

VALIDATION OF MINERAL SPECIES FROM FRANKLIN AND STERLING HILL

Two of the major objectives of our science programs are to develop an accurate list of minerals from Franklin and Sterling Hill and to find as many additional valid minerals as possible. Such a list must be scientifically validated and entirely beyond the realm of opinion.

Many conflicting lists of the minerals found at Franklin and Sterling Hill have been made over the years. The most authoritative was that compiled by Professor Palache in 1935. The study of the minerals has continued; scientists have utilized modern tools of research in the careful investigation of old and new specimens. Some listed species have been discredited, a number of new species have been discovered. The work is far from complete. There must be a starting point, however, and we are fortunate to be able to set forth herewith a current list of validated species.

Professor Clifford Frondel of Harvard University, the outstanding contemporary authority on Franklin minerals, has provided us with his list of validated minerals. The list includes all species that have been scientifically validated and reported in the scientific literature. It is not represented as a complete list of the minerals, some minerals have been reported, others are under test and many have not been brought to Dr. Frondel's attention. The list of validated species provides the basis for us as individuals and as a Society to render a real service to mineralogy by bringing other possibilities to the attention of competent authorities. Your Society is contributing broad distribution of this issue to Franklin collectors to provide the opportunity for maximum benefit to all.

Please examine the list and notes carefully. If you believe that you have a species of Franklin or Sterling Hill mineral not listed as a validated species, please contact us. Validation will give your labels meaning, contribute to the science of mineralogy and measurably to our knowledge and understanding of the Franklin mineral bodies.

ALPHABETICAL LIST OF VALIDATED SPECIES

Clifford Frondel

Department of Mineralogy, Harvard University, Cambridge, Massachusetts

Albite	Datolite	Ilmenite	Realgar
Allactite	Descloizite	Jeffersonite	Rhodochrosite
Allanite	Diopside	Johannsenite	Rhodonite
Andradite	Dolomite	Kentrolite	Riebeckite
Anglesite	Edenite	Kutnahorite	Roblingite
Anhydrite	Epidote	Kyanite	Roveite
Anorthite	Ettringite	Larsenite	Rutile
Anorthoclase	Fluoborite	Lead	Sarkinite
Antigorite	Fluorapatite	Leucophoenicite	Scapolite
Apophyllite	Fluorite	Loellingtite	Schallerite
Aragonite	Forsterite	Loseyite	Schefferite
Arsenic	Franklinite	Magnesium	Siderite
Arsenopyrite	Friedelite	Chlorophoenicite	Sillimanite
Augite	Gageite	Magnetite	Silver
Aurichalcite	Gahnite	Magnussonite	Skutterudite
Axinite	Galena	Malachite	Smithsonite
Azurite	Ganophyllite	Manganberzeliite	Spessarite
Barite	Gersdorffite	Manganite	Sphalerite
Barylite	Glaucochroite	Manganophyllite	Sphene
Barysilite	Glaucophanite	Manganosite	Spinel
Bementite	Goethite	Mangan-pyrosmalite	Stilbite
Bornite	Graphite	Marcasite	Stilpnomelane
Brandtite	Greenockite	Margarosanite	Sussexite
Brookite	Grossularite	McGovernite	Svabite
Brucite	Gypsum	Microcline	Talc
Bustamite	Hancockite	Millerite	Tennantite
Cahnite	Hardystonite	Molybdenite	Tephroite
Calcite	Hastingsite	Mooreite	Thomsonite
Celestite	Hausmannite	Muscovite	Thorite
Cerussite	Hedenbergite	Nasonite	Torreyite
Chabazite	Hedyphane	Natrolite	Tourmaline
Chalcocite	Hematite	Niccolite	Tremolite
Chapcophanite	Hemimorphite	Norbergite	Willemite
Chlorophoenicite	Hetaerolite	Orthoclase	Wollastonite
Chondrodite	Heulandite	Pararammelsbergite	Woodruffite
Chrysotile	Hodgkinsonite	Pectolite	Xonotlite
Clinohedrite	Holdenite	Phlogopite	Yeatmanite
Copper	Hortonolite	Prehnite	Zinalsite
Corundum	Hyalophane	Pyrite	Zincite
Cryptomelane	Hydrochausmannite	Pyrochroite	Zircon
Cumingtonite	Hydrohetaerolite	Pyrrhotite	Zoisite
Cuprite	Hydrozincite	Quartz	
Cuspidine	Idocrase	Rammelsbergite	

Two additional minerals have been added as we go to press:
Birnessite and Todorokite, from Sterling Hill.

