THE PICKING TABLE

JOURNAL OF THE FRANKLIN-OGDENSBURG MINERALOGICAL SOCIETY

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Inside:

A Franklin Wedding

July 27, 2002 was a very special day in Franklin, New Jersey!

It was so special we put down our picks, shovels, jewelers loupes and fossils, cleared the cobwebs from our minds and meandered over to the gazebo at the Franklin Pond to watch two best friends declare their friendship and love for each other.

Franklin mayor *Edward Allen* performed the marriage ceremony, and John Cianciulli and Carol Durham exchanged their vows in front of all their friends.

The Franklin Mineral Museum curator and confirmed bachelor became a husband and his administrative assistant became his wife, creating a new partnership dedicated to recording and preserving the cultural, geological and mineralogical history of The Franklin-Sterling Hill mining community.

The wedding reception was held at another famous Franklin landmark: The Franklin Firehouse. Site of the famous Parker Shaft, parking there is as close as you can get to this source of the famous lead silicate minerals so desirable to many Franklin collectors.

However, once we entered the reception hall, we quickly forgot about these rare minerals because we were introduced to a couple whose talents went far beyond their day-to-day curatorial duties.

We knew John could tune up a car, but not many of us knew he could tune up his guitar and sing to his own accompaniment.

We knew he could identify any assemblage of rare Franklin minerals, but not many of us knew he could assemble the graphics, scan the photos, and create the computer disc used to print this publication.

We knew Carol could type *70* words a minute and successfully collect past-due FOMS dues, but not many of us had seen her other organizational skills at work.

She easily became a gracious hostess, capable of keeping a crowd of incurable mineral collectors happy and enjoying themselves without the help of a mineral to talk about (although some probably spent a few quiet moments coveting the mineral deposit that lay directly beneath the banquet hall).

John quickly became the singing master of ceremonies to complement Carol's hostess duties, and we all settled down to enjoy the food prepared by John's sister, Lynn.

Cold hors d'oeuvres and hot meats and pasta were set-up on long tables like the banquet hall of an old English castle, while nearby keg and bottled beverages beckoned the thirsty.

The entertainment was provided by a DJ, but John became the music director, and the dancing, although slow to start (some of us, after all, are long past 35), eventually got lively.

John is no stranger to music. He was raised in a musical family. His father was a musician, composer and arranger. His sister, Connie, plays the violin; another sister, Lynn, plays the piano; and brother, Phil plays the 4-string tenor guitar and clarinet.

Having been a performer of folk and political satire music in his early days touring the coffee house circuit, John easily took charge of the evening's entertainment.

To cap off the evening the DJ announced an elimination dance based on the wedding anniversaries reached by the participants.

Starting with the newlyweds, a crowded dance floor easily got past the one, five, ten, and 20 year eliminations. At 30 years the crowd thinned out. At 40 years only a few couples remained. At 42 years the Beilings had to sit down. At 52 years, three couples remained: the newlyweds, who were the judges, another couple, and the Baums, who were sitting the dance out but were still eligible to compete.

At 60 years the only remaining couples were the Franklin Mineral Museum's curator team of John and Carol Cianciulli, and the curator emeritus team of Jack and Augusta Baum.

The Baums then announced that they "have been married for 62 years", and they became the clear winners of the dance contest.

The party slowly wound down, and it was noted by some that within the Franklin-Sterling Hill mineral community, the couples married the longest and the shortest could both be visited at the Franklin Mineral Museum.

Franklin mayor Edward Allen performs the ceremony.

The happy couple.

The Cianciulli brothers, Phil on left, and John.

See back inside cover for more photos.

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About The Covers: Front - Kolicite from Sterling Hill. The field of view and crystal size are not known. Notice the etching and inclusions in the kolicite crystal face.
Back Cover: Top - Legrandite from Sterling Hill. The legrandite pictured is an aggregate of slightly divergent individual crystals. **Bottom -** Holdenite crystal from Sterling Hill. Cover photos by Alfred L. Standfast, M.D. For more on the photomicrography techniques used by Dr. Standfast, see PT issue Spring 1990 page 11.

The Picking Table

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The Picking Table is the official journal of the FOMS, and publishes articles of interest to the mineralogical community which pertain to the Franklin-Ogdensburg, New Jersey area.

Articles related to the minerals or mines of the district are welcome for publication in *The Picking Table*. Prospective authors should address correspondence to:

FOMS/Picking Table
900 N. Howard Street
Alexandria, VA 20171

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FRANKLIN-OGDENBURG MINERALOGICAL SOCIETY, INC.
FALL 2002 ACTIVITY SCHEDULE

Saturday, Sept. 21, 2002

9:00 A.M. - Noon — Collecting at the Passaic and Noble Pits, Sterling Hill Mining Museum, for F.O.M.S. members; fee $1.00/lb.
10:00 A.M. - Noon – F.O.M.S. Micro Group, Sterling Hill Mining Museum.
1:30 P.M. – 3:30 P.M. – F.O.M.S. Meeting and Lecture, Franklin Mineral Museum
The Search for North American Diamonds, by Kevin Krajick

Saturday, and Sunday, September 28-29, 2002

**46TH ANNUAL FRANKLIN-STERLING GEM & MINERAL SHOW
Sponsored by the Franklin Mineral Museum.
Franklin Middle School, Washington St., Franklin, N.J.
9:00 A.M. to 6:00 P.M. Saturday, 10:00 A.M. to 5:00 P.M. Sunday.
The ticket price covers the show, The Pond outdoor swap, and admission to the Franklin Mineral Museum: $5.00 per day for adults, $3.00 per day for children.
The Pond Swap-and-Sell, sponsored by the F.O.M.S., takes place outdoors on the school grounds from 7:30 A.M. to 6:00 P.M. on Saturday and from 9:00 A.M. to 5:00 P.M. on Sunday. Show admission required.

The F.O.M.S. Annual Banquet starts at 6:30 P.M. on Saturday at the Lyceum Hall of Immaculate Conception Church, located at the south end of Franklin's Main St.

Tickets may be obtained at the FOMS show table, or reserved by calling Steve Misiur at (973) 209-7212, or John Cianciulli at (973) 827-6671. *The meal is an all-you-can-eat buffet; soda, tea, and coffee are included.* B.Y.O.B. After the banquet there will be an auction for the benefit of the FOMS. Please plan on donating a good specimen, artifact, book, etc.! Auction proceeds may be earmarked for the **Color Fund of The Picking Table.**

**"Garage Sale" of minerals, etc., at the Sterling Hill Mining Museum on Saturday and Sunday from 1:00 P.M. to 3:00 P.M. The Mine Run Dump and Passaic and Noble Pits will also be open to the public for collecting from 9 A.M. to 6 P.M. on Sunday (fee charged).

Saturday, October 12, 2002

**10:00 A.M. – 4:00 P.M. – Fluorescent Mineral Society Meeting at the Franklin Mineral Museum.
**7:00 – 9:00 P.M. – *Night field trip on the Buckwheat Dump for FMS members.*
**6:30 –9:00 P.M. – Night field trip on the Mine Run Dump and Passaic and Noble Pits at the Sterling Hill Mining Museum, for SHMM members only. Poundage fee for both events.

Saturday, October 19, 2002

9:00 A.M. - Noon — F.O.M.S. Field Trip — Collecting on the Buckwheat Dump at the Franklin Mineral Museum.
1:30 - 3:30 P.M. — F.O.M.S. Meeting and Lecture — Franklin Mineral Museum: Speaker and topic to be announced.

Sunday, October 20, 2002

9:00 A.M. - 3:00 P.M. — F.O.M.S. Field Trip — Lime Crest Quarry, Limecrest Road, Sparta, N.J. This is an invitational field trip hosted by the F.O.M.S., and is open to members of mineral clubs which carry E.F.M.L.S. membership and liability insurance. Proof of E.F.M.L.S. membership/insurance required. Proper safety gear a must.

Saturday, October 26, 2002

** 13th Annual ULTRAVIOLATION, a Show-Swap-Sell-Session featuring fluorescent minerals only. First United Methodist Church, 840 Trenton Road, Fairless Hills PA.
For information call Larry Kennedy, 609-882-6819, or e-mail uvrocks@mindspring.com
9 A.M. to 4 P.M. "If your rocks don't glow, you're at the wrong show."

