THE PICKING TABLE

FRANKLIN OGDENSBURG MINERALOGICAL SOCIETY, INC.

BOX 146
FRANKLIN, NEW JERSEY

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CALENDAR OF EVENTS - FALL 1963

Saturday, Sept. 21st.	Field trip - 9 A.M. to 12:00 Noon, Farber Quarry, Cork Hill Road, Franklin, N.J.
	Meeting - 2 P.M., American Legion Hall. Speaker - Dr. Arthur Montgomery, Lafayette College Subject - The Serpentine Deposits of Easton and Phillipsburg and their Relationship to the Franklin Limestone.
Saturday and Sunday - Oct. 12th and 13th	7th Annual Mineral Show - sponsored by the Franklin Kiwanis Club, Franklin Armory, Routes 23 and 517, Franklin, N. J.
Saturday, Oct. 19th	Field Trip - 9 A.M. to 12:00 Noon, Uranium location, Cranberry Lake.
	Meeting - 2:00 P.M., American Legion Hall. Speaker - Dr. Kemble Widmer, State Geologist Subject - Uranium Deposits in Northern New Jersey
Sunday, Nov. 17th	No field trip scheduled. Meeting - 2:00 P. M., American Legion Hall. Speaker - Mr. Neal Yedlin, Micromountist Extraordinary Subject - Crystals in the Franklin Minerals.
	All meetings are held at the American Legion Hall, Route #23, Franklin, N. J.

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THE PICKING TABLE is issued twice per year; a February issue to reach members about March 1st with news and the Club Spring program; an August issue to reach members about September 1st with news and the Fall program.

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F.O.M.S. OFFICERS FOR THE YEAR 1963

President - William Spencer
Vice President - open
Secretary - Henry M. Althoen
Treasurer - John M. Butler

Trustees

John L. Baum — Frank Z. Edwards
Paul Chorney — Ferd DeP. HasBrouck
Edward R. De Roo — Alexander Knoll
Richard Hauck (Alternate)

Committee Chairmen

Program and Field Trip - Henry M. Althoen
Display - Ewald Gerstmann
Nominating - Richard Hauck
Historical - Perry Armagnac and Mrs. E. Packard Cook

Editor of the PICKING TABLE - Frank Z. Edwards
Mimeo and Typing - Louise W. Borgstrom

Fall Program

Two field trips are scheduled for the fall. On September 21st we will make our annual visit to the quarry of the Farber White Limestone Company, Cork Hill Road, Franklin. At least thirty-five minerals have been reported from this location. This is a working quarry and specimens are fresh, clean and desirable.

Through the efforts of Mr. Jack Baum, the club has obtained permission to visit a Uranium mineral location at Cranberry Lake, Andover, N.J. This is undeveloped woodland area consisting of gneisses cut by pegmatites. Such minerals as Allanite, Magnetite, Pyrrhotite, Spencite, Uraninite, Zircon and others may be found at contact points. A map of this location will be available at the September meeting or upon request from the Secretary.

For our Fall meetings, we have been fortunate to schedule three excellent speakers. Messrs. Montgomery, Widmer and Yedlin require no introduction. These gentlemen are tops in their field and they have selected subjects which will interest all members. Please note our meeting dates on your calendar and plan to attend. Bring a guest, too.

The 7th Annual Mineral Show of the Franklin Kiwanis Club will be held on Oct. 12th and 13th at the Franklin Armory, routes #23 and #517, Franklin, N.J. This is always a big event for Franklin enthusiasts. This year, look for a joint display by Jack Baum and Ewald Gerstmann. They will try to show a specimen of every Franklin mineral verified to date. Additional displays and a top notch dealer area will also lure your interest and money.

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Spring Events

Winter ended on March 3rd for 110 members when they arrived at Lafayette College where Dr. Arthur Montgomery, his associates, Drs. Stevens and Jones, and some of their geology students had prepared an interesting program and exhibits of Franklin and general minerals. This was the first time the FOMS had scheduled a trip to other than a collecting locality. The result was gratifying as all who attended were greatly pleased and have requested a similar trip next year.

Our first meeting on March 17th featured a group discussion on Franklin minerals after Mr. George Pigeon had reported on the identification of several unusual specimens.

