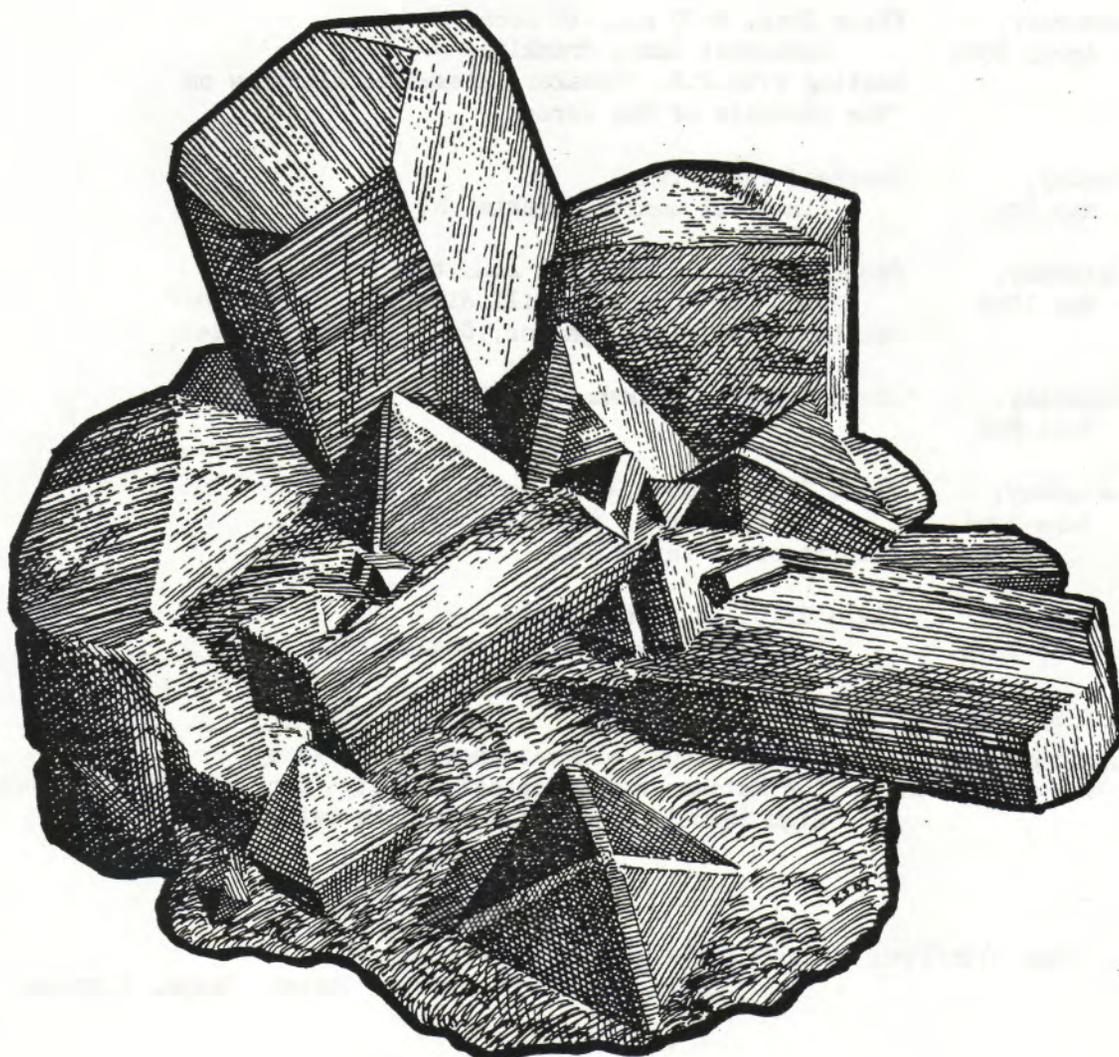


# THE PICKING TABLE

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JOURNAL OF THE FRANKLIN-OGDENSBURG MINERALOGICAL SOCIETY



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F.O.M.S. OFFICERS FOR THE YEAR 1968

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F.O.M.S. Notes

A new administration is in office at the F.O.M.S. Our President, John Sebastian, is familiar to most of our members because of his fine record as Safety Chairman and Vice President. His knowledge of and his interest in Franklin and its minerals dates back to his days as a miner for the New Jersey Zinc Company. He has worked hard for the F.O.M.S. in the past and promises to do even more so in the future. Our Vice President, Alice Kraissl, will continue to represent most capably the feminine point of view at our Board meetings. And now, she will have a double vote. Mrs. Thompson, who was elected Secretary last Fall, resigned that post and President Sebastian has appointed Mrs. Kraissl to that office; a position she has filled most capably in the past. The peerless Jack Butler, our hardest working member, continues as Treasurer. These officers, plus the trustees and committee chairmen, are diligent, capable and most interested in the Society and its affairs. This administration will provide the leadership necessary to keep the F.O.M.S. interesting and progressive.

Again we stress that while the business affairs of the Society are conducted by the Executive Board, these are not closed meetings; they are open to all members. Your attendance at these meetings is invited.

A look at the Club Calendar shows that a most ambitious program has been scheduled. This includes two innovations. Several years ago, in a special field trip, over a hundred members visited Lafayette College in Easton, Pa., where Dr. Arthur Montgomery and his students obliged with a most interesting program. This year we have accepted Dr. Montgomery's invitation for another visit in March. The Shuster, Pohl and other collections will be on exhibit; the laboratory will be open and identification methods demonstrated; a film shown and other treats promised. The other new event scheduled is an interclub Swap Session to be held in June following the Farber Quarry field trip. If this proves interesting and desirable to our members, it will be rescheduled next year. Your reactions after participation are requested.

Our program on April 20th will again be shared with the members of the New Jersey Audubon Society, who will hold their annual Mineral Field Trip on that date. As usual, the Audubon activities will headquarter at the Hardyston School. F.O.M.S. members are invited to participate in their activities.

Please note that attendance at all Club events is limited to paid up members only. 1968 dues (still \$2.00 and the biggest bargain in the hobby) are now due. Please use the handy form on the last page for your renewal. Much valuable information is available in the literature also listed on that page; take advantage of this easy way to order.

#### Franklin Locations and Information

Requests are frequently received for information concerning Franklin locations and mineral suppliers. A review of current facilities may be helpful, particularly to our more distant members.

There are only two collecting areas open to the public. These are the Buckwheat Dump and the newly opened Trotter Mineral Dump. All other localities are privately owned and permission to collect must be previously obtained. Such permission is usually granted only to organized groups for supervised field trips.

The Buckwheat Dump is located on Franklin Avenue, between Buckwheat Road and Cork Hill Road, at the foot of Franklin Lake. It is always open to collectors. Fee is \$1.00 for adults, payable to the Dump Inspector on duty at the Dump. Inspectors reappointed this year are Raymond Rude, Nicholas Zipco and Michael Petro. Ralph Walters resigned as of January 1st. Special rates are available for Club groups and Annual Passes for collectors who wish to collect regularly. Minerals can often be purchased from the inspectors and others licensed by the Borough Council.