Saturday, November 2, 2002

**6:30 P.M. - 9:30 P.M. — Night Dig on the Buckwheat Dump, for the benefit of the Franklin Mineral Museum. Doors open at 6:00 P.M. for check-in and mineral sales. Poundage fee charged. Call for details: 973-827-3481.

Saturday, November 16, 2002

9:00 A.M. - Noon — F.O.M.S. Field Trip — Franklin Quarry, Cork Hill Rd., Franklin.
1:30 - 3:30 P.M. — F.O.M.S. Meeting and Lecture — Franklin Mineral Museum: Speaker and topic to be announced.

Saturday, November 23 through Saturday, November 30, 2002

"Holiday Sale" of minerals at the Franklin Mineral Museum, for FMM members.

Most F.O.M.S. field trips are open only to F.O.M.S. members aged 13 or older.
Proper field trip gear required: hard hat, protective eyewear, gloves, sturdy shoes.
**Activities so marked are not F.O.M.S. functions but may be of interest to its members.
Fees, and memberships in other organizations, may be required.

Message from the President

By Bill Kroth

Be A Curator

It is safe to assume that most of you who belong to the Franklin-Ogdensburg Mineralogical Society, Inc. enjoy minerals enough to have a personal mineral collection from the Franklin and Sterling Hill mines. The actual number of specimens may vary significantly; however, most of us have collections numbering in the hundreds and even perhaps into the thousands! Many of these pieces were most likely purchased from dealers and miners, or obtained from other collectors. Our mineral collections slowly grow with each purchase and over the years become more valuable, historically significant, and comprehensive. We spend hours tracking down and purchasing examples of various mineral assemblages, and finding specimens with rare species or striking fluorescent patterns, etc. We sell off some pieces to fund higher-grade beauties. We build or buy cabinets or fluorescent display cases to show them off. But do we carefully number and catalog each piece? Do we have a comprehensive database of our collections?

Today, virtually everyone has a personal computer, and it is very easy to use a program such as Excel to document the collection. Important information such as date acquired, price, locality, seller, past collection pedigree, and accompanying historic labels should be listed. We are each a curator (like it or not), and we have a duty to keep track of this information so that it can be passed on to subsequent generations of collectors. My high regard for some of my favorite pieces is not just due to their richness, color, fluorescence, or crystal perfection. I also take pleasure in the accompanying hand-written labels, or simply knowing which collectors owned and cherished a specimen before me. There is magic in holding a specimen once owned by Roebling or collected by Billy Ball, and that magic can be sensed only if we know and preserve that history.

Don't limit yourself to just specimens; catalog everything you collect. For example, I have four carbide lamps that appear to just be typical "Guy's Droppers" that you can find at every swap meet. If I were not around to tell their story, they might be sold unknowingly for $25 each. However, once my catalog was checked, it would quickly be noted that these were given to me by Nicolas Trofimuk, the famous Franklin miner who collected some of the rarest lead silicate minerals. Yes, there's quite a difference in appeal and value.

So do these things to preserve the history, the science, the fascination, and your collection's true value.

My Impressions of the NJESA Show 2002

Tema Hecht

600 West 111th Street

New York, NY 10025

The New Jersey Earth Science Association (NJESA) Show, for me, begins and ends in pandemonium. It begins the week before the actual show at our New York apartment, with name badges to be made, minerals to be selected for the fluorescent display, labels to be formatted for the display, and tools to be brought along. And it ends just that way, with all of the above being brought back to the apartment (groan).

Dick Bostwick and I arrived at Sterling Hill about noon on Thursday, April 25, where a rental truck was waiting to be loaded with show gear, including cases, liners, risers, one-by-three boards, electrical equipment, and signs. Joe Kaiser, Larry Berger, and Paul Shizume were waiting at Sterling Hill when Dick and I arrived. John Sanfaçon met us there about 20 minutes later. Then it was up to the core shed where all of the gear was stored, to load a huge Ryder truck that was sitting in front of the shed.

We arrived at the Littell Center at about 4:00 P.M., in time to watch Steve Misiur and Russ Brarens finish skirting the dealer tables. We unloaded about 14 display cases with liners and risers, ultraviolet lamps, electrical equipment and signs, and then started arranging the fluorescent display room. Tables had to be brought in and set up, and a disgustingly heavy pool table had to be moved, and was, by six fabulously strong men. Cases had to be unfolded and set up on the tables. Then the ultraviolet lamps had to be mounted in the cases, and hooked up to extension cords. While this was going on the room had to be "blacked out" with black plastic sheeting taped over the windows, and hung from the ceiling to fashion an elaborate light barrier at the door. Signs and attention-getting Christmas lights had to be put up around the entrance; without a reason, why would anyone walk into a dark room? Paul, Joe, and others were kept busy, and as the day went on a few more people joined us. For the first time I met Eckhard Stewart, of whom I'd heard legends; he was a bundle of cheerful, needed energy. It goes without saying that we stopped frequently for **liquid** refreshments.

On Friday the dealers and exhibitors arrived at the Littell Center and set up their booths and displays throughout the day. Those assigned to the Hardyston School had to wait for school to be out: a frantic process, and rather a blur for all concerned.

Saturday morning turned out to be spectacular, weather-wise **and** otherwise. There was the usual early morning panic to get to the outdoor dealers and find that perfect specimen. I even chased Dick Bostwick out of the fluorescent display area so that he could have his romp, spend our money, and satisfy his curiosity.

I had a walkie-talkie with me so was privy to what really was happening inside and out, regarding the show. At about 9:30 A.M., after the indoor show opened to the public at the Littell Center, I was approached by a few dealers. The wattage of their display lights kept on blowing the main circuit breaker and we needed to find the electrician. So I got on the P.A. system, made the announcement, then waited until Bob Leatham came to the rescue. Then about an hour later there was a smoking ceiling fixture at the Littell Center, and again Bob saved the day. I sure hope he finally got to see the show.

At about 11:00 A.M. I headed outside to the parking area to relieve whoever was there and direct traffic to the appropriate parking spaces. Joe Kaiser and Steve Kuitems were roasting in the sun, taking tickets and sending the cars down to me for parking. The spaces filled up quickly at the Hardyston School and the Littell Center so we had to do some fancy juggling.

Joe got pretty sick last year at the show. He worked so hard he forgot to eat, drink, and take his medicine. So this year, using the walkie-talkie that I had, I clicked it on and asked for Joe. When Joe got on and asked what I wanted, I said, "Joe, don't forget to eat, drink, and take your medicine!" I'm not sure if Joe appreciated my being after him, but he is a great friend to many of us and we all look out for one another.

Sometime in the afternoon, while I was still parking, I heard over the radio that someone had stolen specimens from a dealer at the Hardyston School. Word spread and dealers at the Littell Center found that they were also missing expensive items. Then, all of a sudden, a police car came zooming into the Littell Center parking lot, sat there for about 2 minutes, then went zooming back out. Someone asked over the radio where the police were, and I answered that a car was here and just left. The response on the other end was that they knew who the thief was, and that he took off down Route 23. I suggested someone get back in touch with the police and give them an exact location. It certainly sounded terribly chaotic, but what I didn't know, and found out later, was that our runaway thief, supposedly on Route 23, was on foot. So said Mike Gunderman, who helps out with show security and has lived in the area all of his life. Mike told me that he figured that anyone in his right mind who wanted to get away would not have taken a main road like Route 23. So Mike jumped into his truck and started his own search, driving down the side roads of Franklin that he knew so well. Since Mike had spoken with the thief earlier he would be able to identify him. Lo and behold, down one of the side roads was someone walking at a leisurely pace, with his hands in his pockets. Mike drove his truck beside the walker and knew immediately that he had found his quarry! Mike pretty much told the man that he could either get into the truck on his own, or it would be Mike's pleasure to "help" him get into the truck. If Mike had to "help" him, Mike said he could guarantee the man wouldn't like the

Continued on page 5

results at all. The alleged thief, obviously someone with good survival instincts, opted for self-service, and so would you once you took a good look at Mike.