On April 20th, the F.O.M.S. cooperated with the New Jersey Audubon Society on their second Mineral Field Trip to Franklin. About 300 people enjoyed the activities. Many came to our meeting to hear Mr. William H. Callahan of the New Jersey Zinc Company, who spoke on "Exploration for Mineral Deposits" and received many compliments for his effort.

In May, field trips to the Limecrest Quarry and the open cuts at Sterling Hill were popular and well attended. On May 18th, our speaker was Dean Forrest P. Dexter of Union Junior College. His talk on "Mineralogy and Paleontology in New Jersey" provoked a fine response from the audience in the question and answer period.

The Swap Session held jointly with the North Jersey Mineralogical Association on June 8th was highly successful. Invitations to attend had been extended to all other New Jersey mineral clubs. As a result, more than 300 cars crowded Munson Field, Franklin. Open tailboards and trunks displayed a host of colorful minerals and trading was brisk. The enthusiastic reception for two years of this event must make it a permanent part of our program. But where can we find a real ball park for next year?

On June 15th, through the courtesy of the Cellate Company, many members collected at the old B. Nichols quarry. In the afternoon, Neal Wintringham discussed the "Minerals of the Franklin Limestone", a fine reward for those present.

Many members of the F.O.M.S. attended the Pennsylvania show and the Eastern Federation show and convention at Lake Placid, N. Y.

Miscellaneous News Items

On July 27th the new two-story $50,000 headquarters of the Franklin Fire Department was half complete. The Fire House is being built on the lower triangle of the old Parker Dump at Buckwheat Road and High Street. The upper area has been bulldozed and leveled for parking space. If you have not already done so, remove the Parker Dump from your list of collecting areas.

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The Sparta Adult Education Program has again requested Mr. Robert Metsger to present a lecture series this Fall on Sussex County Geology. The course will be open to all persons, residents or not, of Sparta. If interested, write to Mr. Richard Kidd, Sparta High School, West Mountain Road, Sparta, N.J. for complete information

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On July 19th power shovels excavating for the new $5,100,000 Union County Courthouse in Elizabeth, N.J. uncovered three small veins of "copper". Elizabeth is in the same belt of Newark sandstone and shale in which native copper and copper minerals have been found. The old Schuyler Mine at Belleville was in the same formation.

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On July 1st, the United Press reported that Mr. Leon R. Bellis, a diamond appraiser, had announced that diamonds are as different as finger prints and that he had a new method of individual identification. Mr. Bellis said, "fingerprinting of diamonds could spell the end of an era which has seen diamonds become the most sought after loot partly because of the impossibility of identifying a diamond removed from its original setting. Police departments are holding thousands of dollars worth of unclaimed diamonds. Though the thieves are caught and the diamonds recovered, there is no way of returning the gems to their owners because of lack of identification."

Mr. Bellis said that the services of his organization, the Central File and Identification Bureau, Inc., Chicago, Illinois, will be free to all law enforcement authorities.

"Each diamond has markings discernible only under 10 power magnification. These "invisible" markings, technically called inclusions - are not faults but are part of the very structure of the stones. They are never exactly the same on any two diamonds and they are permanent, no matter what a thief does to change the looks of a diamond."

Mr. Bellis said the identification system would enable jewelers to register any diamond of 1/3 carat or over.

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The Soviet Union's leading geologist suggested today, (5/10/63-N.Y. Times), that Soviet claims that it leads the world in many strategic raw materials were exaggerated.

Writing in Izvestia, the Government newspaper, Aleksandr V. Sidorenko related the exaggeration in reports on mineral reserves to a practice of each republic and region to seek out deposits of metal ores, coal and oil, no matter how small they were or uneconomical it would be to obtain them.

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Mr. Sidorenko, who has headed the country's vast geological exploration program since February 1962, said his committee now had firm control over prospecting plans and budgetary allocations. He said the amount the Government spent each year searching for minerals was "substantially higher" than the capital investment in construction of metallurgical and chemical enterprises. This would make the geological budget more than 1,000,000,000 rubles (about one billion dollars).