The Trotter Mineral Dump is located on Mine Hill behind the Bank of Sussex County on Main Street, Franklin. It is privately operated and is under the management of Ewald Gerstmann, Box 282, Franklin, N. J. phone (201) 827-3728. It will be open during the spring, summer and fall. If the weather is doubtful, check by phone. Fee is \$2.00 for adults and \$1.00 for children under twelve. Minerals are offered for sale at the Dump office.

also recommended for the visitor are the two Mineral Museums in town. The Franklin Mineral Museum, Evans Street, Franklin is a community project sponsored by the Franklin Kiwanis Club. It features a well rounded exhibit of minerals, mining relics and other memorabilia; a fascinating mine replica and one of the world's largest fluorescent displays. The Franklin Mineral Museum also is open all week during the spring, summer and fall. During the winter months it is open by prior arrangement for group visits and sometimes on pleasant weekends. Fee is \$.50 for adults and \$.25 for children.

The Gerstmann Private Museum, 14 Walsh Road, Franklin is adjacent to the home of Ewald Gerstmann. It is open during his spare time or by previous arrangement. A phone call in advance (201 - 827-3728) would be courteous and advisable. This museum houses what is probably the largest and finest collection of Franklin minerals in the world plus an interesting fluorescent display. No admission fee is charged. Some minerals are for sale.

For those who wish to purchase minerals by mail, we suggest the dealers advertising in Rocks and Minerals, Gems and Minerals and the Lapidary Journal. These people solicit and are equipped to handle such business. I particularly recommend John S. Albanese for the advanced collector. The local sources mentioned above rarely accept mail business.

The New Jersey Zinc Company receives many requests each week for free mineral specimens and permission to visit the mine workings. These average about sixty per week and are with good reason disregarded. Please don't waste their time or your own with such requests.

The Chamber of Commerce of Franklin also receives frequent requests for mineral specimens and information for school reports. Here, too, there is no one available to answer such requests. Perhaps some dealer interested in mail business can provide a solution by answering unsolicited requests for both the New Jersey Zinc Company and the Chamber of Commerce.

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On January 2nd, 1967, the New York Educational Station, Channel 13, on their weekly program "SPECTRUM", showed an interesting film on Seismology called "The Trembling Earth". This dealt with the activities of the Lamont Geological Institute, Columbia University, in that field. A major portion of the program showed the installation on the 1850 ft. level of the Sterling Hill Mine of the New Jersey Zinc Company at Ogdensburg, N.J. The information given, however, was elementary and particularly irritating, to me at least, was the deliberate omission of any reference to the mine, the mine personnel shown, or even the name of the New Jersey Zinc Company. The only reference was a view of the mine on the skyline plus the words "at a mine in Northwest New Jersey". Surely poor payment for the cooperation extended to the filming unit.

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#### Miscellaneous News Notes

There were interesting follow-ups on the two gem stories noted in the last issue of THE PICKING TABLE. The first concerned the giant emerald found in Carinthia, Austria. Mr. Max Bareiss of Owensboro, Kentucky was kind enough to write me as follows:

"The story on the huge emerald was very thrilling to me. Please permit me a minor correction: The name of the valley is the Habach-Tal, and it is located in the province of Salzburg, a good bit south of the city of Salzburg, very close to the Italian border. I visited the area in 1956, and called on the widow of a former owner of the emerald mine, from whom I was able to procure a few small specimens of this beautiful green gem. Unfortunately, the weather was not favorable in the high country where the mine is located; there was still snow in July, so I could not visit it in person. But at least I learned a good bit of it. The emerald is found in the brown mica schist of the Central Alps. It was an interesting experience. My congratulations to the finder of the "big one"; I am sure he earned it."

Our other news item concerned the find of a large diamond in Lesotho. Since then activities concerning this diamond have been fast and furious. Of all the information published the most interesting and complete was an article that appeared in the New York Times on October 20th, 1967. It deserves reprinting in full:

"A huge diamond, turned up in a pick and shovel operation on a tiny mining stake in the African kingdom of Lesotho last May and now ranked as the seventh largest gem diamond known, has been acquired by Harry Winston, Inc., of Fifth Avenue (N.Y.C.).

The rough stone has already made a poor man rich. It was found on May 26th by Mrs. Ernestine Ramoboa while she was routinely sifting surface gravel on a claim about 20 ft. square at Letseng-la-Draai.

Mrs. Ramoboa is the daughter-in-law of Petrus Ramoboa, the 38 year old principal shareholder in a claim shared by three other men.

The annual diamond production of Lesotho is about 5,000 carats, of which about 40% are of gem quality and the rest of industrial quality. Mr. Ramoboa's find comes to more than one quarter of his nation's average output of gem diamonds for an entire year.

The discovery brought about a radical change in the life of Mr. Ramoboa, who received half of the initial purchase price of \$302,400. His cash holdings prior to the sale had amounted to \$4.00. He immediately went out and bought a suit, three frying pans and two new wives. Mr. Ramoboa could not even afford the \$19.50 air fare from his home to the diamond buyers' offices in Maseru, Lesotho's capital city. Clutching his treasure, he made a tortuous journey over 110 miles of dirt roads and tracks by hitchhiking rides to make his sale. He still lives in a thatched hut and has announced that he feels "too young to retire".

The stone, tentatively known as the Lesotho diamond, is larger than a golf ball. It weighs 601 carats and is pale brown in color. That ranks it in size just below the famous Jubilee diamond, a 650 carat stone found in the Jagersfontein mine in South Africa in 1895.

Mr. Winston said yesterday that he had invited Mr. Ramoboa to come to New York to "see what is going to happen to his baby".

Mr. Winston estimated that the small diggings or claims at Letseng-la-Draai would ordinarily produce about 25 or 30 cents a day in diamond finds, mostly in rice grain size stones. Letseng-la-Draai is in the ruggedly mountainous diamond country in northeastern Lesotho, close to a stream that feeds into the Orange River, sometimes known in South Africa as "the river of diamonds".

Lesotho, a black ruled kingdom about the size of Maryland, is a nation of about a million people entirely landlocked within white ruled South Africa. It was formerly the British colony of Basutoland but it gained independent statehood in October 1966. Nearly all the diamond production in the nation is near this sector, and much of it is concentrated in mountains at heights of over 10,000 ft., barely served by the most primitive roads. Inaccessibility has made major mining operations uneconomic there.

Nearly all of the diamond hunting is done by native prospectors, mostly on claim areas 30 feet square and rented for about \$3.00 for six months' use. The buyers are mainly from South Africa. They visit Maseru twice a month to buy from the diggers, who make long treks to the capital on foot or by pony.