Notes on The List of Validated Minerals

Actinolite - probably occurs, but not proven.
Arseniosiderite - reported occurrence not valid, probably
a new species.
Calcium Larsenite - not a larsenite, to be renamed.
Caswellite - pseudomorph consisting chiefly of andradite garnet.
Chloanthite - mixture of rammelsbergite, pararammelsbergite and
skutterudite.
Crocidolite - properly named glaucophane.
Delta-mooreite - renamed torreyite.
Diabantite - material so-called is stilpnomelane
Ferroschallerite - species discredited, material is friedelite.
Hornblende - doubtless occurs but not yet identified.
Limonite - by modern definition, material is hematite.
Mariposite - material so-called is kyanite.
Psilomelane - by modern definition, this species is not known here.
Serpentine - group name, includes antigorite, chrysotile,
bementite species.
Titanite - modern name is sphene.
Vesuvianite - modern name is iodcrase.

Some of the species that might be validated - with your help - include actinolite, almandite, analcime, annabergite, anthophyllite, arsenolite, bianchite, biotite, bixbyite, braunite, conichalcite, caryinite, covellite, erythrite, hexahydrite, hornblende, hydrocerussite, jacobsite, kaolinite, linarite, melanterite, orpiment, wurtzite and others. If you believe that you have one or more of the latter or other Franklin-Sterling Hill species, please write to:

John G. Hendricks
121 Ely Street or F-QMS, Box 146
Boonton, New Jersey Franklin, New Jersey

describing the mineral and associations as clearly as possible. The information will be collated for Dr. Frondel, evaluated, investigated and the results made known to you periodically. It should do much to clarify the many questions and uncertainties existent and a big step toward replacing opinion with fact.

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Arrangements are being made with a top-flight mineral photographer for an extensive series of 35 mm color slides and glossy color postcards of the Franklin-Sterling Hill minerals. Tentative prices are \$1.00 for a set of five different postcards, \$2.50 for a set of five different slides. Since appreciable investment is required if this program is to be continued, it is essential that you let us know of your interest.

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Museum Program Report

The museum program has made tremendous strides. While it is not yet a reality, the most difficult hurdles seem cleared and an excellent museum seems in the near future.

As set forth in our objectives, we feel that such a project should be a community undertaking. To achieve this, several joint meetings have been held with the Kiwanis and other civic-minded people. The first important steps have been taken. An independent non-profit organization, the Franklin Museum Association, Inc. is being incorporated. This should be completed before mid-March. The programs which follow are subject to the action of this body. It is expected that F-OMS will be an organization member and hoped that all of you will join as individual members.

Generally, we contemplate a free museum of Franklin-Sterling Hill minerals to be open to the public week-ends and most of the week, at least in season, with an administrator in attendance. Exhibits would include a species collection, fluorescent collection, a dump collection, and special exhibits. An adjoining library would house relevant books, papers, maps and photographs. It is hoped that eventually such tools as binocular and analytical microscopes and the like could be provided for identification and research.

The establishment and maintenance of such a museum requires a building, minerals and other facilities and services. It is expected that these will be realized from membership dues, income from a museum store, donations or grants of money, specimens, materials and services and loan of specimens.

While arrangements are not complete, the New Jersey Zinc Company has generously indicated their willingness to make a portion of their chemical laboratory available for use as a museum. The space available includes a large room approximately 35' x 45' and an adjoining room suitable for an office or library. This provides the type of building prerequisite to the acquisition of fine specimens at the site of the historical studies of H. Lawson Bauer and his associates.

This portion of the laboratory has not been used for several years and help will be needed in removing equipment, painting, fixing the floor, carpentry and cleaning. This will probably be done weekends and, perhaps, evenings from mid-March through spring. Volunteers are needed; if you are willing to lend a helping hand for this most worthy project, drop a note to F-OMS or call John Hendricks (DE 4-5469) so that work may be planned without overloading anyone.