Describing the Government's new approach to the reserve estimates, Mr. Sidorenko wrote, "In the last few years, several thousand deposits that had been explored in detail were dropped from the reserve roster because they were uneconomical for exploitation. But there are still more than 1,000 deposits that could not be operated efficiently even in the next twenty years.

He added that the inclusion of uneconomical deposits in the total reserve estimates had yielded a "false picture of the actual raw material situation".

The Soviet Union claims to have 88% of the world's proved reserves of manganese ore, 57% of the world's coal, 41% of the world's iron ore. It also claims to lead all nations in copper, lead, zinc, nickel, bauxite, tungsten, mercury and mica. The Russians also say they occupy a leading place in oil reserves.

Stressing the high cost of geological exploration and the need for a more effective approach, Mr. Sidorenko said the cost of exploring for one ton of ore in the ground ranged from two kopecks (two cents) in the case of commonly found iron to thousands of rubles for rarer non ferrous metals. He said exploration amounted to 25% of the cost of the end product.

Statistics on most mineral reserves are secret in the Soviet Union. Information has been provided concerning a few common resources such as coal, natural gas and iron ore.

Mr. Sidorenko, who is 45 years old, headed the principal branch of the Academy of Sciences in mineral rich Kola Peninsual in northern Russia before entering Government service.

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Natural Metamorphism in the Act

A mile-deep well near southern California's low-lying Salton Sea is providing geologists with what may be their first look at the transformation of sedimentary rock into another major type of rock: metamorphic. The transformation, one of the major processes in the evolution of the earth's crust, requires great heat and pressure and is believed ordinarily to take place at depths of 25,000 feet or more. In a hot-spring area southeast of the Salton Sea, however, drill cores have revealed what appear to be new metamorphic rocks within 5000 feet of the earth's surface.

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The well, 5,232 feet in over-all depth, was drilled in 1961 and 1962 to tap volcanic heat for power. During the drilling a superheated brine of remarkably high salinity and specific gravity was encountered. Analysis showed it to be freighted with more than 33 per cent of dissolved solids, including unusual concentrations of potassium, lithium, iron, lead, silver and other metals. Writing in "SCIENCE", Donald E. White of the U.S. Geological Survey and two associates - E. T. Anderson of O'Neill Geothermal, Inc., drillers of the well, and Donald K. Grubbs, a University of Virginia student - describe the brine as a sample, probably man's first, of an ore-forming "magmatic" water from the earth's interior. Geologists believe that such waters have been responsible for the formation of many ore bodies.

Examination of drill cores also produced a surprise. Cores from between 4,477 and 4,923 feet showed gradually increasing density and a progressive change from soft shales or siltstones to harder minerals characteristic of an early stage of metamorphism. Moreover, the minerals were bedded horizontally in the cores, as might be expected of new metamorphic rock formed in situ, not old rock uplifted from the depths of the earth. It has so far proved impossible to measure the temperature at the bottom of the hole. White and his associates believe that it may be as high as 1,290 degrees Fahrenheit, perhaps more than enough under suitable conditions of pressure to initiate the metamorphic process and to produce the first samples of metamorphic rock yet found that are less than 10 million years old.

The unusual volcanic-like water was discovered as part of a plan to tap the earth's heat for energy. An oilman had drilled a wildcat well near Niland, close to the Salton Sea in California's Imperial Valley. Although the well did not produce, temperatures encountered in drilling it were so high that the deep geothermal well was dug four miles to the north. (Scientific American, May 1963).

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Man Made Metamorphism

The Associated Press recently reported on the creaton of man made minerals by the fire and fury of an American underground nuclear blast.

This nuclear age variation of alchemy was reported by Leonard M.Gard of the U. S. Geological Survey, who said it resulted as an unusual by product of the Atomic Energy Commission's Project Gnome. This was the detonation of a nuclear device packing the wallop of 3,000 tons of TNT 1,200 feet below the surface in a thick salt deposit on December 10th, 1961.

Experts of the AEC told a reporter it is doubtful the new finding, of itself, would lead to industrial applications of blast created minerals. They said the types of minerals that can be created in a salt environment, like the site of the Gnome blast, are apparently limited.