"If his government hadn't stepped in to protect him, he'd have sold his diamond for a song and been happy to do it", Mr. Winston said yesterday. "If an agent had been there, he would have sold it for maybe \$20,000 on the spot", he said. "I bought a stone once for \$300,000 from a dealer who had bought it from a digger for \$20,000".

At Maseru, Mr. Ramoaba took the enormous stone to an independent buyer, who looked at it fondly but made no offer. "Who knows, he may have only had \$1,500 cash", Mr. Winston said. Word of the extraordinary find spread quickly among the buyers and came to the notice of the Government. The Minister of Economic Development, Senator C.D. Malopa, met with agents of the diamond buying concerns to discuss a sale procedure. A committee of three bankers was formed to receive sealed bids on the stone, which was shown to diamond dealers at the Barclay Bank. The high bid, announced on the lawns of the Ministry of Home Affairs, was by Eugene Serafini, a Bloemfontein buyer, who sold it to a Dutch colleague, Mr. J. W. Vermey, presumably at a decent markup.

Mr. Winston lamented yesterday that three sellers had got profits out of the stone, but he did not disclose what he had paid. He estimated that the stones to be cut out of it "should bring well over \$1,000,000". Vermey called me in Geneva and said, "Are you interested?", Mr. Winston said yesterday. "I said, I certainly am. Send it up". He replied, "I'll bring it to you". He thinks Mr. Vermey called him because he had previously purchased three huge stones, including the 726 carat Jonker diamond in 1935. "I was already crazy, even then", Mr. Winston remarked.

The largest gem quality diamond ever found is the Cullinan diamond, which weighed 3106 carats, or about one and one third pounds. It was unearthed in the Premier mine in South Africa one evening in 1905. Nine major gems and 96 smaller diamonds came out of it.

The other ranking diamonds are the Excelsior (995 carats, 1893); the Victory of Woyie River (770 carats, 1945); the Vargas (726 carats, 1938); the Jonker (726 carats, 1934); and the Jubilee (650 carats, 1895)."

During the month of November, 1967, the Lesotho diamond was on exhibit in the Gem Room of the Smithsonian Institution.

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Recently a signal honor was paid to two of our popular and active members, Mr. and Mrs. Edmund Frey, 291 Summit Road, Mountainside, N. J. During their early explorations as rock hounds, they found lumps of amber in the cliffs at Cliffwood Beach, N. J., in a location since covered by fill. Preserved in one piece of the amber was an insect half-wasp and half-aunt, which has now been named *Sphecomyrma freyi*, in honor of the finders. Dr. William L. Brown, of Cornell University, co-author of the paper in *Science*, called the insect a real missing link in the evolution of insects. He said it had gone far enough over the line of waspdom to be considered an ant; thus making *freyi*, the world's oldest ant, roughly 100 million years old. Professor Edward O. Wilson of Harvard and Frank M. Carpenter, also of Cornell, were co-authors with Dr. Brown on the scientific paper.

Unfortunately, this is the only good news for the Freys in some time. Ed, the victim of a long illness, is still confined to bed. He would enjoy hearing from his friends.

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#### Mineralogical Data

##### Barysilite and Larsenite

"Syntheses of lead silicates: larsenite, barysilite and related phases" a paper by Clifford Frondel and Jun Ito appeared in the July/August 1967 issue of the *American Mineralogist*, Vol.52, No. 7/8, pages 1077-1084. Abstract follows:

"Barysilite, for which the new formula  $Mn Pb_5 (Si_2O_7)_2$  is suggested, has been synthesized hydrothermally at temperatures from 380° to 550°C and pressures 1500 to 2000 bars. The crystals obtained were hexagonal plates ranging up to several millimeters in size. The Xray powder diffraction pattern of the synthetic material is identical with that of natural barysilite from Franklin, N.J. except that the latter material very commonly contains weak extra lines caused by intimately intergrown nasonite. Our powder data agrees closely with that of Glasser (1964) obtained on Franklin material. His patterns apparently also contain nasonite lines. Nasonite breaks down readily to an unidentified anhydrous  $CaPb$  silicate at about 780°C (Ito & Frondel, 1966). The Xray powder data given by Glasser for Franklin barysilite, heated at 760°C appears to represent a mixture of barysilite, nasonite and the decomposition product of nasonite. We observed that synthetic barysilite is not irreversibly changed by heating in air to 800°C; the melting point is near 850°C.

The ferrous iron analogue of barysilite has been synthesized hydrothermally by the same method. The Co, Ni, Ca, Mg, Cd, Zn and Cu analogues also have been synthesized.

In some syntheses of Mn-barysilite and of Fe-barysilite small amounts of kentrolite,  $Pb_2 Mn_2 Si_2 O_9$  and of melanotekite,  $Pb_2 Fe_2 Si_2 O_9$  were formed."

Larsenite, related to the olivine group, is known as a mineral only from Franklin, N.J. It has been synthesized by heating a gel with the composition  $PbO \cdot ZnO \cdot SiO_2 \cdot nH_2O$  in air temperatures from 500°C to 900°C. On heating in air, larsenite began to crystallize at an appreciable rate at about 500°C and remained stable up to 950°C. At 1000°C. larsenite melted incongruently to willemite and liquid lead silicate. The optimum production of larsenite, judging from the X-ray powder pattern, was obtained by a heating period of 20 hours at 800°C. Larsenite has also been synthesized hydrothermally from the same starting materials used for the dry syntheses. The crystallization of larsenite at an appreciable rate and the point of its thermal breakdown are about 200°C lower under hydrothermal conditions than when heated in air."

#### Johannsenite/Bustamite

"Refinement of the crystal structure of Johannsenite" by R.L. Freed and Donal R. Peacor, published in the American Mineralogist, May/June 1967, Volume 52, page #709. Abstract:

"The crystal structure of johannsenite,  $4(CaMnSi_2O_6)$  with  $a = 9.978 \text{ \AA} \pm 0.009$ ,  $b = 9.156 \text{ \AA} \pm 0.009$ ,  $c = 5.293 \text{ \AA} \pm 0.005$ ,  $\beta = 105.029 \pm .02$  and with space group  $C2/c$  was refined by least squares methods using the Warren and Bragg diopside structure as a trial model. The refined structure is similar to the Warren and Bragg model. However, the presence of two ordered large cations combined with a zweierketten arrangement of tetrahedra produces distortion in the tetrahedral chain, making it less stable than other metasilicates. The internal strain is compensated by slight offsets of the tetrahedral chains with the close packed planes and by twinning with  $a^*$  as the twin axis."