The solution to the problem of obtaining suitable cases for the exhibit of specimens may be at hand. Provided certain conditions are satisfied, excellent museum cases may be obtained from the National Museum of the Smithsonian Institution. If the conditions can be met, this would take care of all except perhaps the fluorescent display.

The basis of a museum is, of course, specimens. It is expected that the bulk of the minerals to be exhibited will be donated or loaned by those interested in this program. Pending availability of cases and completion of incorporation (to permit tax deductions by donors), there has been no general solicitation of specimens for exhibit or sale. However, a fine collection is now being held in trust for the museum and specimens of special interest or rarity have been offered. The New Jersey Zinc Company and its geologists have assured of their full cooperation in obtaining specimens. We hope also to obtain the loan of some of the outstanding Franklin specimens not on display at other museums and institutions.

Several books, photographs, reprints and maps relevant to Franklin minerals, mineralogy and history have been collected by F-OMS for the museum. Your Society solicits the donation of such materials, including, for example, the monthly house organ that was distributed by the New Jersey Zinc Company. Materials, information or questions may be forwarded to F-OMS, Miss Beatrice Gosling, 151 Avenue, Milburn, New Jersey, or any F-OMS officer.

The problems of establishing, operating and maintaining a museum are numerous and complex. The benefits to be derived by the community, the collector, the scientist and the visitor are more than deserving of the effort required. Many obstacles remain, but the sincere interest and cooperation of those approached is prophetic of the success of the program.

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Your Society is incorporated as a non-profit association under the state of New Jersey.

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As a result of large individual orders, we are advised by the Superintendent of Documents that they will reprint Palache's Professional Paper 180 (without revision). F-OMS has ordered a number of copies for resale to assure availability to you. Cost and printing dates have not been established.

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Membership Report

Membership as of March 1 (five months) numbers 148, with representation from fourteen states. About 25% are from the immediate Franklin area. Our colleagues range from complete novice through the entire range of amateurs to professional geologists and mineralogists, including a number that have earned international standing.

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Meetings

November President Richard Hauck greeted fifty-three members at our first general meeting on Saturday afternoon, November 14 at the Legion Home in Franklin. Mr. Robert W. Metsger, resident geologist of the New Jersey Zinc Company, discussed the origin of the ore minerals in technically accurate, easily understood terms. An abstract of his talk appears on the next page.

March Mr. Clarence Haight, former superintendent of the Franklin mine will show movies taken in both the Franklin and Sterling Hill mines and will briefly discuss mining methods at our March 26th meeting. Mr. Don McKechnie, present superintendent, has promised to say a few words also. Please bring your favorite specimens for the willemite display.

Schedule A tentative schedule of meetings and field trips for 1960 is given in the appendix. Visitors are welcome at the meetings which will be held at the Legion Home (off Rte. 23 at the Village Inn) in Franklin. Informal sessions start at 2 PM, the formal meeting at 2:30. Assistance will be given in identifying specimens. Field trips are limited to adult members. Individual meeting notices will not be sent.

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BRANDTITE: $2\text{CaO} \cdot \text{MnO} \cdot 2\text{As}_2\text{O}_3 \cdot 2\text{H}_2\text{O}$ was found as tiny colorless slender prismatic crystals at Sterling Hill in a vug with rhodochrosite and chalcopyrite on an intergrowth of calcite, franklinite, brown willemite and schalerite adjacent to black willemite. The vitreous mineral has perfect cleavage, is rather soft (3.5) and soluble in dilute acid. R.V. Gains, Am.Min., Jan.-Feb., 1959.

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LARSENITE: has been found, on careful x-ray analysis, not to be an olivene. F. Layman, Am.Min., Nov.-Dec., 1957. Note: subsequent studies at Harvard show that "calcium larsenite" is neither an olivene or a larsenite, but a separate species.

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Origin of Some of The Ore Minerals - Abstract
Robert W. Metsger
Resident Geologist, New Jersey Zinc Company

The Franklin and Sterling Hill ore bodies are both enclosed in country rock composed of a coarsely crystalline, graphitic and sparsely silicated white marble, the "Franklin" limestone which dips about 55° to the east and overlies the metasedimentary Cork Hill gneiss. The Franklin ore body was within a few feet of this gneiss, but the Sterling Hill ore body, three miles to the south, is situated about 600 feet above it. Graphite is abundant in the marble to within a few feet of the ore body, but it is unknown in the ore body proper.

