



THE PICKING TABLE

FRANKLIN-OGDENSBURG MINERALOGICAL SOCIETY, INC.

BOX 146

FRANKLIN, NEW JERSEY

Special Research Issue

Volume 1

September, 1960

Number 3

DEDICATION

This issue of The Picking Table is dedicated to

Miss Alypia Wendt

RESEARCH PROGRAMS

The most important and lasting contribution our Society can make is to facilitate, encourage and sponsor scientific research relevant to the mineralogy and geology of the Franklin and Sterling Hill ore bodies and their environment. The systematic development of factual information will provide a better understanding and appreciation of the minerals.

Approach: Your Society has undertaken several basic programs of research. They include:

1. Providing a list of mineral species found in Franklin and Ogdensburg validated by competent authority.
2. Continuous screening and identification of promising or questionable specimens by competent investigators.
3. Encouraging, facilitating or sponsoring specific studies of the minerals and providing lists of the studies needed to those qualified and interested.
4. Sponsorship, at the professional level, of an annual symposium on the geology and mineralogy of the area.

These activities are supplemented by educational programs, such as providing authoritative speakers in selected fields, dissemination of factual information, sponsoring courses in mineralogy and geology and cooperative efforts to provide a permanent museum of Franklin minerals in Franklin.

Policy and Purpose: Our purpose is simple and uncomplicated: to increase the public knowledge and understanding of the local rocks and minerals. It is immaterial whether the studies are done, reported or published under our sponsorship. It is important that the work be done and of professional caliber and that the information be made generally available.

Participation: The interest and participation of amateur, professional and student is fundamental to the success of these programs. The vigorous interest and contributions of each in the general activities of our young organization is indicative of the potential. Please consider this your personal invitation to participate in these programs.

SYMPOSIUM

The details of the symposium are in the planning stage. The general framework of the meeting, however, has been established. Your suggestions and advice will be appreciated.

When and Where: The symposium will be held on a Saturday and Sunday, probably June 2 - 3 or September 23 - 24 in the Franklin, N.J. armory and/or Legion Home. It is intended that it be held in conjunction with a mineral exhibit, a field trip and perhaps other programs.

Content: The general symposium program will comprise several sections:

Papers on the geology of the area and the origin and paragenesis of the minerals.

Papers on special subjects and critical reviews

Papers reporting recent research on Franklin minerals.

A discussion period will follow each presentation.

The specific program is incomplete partly because many mineralogists/geologists have been in the field or attending the international meeting in Switzerland and partly because it is difficult to anticipate the result of research in progress or contemplated. However, the nature of the program will be evident from the tentative acceptance of the following speakers and panelists.

Mr. John L. Baum, New Jersey Zinc Co., Geology of the Area.
Dr. Michael Fleisher, U.S. Geologic Survey, Manganese Oxides.
Prof. John Ridge, Penn. State Univ., Geochemistry of the Franklin Ores.
Mr. Robert Metsger, New Jersey Zinc Co., Geochemistry of Sterling Hill.
Prof. Ralph J. Holmes, Columbia Univ., Nickel Sulfides and Arsenides.

Discussion Panel: above-listed speakers; Prof. Paul F. Kerr, Columbia Univ.; Prof. H. H. Hesse, Princeton Univ.; Prof. Arthur Montgomery, Lafayette Univ.; Dr. George Switzer and/or Dr. Paul Desautel, U.S. National Museum.

Other distinguished speakers and panelists will participate. We are certainly hopeful, for example, that Prof. Clifford Frondel of Harvard University will be a key participant.

It is our intention to make the papers presented at the symposium available to those interested.

RESEARCH PROBLEMS AND PROJECTS

One of the foremost purposes of the symposium is to encourage and foster new research on Franklin mineralogy and geology. To facilitate this, a list has been prepared suggesting some of the general and specific research problems and projects that can contribute substantially to our understanding of the area. We ask, most earnestly, that those of you in universities, industry or other professional fields who are in a position to help directly or indirectly and other interested and qualified individuals and groups to consider these problems most carefully and advise us as to your interest in participation. You are assured of the fullest support and assistance of this Society.