About 4 P.M. police cars descended upon the outdoor swap with the handcuffed man in one of them. Eckhard Stewart came running up to me and said that the thief had a brother who was helping him steal from our dealers, and that he was walking around the outdoor swap. Eckhard literally tripped over this brother's backpack, loaded with specimens, and was able to identify its owner so both brothers could be taken into custody. They were searched and the backpack was unloaded, to the great relief of the dealers who recognized and recovered nearly all of their stolen specimens. Of course the story spread, and our heroes were slapped on the back and thanked for the rest of the day.

Saturday's show was finally drawing to an end, and what followed was the NJESA show banquet. Each year the EFMLS (Eastern Federation of Mineralogical and Lapidary Societies) is hosted by one of its member clubs. This year Fred Stohl, the NJESA Show Chairman, convinced the EFMLS that the NJESA show should be their host. Among other things that meant EFMLS meetings at Sterling Hill on Friday, some competitive cases in the show, and a lot more people at the banquet. "The Suits," as some of the locals called the well-dressed EFMLS delegates, numbered over 80.

The Saturday show was now closed, and Dick Bostwick and I put the fluorescent displays to bed for the night to get their beauty sleep and prepare for Sunday, the final day of the show. On our way over to the American Legion Hall, where the banquet was being held, Dick mentioned that it would be great to kick back and relax, something he isn't able to do as the master of ceremonies at the Franklin Show's FOMS banquet. We arrived at the Legion Hall ten minutes late and in no particular hurry, looking forward to an evening of fun. All of a sudden, before we even had a chance to find seats, a friend of ours charged up to us and told Dick that there was no one to introduce The Suits, and that Dick had to do it, and also emcee the event! We looked at each other, shrugged, and I once again became a merry widow for the evening. The only two NJESA officials present were Steve Misiur and Russ Brarens. Steve, who had been laboring on the show for weeks, was completely exhausted. Though seated at the Rowdy Table, a normally noisy FOMS institution, he was already nodding off. Russ Brarens, who is a quiet, reserved person, politely and sensibly declined any public role other than writing a check for EFMLS. As for co-sponsor FOMS, only two officials were present, one of them the aforementioned and overworked Steve Misiur, now fast asleep with his chin in his hand.

So Dick Bostwick, facing the firing squad for the umpteenth time, got up and talked about Franklin and Sterling Hill, the minerals of the area, the interesting people of the area, how wonderful it was having everyone present from the EFMLS, and the success of the show. Then Dick went on to introduce the President of the EFMLS and the evening continued. The Rowdy Table did not disappoint us. There were private jokes, facial contortions, strange noises, and other antics best left to the imagination. At a glance, people at The Rowdy Table looked as though they were in mourning, crying and hunched over, with their shoulders shaking. But most of us knew better! What a day, what an evening! After the banquet was over it was all we could do to drag ourselves into bed and collapse, unconscious until the dawn of another day.

Sunday morning came all too quickly and brought with it a cloudy day and a very wet one. When Dick and I arrived at the Littell Center there were only three hopeful outdoor dealers waiting in their campers for the rain to go away. The rain did not go away, but eventually the dealers did. The indoor show this day was crowded since the weather drove people inside. At one point someone noticed three suspicious characters who kept splitting up and taking the shuttle bus back and forth between the two locations. After our experience on Saturday we weren't taking any chances so we watched them closely until they finally left the show for good.

At one point I made my way into the fluorescent display room where it was blissfully dark and quiet. I got a chair and decided to sit on the side and take a short nap. Among the many fabulous fluorescent displays the Franklin Mineral Museum had put in an exhibit of the various types of wollastonite found at Franklin and Sterling Hill. Some specimens in the FMM case were labeled First Find, Second Find, and Third Find, the chronological order in which those types were found in the Franklin Mine. As I was slowly drifting in and out of sleep, a father and his daughter came in to look at the exhibits. The father seemed to be concentrating very hard on the wollastonite display while his daughter, aged approximately five, roamed around the room. He said, "Come here, honey." She came running over. The little girl's father stooped down and put his arm around his daughter's shoulders, and said, "Look at these rocks. Aren't they beautiful?" His daughter answered with a squeaky high voice, "Yeah." "See these orange rocks here?" said the father. "Yeah," said the little girl. "This one here says First Find," the father said, and continued, "Do you know what that means?" The little girl answered, "What?" And the father said, "it means that this is the first rock that they ever took out of the mine. And over here," he continued, "it says Second Find, and that means that this is the second rock to be taken out of the mine. Isn't that interesting?" And the little girl squeaked, "Yeah." That information certainly woke me up but I didn't say a word, and let the little girl's father be her all-knowing guardian.

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FRANKLIN MINERAL MUSEUM NEWS

John Cianciulli, Curator
Franklin Mineral Museum
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Bugs, birds, and butterflies appear to be as interesting as "leaping lizards!" Thanks to the generosity of Mr. Francis Gregus, retired school teacher from West Milford, New Jersey, The Franklin Mineral Museum now has a wonderful entomological collection. A small portion of this collection is now on display in Welsh Hall and is already a popular addition to our many fine exhibits. What do bugs and butterflies have in common with rocks? Aside from being a product of mother nature, some of those critters exhibit exquisite colors (like rocks) and a few even fluoresce under UV Light! The ladies seem to prefer the colorful butterflies and the young men seem to favor the hairy spiders and ferocious looking beetles. The new exhibit is a big hit with kids of all ages. It is a must see!

The museum continues to take "the show on the road." We provided the Borough of Franklin a portable fluorescent exhibit for the New Jersey State Fair held in Frankford Township, Sussex County, New Jersey. Fred Young is busy doing his part in spreading earth science education by giving talks at various schools giving talks. The Museum has installed a mineral display in Franklin Borough Hall. It features the original collection that was displayed at the Neighborhood House in Franklin and later in the former Franklin High School and subsequently was displayed in the National Bank of Sussex County for 25 years before it was returned to the Franklin Mineral Museum.

The Buckwheat Dump was turned over earlier this year in April. Rich ore was brought to the surface and along with it material that has not been seen on the Buckwheat for 40 years! Large hunks of hardystonite with clinohedrite, lots of very nice fluorescing fluorapatite, several significant finds of cuspidine, large amounts of sphalerite, calcite, and hydrozincite combinations, chlorophane and scheelite-powellite were found. Large blocks of fluorescing microcline and lots of interesting micro smutch can be collected from the material transported to the dump from the Phillips' property on Buckwheat road. This is a very productive year for the Buckwheat Dump.

Research is progressing well. So far for 2002 three minerals have been added to the local mineral species list; one is a new mineral to science, rouaite. The other two, paragonite and dundasite are described from this area for the first time in this issue of *The Picking Table*. Some amphiboles from the area are presently under study and the hematolite-like and the ferric iron analog of hematolite are being revisited. Potentially these studies may add more species to the local mineral list in the coming year.

NEWS FROM STERLING HILL

Joseph Kaiser
40 Castlewood Trail
Sparta, NJ 07871

The museum has had an architectural historian and preservation planner draft a Master Plan for its next twenty years. When making grants and donations, foundations and donors want to see how their assistance helps the museum to reach specific goals. The plan shows how some currently unused museum buildings could be utilized for displays and activities that focus on the history and development of the site. The upper site has several buildings with large interior spaces that could be adapted to this purpose without modifying the exteriors of the buildings. There is also a large area available for parking.

On the west side of the Passaic Pit a ramp has been built to an old adit part way up the hillside. There are plans for special tours into this old mining tunnel, which has its original rails intact, and leads to the "Glory Hole." Such tours will give a true feeling of what mining was like in the old days.

Three new species have been added to the list of mineral species from The Franklin - Sterling Hill area. Samples of both were found on the surface at Sterling Hill and confirmed through analysis. Paragonite, a mica, was found by Jim Rumrill; dundasite occurs with galena and was collected by Donald Lapham. The third, rouaite, was found in the Sterling Hill Mine in 1978.