The Franklin ore was composed mainly of green willemite with franklinite and zincite. The Ogdensburg willemite is chiefly brown, red or black in color. There is little of the green willemite so typical of the pepper and salt ore of the Franklin mine. The green color of the latter is due to fluorescence caused by the long wave ultra-violet radiation present in natural and common artificial light. The red and black willemite are both colored by inclusions of red or black franklinite a few millimeters in diameter. These have been formed as a product of the partial serpentinization of the willemite and are of a later generation than the gross franklinite.

Willemite is believed to have been the original ore mineral at Sterling Hill, though much willemite is of secondary origin. Zincite may have been formed as a product of the conversion of willemite to serpentine, friedelite, tephroite and other olivenes. Whereas many of the unusual minerals of Franklin were products of the reaction of the ore with associated "pegmatitic" rock, those at Sterling Hill are largely products of the alteration of the ore by more recently introduced magnesian solutions which also dolomitized large masses of the country rock.

I believe that both the Franklin and Sterling Hill ore bodies took on their present form and mineralogy by metamorphism during Grenville time from a previously existing ore body. This is based on the following observations:

1. The ore textures are identical with those found in the massive and limey gneisses of the region.
2. Potassium/argon determinations place ore minerals formation as about one billion years ago, which is identical with that of the gneisses of the area.
3. The long axes of the willemite crystals are oriented parallel with the major structural features of the ore body, indicating that the ore must have been present before folding took place or, at the latest, introduced during folding.

Those and other observations lead me to the conclusion that the ore bodies, as now constituted, are metamorphic in origin. What they were prior to Grenville time is thus far a matter of pure speculation. If they were sulfide bodies, it is difficult to explain the disappearance of the sulfur. Other postulated modes of origin are equally open to question and only continued study will provide the answer.

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Field Trips

Arrangements have been made for field trips to three Franklin quarries. None of these is normally open to collectors; strict observance of courtesy and safety rules is essential. The trips open only to adult members at their own risk.

The Rifle Range Quarry, formerly the Franklin Iron Company quarry, is located on the northeast corner of Buckwheat Road and Church Street, near Buckwheat dump. The white limestone, quarried as a flux for the iron furnace, is cut by pegmatite veins. It has yielded apatite, arsenopyrite, calcite, edenite, fluorite, galena, graphite, norbergite, pyrite, pyrrhotite, rutile, spinel, tourmaline and other minerals.

The Farber Quarry, formerly the Bigelow Quarry, is located on Cork Hill Road at the Franklin-Ogdensburg line. It is the only active local quarry. While not highly mineralized, tremolite in fluorescent crystals, pyrite crystals and calcite, chondrodite, dolomite, edenite, fluorite, graphite, hematite, phlogopite and scapolite are found.

The B. Nicol quarry, largest in the area, was active at the turn of the century as a source of flue for the blast furnaces. We will meet at 9 AM in the parking area beside Franklin Lake on Cork Hill Road before entering. It is essential that collectors stay well away from the chemical plant and solvent drums stored in the yard. Diopside, apatite, pyroxene and amphibole, graphite in crystals and spheroids, scapolite, fluorite, pyrite, spinel, chondrodite pyrrhotite and magnetite are found in the quarry and dump and tourmaline, arsenopyrite and other minerals have been found at this location.

No special plans have been made for group visits to the Buckwheat or Parker mineral dumps. It is expected that many will visit these areas before the meetings or after other field trips.

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MANGANBERZELIITE: $4(\text{Mn},\text{Mg})\text{O}\cdot 5\text{CaO}\cdot \text{Na}_2\text{O}\cdot 3\text{As}_2\text{O}_5$ is a resinous fine granular honey yellow mineral found as a $3/8$ -inch vein in normal green willemite ore from Franklin. It was recognized as a mineral new to the area by S. Schaub from optical and chemical tests and its identity has been established by C. Frondel.