It will be apparent from the subsequent list of research problems that it will take some time to complete all of them. Our knowledge will grow by the solution of the smaller problems which make up the larger problems. Specific problems can be shared by different investigators or groups, if desired. Arrangements can be made, for example, for optical studies to be carried out by one investigator and x-ray and chemical studies by others.

GENERAL RESEARCH AND REVIEW SUBJECTS

A. Country Rock of the Area

- Geology/mineralogy of the area
- Gneiss, dikes and pegmatites
- Geology/mineralogy of the iron deposits
- Geology/mineralogy of the porous dolomite at Buckwheat
- Hydrothermal contact-metamorphism (non-ore)
- Regional metamorphism

B. Origin of the Ores

- Geological origin, chemical form, subsequent changes
- Separation of the ore bodies
- Geochemistry of the ores

C. Interaction of Ore and Country Rock

- Hydrothermal contact-metamorphism
- Regional metamorphism
- Pyroxenes and pyroxenoids/amphiboles
- "Parker Shaft" mineralogy/geology
- Mineralogy of footwalls/hanging walls
- Differences between Franklin and Sterling Hill

D. Paragenesis of the Minerals

Overall/specific areas
Mineral associations
Pseudomorphs

E. Post-Metamorphic Changes

Weathering
Solutions
Hemimorphite pits
Current

F. Miscellaneous

Chemistry of the ore bodies/groups/areas
Luminescence
Comparisons with Langban/Crestmore
Mineralogy/Chemistry of specific mineral groups

SPECIFIC RESEARCH PROBLEMS

I. Amphiboles

Problem: The complexity of amphiboles is multiplied at Franklin-Sterling Hill by the variety of chemical components available. Several species not yet validated are almost surely present and others are not defined in terms of modern mineralogy.

Possible Approach: Specimens will be checked by specific locality, color and associations.

Remarks: Interesting and important probabilities. The crux of the problem can be resolved by a relatively short period of properly planned mass quantitative chemical analyses.

- A. Anthophyllite. Optics and qualitative microchemical analyses complete. X-ray and probably chemical analysis required for validation.
- B. Actinolite. Differentiation from cummingtonite and identification needed.
- C. Hornblende. Almost surely occurs, but not validated. Additional Franklin-Sterling Hill specimens (which remain black after powdering) desired. Chemical, optical and x-ray data needed.
- D. Type specimens. Analyses of specimens of different color, association and locality. Can be subdivided.

II. Humite Series

Problem: It has been established that norbergite and chondrodite are present at Franklin. No basis has been established for current attempts at identification based on color, fluorescence or locality and the relative occurrence of the several humites has not been determined.

Approach: X-ray analysis of specimens selected by color, fluorescence and locality (including other locations in the Franklin limestone belt).

III. Apatite-Svabite

Problem: There seems little doubt that the green quarry mineral is apatite and that the grayish-white contact mineral that fluoresces is svabite. There is confusion as to the identity of green-colored specimens from within or near the ore body, especially those that fluoresce.

Approach: Determination of phosphate arsenate ratios by chemical analyses (or fluorescent x-ray) of specimens selected for specific localities, color fluorescence and associations.

IV. Oxides

Problem: Several minerals have been tentatively identified or seem likely to have occurred at Franklin. Validation through test is needed.

- A. Arsenolite. This species has been sight-identified as a component of the grayish coating on native arsenic from Sterling Hill by your editor and Dr. Frondel. The limited quantity of material and intricate mixture makes analysis difficult, though not impossible.
- B. Bixbyite. This species has been tentatively, but not positively identified in a single small crystallized specimen. X-ray analysis is needed. Dr. B. Mason has agreed to undertake this study.
- C. Pyrolusite. It seems probable that this species is present amid the many manganese oxides at Franklin-Sterling Hill. It must be verified, however. Some promising specimens are available, more are needed.
- D. "Arsenosiderite". Prof. Frondel has determined that the mineral tentatively identified as arsenosiderite is not this mineral, but a new species of manganese oxide. Additional material has been located so that he can complete his study.