The Sterling Hill Mining Museum has recently begun a new growth phase, part of the educational mission embodied in the newly named Sterling Hill Institute of Geoscience. The new program will be implemented in two parts. The first is the development of a new on-line presence for the Sterling Hill Mining Museum. There on our website we will provide educational content for educators who have access to the internet: not just local educators but those all over the world. On this website, the teachers will be able to utilize the varied educational resources of the Sterling Hill Mining Museum. The second part of the new program is the establishment of a physical home for the Institute, in the GeoTech Center. The Institute will create programs for educators and visitors who want to experience the many educational aspects of the museum site, and obtain materials as well as lessons to further not only the education of their students but also their own. These two parts will be phased in over the coming months and will be more visible as time goes on.

To confirm dates and times for night collecting on the Mine Run Dump, and collecting in the Passaic and Noble Pits, check the Sterling Hill web site at www.sterlinghill.org. These events are for Sterling Hill Mining Museum members only.

FIELD TRIP REPORT

Steven M. Kuitems, D.M.D.
14 Fox Hollow Trail
Bernardsville NJ 07924

Buckwheat Dump
Franklin, New Jersey

May 18, 2002 - After eager collectors descended the inclined ramp to the collecting area, the first sight that greeted them this day was two newly overturned portions of the dump. Of interest were many heavy dark-colored boulders of Franklin Mine ore. Upon sampling this newly exposed rock it was evident that a large cache of franklinite-dominant ore had been exposed. Andradite garnet boulders with small stringers of hematite were in abundance, and a 4 x 5 cm blocky parting mass of hematite was recovered. Green willemite masses as much as 7 cm across were also found. Several boulders from the center of the dump yielded zincite grains and masses as much as several cm across, associated with blue, gray, and pink tephroite. Several collectors tried to remove franklinite crystals as much as 4 cm across, but with limited success; it really is extremely difficult to recover large franklinite crystals intact, as they are very brittle.

Hardystonite was found with willemite and clinohedrite; the largest mass was 14 x 20 cm. These minerals fluoresce blue-violet, green, and orange respectively in shortwave ultraviolet light, and pieces of this size are seldom found now. Barite, another rarity from this dump, was found in 1-cm grains in a matrix of calcite, the two showing typical cream and red fluorescence under shortwave ultraviolet light. Perhaps the most unusual find of the day was cuspidine in a 2 cm x 5 cm layer in calcite-franklinite-willemite ore. The cuspidine fluoresces yellow-orange in shortwave ultraviolet light, with characteristic brief intense phosphorescence. Its identity was confirmed optically by John Cianciulli, Franklin Mineral Museum curator.

Lime Crest Quarry
Sparta, New Jersey

May 19, 2002 - The small amount of new rock exposed this day was on the floor of the quarry. Other areas were in the process of being cleaned out or reorganized with the apparent intent of going down another level. Many pyrite crystals were found, most as cubes between 0.5 cm and 1 cm in size, although one spectacular complex 3 cm x 2 cm crystal was certainly a prize for one lucky collector. Several spent tremendous energy working the pegmatite boulders for sphene crystals, some of which measured as much as 2 cm x 3 cm; these were dark brown with glassy surfaces. One small boulder from an old upper bench contained brown phlogopite crystals in a star-like form, almost like Brazilian star mica; these crystals were 5 cm x 5 cm, in calcite with very minor grains of corundum and an unusual emerald-green serpentine. A block of pegmatite yielded a rare specimen of uraninite with 1 cm by 1.5 cm twinned cubic crystals.

Only a few brown 1-cm uvite crystals were collected. All the spinel crystals I saw this day were small (6 mm maximum) but of surprisingly bright reddish-purple color. One collector found an isolated pocket of small transparent yellow barite crystals, 2 mm x 5 mm, intergrown with small calcite and quartz crystals. There were no great finds of corundum as in past years, only a few rounded crystals 1 cm or less in diameter, with blue and purple radial zoning visible in cross-section.

The find of the day appeared in the lowest level of the quarry where the only fresh rock was to be found. This consisted of a series of veins of scapolite, probably the species meionite, which was for the most part light gray to colorless and translucent. (The light gray color appears to come from very finely disseminated graphite.) The scapolite veins were as much as 10 cm wide and were generally bordered by a pale-green mica. In the veins were found large, crude scapolite crystals, the largest 20 cm long. There were also sharper, smaller scapolite crystals, 4 cm long at most. This scapolite fluoresces yellow to orange of moderately bright intensity in longwave ultraviolet light. Scattered patches of calcite in these veins fluoresce pink in longwave ultraviolet light. A few specimens had scheelite grains as much as 3 mm across, and these fluoresce bright blue-white in shortwave ultra violet light.

Franklin Quarry
Franklin, New Jersey

June 8, 2002 - Much less work had been going on in this quarry than at Lime Crest, and only the northeast corner had any recent work evident. Even so, it paid off to check the rock piles that have been sitting around for a few years. As a result of this scrutiny the find of the day came to light, a stout 2.5 cm x 5 cm, sharply crystalized, pale gray tremolite crystal that now graces a collector's shelf instead of waiting for the crusher. This type of tremolite is the least common in this quarry, whereas many dark gray fan-like clusters of elongated flat tremolite crystals were found today.

Many small, bright pyrite cubes as large as 2 cm on edge were found on this outing. Several layers of yellow granular norbergite were brought out; these fluoresce yellow under shortwave ultraviolet light. One norbergite-diopside bullseye pattern piece was worked out of a marble boulder; these typically fluoresce in concentric ringlike patterns of yellow and white under the shortwave ultraviolet lamp. A few pale-green uvite crystals as large as 2 cm were also found, and these fluoresce pale yellow in shortwave ultraviolet light.

The 30th Annual New Jersey Earth Science Association Gem & Mineral Show

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This year as before there were two locations for the Million Dollar Show: the Robert E. Littell Community Center and the Hardyston Township School. There were two shuttle buses between those locations, keeping show-goers from wandering into the killer traffic on Route 23. And yes, there were two sponsors. This year we played host to the Eastern Federation of Mineralogical and Lapidary Societies (EFMLS) convention and show. That being said, there were almost no significant changes in how the show was set up this year, with two notable exceptions. First, there were new white-light displays and displayers following the EFMLS guidelines for competition. Second, there were "The Suits," formally attired EFMLS officials who attended the show, critiqued the displays, and gave speeches and made presentations at the Saturday night banquet. Beyond this, the food was good, the camaraderie fun, and the plethora of minerals enough to satisfy the show-goer till the fall show.

What's new in the mineral world? That is always the operative question in the spring show. The short answer is "not a whole lot," but there certainly were specimens galore, and much delight was found in actually seeing and handling some of the new and not-so-new mineral finds. Rocko Minerals had a fine selection of superbly crystallized calcite from Guangxi Province, China. These seem to be getting larger and better each year, with killer scalenohedral crystals as much as eight inches long. Pale amethyst quartz crystals from Magaliesberg, South Africa also made a reappearance at Rocko's booth. Bob Jenkins of Coisas Preciosas displayed some classic Colorado amazonite crystals of huge proportions (some nine inches high) along with the occasional smoky quartz crystal. Bob had one of the showiest pyrites I have seen from Daye Hubei, China, made up of razor-sharp, inch-size cubes covering a large (8") plate of matrix. Bob's booth also had a large variety of Cobalt, Ontario silver specimens.

Bill Butkowski, of The Mineral Cabinet, had a fine assortment of miniature Chinese pyromorphites with individual crystals up to 3/4 of an inch in size. Bill brought out a number of calcite clusters from Irai, Brazil, which fluoresce bright pink to red in shortwave ultraviolet light. His usual high esthetic standards were evident in the fine pink stilbites from Poona, India, and the bright blue cavansites from nearby Wagholi, India. It was also nice to see his classic deep-purple amethyst clusters from Artigas, Uruguay. Dan Weinrich brought his usual fine selection of Midwestern specimens, including colorful fluorites from Hardin County, Illinois, and galena and bar-shaped pyrite crystals from the Buick mine, Iron County, Missouri. Dan is also gaining renown for his regular installments of wire silvers from the Uchuchaqua Mine, Lima Dept., Peru. Yes, they do seem to be getting even better specimens with very thick bundles of silver wires up to four inches long. If you needed an amethyst, Cathedral Amazon Imports had them, as well as a fine selection of faceted rhodolite (pyrope) garnet, Malaysian red-orange grossular garnet, and deep pink Brazilian beryl, or morganite. Their tanzanite (violet zoisite) gemstones were available in fine deep-blue shades, and in larger sizes than last year.