"Oriented transformation of johannsenite to bustamite" a paper by N. Morimoto and K. Koto and T. Shinohara, published in the Mining Journal of Japan, 1966, and Mineralogical Abstracts, Volume 18, page 159, No. 3, September 1967. Abstract:

"Details of the oriented transformation of johannsenite to bustamite have been studied by single crystal X-ray methods in order to elucidate the transformation mechanism for silicate chain structures in general. A single crystal of johannsenite was heated at 900°C in a silica tube. The product is a pseudomorph in which the johannsenite has been partly changed into bustamite. The latter is formed in a definite orientation relative to the johannsenite; the sheet of close-packed oxygen atoms of johannsenite makes an angle of  $4.5^\circ$  with that of bustamite, and (012) of johannsenite is coincident with (111) of bustamite. These results are interpreted on the basis of preservation of the close-packed framework of oxygen along a dense zone of metal cations and silicon atoms in johannsenite during the transformation. The differences in the direction of the  $SiO_3$  chains and in the ordering of Ca and Mn atoms in the johannsenite and bustamite structures provide direct evidence of the migration of Ca and Mn atoms as well as of Si atoms during the transformation.

The oriented transformation of rhodonite to wollastonite, described by Glasser & Glasser ( M.A. 15-419), is better explained by the same principle as the johannsenite-bustamite transition than by that of simple preservation of the close-packed framework of oxygen atoms."

#### Kentrolite

"New Data on Kentrolite and Melanotekite" a paper by F.P. Glasser. American Mineralogist, July August 1967, Vol. 52, Nos. 7/8, page 1085, abstract as follows:

"A phase identical with melanotekite is readily prepared by heating the composition  $2 \text{PbO} \cdot \text{Fe}_2\text{O}_3 \cdot 2\text{SiO}_2$  in an air atmosphere at  $650^\circ - 700^\circ\text{C}$ . Results of heating experiments and crystallographic examination of naturally occurring melanotekite confirms this formula. Melanotekite is orthorhombic, space group  $P^{***}$ ,  $a = 6.97$ ,  $b = 11.0$ ,  $c = 9.83 \text{ \AA}$ . Kentrolite,  $2 \text{PbO} \cdot \text{Mn}_2\text{O}_3 \cdot 2\text{SiO}_2$ , is isostructural with melanotekite;  $a = 7.00$ ,  $b = 11.0$ ,  $c = 9.97 \text{ \AA}$ .  $Z = 4$ .

Laboratory studies to determine the subsolidus compatibility triangles show that at  $650^\circ$ , melanotekite can coexist with the following minerals; alamosite ( $\text{PbSiO}_3$ ), quartz, hematite, magnetoplumbite ( $\text{PbO} \cdot 6\text{Fe}_2\text{O}_3$ ), and plumboferrite ( $\text{PbO} \cdot 2 \text{Fe}_2\text{O}_3$ ). In addition a new ternary phase, probably  $12\text{PbO} \cdot \text{Fe}_2\text{O}_3 \cdot 2\text{SiO}_2$ , has been encountered."

#### Voltzite

"Voltzite" a paper by Clifford Frondel, The American Mineralogist, May/June 1967, Vol. 52, Nos. 5/6, pages 617-634. Abstract as follows:

A seemingly homogeneous mineral from Sterling Hill, New Jersey is found to be a mixture of  $\text{ZnS}$  (wurtzite) and an organometallic compound containing zinc. The bulk analysis show  $\text{Zn} > \text{S}$  in atomic percent, and can be interpreted as of a zinc oxysulfide, but the Zn present over the requirements of the S is contained in the organic component. The original voltzite from Rosiers, France, was described as zinc oxysulfide,  $\text{Zn}_5 \text{S}_4 \text{O}$ , but is an apparently identical mixture. A number of probably similar occurrences have been reported in the literature. These include six localities for supposed zinc sulfocarbide, and five analyzed occurrences of so-called zinc oxysulfide.

The Sterling Hill material has the bulk composition Zn 60.63, Fe 0.32, Mn 0.016, S 27.23, C 3.38, H 0.69, N none, O (7.30), total 100.00 percent (average of three). The atomic ratio Zn / S is 1.09, corresponding to  $\text{ZnS}$  82.19,  $\text{ZnO}$  6.83. The mineral occurs as brownish black, submicrocrystalline botryoidal crusts. Small grains are transparent and faintly birefringent. The mean index of refraction is 2.08, and the specific gravity is 3.48. It is readily soluble in HCL with release of the organic component. The latter is a zinc salt of a highly oxidized organic acid. It carbonizes below  $400^\circ$ , turning mineral black. X-ray thermal and infrared absorption data are given.

#### Antimonium Groutite

"Antimonium Groutite" a paper by Cornelius Klein, Jr. and Clifford Frondel, the American Mineralogist, May/June 1967, Vol. 52, nos. 5/6, pages 858/859.

"Groutite has been identified as thin rectangular plates up to 0.5 mm on edge lining an open veinlet in andradite and franklinite ore from Franklin New Jersey. Electron microprobe analysis surprisingly revealed the presence of Sb. Quantitative determinations gave Sb  $5.7 \pm 0.5$  percent and Mn  $56.3 \pm 1$  percent, corresponding to  $Sb_2O_5$  7.6 percent and  $Mn_2O_3$  80.9 percent. Fe, Al, Zn and Si were not detected. If the remainder, 11.5 percent, is taken as water the analysis corresponds to (Mn 0.89 Sb 0.04) O (OH) 1.11. The unit cell dimensions obtained by least squared refinement (Burnham, 1962) of selected lines in the X-ray powder diffraction pattern are: a  $4.558 \pm 0.005$  Å, b  $10.727 \pm 0.034$ , c  $2.894 \pm 0.004$  Å. The calculated density based on the electron probe analysis and the measured unit cell dimensions is 4.16. Collin and Lipscomb (1949) obtained a 4.58, b 10.76, c 2.89 on the type groutite of Gruner (1947) from the Cuyuna Iron Range, Minnesota. The calculated density of this material is 4.17 and the value measured by Gruner is 4.144.

The crystals were found by X-ray single-crystal study to be flattened on (010) and elongated (001). There is an almost micaceous cleavage on (010) and an indistinct cleavage on (100) or (110). Very thin cleavage flakes tend to undulate or warp. The color is black. In very strong illumination the mineral is translucent and deep reddish brown in color. Optically positive, with the axial plane (010) and X parallel to (001). Extinction parallel; 2V medium. Strong pleochroic, with a 2.1-2.2 (Yellowish brown) 2.1-2.2 (dark brown to purplish black). The optical orientation is identical with that of diaspre. Optical data are lacking for groutite from Minnesota and for montroseite, both of which are virtually opaque.

The presence of Sb in groutite is of interest in connection with the puzzling silicoantimonides of magnesium catoptrite and yeatmanite (the latter is known only from Franklin). These complex minerals are structurally related to pyrochroite (and groutite) and may be stuffed derivatives thereof, (Moore, 1966). If the Sb is present as  $Sb^{5+}$  in the Franklin material, valence compensation may be effected by the omission of H from a hydrogen bond analogous to the series extending from montroseite,  $VO(OH)$  to paramontroseite,  $VO_2$  (Evans and Mrose, 1955)."