V. Hydrrous Sulfates

Problem: With a few exceptions, the hydrrous sulfates, such as those formed by the oxidation of pyrite, marcasite, sphalerite and other sulfides or by the action of solutions, have not been closely investigated. Frequently the quantity found is very small. Several as yet unvalidated species have been identified.

Approach: Completion of tests and validation will be sought for identified specimens. Collectors are asked to look for and contribute specimens of oxidized sulfides.

- A. Hexahydrite. Qualitative chemical and optical tests and x-ray analyses of three fresh specimens of different associations have positively identified this mineral. Validation is required.
- B. Bianchite. A single specimen of this material was identified by qualitative chemical and optical tests. Insufficient pure material remains for x-ray tests. Semimicro quantitative analysis would probably suffice for validation.
- C. Siderotil. This species has been identified by qualitative chemical and optical tests. Verification of the locality of the specimen is needed, as well as confirming tests.
- D. Melanterite, Goslarite. Melanterite has been tentatively identified optically several times on micro specimens associated with sphalerite and galena. Additional specimens are needed for more complete tests.

VI. Olivenes.

Problem: The Franklin-Sterling Hill olivenes are rarely pure and frequently present separation problems prior to analysis. An olivene unusually high in magnesium has been reported (R. Metsger) and is under study (C. Hurlbut, J. Baum).

VII. Arsenates

Problem: It is probable that unvalidated species of arsenates remain among the number of rare arsenates found at Franklin and Sterling Hill.

- A. Annabergite. The possible presence of this species with micolite is being investigated (R. Holmes).
- B. Erythrite. This species has been positively identified (J. Hendricks, S. Schaub) in association with magnetite, malachite and fluorescent calcite. Verification of locality is necessary. This mineral has been reported unofficially several times; specimens are needed for verification.

VIII. Garnet Series

Problem: One as yet unvalidated species (almandite) has been tentatively identified. The possibility of the occurrence of rare garnet species exists.

Approach: Garnets of various colors, associations and locations will be screened by fluorescent x-ray analyses and specific gravity, optics, chemical analyses and x-ray diffraction determined as indicated.

Specimens: A number of specimens are on hand, but specimens of unusual color, associations or properties are desired.

IX. Mica Group.

Problem: Of the many micas, chlorites and hydromicas, only phlogopite, manganophyllite, muscovite and stilpnomelane have been validated.

Approach: Specimens of the group representing different associations, colors and localities will be examined by x-ray and such other tests as indicated.

- A. Biotite. This species has been identified by optical and chemical tests. X-ray data and validation are needed.
- B. Hydromicas. A hydromica has been reported from Sterling Hill. Analytical data are needed.
- C. Other micas. Systematic examination by color, association, locale.

Unusual specimens would be appreciated.

X. Dikes

Problem: The material in and adjacent to the camptonite dikes has provided some of the minerals rare at Franklin. Although the dikes are of post-ore origin and have been explored generally, there is ample evidence of the presence of mineral species present that are not yet validated at Franklin.

Approach: Generally, the sequence of acid treatment, binocular examination and optical tests would obtain for the contact faces and optical tests, especially polished section studies, for the amygdaloidal cavity fillings.

XI. Gneiss

Problem: Several minerals rare at Franklin have been found in relatively cursory examinations of the gneiss. A more complete examination, as by polished section studies and investigation of acid-insoluble constituents, might yield worth-while results.

XII. Sulfides

Problem: The presence of unvalidated sulfides at Franklin is almost a certainty.

Approach: The "probable" specimens will be analyzed. Collectors are asked to contribute any specimens they believe to contain unvalidated species. Polished section studies would probably be rewarding.