Graeber and Himes did not disappoint but brought their typical assortment of show-stoppers. There I saw a superb flawless ½ inch gem cassiterite twin with a pleasing smoky color, and if you wanted fine uncut tanzanite crystals up to two inches across there were several from Merelani, Tanzania. They had a fine suite of elbaite tourmaline from Nuristan, Afghanistan, in shades of hot pink. For the high-end collector they had a fantastic bright red crystal of rhodochrosite on matrix from the Sweet Home Mine, Colorado. One of the new finds to make its way to our show was the mint-green apophyllite on stilbite from Maharashtra, India, with flat terminations giving a checkerboard effect to the hedgehog groups of crystals. Try to imagine three of these four-inch groups on one plate of pale pink stilbite, perfectly spaced and displayed, and you will understand why I just parked myself in front of this case for a few minutes to enjoy the sight.

Detrin Minerals had a wide selection of Chinese fluorites, calcites, and stibnites of huge proportion, often 12 to 14 inches long. Of note were the nice purple colors of the fluorite crystals with much sharper glassy surfaces than I have seen in the past. Dudley Blauwet of Mountain Minerals International had his typical array of high-quality gems and gem mineral specimens; yes, you could buy a combination package of cut and natural crystal specimens. He had several fine large iolites (cordierite) from Orissa and a rainbow of sapphires from Sri Lanka. Excalibur Mineral Co. had a nice selection of light green crystallized nickischerite from Huanuni Mine, Oruro Dept., Bolivia, and a fine assortment of diamond crystals from many localities. John Betts had a large three-inch lazurite crystal with unusually sharp faces, and ruby crystals in marble from Kopica, Afghanistan.

If you were looking for local specimens, C. Carter Rich had a wide selection of Franklin and Sterling Hill species. These produced a small flurry of activity at the show opening due to an advance notice which whetted the collectors' appetite (or apatite?). I know I went home with one nice leucophoenicite

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from the Franklin Mine. My wife and I admired the fine selection of gem rhodochrosite from Argentina, many mounted in unique wire-wrapped settings by the Fowlers. Dave Bunk Minerals pulled out all the stops with showy museum-sized pieces: pink and green fluorites from Piute County, Utah, a huge smithsonite about one foot long from Sinaloa, Mexico, and a world-class azurite specimen from Tsumeb with crystals five inches long. There were many other dealers inside and out at both locations who had fine wares for sale, but these were notable and worth remembering.

My compliments to the many white-light and fluorescent exhibitors. This year I, Dick Bostwick, and Tema Hecht put together an exhibit we had been contemplating for at least ten years, and that was fluorescent "picture rocks" from the Franklin-Sterling Hill area. Viewing these is similar to seeing lions and sheep in a summer sky, but here it was the pattern of fluorescent minerals that did the job, with dancing ladies, waterfalls, dragons, and more. I think it was a success, and I want to encourage any of you who read this report to consider putting in a display of your best white-light or fluorescent minerals in the next show. Be creative and see this as an outlet for your collecting efforts. Show the public what you have an interest in, and let others be inspired to study and enjoy these treasures of natural history. Till the next show, happy hunting!

The Buckwheat Diary
Fall 2001

By
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The Buckwheat Dump in the fall of 2001 became, more than ever, a special place for children.

On 9-11 their country was attacked and their confidence was shaken, but their spirit was unbroken.

This spirit is displayed every tour day at the Buckwheat. Rocks are a comfortable constant and the geology of the Franklin mineral deposit, in full panorama in the Buckwheat, lies ready for search and discovery by the inquisitive minds of these young visitors.

The Buckwheat Dump provides a brief refuge from a troubled world.

The Buckwheat Trail

Like the spirited pioneers of 1898 who followed the legendary Chilkoot trail to Yukon gold, these modern day treasure hunters follow the newly constructed Buckwheat trail to Franklin treasures of a different kind.

Tools

They use plastic lunch bags, paper lunch bags, zip lock bags, back packs, pails or pockets. They wear goggles or glasses, helmets or baseball caps. They carry rock hammers or house hammers. They wear work boots, cowboy boots, sneakers, and even clogs. They walk, run and sometimes leap in their tireless search for their Franklin treasures.

The methods vary but the results are the same: a collected piece of special Franklin rock.

A First Find Pyrite

Clifford, a shy 9-year-old from a distant school district, had only one request: Can I find pyrite here?

No matter that other extremely rare minerals lie hidden among the rocks, pyrite was his desire.

There must be a Franklin miner's memory that hangs over the Buckwheat ever ready to point the way to a sought-after specimen, because that day was pyrite heaven for Clifford.

His special find was a boulder that was too heavy for him to carry. After some work, he accepted a 1/2-lb piece filled with tiny crystals and left the dump with a smile on his face and a new treasure: his "first find" pyrite.

Dennis the Menace and the Camptonite

One very cool fall day, small classes of serious children were individually and quietly going about their business of collecting small fluorescents. Standing out among the class was one larger boy whose only tool was a 5-lb sledge with a long handle. Like a FOMS collector trying to break up a piece of Lime Crest boulder to remove one spinel crystal, this young collector, with a gleam in his eye and his 5-lb sledge, roamed and hammered at every big rock he saw, leaving a trail of broken pieces. He was not collecting anything, only breaking everything.

A crowd of his classmates followed him, eagerly picking up pieces he left behind. FOMS again! Just before being called back to the school bus he discovered a large piece of camptonite. Ping, bounce, ping, bounce, ping, bounce. The harder he swung, the higher the bounce.

After repeated tries he finally gave up and moved on. Standing next to his teacher, we asked, "who was that boy?" With a smile she answered "we call him Dennis the Menace."

Crowd Control

Large school groups who gather at the top of the trail waiting to be led to the dump are often wired tight after their controlled museum tour and are ready to unwind as soon as they can. To get her children calmed down so they don't pile up at the bottom of the trail in a big ball of coats and sweaters, one teacher practiced a special method of Pavlovian crowd control.

She clapped loudly four times. Almost as one, all the children answered with four claps of their own and then it became so quiet you could hear a crystal grow.

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She then instructed them to follow Fred slowly down the trail. At the end of their collecting hour, she repeated the procedure, four claps followed by four answering claps and an orderly walk back up to the waiting school bus.

Another successful tour day at the Franklin Mineral Museum.

The Salamander and the Lizardite

The recent excavation and preservation of a "salamander" in the wooded area by the Wallkill River has opened up a new learning experience for the school visitors. "Salamander," a term derived from ancient belief that salamanders survive the heat of a fire, was used by early metal refiners for ore that would not melt in the heat of a furnace. Franklinite was such an ore. Attempts in the early 19th century to smelt franklinite in a furnace were not successful since the heat of the furnace would only partially melt the franklinite and form a fused refractory mass. After one such attempt, the furnace had to be torn down to remove the refractory mass and haul it away by a team of oxen to the bank of the Wallkill River, where a piece of it was recently found by an enthusiastic collector. After a confirmed identification by the museum's curator, John Cianciulli, the piece was destined to be displayed as a rare piece of New Jersey mining history.

Later that same day, between tours, the author stumbled over a piece of what he thought was a funny looking green mica. This piece now resides in the curator's office as a reminder that things are not always what they seem, especially at the Buckwheat Dump. The piece was from the stilpnomelane assemblage which include franklinphilite, lennilenapeite, chamosite, and lizardite. Lennilenapeite is not green mica but a rare mineral unique to Franklin.

Rainbows in the Dark

From the top of the Buckwheat trail it looked like the dump was being invaded by a swarm of huge fireflies. What in sunlight was a big pile of dull gray rocks, this October night was being transformed by powerful portable UV lamps being swung back and forth into a Christmas tree display of reds, greens, oranges and blues. It was night collecting at the Buckwheat Dump, and children of all ages from 3 to 73 lined up at the museum door waiting for the opening bell.

Looking like early participants in a Halloween costume party, they wore miner's headlamps, glasses, kneepads, work gloves, and heavy boots. They carried tools spotted with fluorescent paint so they could find them in the dark with UV glare.