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But they said the work demonstrates beyond doubt that strange chemical transformations can be achieved beneath the ground by the high pressures and temperatures of nuclear blasts and that conceivably:

a) Such blasts in materials richer in chemical elements than ordinary salt - for example, in limestone, which contains nearly a dozen basic elements - might well lead to "something new and useful" in the industrial line.

b) Chemicals now used in industry might be placed inside a blast site prior to a detonation and converted into entirely new products having different applications.

Gard, a geologist employed at the Denver branch of the Geological Survey, was one of a group who studied the Gnome site before and after the blast.

In a report in the technical journal "SCIENCE", he said the blast produced veins of "black salt containing (man made) minerals created by the blast, "and that the veins resembled ore bearing veins seen in some western mining camps." And, by ironic coincidence, one of the new minerals is believed to be the artificial counterpart of Muscovite - a form of mica first found in nature many years ago by the Russians. Others included various lead containing minerals.

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Coral Clock

The study of fossils provides a relative chronology for geological deposits and events, but not an absolute time scale. Now John W. Wells of Cornell University has proposed a method by which it may eventually become possible to examine some kinds of fossils and estimate their absolute age. Well's technique would combine paleontology with the finds of astronomy to get results that can now be obtained only by measuring the decay of radioactive isotopes.

Astronomers have determined that the speed of the earth's rotation on its axis is slowly decreasing: the current estimate of the rate of decrease is two seconds per 100,000 years. At the begining of the Cambrian period (isotope dated at 600 million years ago) a day was less than 21 hours long and there were 424 days per year scale for geologic time that shows, for example, 396 days in the Devonian year and 390 days in the Pennsylvanian.

Writing in NATURE, Wells connects these figures with fossils by noting that the annual growth rate has been established for a number of species of corals; in some cases this is particularly easy because there are clear annual growth rings. The epitheca, or outer covering of some of the corals also bears ridges that clearly reflect some regular variation in calcium carbonate secretion. Is it perhaps a daily variation?

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Wells counted the fine lines on some recent corals and found that there were roughly 360 within the space of a year's growth, suggesting that the lines do reflect daily, or approximately daily variations. It was much harder to find fossil corals with annual growth rings and fine growth lines distinct enough to count. But he did determine that some Devonian corals had between 385 and 410 lines per year, with a mean near 400. And two different corals from the Pennsylvanian period respectively gave counts of 390 and 385 lines per year. All these values fit the theoretical days per year scale within reason, implying that the geophysical estimates (from isotope dating) and the astronomical estimates (from rotation-time variation) of the earth's age agree. Wells does not claim that the growth line verification proves that either of the two standard estimating methods is surely correct. But he suggests that fossils other than corals may also bear diurnal records of some kind. If these can be identified, he writes, paleontology may be able to supply a "third stabilizing, and much cheaper, clue to the problem of geochronometry". (From Scientific American, May 1963).

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Indian Silver Mine

In his interesting talk to the F.O.M.S. on June 15th, Neil Wintringham stated that the Limestone Quarry workings had now obliterated the former so-called "Indian Silver Mine". This reference so intrigued Perry Armagnac, of our Historical Committee, that he went looking for information. He found the answer in "The Mineral Industry of New Jersey for 1934", N.J. Department of Conservation and Development, Bulletin #43, Geologic Series, written by Meredith E. Johnson, then Assistant State Geologist, pages 23-24:

"A large sign posted beside the highway at Woodruff's Gap on the Sparta-Branchville road, which invited the passerby to come and inspect the "Indian Silver Mine" aroused the writer's curiosity in June 1935. Accepting the invitation, he traveled southwest about two miles to another sign which directed him up a steep and little used road, past an old furnace, to an old inclined shaft at the top of the hill. There he found the proprietor, who when asked the relevancy of the name, "Indian Silver Mine", naively replied that he thought it sounded attractive. The shaft, and several nearby test pits, were actually dug about seventy-five years ago by the Sussex Lead Company in a futile search for lead ore. Examination of outcrops near the old shaft disclosed disseminated grains of galena (lead sulphide) and sphalerite (zinc sulphide), but there was no indication at the surface that these minerals occurred in paying quantities, nor was any ore found in the old shaft. "Prospecting" terminated a few months later as the result of a court order enjoining the proprietor of the Indian Silver Mine from the further sale of stock in his enterprise."