- A. Chalcopyrite. One "probable" specimen is at hand. Others are solicited. X-ray will probably provide the simplest verification.
- B. Argentite. Spectroscopic examination of a siler-magnetite-malachite specimen showed the presence of argentite. The argentite was not predominant and the specimen rather small.
- C. Orpiment. Some of the realgar specimens have areas in which the arsenic sulfide has the yellow color of orpiment. X-ray would seem the most practical approach in investigating this possibility.
- D. "Stibnite". Minute areas on some realgar-arsenic specimens contain a metallic mineral greatly resembling stibnite, except that bending and deformation due to gliding planes seems absent. A single-crystal x-ray examination seems the best approach.
- E. Covellite. This species has been reported in polished section studies of specimens of chalcocite. Confirmatory studies are indicated.
- F. Cubanite. This species was tentatively identified in studies by New Jersey Zinc Company geologists. No specimens are available, but the possibility is made known to encourage search.

XIII. Clays

Problem: Although aluminum-rich rock is relatively scarce at Franklin-Sterling Hill, clay-like material is present in the oxidized and mud zones at Sterling Hill. Previous studies have been very limited in scope.

Approach: X-ray and other indicated means will be used to determine the possible presence of baolinite, halloysite or other clays and to distinguish among these and zinalsite and sauconite. Sauconite requires validation.

XIV. Miscellaneous Specific Problems

- A. Gold. To date all specimens, except one (to be tested), have been discredited either as to locality or identity. Anyone believing they have a valid specimen of gold from Franklin or Sterling Hill is asked to communicate with us.
- B. Powellite. Minute quantities of an alteration product of molybdenite give qualitative indication of being powellite. Additional material and microchemical and optical tests are needed.
- C. Piedmontite. There is some indication that the tiny "edpidote" crystals associated with rhodonite and bementite may be piedmontite. Optical tests could check this possibility.

ADULT COURSE IN BASIC GEOLOGY AND MINERALOGY

Another opportunity for increasing your understanding of minerals and their origin has been made available to you. Your Society is sponsoring a course in basic geology to be given by the Community Adult School, Box 228, Parsippany, N.J. The class will meet at Parsippany High School from 8 - 10 PM, Monday evenings for ten weeks starting October 3rd. The fee is \$10. F-OMS member Orrin Main, geologist with Freeport Sulfur, will teach the course.

You may obtain further information or enroll through either F-OMS or the school. If you do not live nearby, it is suggested that you investigate related courses that may be available in your area.

* * * * *

MEMBERSHIP

Membership as of August 20th numbers 283, with representation from 23 states and 1 foreign country. A substantial increase is anticipated at our evening fluorescence program. We now have twenty-three 1960-61 paid-up members. Your 1960-61 dues are now due; the form attached to the ballot is enclosed for your convenience.

* * * * *

ELECTION OF OFFICERS

Your ballot for officers for 1960-61 is enclosed. Please Vote! The nominees have each contributed strongly to your Society this year and are well qualified for the respective offices. When you make out your ballot, your present and future officers will appreciate it if you would take the time to advise of your likes and dislike of our program and projects and other areas and programs that you would like to see included. It's a lot easier to know what you want if you simply tell us!

* * * * *

CONSTITUTION

Our Society's constitution has been approved by the executive committee and is ready for ratification at the annual meeting. It has not been feasible, for several reasons, to prepare and distribute copies to the entire membership. Copies are available on request and will be available at the next two meetings. Several features of the constitution follow.

Policy not prescribed in the constitution is set by the executive committee, which comprises the president, vice president, secretary-treasurer and six trustees; the trustees serving for two year periods, three being elected in each alternate year.

Junior membership is now open to those under eighteen years of age. They have the right to vote, receive publications and attend meetings (subject to reasonable decorum), but not to attend field trips. Permission to attend field trips must be obtained on an individual basis for specified trips.

As a matter of policy, prolonged discussion of matters not directly relating to mineralogy is not expected at meetings, except as it involves the good of the Society.

The constitution may be amended by a two-thirds vote of members present at a meeting after due notice.

* * * * *

THE COLOR OF ZINCITE

The color of zincite, which in nature varies from ruby red through orange to various shades of yellow, has long been an enigma to the scientist and collector. Until relatively recently, it was thought that the color derived from the presence of manganese of certain valence states. We are indebted to member Donald Swaze for calling our attention to more recent investigations.

