O and 4% Zn O, with $A1_2O_3$ from 0.10 to 1.30%; x-ray data are lacking on the analyzed material but other samples conform to Antigorite.

The name baumite for the mineral is given after John Leach Baum, former Chief Geologist of the New Jersey Zinc Company, who has supplied much specimen material from the Franklin and Sterling Hill mines to investigators. The name has the approval of the Commission on Mineral Names of the International Mineralogical Association."

Editor's Note: Formula given for Baumite by Frondel and Ito is

$$(Mg_{5.4}Mn_{2.2}Fe^{II}_{1.7}Zn_{1.0}A1_7Fe^{III}.3)_{11.3}(S1_{7.1}A1.9)_8O_{20}(OH)_{16}$$

Baumite, as well as the other chlorites, may still be found on the Buckwheat Dump. A nice specimen of this new species was found by one of our members on the last field trip to this locality.

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Zn Mn Fosterite/Zn Sonolite/Zn Alleghanyite/Zn Mn Humite

David A. Cook of Harvard University and Assistant Editor of this journal has submitted a paper for original publication in The Picking Table. We are proud to present

The Olivine and Humite Groups at Franklin-Sterling Hill

David A. Cook

During the past five years, it has been shown that the olivine and humite group minerals are among the most interesting which occur at Franklin and Sterling Hill. This paper will deal with both the common and the chemically unusual members of these two groups that occur there.

It is important for the serious collector to have a basic knowledge of the crystal chemistry of the specimens he studies, and I will begin with a general discussion of the crystal chemistry of the olivine and humite groups.

The important features of both the olivine and the humite minerals are the hexagonal close packed array of oxygen atoms (also F and (OH) in the humites) and the octahedral and tetrahedral voids which occur between these oxygens. In hexagonal close packing of atoms, the atoms are considered to be spheres which are packed in layers as tightly as possible, with atoms in every other layer

directly above each other. Any basic crystallography or crystal chemistry text (Evans 1966 is a useful book) will show pictures to explain this. In fact, the atoms are not tightly packed resulting in voids which have four adjacent atoms (tetrahedral voids) or six adjacent atoms (octahedral voids).

In the olivines and humites, one half of the octahedral voids are filled with metal atoms (Mg, Fe, Zn, Mn, Ca) and varying amounts of the tetrahedral voids are filled with silicon atoms. (1/8 in olivine and 1/9 - 1/12 in humite minerals). These voids are not filled randomly. The octahedral voids are filled in such a way as to form serrated chains of occupied octahedra with varying numbers of shared edges. In olivine, each unit of chain consists of four occupied octahedra. This unit is repeated to form indefinitely long serrated chain. These chains run parallel to each other in one direction throughout the crystal. In humites, the repeated chain units contain from six to fourteen occupied octahedra. Four oxygen atoms in the olivine structure are replaced by four fluorines or hydroxls to form the humites. This is accompanied by the replacement of one of the silicons in olivine by a tetrahedral void.

Although the generalized structures of these minerals is relatively simple, compositions can vary widely due to the fact that atoms (of approximately the same size) of many different elements can occupy the octahedral voids.

The general formula for olivines is X_2SiO_4 where X is the octahedrally coordinated element or elements (i.e. these are the elements that fill the octahedral voids).

X	Mineral Name
Fe	Fayalite
Mg	Forsterite
Fe, Mg	Hyalosiderite, Hortonolite, Chrysolite
Mg, Mn, Zn	Zinc - manganese Forsterite
Mn	Tephroite
Fe, Mn	Knebelite
Mn, Zn	Zinc Tephroite
Ca, Mg	Monticellite
Ca, Mn, Zn	Glaucochroite

(Note that although the formula for willemite Zn_2SiO_4 fits the olivine formula, it has a different structure and is therefore not a member of this group.)

Of the minerals belonging to the olivine group, tephroite, zinc tephroite, zinc-manganese forsterite, glaucochroite and hortonolite occur at Franklin-Sterling Hill. Good descriptions of hortonolite, tephroite and glaucochroite may be found in Palache (1935) and Frondel (1972). Although the composition of glaucochroite is given in most texts as $CaMnSiO_4$, the composition of this mineral actually varies widely due to substitution and as much as 16% ZnO has been found to be present.