Seventy-nine collectors from the Northeast states and from as far away as Battle Creek, Michigan, visited the dump that night, and over 800 lbs. weighed out at the end of the event. Many fine collected fluorescents left Franklin, but just as interesting were the ones that got away.

The Alchemist

The alchemist of medieval times was charged with trying to turn lead into gold. This modern-day alchemist performs mineralogical miracles with more mundane commodities.

He sits in front of his computer 24/7, cataloging minerals and answering e-mails from collectors around the world, but on this October evening he was being asked by two overly enthusiastic fluorescent collectors to change hydrozincite into margarosanite and microcline into hardystonite.

You can't change lead into gold and you can't make margarosanite out of hydrozincite or hardystonite out of microcline. The colors are true but not the rocks.

Two disappointed but wiser collectors left the Franklin Mineral Museum that evening newly aware that fluorescence is not a sure-fire way to identify rare species of Franklin minerals.

Fossils in the Franklin Marble

One of the last groups to visit the museum during the fall of 2001 came from a charter school in Morris County, and they wanted to learn.

A very serious young student had many hard questions and one question he asked has gone unanswered for many years. "Are there fossils in the Franklin Marble?" That fall day the answer to that question was a positive "yes." It is known that there was primitive life during the pre-Cambrian era and fossilized remains of that life can be seen in limited sections of the Franklin Marble. However, such fossils have yet to be found on the Buckwheat Dump.

These fossils, called a stromatolites, are the remains of cyanobacteria that lived in a warm, shallow sea that covered the landmass that today is northwestern New Jersey.

This charter school left the museum that day with one of the special treasures that the Franklin Mineral Museum has to offer, increased knowledge of one of the world's most magnificent mineral deposits.

GROWTH SPIRALS ON GRAPHITE CRYSTALS FROM THE TROTTER MINE DUMP, FRANKLIN, NEW JERSEY

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The Franklin and Sterling Hill deposits have been the source of several mineralogically important graphite occurrences. While the Franklin Marble is rich in "ordinary," small, disseminated graphite flakes, several notable occurrences of graphite have been found in and near the Franklin and Sterling Hill deposits. Some examples include the remarkable barrel-shaped crystals (the best ones not exceeding 0.5 mm) described by Charles Palache from the 900' level of the Sterling Mine in 1941 (Palache, 1941; Jaszczak, 1994a, 2001), and the spherical graphite aggregates, ranging from submillimeter to 2 cm across, that have been found at both deposits (Lemanski, 1991; Jaszczak, 1994b, 1995; Hanna and Jaszczak, 1999).

New to the list of remarkable graphite crystals from this area are crystals up to 2 mm across that show visible growth spirals on the basal pinacoid faces c{0001}. While graphite crystals are common throughout much of the world, those showing pronounced growth spirals are relatively rare. Such spirals have been noted on only a small fraction of the crystals occurring at several localities, which are listed in Table 1.

During the April 24-25, 1999 collecting trip to the Trotter mine dump, Franklin, New Jersey, Mr. Wayne Cokeley collected samples of graphite crystals in marble from a series of large boulders near the edge of the dump. The graphite occurs in these samples as disseminated, tabular flakes as much as 4 mm across associated with abundant, amber phlogopite crystals in calcite. Tiny, spheroidal graphite aggregates occur on some of the phlogopite crystals. The calcite matrix is tan-colored and moderately fluoresces orange-red in short-wave ultraviolet light, which indicates that the samples probably originated from within the orebody or within its manganese halo (Richard Bostwick, personal communication, 2000). The fluorescence is also in contrast to otherwise similar-looking material from the Lime Crest Quarry, Sparta, New Jersey (Jaszczak, 1998), which typically does not fluoresce. Etching of the marble in dilute hydrochloric acid revealed the presence of some light-colored insoluble crystalline masses that resemble pyroxenes or amphiboles but were not positively identified.

The growth spirals on the graphite crystals are easily visible in reflected light with a stereoscopic microscope. On the crystal in Fig. 1a, the steps are fairly straight and uniformly separated from one another. The corners of the steps and the steps near the center of the spiral are rounded. The step edges appear to be more or less parallel to [100], the outline of the crystals formed by the edges between the basal pinacoid and the dominant prism (probably first-order) faces. A second crystal (Fig. 1b), situated less than 5 mm from that in Fig. 1a, shows less regularity in the step spacing, although the step edges are also more or less parallel to the edges of the external crystal form. This crystal also shows some surface pitting and some wavy step edges, particularly near the center of the crystal, which may indicate that some degree of dissolution took place. On a surface of the host rock approximately 30 cm^2, approximately 35 graphite crystals were exposed; however, only the two illustrated here show visible growth spirals.

The occurrence of prominent growth spirals on the surface of the graphite crystals may give some clues as to their origin. Such spirals are indicative of graphite growth by the spiral growth mechanism (Sunagawa, 1987) first proposed by Frank (1949). Spiral growth is well documented in minerals that have grown from solutions and vapors, and indicates growth at relatively low supersaturations with a regular addition of growth units (atoms or clusters of atoms) to specific surface sites, especially steps. Graphite disseminated in metasedimentary rocks is generally believed to be formed from the graphitization of organic matter in precursor sediments during metamorphism (see, for example: Weis *et al.,* 1981; Buseck and Huang, 1985; Wopenka and Pasteris, 1993; Luque *et al.,* 1998). During heating, organic precursors release oxygen, hydrogen, and nitrogen, and the remaining carbon progressively orders into crystalline graphite. However, since the spiral growth mechanism is one that is mediated by dynamics at a crystal's surface, it is an extremely unlikely mechanism for growth in solid-state transformations such as the graphitization of carbonaceous matter where crystallization takes place throughout the bulk of the developing crystal. It seems more likely that the crystals grew by carbon precipitation from a carbon-rich fluid permeating the system (see, for example: Rumble and Hoering 1986; Luque *et al.* 1998; Satish-Kumar 2001), perhaps after peak metamorphism, but at relatively low supersaturation and unhindered by surrounding calcite. Although graphite is usually considered a fairly chemically inert mineral, it is well known that it can be dissolved [see for example Jaszczak (1991) Fig. 12] or precipitated from high temperature and pressure carbon-oxygen-hydrogen fluids. The carbon could have originated from organic matter in the sediments [this would be indicated by relatively light carbon isotopic ratios, $^{13}C/^{12}C$, for the graphite], and mobilized under later fluid flow (Crawford and Valley, 1990). Graphite could

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have subsequently reprecipitated under changing conditions, such as regional cooling or changing solution composition due to fluid-rock reactions. Although the picture is incomplete, growth spirals on the surface of graphite crystals are an attractive piece in the puzzle of understanding their genesis.

Table 1. Occurrences of growth spirals on natural graphite crystals.

Locality	Reference
Canada: Princeton Resources Corp. Mine, Bissett Creek, Renfrew County, Ontario.	Jaszczak (unpublished).
Namibia: road D-1918 heading for Big Spitzkoppe, near Usakos.	Jaszczak (unpublished).
Namibia: near WlotzkasBaken.	Weiner and Hager, 1987; McCall *et al.* 1999; Rakovan and Jaszczak, 2002.
Ukraine: Zavallya deposit in Bug River area; Smela anorthosite complex, Ukrainian Shield; Stary Krym deposit, Azov Sea area.	Kvasnitsa and Yatsenko, 1997; Kvasnitsa *et al.*, 1999.
U.S.A.: Lime Crest Quarry, Sparta, New Jersey.	Jaszczak, 1998.
U.S.A.: Crestmore Quarry, California.	Jaszczak, 1991.
U.S.A.: Jensen Quarry, Riverside County, Ca.	Jaszczak (unpublished).
U.S.A.: Gouverneur Talc Company No. 4 Quarry (Valentine Deposit), Harrisville, New York.	Chamberlain *et al.*, 1999.
U.S.A.: Trotter Mine dump, Franklin, New Jersey.	This work.
U.S.A. and Canada: Grenville series marbles.	Horn, 1952.