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HYDROHAUSMANNITE: $(\text{Mn}_2,\text{Mn}_3)_3(\text{O},\text{OH})_4$ is the brownish black to iron black mineral associated, for example, with rhodochrosite, sussexite, and mooreite. It is commonly labelled pyrochroite, and is frequently pseudomorphic after pyrochroite which is a colorless mineral altering to hydrohausmannite on exposure to the moisture in the air. C. Frondel, Am. Min. Sept.-Oct., 1953.

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The Franklin Mineral Association (FMA), Box 408, Middleburgh, New York, publishes an annual 'Franklin Digest' a well-printed booklet specializing in reprinting important papers on Franklin mineralogy. Membership is \$2.00.

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"FERROCHALLERITE": This material was so designated originally on the basis of chemical composition. Modern x-ray techniques have shown that molecular structure is that of friedelite. C. Frondel and L. Bauer, Am. Min., 755, 1953.

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ZINALSITE: $6\text{ZnO}\cdot \text{Zn}(\text{OH})_2\cdot 2\text{Al}_2\text{O}_3\cdot 6\text{SiO}_2\cdot 9\text{H}_2\text{O}$ is a zinc-containing clay reported as a new mineral from southern Russia and Sterling Hill by the Russian, Chirkhrov. Abstract in Am.Min., Jan.-Feb., 1959.

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John S. Albanese, well-known mineral dealer and Franklin specialist, publishes a quarterly "Notes on Minerals of Franklin and Sterling Hill, New Jersey". Annual subscription is \$2.00. P.O. Box 221, Union, New Jersey.

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MAGNUSSONITE: is a fine-grained green manganese arsenate-silicate found in very small quantity on zincite-franklinite-willemite-calcite ore at Franklin. C. Frondel, Arkiv. Min. Geol. (Sweden), 1956.

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Calendar of Events for 1960

- March 26 Meeting. C. Haight will show movies in the Franklin and Sterling Hill mines. Display of willemites.
- April 9 Field Trip to Rifle Range Quarry, Franklin, New Jersey 9 AM - 1 PM.
- April 23 Meeting. N. Wintringham will discuss simple means of identifying minerals. Display of Parker Shaft minerals.
- May 7 Field Trip to Farber's Quarry, Franklin, New Jersey 9 AM - 12 M.
- May 21 Meeting. To be announced. Display of franklinites and zincites.
- June 23 Meeting. To be announced. Display of native elements.
- June 25 Field Trip to B. Nicol Quarry and vicinity, Franklin 9 AM - 3 PM.
- July 23 Meeting. To be announced. Display of rhodonites, hemimorphites and hodgkinsonites.
- August 27 Meeting. To be announced. Display of leucophoenicites, tourmalines and axinites.
- October 1 Annual Meeting. Kiwanis Mineral Exhibit.
- October 2 Kiwanis Mineral Exhibit.
- November 19 Meeting. Prof. Ralph Holmes will discuss niccolite and its associations briefly. His primary topic will be basic mineralogy. Display of corundum, garnet and hematite.

See also Page 6.

FRANKLIN-OGDENSBURG MINERALOGICAL SOCIETY, INC.

BOX 146

FRANKLIN, NEW JERSEY

The Franklin-Ogdensburg Mineralogical Society is a new organization established to provide a framework for a series of active programs designed to benefit the community, the collector and those interested in the minerals, mineralogy and geology of Franklin and Sterling Hill, New Jersey.

1. To establish, in cooperation with other interested groups, and maintain a sound, permanent museum of Franklin minerals in Franklin, New Jersey.
2. To develop new information on Franklin minerals and mineralogy, through cooperative scientific programs with universities, and other organizations and individuals.
3. To obtain and make available accurate up-to-date information on Franklin minerals and mineralogy.
4. To facilitate collecting of Franklin minerals while conserving material for future collectors.
5. To facilitate identification of Franklin minerals.
6. To promote fellowship and the advancement of mineralogy and geology by providing meetings of those interested in the Franklin Area.

Any adult interested in any of these or related programs is invited to join us. Membership dues of \$2.00 or questions concerning the Society may be addressed to:

Franklin-Ogdensburg Mineralogical Society, Inc.

Box 146
Franklin, New Jersey