Zinc tephroite occurs at both Sterling Hill and Franklin as large up to 3" in length) reddish brown to flesh red rounded crystals embedded in coarse calcite. Rounded zincite and franklinite crystals are common associations. Many of the old Franklin tephroite specimens showing large tephroite crystals carved out of matrix are high in zinc. The name Zinc tephroite is not an officially accepted name but is used here because this variety is distinct in appearance and chemistry. Normal tephroite contains up to 7% ZnO. Zinc tephroite contains up to 19% (see analysis 10 for tephroite in Palache, Page 77). The difficulty with early analyses is that willemite is present as exsolutions in the tephroite resulting in abnormally high ZnO values. To eliminate this problem a powdered sample was leached with dilute hydrochloric acid dissolving the exsolved willemite. The remaining pure zinc tephroite was analyzed by X-ray fluorescence techniques. The resulting value for ZnO was 16.5%. Crystals and grains of zinc tephroite are often partially rimmed by and rarely completely replaced by zinc sonolite and zinc-manganese humite which will be discussed later.

Zinc-manganese forsterite occurs as gray grains, 1/4 to 1/2" in length, associated with franklinite and zincite embedded in calcite. Preliminary chemical analysis indicates 32% MgO, 17% MnO and 13% ZnO. The only specimen seen of this mineral is in the Lee Areson collection. A portion of this specimen was given to Harvard University (#113721). The name zinc-manganese forsterite is not yet officially accepted and is here used to describe a chemical variant of forsterite.

The humite minerals can be separated into the Magnesium humites (nor bergite, chondrodite, humite and clinohumite), the Manganese humites (alleghanyite, sonolite and a new mineral being described by Paul Moore which is the manganese analogue of humite) and the zinc rich variants (Zinc sonolite, zinc alleghanyite and zinc-manganese humite). The following chart relates their chemical formulas. The checked species and variants occur at Franklin and Sterling Hill.

X	$X_2SiO_4.X(OH,F)_2$	$2X_2SiO_4.X(OH,F)_2$	$3X_2SiO_4.X(OH,F)_2$	$4X_2SiO_4.X(OH,F)_2$
Mg	Norbergite	Chondrodite	Humite	Clinohumite
Mn	— —	Alleghanyite	Manganese Humite	Sonolite
Mn,Zn,Mg	— —	Zinc Alleghanyite	Zinc-Manganese Humite	Zinc-sonolite

Descriptions of all of the species occuring at Franklin-Sterling Hill except Zinc-manganese humite may be found in Palache (1935) Frondel (1972) Cook (1969) and Cook (1973).

Zinc-manganese humite has been found in two specimens, both from Sterling Hill. Specimen # 110358, presented to Harvard by Jack Baum, consists of a large mass of reddish brown massive Zinc Manganese humite associated with calcite and franklinite. In appearance, it is identical to some zinc tephroites. The second specimen, #113716, consists of pale brownish pink grains (1/4 to 1/2" in length) embedded with irregular zincite crystals and octahedral franklinite crystals in coarse calcite. The zincite shows unusually well developed rims of "chalcozincite".

All three of the zinc rich variants are also high in magnesium. A typical rough analysis of zinc sonolite follows: SiO_2 - 31%; MnO - 31%; MgO - 22%; ZnO - 13%; F, OH - 3%.

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Editor's Note — Mr. Cook began work on these minerals in 1968. While researching specimens of "leucophoenicite" he discovered the new Zn, Mn, Mg series. His first findings were quoted in The Picking Table in the August 1968 issue, Volume #9, #2, page 8. At that time specific names were proposed for members of this series, namely baumite and gerstmannite, as well as aresonite for the zinc tephroite. Additional references to these names and minerals have also been made in subsequent issues of The Picking Table. These proposed names are no longer valid and should be removed from your Franklin-Ogdensburg list. The correct nomenclature for these minerals is given by Mr. Cook above. Note further, however, that baumite is now the proper name for the new septechlorite described by Frondel and Ito and quoted earlier in this issue of The Picking Table.

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Synadelphite

10 (Mn_4As0_4 $(OH)_5$) Hey # 20.8.6 Dana # 41.1.5

David Cook advises of the verification of synadelphite from Franklin-Sterling Hill. In a note he states: "One new mineral - Synadelphite found as brownish red needles associated with flinkite and cahnite. This was suggested to me by Paul Moore and it checked out. The habit is more acicular than Dana describes for Langban material but the rest of that description is okay." We hope to get more description from David on this material.