#### Leucophoenicite

"On Leucophoenicites: I. A note on form developments" a paper by Paul B. Moore, the American Mineralogist, July/August 1967, volume 52, Nos. 7/8, pages 1226/1232.

"Leucophoenicite,  $3 Mn_2 SiO_4 \cdot Mn(OH)_2$ , is generally regarded as a member of the manganese humite group. However, unlike the monoclinic members alleghanyite,  $2 Mn_2 SiO_4 \cdot Mn(OH)_2$ , and sonolite,  $4 Mn_2 SiO_4 \cdot Mn(OH)_2$  which seem to be normal members of the manganese humite series, being isotypic with chondrodite and clinohumite respectively, leucophoenicite does not appear to have the orthorhombic symmetry expected for the manganese analogue of humite. The detailed studies on leucophoenicite morphology by Palache (1928) led him to conclude that "No interpretation of the highly peculiar assemblage of forms offered the slightest resemblance to the form series of any member of the humite group to which leucophoenicite is related chemically".

Leucophoenicite is one of the more conspicuous and abundant of the accessory minerals from Franklin, N. J. occurring as raspberry red to pink masses usually associated with green willemitte and coarse granular franklinite. In most specimens it appears as a replacement mineral and Palache considered it a pneumatolytic product, somehow connected with the pegmatite lenses which intruded certain portions of the ore body. Crystals of leucophoenicite, however, appear to be confined to open hydrothermal veins and display a wide variety of developments and a range of colors from pink to red to brown.

No structure-cell studies on leucophoenicite have been done to my knowledge, and this effort was undertaken to elucidate the species as a portion of work on manganese<sup>olivines</sup> and humites in general. This work turned out to be full of surprises. There appear to be no less than four kinds of leucophoenicites, distinguishable by their powder patterns and structure cells and to a lesser extent, physical properties and paragenesis. Briefly stated, the various leucophoenicites can be divided crystallographically into two categories which I call m-leucophoenicites and o-leucophoenicites. The m-leucophoenicites have pseudo-orthorhombic cells with monoclinic intensity relationships, the pseudo-orthorhombic cell translations being closely analogous to humite but requiring a doubling of c. All single crystals of pink and red leucophoenicites examined so far belong here. The o-leucophoenicites are three types. The orthorhombic isotype of humite; the orthorhombic member closely analogous to humite but with doubled c which is represented in the abundant massive raspberry-red material from Franklin and some "hydrotrophroites" from Pajsberg; and orthorhombic members with unusually large identity translations along the c axis, normal to the assumed tephroite and pyrochroite layers. Some specimens show manifestations of semi-random structure, with streaks parallel to this translation on Weissenberg photographs. Many of the so-called "hydrotrophroites" and platy brown leucophoenicites belong here.

The paper concerns the m-leucophoenicite crystals of Palache and a revision and discussion of their morphology. Regarding the crystal chemistry of the o-leucophoenicites, the work is as yet incomplete and shall be reported later. In particular, their chemical variations must be assessed which at present are unknown variables."

#### Barysilite

"Structure de la barysilite" by Janine Lajzerowcz, C.R. Acad. Sci., Paris, Vol. 259, pages 4248-4250, 1964. Min. Abst. Vol. 18, Dec. 1967, page 244.

"From the X-ray diffraction and IR absorption studies reported the formula of barysilite is not  $Pb_3Si_2O_7$  but  $MnPb_8.3(Si_2O_7)$ ; it is rhombohedral with  $a = 9.821 \pm 0.005$  and  $c = 38.38 \pm 0.05\text{\AA}$ ; space group  $R\bar{3}c$ . Electron microprobe analysis confirmed the presence of Mn and crystals synthesized according to the new formula gave good agreement between calculated and measured density. The crystal structure has been refined to R 0.20!"

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THE EXCLUSIVE MINERALS OF FRANKLIN/OGDENSBURG, N.J.  
(as of January 1968)  
Frank Z. Edwards

One of the attractions of Franklin/Ogdensburg minerals for the scientist and the collector is the number and diversity of exclusive species - that is, those minerals found only in this area. In his classic Professional Paper #180, "The Minerals of Franklin and Sterling Hill, Sussex County, New Jersey", Charles Palache listed thirty such species. Today, thirty odd years later, this list is repeatedly cited although many changes make it valid no longer. An authentic current list, therefore, should be both useful and interesting.

To prepare this list it was necessary to individually review the minerals shown by Palache plus the new minerals reported from Franklin/Ogdensburg since 1934. This survey revealed that many of these minerals have not been studied for years, affording many research opportunities for our scientists. I do hope that some of our professional members undertake such research. It would be a welcome reward for the preparation of this paper.

This review includes all papers reported in the American Mineralogist through Volume 52, #9/10, September/October 1967 and Mineralogical Abstracts through Volume 18, #3, September 1967.

Antimonian Groutite (MnSb)O(OH)

This mineral is the latest addition to the list of the Franklin/Ogdensburg one locality minerals. Discovery of this variety was announced in the May/June 1967 issue of the American Mineralogist by Cornelius Klein, Jr. and Clifford Frondel. An abstract of their paper is given earlier in this issue of The Picking Table.

Cahnite  $2[\text{Ca}_2\text{B}(\text{OH})_4\text{As}_2\text{O}_4]$  Hey 10.2.2

Since the original discovery at Franklin, cahnite has been found at Arendal, Norway (1952) and Capo di Bove, Rome, Italy (1960). This rare mineral has always presented problems for the research mineralogist. With the one exception noted by Palache, cahnite is found only as micro crystals, usually twinned and poorly crystallized. In 1948, Palache placed cahnite in the tetragonal disphenoidal class,  $\bar{4}$ ; the first mineral to belong to this crystal class. Since then, Bugge using Arendal crystals claimed that the distribution of (311) faces suggested a scalenohedron rather than a disphenoid. Embrey, using Capo di Bove material, suggested that the structure is similar to that of zircon. Formulas cited also vary; the one shown above, from cell contents derived by Embrey, is accepted by Hey (1963 appendix).

Calcium Larsenite (See Esperite)

Chalcophanite  $2[\text{ZnMn}_3\text{O}_9.3\text{H}_2\text{O}]$  Hey 7.5.7

Chalcophanite is no longer a Franklin/Ogdensburg exclusive. Among other localities given in mineralogical papers are Tasmania, Australia, Colorado, India, the Transvaal, Serbia and Macedonia. With increased interest in the manganese oxides, chalcophanite is frequently mentioned in research papers. Formula and cell contents as derived by Wadsley and accepted by Hey (1963 appendix) are given above.