Merck and Co. markets an ultra-pure zinc oxide prepared in such a way that manganese and other impurities are not present. The product is pink to buff-pink in color. At temperatures above 250°C. the pink transposes to orange, and the powder eventually assumes the usual white appearance of zinc oxide. The source of the color, as developed by research at the Palmerton Laboratories of the New Jersey Zinc Co., is characteristic of a defective crystal lattice associated with the presence of an excess - less than one one-hundredth of one percent - of free zinc.

* * * * *

MEETINGS AND FIELD TRIPS

The June and July meetings and field trips were well attended and successful.

The trip to the B. Nicol Quarry found seventy members collecting a wide variety of minerals. The prize finds were excellent crystals of sphene and amphiboles and two small fluorescent, hemimorphic tourmaline crystals. Quantities of magnetite, humites, fluorite and sulfides were found.

Mr. John Rodda used specific examples of minerals to illustrate his discussion of research showing chemical reactions that occurred at Sterling Hill. See Page 11 for resume.

The June 3rd trip to Buckwheat yielded fine crystals of dravite tourmaline in addition to the numerous species normally found.

Mr. Robert Metsger spoke to the Society in July on the significance of the attitude (shape) of the ore body and also explained the reason for the unusually high magnetism of some Sterling Hill franklinite.

Those interested in fluorescence will have their day - and evening - at our August 27th meeting and field trip. Dr. Henry Millson, an unusually reliable investigator in the field of luminescence, is scheduled to present some very interesting information to the group and to show simultaneous projections of minerals in natural light, under S.W. ultra violet light and phosphorograms. The Cooper brothers of Black Light Eastern Corp. will illuminate Buckwheat under long range long and short wave ultra violet radiation shortly after dark. These programs are planned to be interesting and informative, as well as spectacular.

EVIDENCES OF CHEMICAL REACTIONS AT STERLING HILL - resume

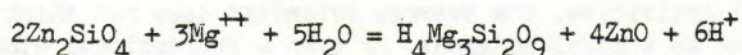
J. L. Rodda, New Jersey Zinc Co.,
Palmerton, Penna.

The zinc ores are found in Precambrian rocks and were themselves formed in Precambrian time. The period of deposition followed by erosion represents an immense interval of time. The period of erosion before the laying down of the adjacent and more modern Paleozoic rocks in itself may have been as long as a billion years.

During this long period of deposition, erosion, faulting, folding and volcanic activity many things took place, each partly obscuring the others. It is like reading the messages on a sheet of paper on which dozens of people have written, one on top of the other. If we can but decipher one of these messages it makes much easier the task of reading the others. Frequently it is helpful to explore minor features of the ore body in some detail, in order to clarify our over-all understanding of its formation and genesis.

For example, when it was noted that the normal fluorescence of willemite and calcite was not present for an inch or so on either side of a small veinlet, though these areas looked exactly like the normal ore adjacent to them, spectrographic analysis, x-rays diffraction, infra-red absorption and microscopic examination of thin sections were used to determine the cause. Careful sampling of the non-fluorescent areas showed that the calcite had been converted to dolomite and the willemite to serpentine. That is, magnesium had replaced the calcium of the calcite and the zinc of the willemite. Clearly, the magnesium solutions which entered along cracks and veinlets even diffused through solid rock, at least for short distances.

Many other examples of the conversion of willemite to serpentine have been found. Zincite has been found in association with serpentine on both a gross and microscopic scale. Extensive studies indicate that the willemite and magnesium solutions may react to form serpentine and zincite. A possible reaction follows:



Fluorescence at Franklin occurs throughout the willemite grain, typically at Sterling Hill it occurs on the surface or in fracture zones of the grain. Franklinite inclusions or iron in the lattice of Sterling Hill willemite may tend to quench the fluorescence. Geochemical studies at other localities indicate that iron-bearing olivines (which are related to willemite) form magnetite-type inclusions on serpentinization. If Fe^{++} replaces part of the Zn^{++} of willemite, it is relatively easy to visualize the formation of franklinite as well as zincite.