Dana gives the following description: "Tri-clinic; pseudo-orthorhomic. Crystals short primatic (001) with (110) striated (001). The seemingly single individuals, however, are found on optical study to be fourlings twinned by reflection on (110) and (010) of a pseudo-orthogonal triclinic lattice. Cleavage (010) imperfect. Fracture uneven to concoidal. Brittle. Hardness 4½. Gravity 3.57-3.79. Luster vitreous. Transparent. Found originally at the Moss Mine, Nordmark, Sweden; later described from Langban, Sweden."

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Other Research Reports

Chalcophanite

Paper by D.R. Dagsputa "Oriented Transformation of Chalcophanite During Thermal Treatment", Zeitn. Krist., volume 139, pages 116-128, 1974; Min. Abst., volume 26, #1, March 1975, page 25. Abstract follows:

"The toptactic transformation of chalcophanite, $ZnMn_30_7.3H_20$, from Sterling Hill, N.J. to $ZnMn_30_7$ during thermal treatment was studied by X-ray, DTA, and TGA methods. The triclinic but pseuodrhombohedral chalcophanite is completely transformed to the truly rhombohedral anhydride at 200° C. Upon further heating to 500° C this is further transformed into a polycrystalline material structurally similar to hausmannite or hetaerolite with tetragonal cell constants a 5.74, c 9.32 A."

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Willemite

"Though widely distributed, willemite is rarely found in gem quality." The variety of colours and textures of willemite is described in an article by F. H. Pough, "Willemite, an uncommon gemstone" Zeits. Deutschen Gemmologischen Gesell, volume 23, 1974, pages 128-130. Min. Abst., volume 26, # 2, June 1975, page 101.

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Wollastonite/Bustamite

Appearing in the American Mineralogist, volume 60, March-April 1975, pages 209-212, is an article by Brian Mason on the "Compositional Limits of Wollastonite and Bustamite". Abstract and portions of the discussion are quoted herewith:

Abstract — "The compositions of naturally occurring wollastonite and bustamite show that a narrow composition gap separates these two minerals. Iron free wollastonite from Franklin, N.J. with up to 8.1% MnO coexists with bustamite with 12.3% MnO and 0.7% FeO. The maximum iron content found in wollastonite is 2.23% FeO in a specimen from Scawt Hill, Ireland. The limiting composition recorded for ferrobustamite is 9.29% FeO, 1.22% MnO, and 38.86% CaO in a specimen from Skye, Scotland."

Discussion — "The late Dr. W. T. Schaller did considerable unpublished research on the compositional limits of wollastonite and bustamite. After his death in 1967, his material and notes were transferred to the Department of Mineral Sciences in the Smithsonian Institution for curating and preservation. These notes stimulated my interest and to study the problem further I have analyzed with the microprobe 16 specimens selected from as wide a range of parageneses as possible. The nine elements Si, Al, Fe Mg, Ca, Na, K, Ti, and Mn were looked for; of these only Si, Fe, Ca, and Mn were present in measurable amounts, the remaining elements being at or below background (0.1%0). Evidently the wollastonite structure is relatively intolerant of substitutionby related elements. Of particular interest is the practical absence of Mg, even in rocks containing appreciable amount of this element; in such rocks the wollastonite is associated with diopsidic pyroxene.

The Franklin specimen, which contains both wollastonite and bustamite provides the critical information for establishing the compositional limits for these minerals. It was found in the mine in mid 1944 and its occurrence has been described by Baum (1972). It consists of a granular aggregate of calcite (white), wollastonite (cream), bustamite (pale grey), and andradite (yellow brown), with microscopic blebs of willemite confined to the bustamite. The willemite is probably an exsolution product from the bustamite, which contains 0.26% ZnO whereas the wollastonite is essentially zinc free. Under a short wave ultraviolet lamp, the specimen is spectacular, the calcite fluorescing pink, the wollastonite orange, the willemite green, and the bustamite and andradite being nonfluorescent. The wollastonite and the bustamite have similar refractive indices and birefringence, but in thin section they are clearly distinguished because the bustamite grains are very turbid. Microscopic examination revealed this turbidity to be due to exsolved bustamite. Exsolved bustamite has the same composition as the primary bustamite, whereas the wollastonite varies considerably in manganese content, with the highest value in a homogeneous area of 8.09% MnO. This suggests the phase relations illustrated in Fig. 2, with the solubility of $MnSiO_3$ in wollastonite rapidly declining with decreasing temperature, whereas the limiting composition of bustamite remains almost constant. The tentative temperatures indicated on Figure 2 are derived from the crystallization temperatures of the Franklin ore body deduced by Frondel-Baum (1974)."