Chlorophoenicite  $(\text{Mn, Zn})_5 \text{AsO}_4 (\text{OH})_9$

Hey 20.3.10

Chlorophoenicite is still a Franklin/Ogdensburg exclusive mineral. This species has been neglected by our research scientists. The 1924 description of Gage, Foshag and Berman still provides most of the data available on this mineral. Dana's 7th (Volume 2, page 778) does give additional crystallographic data derived by Palache (1946).

Clinohedrite  $2 [\text{CaZnSiO}_4 \cdot \text{H}_2\text{O}]$

Hey 14.7.8.

Clinohedrite also stays on the Franklin/Ogdensburg exclusive minerals list. This too is another mineral neglected by research mineralogists. Clinohedrite was described in 1898 by Penfield and Foote. Thirty years later, Palache and Bauer provided new crystallographic data and analyses, confirming the original description. Thirty five years later, two Russian scientists, Nikitin and Belov, analyzed the crystal structure, determined the cell contents and showed that clinohedrite had been incorrectly assigned to the series containing hemimorphite. (The Picking Table February 1967).

Delta Mooreite - (See Torreyite)

Desaulite

Desaulite was originally described as a hydrous nickel magnesium silicate by Koenig in 1889. In 1966, Faust showed by chemical, optical and X-ray powder diffraction studies that desaulite and many other hydrous nickel magnesium minerals were actually pimelite, a clay mineral found in many locations.

Esperite  $\text{Ca, Pb}(\text{ZnSiO}_4)_4$

Hey 14.7.10

Esperite, previously known as Calcium Larsenite, continues as an Franklin/Ogdensburg exclusive mineral. Moore, in 1965, provided data showing that calcium larsenite was not a larsenite but a new type of zinco silicate, monoclinic, and with the formula shown above. This necessitated a change of name which Moore provided in Esperite. (The Picking Table February 1965)

Feitknechtite ( See Hydrohausmannite)

Ferroschallerite

In 1953, Frondel and Bauer found ferroschallerite to be a friedelite relatively high in Fe and As but not sufficient to be regarded either as a variety or a separate species.

Franklinite  $8 [(\text{Zn, Mn, Fe}^{2+})(\text{Fe}^{3+}\text{Mn}^{3+})_2 \text{O}_4]$  Hey 7.5.10

The status of Franklinite as a Franklin/Ogdensburg exclusive species is open to question. Palache included franklinite in his list although there had been reports of other finds. Also, Wilkinson states "Franklinite has also been found at several other places. This is mentioned because it is the belief of many persons that the mineral occurs solely in New Jersey".

However, Dana's System, 7th Edition, states "The mineral has been said to occur at Altenberg, near Aix-la-Chapelle, Germany, in amorphous masses and at a few other localities, but verification is lacking." Since the publication of Volume 1 of Dana's 7th in 1944, no reports have been made of any new finds of franklinite at other locations. Therefore, with Dana as the authority, and until proved to the contrary, I believe that franklinite should remain on the exclusive list.

Perhaps the confusion is the result of the great variation in the mineral itself. For instance, Metsger, Tennent and Rodda (1958) found "The variation from black to red willemitite (at Sterling Hill) is due to color differences in inclusions <10 $\mu$  of franklinite. Red franklinite is non magnetic with a unit cell dimension of nearly 8.51 $\text{\AA}$ . Black franklinite is magnetic with a unit cell dimension of about 8.42 $\text{\AA}$ ." These and other variations are substantial and a study in depth of this mineral with modern equipment should be interesting and rewarding.

Gageite (Mn,Mg,Zn)<sub>8</sub> Si<sub>3</sub>O<sub>14.2</sub> or 3H<sub>2</sub>O Hey 14.7.14

Gageite remains a Franklin/Ogdensburg exclusive mineral. The last report on this species was in 1928 when Palache supplied new analyses and optical data.

Glaucochroite 4 [(Mn,Ca) SiO<sub>4</sub>] Hey 14.18.10

Glaucochroite also remains as a Franklin/Ogdensburg exclusive mineral. A 1933 report indicated that tephroite and glaucochroite had been found in an ancient manganese rich iron slag in central Asia. Since slags are man made, this cannot be considered a natural occurrence. Since the publication of Professional Paper #180, additional data has been accumulated for glaucochroite. Schaller (1935) provided optical data; Poldevaart (1950) additional figures; and O'Mara (1951) unit cell and space group.

Hancockite (Pb,Ca,Si)<sub>2</sub> (Al,Fe)<sub>3</sub>Si<sub>3</sub>O<sub>12</sub>)OH Hey 16.14.13

Hancockite also remains on the Franklin/Ogdensburg exclusive mineral list. It also has been neglected by researchers. The only data available on hancockite may be found in Paper #180 derived from the original work of Penfield and Warren (1899) and optical data by Larsen (1921).

Hardystonite 2 [Ca<sub>2</sub>ZnSi<sub>2</sub>O<sub>7</sub>] Hey 14.7.7

Hardystonite continues on the Franklin/Ogdensburg exclusive list. This mineral also lacks recent data. All of the information available on hardystonite may be found in Paper #180.

Hendricksite KZn<sub>3</sub>(Si<sub>3</sub>Al)O<sub>10</sub>(OH)<sub>2</sub>

This recent addition to the Franklin/Ogdensburg exclusive mineral list was announced by Frondel and Ito in July 1966. (See The Picking Table February 1967 and August 1967)

Hetaerolite            4 [ZnMn<sub>2</sub>O<sub>4</sub>]            Hey 7.5.5.

Hetaerolite no longer belongs on the Franklin/Ogdensburg exclusive list. It has been found in manganese deposits in Japan and probably elsewhere.

Hodgkinsonite            ZnMn(SiO<sub>4</sub>)(OH)<sub>2</sub>            Hey 14.7.13

Hodgkinsonite stays on the Franklin/Ogdensburg exclusive list. Considerable new data, including the revised formula above, has resulted from recent research. Such data is given in The Picking Table issues of February 1964 and August 1965.

Holdenite            2 [(Mn,Ca)<sub>25</sub> (Zn,Mg,Fe)<sub>15</sub> (AsO<sub>4</sub>)<sub>7</sub> (OH)<sub>33</sub> O<sub>13</sub>]            Hey 20.3.9

Holdenite also remains on the Franklin/Ogdensburg exclusive mineral list. A paper by Prewitt-Hopkins (1949) supplements the information given in Paper #180 with x ray study data. All details are included in the description of holdenite in Dana's 7th (Volume 2, Page 775)

Hydrohausmannite

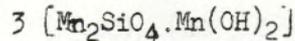
Hydrohausmannite was originally described from Franklin by Frondel in 1953. Later it was found to be a mixture of three manganese oxides, including feitknechtite, by Bucher 1965 (The Picking Table February 1966). The old hydrohausmannite and the new feitknechtite are found in many manganese deposits, and neither belongs on the Franklin/Ogdensburg exclusive mineral list.