Another specimen of typical brown Sterling Hill willemite showed strong fluorescence adjacent to a thin veinlet, grading off to the weak fluorescence of the normal ore. It was found that the minute franklinite inclusions had been dissolved from the bleached willemite adjacent to the veinlet. The nature of a solution capable of dissolving the franklinite from the willemite is not known. Perhaps this study may have some bearing on the absence of the minute franklinite inclusions in Franklin ore. The larger franklinite inclusions sometimes seen clustering near the center of willemite grains at both Franklin and Sterling Hill may be evidence of earlier serpentinization.

KIWANIS EXHIBIT

The Fourth Annual Franklin Minerals Exhibit sponsored by the Franklin Kiwanis Club will be held at the National Guard Armory in Franklin on Saturday and Sunday, September 25 and 26. The armory is located just off Route 23 near Hewitt-Robbins on Individual members of F-OMS are cooperating with the Kiwanis by entering exhibits. Our annual meeting, at which your new officers will be presented and which features Mr. Neal Yedlin is scheduled for that Saturday at the Legion home to allow as many as possible to attend both functions. On Sunday afternoon, your editor will speak at the MSP Earth Science and Gem Show at Doylestown, Penna., on Franklin minerals and F-OMS.

* * * * *

THE SCIENTIFIC CONSCIENCE

Condensed from Hercules Chemist, No. 39, June, 1960

Scientists have a sort of scientific conscience that lays down precepts that no scientist would think of disobeying. In his normal activities, the average scientist does not think of this conscience as a moral judgment, or even a professional ethic. The thing he strives to maintain is technical accuracy, and the experienced scientist does this without conscious thought. So far as he is concerned, an inaccurate statement isn't just untrue, but is abhorrent.

Science has been defined as a search for truth. Such an elusive thing as truth is not found by kidding oneself, and the scientist tries desperately not to kid himself or anyone else. In this effort, he examines minutely every alleged fact to determine if it is indeed a fact. To the layman, the scientist may appear to quibble about details, be reticent to generalize and his insistence on technically accurate statements at times may seem petty.

If you are not a scientist, please have patience with your scientifically trained associates when this occurs. He may be teaching you to think things through and to sort out what you know from what you think you know.

* * * * *

Please return your ballot and dues promptly!

* * * * *

CALENDAR OF EVENTS FOR 1960

- March 26 Meeting. C. Haight, former mine superintendent, will show and discuss movies taken in the Franklin and Sterling Hill mines. Willemite display.
- April 9 Field Trip. Rifle Range Quarry, Franklin, New Jersey 9 AM - 1 PM.
- April 23 Meeting. N. Wintringham, American Cyanamid, will discuss practical means of identifying minerals. Display of Parker Shaft minerals.
- May 7 Field Trip. Farber's Quarry, Franklin, New Jersey 9 AM - 12 AM.
- May 21 Meeting. A. Montgomery, Lafayette College, will discuss contact-metamorphic minerals. Display of franklinite and zincite.
- June 11 Field Trip. B. Nicol Quarry and vicinity, Franklin, New Jersey - 9 AM - 3 PM.
- June 25 Meeting. J. Rodda, New Jersey Zinc Company, will discuss chemical reactions at Sterling Hill. Display of native elements.
- July 3 Field Trip. Buckwheat and Parker Dumps, Franklin, New Jersey 9 AM - 3 PM.
- July 23 Meeting. Speaker: R. Metsger, New Jersey Zinc Company. Display of rhodonite and hemimorphite.
- August 27 Meeting. H. Millson, American Cyanamid, will discuss luminescence. Display of hodgkinsonite and axinite.
- August 27 Field Trip. Buckwheat Dump. Fluorescent Show. 8 PM.
- September 24 Annual Meeting. Mr. N. Yedlin will discuss micromount mineralogy - Franklin minerals. Kiwanis minerals exhibit.
- November 19 Meeting. R. Holmes, Columbia University, will discuss niccolite and aspects of basic mineralogy.

Meetings held at Legion Home, off Route 23, Franklin, at 2 PM.
Visitors welcome at meetings; members only at field trips.

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