Editor's Note — The Franklin specimen was supplied by Dr. John L. Baum. The occurrence of wollastonite at Franklin was described by Mr. Baum in a paper appearing in The Picking Table, volume 13, #1, pages 4-6.

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Pectolite

Mr. Fred J. Parker, 11 Evergreen Avenue, Livingston, N.J., 07039, has sent me the following paper:

Franklin Pectolite — Rarer Than You Think

Fred J. Parker and Dr. Arnold Fainberg

"One of the most sought after fluorescent minerals from Franklin, N.J. has been the cream white silky masses labeled Pectolite associated with a pink garnet and sometimes Lead, Copper, Roeblingite, etc. This brilliant peach-orange fluorescent is seen on dealers' tables commanding top price and is purchased without hesitation. The authors of this article now have proof that this assumption is often in error. Quite routinely, Dr. Fainberg, using a modified Infrared Spectometer, tested a sample of the material in question and found no Pectolite was present. The data did bear a close resemblence to that of Wollastonite plus a garnet, and later samples from various sources

bore out this conclusion. Fred Parker, having access to an X-ray Diffraction unit, tested the validity of the infrared data and came up with comparable results. X-ray data showed a good pattern for Wollastonite plus a garnet (subsequently identified as Grossular) along with four low intensity peaks whose validity is in doubt at this time. By either method, what was thought to be Pectolite turned out to be a silky form of Wollastonite plus Grossular. In neither case, did any data resemble that of Pectolite from other localities.

This does not by any means exclude the existence of Pectolite from Franklin. An authentic sample was obtained from Tom Peters of the Paterson Museum but bore no resemblence to the silky white masses we identified as Wollastonite. Mr. Peter's piece consisted of white glassy to pearly masses in an unusual Prehnite associated with a brown garnet, a mica and branches of native Copper. This is certainly in line with Palache's description of Pectolite: "Pectolite is found as transparent colorless crystals and grains implanted on and mixed with prehnite and as pinkish coarse fibrous aggregates associated with brown garnet, willemite and biotite." In each case he goes on to mention prehnite as an associated mineral. The fluorescent response of the Pectolite under short wave U.V. radiation is a bright orange color white under long wave it fluoresces a more subdued orange. Wollastonite hasno response under L. W. Radiation.

We would like to hear from anyone who has found similar or different results on the identification of the minerals in question. We are also looking for additional specimens of real Franklin pectolite with Prehnite or other associates for future research. If you have any such extras, please let us know.

From this new data, one must realize the existence of a glassy, crystalline Pectolite, a fibrous Wollastonite, and, of course, the glassy Wollastonite associated with Barite that makes such a spectacular fluorescent piece. When purchasing any of these expensive fluorescent pieces from Franklin, the buyer should be very careful of what he is actually buying. On the other hand, a careful search of dealers' material by the informed collector may turn up a real Pectolite, a true prize indeed.

As a final important note, it should be noted that, in this case, similar identifications were arrived at using entirely different methods by two independent analysts. Certainly such cross checking is in the best interest of science in order to prevent accidental error or misinterpretation of data, and must become a normal procedure in the future.

Technical data available by writing Fred Parker".

Additional word on this subject by other investigators and collectors, will be welcomed.

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Sphalerite

Dr. Warren Miller also has a report on some research on the cleiophane variety of Sphalerite:

"John Kolic gave me several specimens from Sterling Hill of very clean sphalerite in a matrix of mcgovernite. Some of the material fluoresced pure orange, and identical material in other specimens fluoresced pure blue. A spectrographic analysis of the two specimens revealed no appreciable difference in the levels of manganese, iron or cadmium, and in fact the only noticeable difference was in the level of silver. The concentration in the blue fluorescent material was considerably less than .001%.

A similar analysis on a specimen of sphalerite on franklinite from Sterling Hill again revealed that the level of silver in the areas which fluoresced mainly blue was considerably higher than in the material which fluoresced orange.

These results are consistent with the fact that silver/activated zinc sulphide is a common blue phosphor."

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Mooreite/McGovernite

Please refer to the last issue of The Picking Table, Volume 16, number 1, February 1975. The first paragraph on page 10 is incorrect. The correct wording is as follows: In the Jim Gouger collection - a Sterling Hill specimen of brown willemite ore containing a vug, about 1½ x 2½", loaded with about 100 very sharp crystals of Mooreite averaging 1/4" tall. By far, the finest specimen of this species I have ever seen. Also an unusual occurrence of McGovernite. This specimen, about 3 x 3 x 4" of calcite, willemite, franklinite ore is cut by a 1/2" thick vein of McGovernite. This species is usually found in rosettes and crusts on the surfaces of ore material. A vein of this mineral and in this thickness is an extreme rarity.