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Fig. 1 Growth spirals on tabular graphite crystals in calcite from the Trotter Mine dump, Franklin, New Jersey. Both crystals (a;b) are 2 mm across and occurred within 5 mm of each other. (J.A. Jaszczak specimen #2336 and photos 83-29, 83-24.)

(b)

(a)

"Glow Father" Ralph Thomas at the NJESA Show, April 27, 2002. *Photo by Tema Hecht*

EVIDENCE OF EARLY LIFE IN PRECAMBRIAN ROCKS OF THE NEW JERSEY HIGHLANDS

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INTRODUCTION

Scratch the surface of New Jersey and you discover a fossil record that places the state prominently in the category of important discoveries. For more than a century fossils have been recovered in rocks and sediments that range in age from the Cambrian to the Quaternary Periods, and that span the Valley and Ridge, Highlands, Piedmont, and Coastal Plain provinces. Some of these milestones include the following. In 1885, the first complete dinosaur skeleton known in North America was discovered near Haddonfield in a clay deposit 70 to 100 million years old. In 1954, a 7.5-foot-tall mastodon that lived 12,000 years ago, when New Jersey was coming out of the last great ice age, was found near Vernon. In 1983, a deposit of amber within a clay deposit 90 to 94 million years old that contained the world's oldest mosquito, moth, mushroom, bee, biting fly, and tick was discovered near Perth Amboy. In 1988, a site near Clifton in sandstone 200 million years old was excavated that contained thousands of perfectly preserved footprints of several species of dinosaurs.

Until recently, fossils were thought to be absent, or at least unrecognizable, in Precambrian rocks of the New Jersey Highlands because of the ancient age of these rocks and the fact they were metamorphosed under conditions of high temperature and pressure sufficient to obliterate any fossil remains. However, this changed in 1999 when a fossil stromatolite (Fig. 1) was discovered in the Highlands in Sussex County in the Franklin Marble. The fact that this fossil survived the destructive effects of metamorphism is truly remarkable. This find predates all other fossil occurrences in the state and turns back the geologic clock to the Precambrian Era, a time early in the evolutionary history of the Earth when primitive life existed only in oceanic environments. Other corroborative evidence for life during the Precambrian in New Jersey has since been documented, and these fascinating occurrences are the subject of this paper.

NEW JERSEY HIGHLANDS

The Highlands are a region of approximately 1,000 square miles in the northern part of the state that has undergone a long and complex geologic evolution, resulting in the formation of a variety of Precambrian rock types. These consist principally of granites, gneisses and marble that are slightly more than 1 billion years old, making them the oldest rocks in New Jersey. The Highlands, exposed roots of the ancient Appalachian Mountain system that stretched from Canada south to Alabama, were formed as a result of a collision 1 billion years ago between the continent of Laurentia (what would one day be North America) and another continental landmass. The collision of these two continental plates produced a mountain-building event known as the Grenville Orogeny, creating a double thickening of the Earth's crust and uplifting the Appalachians to heights rivaling those of the present-day Rocky Mountains. As a result, the Precambrian rocks in the Highlands (and elsewhere) were metamorphosed deep within the crust at high temperature and pressure. These rocks are presently exposed at the surface because of the uplift of large crustal blocks and erosion of overlying rocks over the past billion years.

Fossils in the Precambrian rocks of the Highlands would not be expected to occur in granites or gneisses that had crystallized from magma or lava. Nor would they be expected in metamorphosed sedimentary rocks that were formed in a terrestrial environment because life had not yet begun to evolve on land, and existed at the time only in primitive form in marine (ocean) environments. Therefore, only marble and some of the gneisses in the Highlands that had formed from sediment in a marine environment were logical places to look.

Fig. 1

Figure 1. Stromatolites in the 1.1 to 1.2 billion-year-old Franklin Marble are the fossil remains of colonies of cyanobacteria. *Photo by Brett Kent.*

Continued on page 15

MARBLE AND GNEISS

Marble in the Highlands was formed by the conversion during metamorphism of limestone and less abundant dolomite. These carbonate rocks represent a marine deposit that formed in a shallow-water environment along the Laurentian continental margin. A shallow-water environment was proposed (Volkert, 2001) based on the occurrence of stromatolites, geochemistry of the sediments (now gneisses) interlayered with the marble, and by the occurrence of intraclasts in marble, that are rip-ups of lithified limestone redeposited within the host limestone prior to metamorphism.

Marble in New Jersey underlies about 5 percent of the Highlands, with most occurring in the western part of the region in discontinuous belts that extend from New York State southwest to eastern Pennsylvania. The largest of these belts contains the Franklin Marble, host to the world-famous zinc ore bodies at Franklin and Sterling Hill. Marble in the Highlands is between 1.1 and 1.2 billion years old. Its age was inferred from the fact that marble is part of a succession of metamorphosed sedimentary rocks that were deposited on rocks 1.25 to 1.3 billion years old, and because marble is intruded by, and therefore older than, granites that are 1.1 billion years old (Volkert and Drake, 1999).

Intimately associated with marble in the Highlands, and, therefore of the same age, are gneisses that represent metamorphosed sandstones and minor associated shales. Comparable sedimentary sequences occur throughout the geologic record, and some are an appropriate analog for these Precambrian marine deposits in the Highlands. Of particular interest is rusty, highly sulfidic gneiss that contains ubiquitous, and sometimes appreciable amounts of graphite.

PRECAMBRIAN FOSSIL EVIDENCE IN NEW JERSEY

Stromatolites

Stromatolites (Fig. 1) are the fossilized remains of colonies of cyanobacteria (prokaryotic microbial organisms) that have a characteristic laminated structure. The laminations are mats constructed by micro-organisms as they trapped fine grains of calcium carbonate on the sticky surface of their filaments. A new organic mat was then constructed over the layer of fine sediment, trapping another layer of sediment and producing the next lamination. Stromatolites are among the oldest known fossils and are found in 3.34 billion-year-old marble in western Australia and in 3 billion-year-old marble in South Africa. They are still forming today, notably in warm water marine environments such as the Bahamas and Australia, and this setting may provide a modern analog for the environment in which the Franklin Marble was formed.

The discovery of stromatolites by Volkert (2001) during fieldwork in Sussex County provided critical information on the paleoenvironment in which the Franklin Marble formed. Their occurrence in this 1.1 to 1.2 billion-year-old marble constrains their age as they were forming at the same time as their host rock. Stromatolites are also present in the New Jersey fossil record in 500 million-year-old unmetamorphosed dolomites of the Valley and Ridge (Fig. 2). At the time the New Jersey stromatolites were forming, Earth was devoid of air breathing plants and animals because the atmosphere contained less oxygen compared to today, and atmospheric carbon dioxide and nitrogen were present in large amounts. Consequently, life consisted of primitive micro-organisms that were confined to the oceans. Yet, these cyanobacteria were setting the stage for all future life on Earth. Through the process of photosynthesis the cyanobacteria were able to use chlorophyll to capture light from the sun, convert it into energy, and then release oxygen into the atmosphere. Over geologic time, the atmosphere changed from one rich in carbon dioxide to one rich in oxygen, creating a less hostile and more habitable environment for the millions of species of life in existence today.

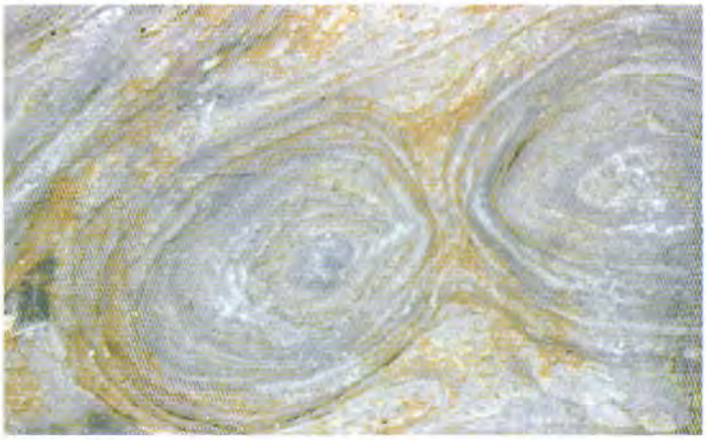

Fig. 2

Figure 2. Stromatolites appear in the New Jersey fossil record in this 500 million-year-old unmetamorphosed dolomite from Sussex County. *Photo by Brett Kent.*

GRAPHITE

Graphite, one of the crystalline forms of carbon, occurs as disseminated flakes in the Franklin Marble and in trace amounts in several types of Precambrian gneiss in the Highlands. However, it is quite abundant in rusty-weathering, sulfide-rich gneiss and quartzite in the eastern Highlands (Fig. 3), where it was mined from 1848 until 1931. Possible sources of carbon in the graphite include 1) organic matter, 2) magmatic fluids, 3) volcanic gases, 4) metamorphic fluids, or 5) breakdown of carbonate minerals in limestone during metamorphism. Stable isotopes of carbon are useful in identifying the source because each preserves its own distinct signature from the time of formation.