When forwarding this item, Perry noted that the passage had also shed some light on references in old Franklin literature to the Sussex Lead Company.

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Willemite and Its Polymorphs

In the July-August 1962 issue of the American Mineralogist, pages 932-44, H.W.F. Taylor, Department of Chemistry, University of Aberdeen, Scotland, reports on "The Dehydration of Hemimorphite". I quote his abstract:

"The thermal dehydration of hemimorphite, $Zn_4 Si_2O_7 (OH)_2.H_2O$ has been studied by single crystal X ray methods. Loss of the molecular water below 550°C. causes only slight change in the rest of the structure. At about 700°C. the hydroxyl water is lost, and there is an oriented conversion to beta Zn_2SiO_4; below 960°C. there is a second oriented conversion to alpha Zn_2SiO_4 or Willemite. Gamma Zn_2SiO_4 does not appear to be formed. Both orientation relationships have been established and the unit cell of beta Zn_2SiO_4 determined. The structure of beta Zn_2SiO_4 is probably derived from a distorted tridymite or cristobalite-like framework in which half of the silicon is replaced by zinc and additional atoms of zinc introduced into suitable interstices. Possible mechanisms for the two oriented conversions are discussed, and are compared with those known or believed to occur in similar reactions of silicates containing other cations".

Several investigators have studied Zn_2SiO_4 and its polymorphs. In 1923, Schleede and Gruhl, through the use of X ray powder photographs, demonstrated the existence of beta willemite with a yellow fluorescence and of gamma willemite with a red fluorescence. During the next twenty years, other investigators concluded either that the beta and gamma forms did not exist or that they were amorphous. In 1941, Rooksby and McKeag confirmed the existence of the beta form and published better X ray powder data. However, they were unable to obtain convincing evidence for the existence of the gamma form. In 1948, Ingerson, Morey and Tuttle prepared single crystals of all three polymorphs and reported their optical properties; the beta and gamma forms were both biaxial. Taylor has now confirmed the conversion of hemimorphite to beta willemite; has determined the unit cell and established orientation relationships; but has not confirmed the formation of gamma wellemite. All investigators agree that the metastable polymorphs invert to willemite on sufficiently prolonged heating at 850°C. or above. Willemite appears to be the only stable form and the only form found naturally.

The hemimorphite (old name calamine) specimens used in the research by Dr. Taylor came from Sterling Hill, where large masses were once mined from the open cuts. Yellow fluorescent specimens marked Beta Willemite, Sterling Hill, still appear in some collections. Such labels have always been questionable, and while Dr. Taylor's findings would seem to substantiate this labeling, actually such designations are incorrect.

In 1952, Lawson Bauer, of the N. J. Zinc Company, prepared a paper for submission to the American Mineralogist in which he described a new variety of willemite found at Sterling Hill which fluoresced and phosphoresced yellow when exposed to short wave ultra violet rays. Because of the fluorescense, specimens were called and marked beta willemite. But, since there was doubt about the variety, a specimen was sent to Dr. Frondel at Harvard, who wrote Mr. Bauer on February 25th, 1953, as follows:

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"You will recall sending me a sample of willemite that fluoresced yellow. I have heard from my friend at the Fluorescence Laboratory of the Naval Research Laboratory, and this started me on an intensive examination of your sample.

ZN_2SiO_4 fluoresces in three different colors: green which is ordinary willemite; red, which is supposed to be an amorphous glass formed by quenching molten Zn_2SiO_4; and yellow. The yellow material has been the subject of long controversy; it seems to be accepted as a polymorph of willemite, with different crystal structure, and is called beta willemite.

There is no doubt, however, that your natural sample of yellow fluorescing willemite is ordinary willemite. I have measured the crystal angles and they check willemite, the X ray powder diffraction pattern checks willemite, and an X ray single crystal rotation pattern taken about the C axis checks willemite."

When this information was circulated, the discriminating collector relabeled his specimens. So, until otherwise proved, of the Zn_2SiO_4 polymorphs, only willemite is stable, the one form found naturally, and the yellow fluorescent specimens from Sterling Hill a scarce variety of willemite.