Jeffersonite            4 [Ca(Mn,Zn,Fe)Si<sub>2</sub>O<sub>6</sub>]            Hey 14.7.18

In the only research work done on jeffersonite since the publication of Paper #180, (and actually for many years previous) Frondel (1966) analyzed a number of dark colored pyroxenes, found them to be members of the aegerine-augite series, and concluded that jeffersonite should be set aside as lacking species of varietal significance. Therefore, technically jeffersonite should be removed from both our species list and our exclusive minerals list. However, Dr. Frondel later acknowledged that if he had been able to analyze specimens of jeffersonite from the original locality (the Noble pit, Sterling Hill Mine) the study he wrote and published may have been different. (See The Picking Table August 1967). Now that Dr. Frondel does have specimens of the original jeffersonite, I believe it advisable to await further word before we remove this species from the books. In the meantime, I also believe that jeffersonite should be shown on our exclusive minerals list but with a question mark.

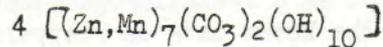
Larsenite            8 [PbZnSiO<sub>4</sub>]            Hey 14.7.9

Still a Franklin/Ogdensburg exclusive mineral, larsenite has been the subject of considerable research since the publication of Paper #180. In 1958 Layman provided data on the unit cell (given above), space group, and x ray data; Prewitt and Kuchner (1966) the crystal structure; and Frondel/Ito 1967 on the synthesis of larsenite (See The Picking Table August 1966 and February 1968).

Leucophoenicite

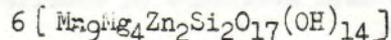
Hey 14.17.6

While leucophoenicite should still be listed as a Franklin/Ogdensburg exclusive mineral, it might also carry a question mark. In a preliminary paper (see earlier in this issue) Moore (1967) reports that there appears to be four kinds of leucophoenicites. Additional research is under way and a full report on this specie/species should be available in the near future. Prior to Moore's investigations, no research had been done on this mineral since 1928.

Loseyite

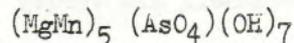
Hey 11.6.14

Loseyite continues to be one of the exclusive Franklin/Ogdensburg exclusive minerals. No data has been added to that given in Dana's 7th, which provides information available to the Harvard staff after the publication of Paper #180. Specimen material still seems to be limited to that on hand at Harvard.

McGovernite

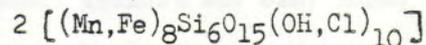
Hey 17.7.7

This mineral also remains on the Franklin/Ogdensburg exclusive list. Wuensch (1960) supplemented the data in Paper #180 with a detailed x ray study which provided unit cell dimensions as above; the largest unit cell yet discovered for an inorganic material which is not a stacking polymorph.

Magnesium Chlorophoenicite

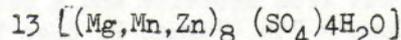
Hey 20.8.10

This species also remains on the Franklin/Ogdensburg one locality mineral list. Here again, Dana's 7th contains all the data known. However, additional specimen material was found at Sterling Hill three years ago. With ample research material now available, perhaps additional data will be sought.

Manganpyrosmalite

Hey 17.3.10a

In 1953 Frondel announced manganpyrosmalite as a new mineral from Sterling Hill. However, since then it has also been located at Broken Hill, Australia (1956), Japan (1964) and other locations.

Mooreite

Hey 25.9.9

Here again the data shown for Mooreite in Dana's 7th (Vol.2 page 574) is all that is available. A paper by Hans Rechenber (Min. Abst. vol.11, p.384) states that "the action of salt water on the minerals of a vein in the Augusta Victoria mine at Huls, Westphalia, has produced the following secondary minerals (determined optically on small amounts) millerite, mendepite, alumian bianchite, voltaite, mooreite, dickite, sericite and blodite". I am advised that such identification is doubtful and considered insufficient for lack of data. Pending more substantial verification, I believe that mooreite should remain on the Franklin/Ogdensburg exclusive list.

Roeblingite  $\text{Ca}_7\text{Pb}_2\text{Si}_6\text{O}_{14}(\text{OH})_{10}(\text{SO}_4)_2$  Hey 17.9.6

Since Roeblingite is also found at Langban, it is no longer a Franklin/Ogdensburg exclusive. However, this interesting species and its alteration products are under study at Harvard and verbal reports indicate that several new lead oxides may result.

Roepperite  $4 [(\text{Fe},\text{Mn},\text{Zn})_2 \text{SiO}_4]$  Hey 14.7.15

Roepperite also continues as a Franklin/Ogdensburg exclusive mineral. Again, Paper #180 gives all the known data on roepperite except for one partial analysis by Hurlbut (1961).

Roweite  $4 [ \text{H}_2(\text{Mn},\text{Mg},\text{Zn})\text{Ca}(\text{BO}_3)_2 ]$  Hey 9.4.1

This mineral announced in 1937 by Berman and Gonyer is also one of the exclusive Franklin/Ogdensburg exclusive minerals, since only three specimens have been reported. All of the data available on Roweite may be found in Dana's 7th (Volume 2, page 377).

Schallerite  $\text{Mn}_8[(\text{SiO}_3)_6 \cdot (\text{OH})_{1.2}(\text{As}_2\text{O}_5)_{.7}] + 3\text{H}_2\text{O}$  Hey 17.7.8

Schallerite also stays on the Franklin/Ogdensburg exclusive minerals list. Professional Paper #180 contains practically all of the data available for this mineral. In 1953, McConnell did verify that schallerite is hexagonal.

Sussexite  $[(\text{Mn},\text{Mg})(\text{BO}_2)(\text{OH})]$

In 1934, Sussexite was found as veinlets at the Chicagoan mine, Iron County, Mich. Therefore it can no longer be listed as a Franklin/Ogdensburg exclusive. For data on this species see Dana's 7th (Volume 2, page 375) plus the Frondel/Ito 1965 paper (See The Picking Table August 1965).

Torreyite  $(\text{Mg},\text{Zn},\text{Mn})_7\text{SO}_4(\text{OH})_{12} \cdot 4\text{H}_2\text{O}$  Hey 25.9.10

Delta mooreite was listed by Palache as one of the Franklin/Ogdensburg exclusive minerals. But in 1949 research by Prewitt-Hopkins showed this mineral to be structurally different from mooreite and a distinct species. It was then renamed Torreyite. Dana's 7th (Volume 2, page 575) contains complete information. It remains a Franklin/Ogdensburg exclusive.

Woodruffite  $(\text{Zn},\text{Mn}^2)_2\text{Mn}_5^4\text{O}_{12} \cdot 4\text{H}_2\text{O}$  Hey 7.5.7a

Woodruffite originally found at Sterling Hill was named and described by Frondel in 1953. Since then it has been located at Sandur, Mysore, India (The Picking Table August 1964). Data on this species may be found in the original paper by Frondel and in the Nagana report (1963).