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Malachite/Brochantite

Recently, I asked Dave Cook: "What are the normal alteration products of chalcocite/djurleite, particularly, the green mineral, which we usually assume is malachite?" His answer was: "The alterations of these minerals depends upon the composition of the circulating fluids. Most commonly this is an H_2O - CO_2 fluid producing carbonates (malachite). But, if sufficient SO_4 is present, brochantite may result. In fact, this is how the Sterling Hill brochantite-linarite-devilline assemblage originated. The SO_4 may be from earlier deposite gypsum."

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Sterling Hill Minerals, 1974-75

A very complete and most informative letter describing recent mineral finds at Sterling Hill has been received from a miner friend. This letter, plus additional comments and verification from other correspondents, is quoted herewith:

"This has been a busy year for specimens at Sterling Hill. While I cannot remember the exact sequence in which the various finds appeared, the order presented below is a rough approximation.

Lollingite crystals, usually singles ranging from 1/2" to 5/8" in length, in moderate abundance, have been coming from a transverse pillar in black ore situated in the cross member of the orebody: 1260 pillar near the 1200' level. They are brilliant in luster and make a good contrast against the black willemite and tephroite.

Quantities of micro crystals of willemite, golden barite, and fluorite were found in an old stope adjacent to 1460 pillar, again in the cross member portion of the ore, just above the 1400' level. The clear cubes and prisms occupy small voids in a slaty appearing seam of sheared material. This seam cuts through to 1460 pillar, from where it was traced and therein produced at least one fine specimen of chlorophoenicite. This piece is 2" x 3½". In a cavity in the slip surface are numerous, clear, glassy sprays of chlorophoenicite jack strawed about. Several of them are up to 3/8" long and all are very visible without magnification. There are several doubly terminated crystals here and there. Identification was made by Jack Baum based on optical parameters. While most of the willemite, barite and fluorite crystals are microscopic, a few are visible to the naked eye. This same type of barite has previously been reported in The Picking Table.

#1420 transverse pillar, two cuts above the 1300' level, is again producing good specimens of orange zincite balls and micro crystals together with hetaerolite, chlorophoenicite and hodgkinsonite. A previous find from this occurrence has been carefully described in The Picking Table. (Also see Note #1).

From a calcsilicate body in the hanging wall of 1120 stope on 1000' level have come rhodonite crystals, varying in size from 1/2" x 1-1/4" to 1-3/4" x 3-1/2". Their color ranges from purplish to bright baby pink (rather rare). Most crystals are variegated in some combination of these. The rhodonite crystals as singles or in groups, are embedded in calcite or attached to a matrix of massive rhodonite and gahnite. (See Note # 2).

This is the same calcsilicate body that has been yielding green gahnite crystals, fair to excellent, ranging in size from 1/4" up to rare 3" octahedrons, for several years from 1010 stope, now nearing the 700' level. This body, while somewhat shredded in the deformation attendant to the

folding and alteration that produced the morphologically complex cross member is generally consistent mineralogically from at least the 1000' level to the 700' level. Both 1120 LS and 1010 LS work that part of the ore referred to by the miners as the "East branch of the West vein", i.e. the slender stem of ore connecting the West limb with the greatly thickened cross member.

The North Ore Body produced this Spring a limited quantity of choice doubly terminated Mooreite crystals in vugs in a zincite-pyrochroite pod in that rather leached looking lean ore adjacent to the hematite envelope surrounding much of the North Ore Body. The exact location of #3 pillar, four center sets below the 2250' level. The mooreite crystals are considerably less massive than those seen in Jim Gouger's fine specimen. However, the tan crystals display a very pleasing, perfect demantoid habit, sometimes attaining 1/4" along the c axis.

In the East Limb, halfway between the 700' and 600' levels in 935 stope, a 2" to 4" vein cuts the ore at approximately 30° and is nearly vertical in dip. It is composed mostly of yellowish carbonates with some parallel bands of reddish sphalerite. For three cuts now (each being the mining of a 10 ft. upward slice) it has yielded tantalizing specimens of radiating willemite. Hopefully the small isolated pods will coalesce higher in the vein to produce material similar in quality to that from Franklin. Up to now some pieces display very pale green complete rosettes about 1/2" in diameter. Their phosphoresence is equivalent to the good Franklin material. Other pieces show masses of light yellowish needles up to 3/4" long.