In the specimens that I have seen from Sterling Hill of the yellow fluorescent variety, the mineral occurs as drusy masses of colorless micro crystals in cavities and as crusts on massive manganiferous calcite; with a crumbly smithsonite; and in small cavities in massive yellow brown sphalerite. Sometimes, the little crystals are stained pink to red. In some cases, there is no fluorescence under the short wave but a good yellow phosphorescence. In spectograms of the original material, Mr. Bauer reported the presence of copper and lead and only minor traces of manganese, which may account for the yellow fluorescence.

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Manganberzeliite

In the May-June 1963 issue of the American Mineralogist, pages 663-4, Drs. Clifford Frondel and Jun Ito, both of Harvard University, Cambridge, Mass., report as follows:

"Manganberzeliite has been identified in a few specimens from Franklin, N. J., as granular veinlets up to 3/4" thick cutting franklinite-willemite ore. No other minerals are associated in the veinlets. The chemical analysis is in very close agreement with the established formula $Mn_2(Ca,Na)_3(AsO_4)_3$, with Na:Ca=1:2.18; small amounts of Fe, Mg and Zn substitute for Mn.

The mineral has a honey yellow to orange yellow color, with specific gravity $4.21 \pm .02$ and an index of refraction of $1.770 \pm .002$ in white light.

(Cont. on P. 10)

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Manganberzeliite (continued)

The unit cell dimensions calculated from a sharp X ray powder diffractometer pattern is 12.500± .005A. This value is in close agreement with that indicated by the graph relating MnO content and obtained for the berzeliite-manganberzeliite series by Blix and Wickman (1959). The mineral is not fluorescent in either long or short wave ultraviolet radiation. The specimens closely resemble the veinlets of granular, yellow to brown willemite sometimes found cutting the ore bodies at Franklin and Sterling Hill.

This species and its magnesium analogue berzeliite are known chiefly from their occurrences at Langban and at the Sjo mine, Sweden. The present occurrence is the first in the United States. The recognition of the mineral at Franklin is owing to the interest of two private mineral collectors, Roy W. Ebting of Warwick, N.Y., and Stanley J. Schaub of Westfield, N.J., who noted an isotropic mineral that contained arsenic and manganese in specimens acquired from an old collection."

Since the recognition of Manganberzeliite from Franklin, a small number of specimens have been located by collectors. In all cases, the occurrence is similar to the one described above by Drs. Frondel and Ito - as veinlets, 1/4" to 3/4" wide, in a granular franklinite-green willemite ore. The association and vein color are distinctive; a major help in visual identification.

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Margarosanite

In 1916, Ford and Bradley reported the discovery of Margarosanite at Franklin, N. J. A year later, Flink reported a second occurrence at Langban, Sweden. The physical and chemical data provided by these investigators is fully recorded by Dr. Palache in Professional Paper 180, pages 69-70.

Because no additional work on this species had been reported, Mr. Richard Lee Armstrong, Department of Geology, Yale University, decided to bring data up to date. Specimens used in his research were collected from the Parker Shaft in 1898 and came from the Brush collection. His complete report may be found on pages 698-703, in the May-June issue of the American Mineralogist.

The average collector with limited identification facilities, should make one change and one addition to the data in Palache. Specific gravity should be changed to 4.33 - as measured on a Berman Torsion Balance (calculated 4.30); and note that while margarosanite is colorless and transparent, the streak is white.

The original chemical analyses have been verified by Mr. Armstrong and found to be in excellent agreement with the formula $Pb(Ca,Mn)_2(SiO_3)_3$. New X ray and crystallographic data, and changes in optical properties, are technical in nature and may be obtained from the American Mineralogist article.

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MEMBERSHIP RENEWAL FOR 1964

I would like to renew my membership in the Franklin-Ogdensburg Mineralogical Society for the year 1964. Dues of $2.00 attached.

Name ____________________

Address ____________________

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(Please show exactly as you wish your name and mailing address to appear on our mailing list.)

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PROSPECTIVE MEMBERS

I believe the person or persons listed below may be interested in the F.O.M.S. and its activities. Please send them information.

Prospect's name ____________________

Address ____________________

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Recommending Member ____________________

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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 1964 dues is attached hereto.

Name ____________________

Address ____________________

____

(Please show exactly as you wish your name and mailing address to appear on our mailing list.)

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