Yeatmanite  $(\text{Mn},\text{Zn})_{16}\text{Sb}_2\text{Si}_4\text{O}_{29}$  Hey 17.7.12

In 1938, Palache, Bauer and Berman announced the discovery of yeatmanite, the first antimony bearing mineral from Franklin. This report plus papers by

Moore and Frondel (The Picking Table August 1967 and February 1968) provide the data available on this species. It has not been reported from any other location and remains on the Franklin/Ogdensburg exclusive minerals list.

Zincite (ZnO) Hey 7.5.1

Zincite no longer appears on the Franklin/Ogdensburg exclusive list. It has been reported from Poland, Tuscany, Spain and Tasmania. Considerable research, particularly on synthetic zinc oxide, has added considerable data on this species.

Zinc-Manganese Cummingtonite 2 [(Mg,Fe<sup>2+</sup>,Mn,Zn)<sub>7</sub> Si<sub>8</sub>O<sub>22</sub>(OH)<sub>2</sub>] Hey 14.7.17

The only information available on this variety of cummingtonite named by Bauer and Berman in 1930, can be found in Paper #180. However, Hey refers to a zinc-manganese-cummingtonite of Shubnkova and Yufarov as a synonym of zinc-manganese-cummingtonite. This would seem to indicate that this variety may be found elsewhere. However, I have been unable to trace this reference and pending further information, I am continuing to show this variety as a Franklin/Ogdensburg exclusive but with a question mark.

Zinc Schefferite 4 [Ca(Mg,Mn,Zn)Si<sub>2</sub>O<sub>6</sub>] Hey 14.7.16

This variety of pyroxene was announced in 1900 by Wolff; all the data known is given in Professional Paper #180. It has not been located elsewhere and continues on the Franklin/Ogdensburg exclusive list.

This completes the review of individual mineral species and varieties, producing the following list of Franklin/Ogdensburg exclusive minerals:

MINERALS FOUND ONLY AT FRANKLIN/OGDENSBURG, NEW JERSEY  
(as of January, 1968)

Antimonian Groutite	Larsenite
Chlorophoenicite	Leucophoenicite (?)
Clinohedrite	Loseyite
Esperite	McGovernite
Franklinite (?)	Magnesium Chlorophoenicite
Gageite	Mooreite (?)
Glaucochroite (?)	Roepperite
Hancockite	Roweite
Hardystonite	Schallerite
Hendricksite	Torreyite
Hodgkinsonite	Yeatmanite
Holdenite	Zinc-manganese Cummingtonite (?)
Jeffersonite (?)	Zinc Schefferite

(?) Some uncertainty - see detailed explanation in the individual mineral review.

Zincite

Our micromount expert, Dr. W. B. Thomas, has sent in the following article, which should interest all collectors.

ZINCITE MICROMOUNT CRYSTALS

Dr. W. B. Thomas

The principal minerals of the Franklin-Ogdensburg area are willemite, zincite and franklinite. But, strangely, good crystals for micromounts are scarce. However, zincite can be easily worked to bring out good micromount crystals that will show fine pyramids and variations.

The secret is to find good ruby zincite. This is soluble in hydrochloric acid as well as in the cheaper muriatic (sulphuric) acid. Zincite crystals are more resistant to acid than the massive zincite. Pickle a batch of ruby zincite in acid for several days; that should produce tiny rows of pyramids requiring 45x for magnification. Wash in running water and use a soft hand brush to remove the flocculent covering. When dry, examine carefully. If the result is not satisfactory, you may have to return the material to the acid bath for additional etching of the matrix. Be sure to use dilute acid and take plenty of time.

In addition to the zincite crystals, you will often find nicely truncated octahedrons of franklinite.

\* \* \* \* \*

Carbonates

"Miscibility and nomenclature of the carbonates with dolomite type of structure" a paper by Y. Mincheva-Stefanova and M. Gorova. Bull. Geol. Inst. Ser. Geochem. Min. Petr., volume 16, pages 95-118, 1967. Min. Abst., Vol. 18, Dec. 1967, page 282.

"In addition to dolomite, kutnahcrite, theoretical ferro-ankerite and ankerite, ferrodolomite, ferromangandolomite, manganankerite and ferromagnesian kutnahcrite are recognized as varieties. Members with higher manganese content are considered to have formed under higher pressure, those richer in iron at higher temperatures; thus they are good indicator minerals in hydrothermal deposits. D.t.a. curves of these members vary considerably and cannot be used for diagnostic purposes."

\* \* \* \* \*

MEMBERSHIP RENEWAL

I would like to renew my membership in the Franklin-Ogdensburg Mineralogical Society for the year \_\_\_\_\_. Dues of \$2.00 attached.\*

Name (Mr. Mrs. Miss) \_\_\_\_\_

Address \_\_\_\_\_ Tel. No. \_\_\_\_\_

\_\_\_\_\_ Zip Code \_\_\_\_\_

PLEASE PRINT your name and mailing address exactly as you wish it to appear on our mailing list.

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APPLICATION FOR MEMBERSHIP

I am interested in the Franklin Ogdensburg Mineralogical Society and would like to apply for admission as a member. \$2.00 in payment of 1968 dues, and registration fee of \$1.00 is enclosed.\*

Name (Mr. Mrs. Miss) \_\_\_\_\_

Address \_\_\_\_\_ Tel. No. \_\_\_\_\_

\_\_\_\_\_ Zip Code \_\_\_\_\_

PLEASE PRINT your name and mailing address exactly as you wish it to appear on our mailing list.

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LITERATURE ORDER

Will you please send me the following literature -

Golden Series -	Rocks and Minerals	_____	copies @	\$1.00 =	_____
Jones	Nature's Hidden Rainbows- Fluorescent Minerals of Franklin, N.J.	_____	copies @	2.95 =	_____
Knoll	Mineral Identification for the Amateur	_____	copies @	1.00 =	_____
Mason	Trap Rock Minerals of New Jersey	_____	copies @	1.50 =	_____
Palache	The Minerals of Franklin and Sterling Hill, N.J.	_____	copies @	2.00 =	_____
Pepper	Historic New Jersey	_____	copies @	4.95 =	_____
Widmer	Geology and Geography of N.J.	_____	copies @	3.95 =	_____
Wilkerson	The Minerals of Franklin and Sterling Hill, N.J.	_____	copies @	1.50 =	_____
Yolton	Fossils of New Jersey	_____	copies @	1.50 =	_____
Back issues of	THE PICKING TABLE	_____	copies @	.25 =	_____
F.O.M.S.	Lapel Buttons <u>or</u> Lapel Pins (specify)	_____	@	2.50 EACH	_____
F.O.M.S.	Shoulder Patch	_____	@	1.00	_____

Total - (check enclosed)\* \_\_\_\_\_

NOTE: rock picks, chisels, magnifiers and safety glasses available for purchase at meetings and field trips.

\* Please mail checks to Julian M. Butler, 712 Pemberton Ave. Plainfield, N.J. 07060