From a large stope mining the terminus of the West limb, 800 longitudinal, has come a single piece of brownish tan, foliated Bementite. This mineral is the sole component of a 3/4" thick vein. It displays the characteristic luster, cleavage and color found in that species at Franklin.

Latest of the major finds has been that of Stilbite during the driving of a drift on 1300' level. This drift, referred to as the 1340, will service a pillar that is to be developed in the cross member on that level. The stilbite occurs as sheaves of pearly white crystals, sometimes covering areas up to 3" x 3" with 1/4" bundles. Occasionally doubly terminated bow ties or single crystals sit apart in secluded beauty. A few specimens display similarly sized heulandites. Minute grains and prisms of epidote form a green backdrop for the larger zeolite crystals. The above species are in vuggy material that has been hydrothermally developed from one of the complex of rocks known as the gneiss zone near the core of the orebody. (see Note 3).

Specimens from the footwall of 935 stope found about two years ago, when mining was still below the 700' level, have recently been determined by Bruce Barr to be an exsolution phenomenon analagous to the Swedish "vredenburgite". They superficially resemble massive franklinite in which a pronounced rhombohedral cleavage is developed. At that time, specimens were rather abundant. Frondel's definition - "oriented exsolution intergrowths of Fe, Mn and Zn oxides - fits this material nicely. For a thorough study see "Exsolution in Franklinite" Frondel and Klein, Am. Mineralogist, volume 50, October 1965.

The manganbrucite recently verified may be described as follows: The piece is approximately 2" x 3" and primarily composed of North Ore Body rare mineral pod but with a small portion of non fluorescent calcite as wall rock. The exterior portions if the pod are of sussexite, followed by calcozincite towards the interior. A dark black to bluish black mineral lays between this and the brucite. The core of the pod is formed of minor amounts of gemmy orange zincite, with masses of tan, crumpled micaceous manganbrucite. The latter covers an area of 1-1/2" x 1-1/2" x 1-1/2" on two of the specimen's surfaces.

The North Ore Body is still plugging along, being carried by the rest of the mine, but the returns are becoming leaner and leaner. At present there are only four working pillars plus a crown pillar they intend to mine.

Hope you will find this information useful to you."

Note #1 — Re this occurrence. John Mac Donald writes me "Recently I acquired several pieces of willemite ore loaded with micro crystals. I found perfect prismatic zincite crystals that are clear gemmy yellow to deep orange. Some of the crystals are grouped in gemmy yellow orange balls. This material is very similar to the zincite crystals on display in the Gerstmann Museum. The zincite

crystals are associated with white to pink rhombohedral crystals (of rhodochrosite?) black crystals of haeterolite, tan bladed crystals of chlorophoenicite and gemmy clear red monoclinic crystals of hodgkinsonite."

Note # 2 — John Mac Donald has this to say re the rhodonite crystals: "Have two rhodonite crystal groups from the Sterling Hill mine. The one group has very sharp crystals. Gerstmann has a crystal group on display in his Museum. The rhodonite has a purple red color and forms rather sharp crystals (up to 2" long) in calcite with a green pyroxene. Very showy.

Neither of these correspondents has mentioned the most unique feature of this find. All of the good rhodonite crystal specimens up to this time had been found at Franklin. Sterling Hill in the past has produced only some massive rhodonite plus a few micro specimens. This find of good sized, attractive crystals and groups is a first for Sterling Hill.

Note # 3 — Re the stilbite/heulandites, Jack Baum advises "Came up with some first rate clear stilbite and heulandite crystals on epidote frosted white silicate rock (black rock) from the Sterling core zone. Really good for local zeolites; the crystals were up to 1/4" long."

Another source advises that only 8 pieces came from the cavity that produced these specimens. Of these, only 3 pieces were choice.

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In his letter John Mac Donald also had this to say: "Tephroite came out of Sterling Hill recently in large brown chunks with a green pyroxene and calcite. This tephroite shows perfect distinct rectangular cleavage.

Several years ago I purchased a large piece of chalcocite with magnetite crystals. This piece was broken into many smaller pieces. In one of these I found a pocket with small unknown white crystals like aragonite and green transparent cyrstals that appear to be monoclinic, very soft, and show a pleiochroism. Is this vivianite? This mineral was listed by Fowler in 1825 but was not supported by specimens or descriptions. Let's look over those chalcocites!"

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