Volkert et al. (2000) analyzed graphite using carbon isotopes and pyrrhotite using sulfur isotopes from the ore zones hosted by gneiss and quartzite, and also from

Continued on page 16

country rock distant from the ore zones. They obtained Ų^{13}C values of −19.2 to −28.1 per mil from graphite and Ų^{34}S values of 3.6 to 10.6 per mil from pyrrhotite. Because biologically derived carbon preferentially concentrates the light isotopes, their findings argue strongly in favor of a biological origin for the graphite. Similarly, the sulfur isotope values fall within the range of a bacterial sulfide source.

X-ray diffraction analysis of the (002) interplanar spacing of the graphite was performed to obtain a crystallinity index, a measure of the structural ordering related to the temperature of graphite formation (Shengelia et al., 1979; Luque et al., 1993). Measurements showed a highly ordered structure, and calculated temperatures of graphite formation range from 685° to 705° C. Thus, the crystallinity data and field relations, which show no evidence of carbon mobility in the host rocks, imply that the carbonaceous precursor of the graphite was in place prior to regional metamorphism during the Grenville Orogeny. The stable isotope data constrain the carbon as being organic, and the graphite is interpreted to be the metamorphosed remains of Precambrian cyanobacteria that accumulated in an anoxic (oxygen-deficient) marine environment.

SIGNIFICANCE

The discovery of stromatolites in the Franklin Marble is significant for several reasons. 1) They strengthen the correlation between Precambrian marble in the Highlands and marble in the Adirondacks Mountains in New York and in the Grenville Province in Canada, where stromatolites have been discovered in marble of roughly the same age as that in New Jersey. 2) They provide important information on the marine paleoenvironment in which they formed, constraining the water depth to a shallow intertidal setting. 3) They constitute tangible evidence for biological activity during the Precambrian in New Jersey. The indirect evidence for fossil cyanobacteria derived from the stable isotope data from graphite and pyrrhotite now receives additional support from the presence of stromatolites. Since the host rocks of both Precambrian fossil occurrences are of roughly the same age and were formed in the same marine environment, the evidence overwhelmingly supports the presence of 1.1 to 1.2 billion-year-old life in New Jersey during the Precambrian.

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ACKNOWLEDGMENTS:

The authors would like to thank New Jersey Outdoors magazine for permission to reprint selected sections of the article "World Class Fossils" from the Spring 2002 issue.

Fig. 3

Figure 3. Graphite layers in 1.1 to 1.2 billion-year-old rusty gneiss from the Highlands preserve evidence for their origin from accumulations of cyanobacteria. Hammer for scale is 11 inches long. *Photo by Richard Volkert.*

Arsenate Photo Essay
Part II

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This is the second part of a multipart photographic essay presentation on the arsenates and arsenic-bearing silicates from Franklin and Sterling Hill, New Jersey. According to Dr. Pete J. Dunn, there are over 60 species of arsenates and arsenic-bearing silicates [*Franklin and Sterling Hill, New Jersey: the world's most magnificent mineral deposits* (1995) privately printed, pp 647-648]. In Part I, the Spring 2002 Issue of The Picking Table, I presented 10 species from common to rare: allactite, brandtite, chlorophoenicite, köttigite, kolicite, parasymplesite, picropharmacolite, retzian-(La), retzian-(Nd), and sarkinite.

Following the example of Part I, 9 more arsenates and arsenic-bearing silicates are presented, from collected to the rarely seen: adamite, eveite, holdenite, kraisslite, legrandite, mcgovernite, scorodite, villyaellenite, and wendwilsonite. Many of these species are worthy of a photo essay unto themselves, as the variety of locations and associations in which they have been found is numerous. However, that broad presentation of the many variations of one species that occur on many mine levels or in both mines is beyond the scope of this article.

The purpose of this article is to assist you in discovering the great variety of form, color, and number of arsenates and arsenic-bearing silicates that have been found at Franklin and Sterling Hill. Some of these species are found at both localities, and others only at one or the other. For example, as of this writing the author is aware of specimens bearing retzian-(La) or retzian-(Nd) having been recovered and identified only from Sterling Hill. Space permitting, future parts of this series of photo essays will provide photo comparisons of the arsenates from both Franklin and Sterling Hill.

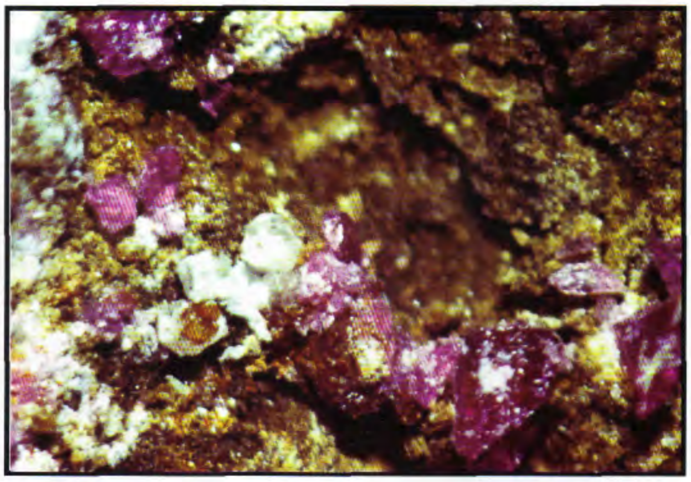


Figure 1: Wendwilsonite – $Ca_2Mg(AsO_4)_2 \cdot 2H_2O$ - in raspberry-red gemmy crystals and crystalline masses in corroded orange-brown massive granular friedelite from Sterling Hill. The translucent red crystals and masses of wendwilsonite measure 1 to 2.5 mm. The field view is 1.2 cm. From the Philip Betancourt collection, photo by Gary Grenier.

Continued on page 18

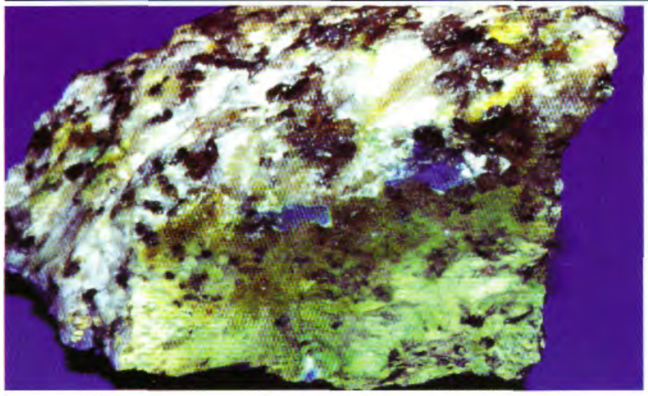


Figure 2 : Adamite – $Zn_2(AsO_4)(OH)$ - in green coatings and radial masses associated with linarite on lean willemite-franklinite-calcite ore. The specimen is from Sterling Hill and measures 8 x 7 x 5 cm. No distinction is made between cuprian and non-cuprian adamite since it is the same species. Formerly in the Grenier collection, photo by Gary Grenier.

Figure 3: Adamite – $Zn_2(AsO_4)(OH)$ - in well-formed rounded masses as much as 3 mm in diameter on a seam in lean willemite-franklinite-calcite ore from Sterling Hill. Where broken, these masses show internal layering and radial fibrous habit common for adamite. Field of view is 1 cm wide. Formerly in the Grenier collection, photo by Gary Grenier.

Figure 4: Eveite – $Mn_2(AsO_4)(OH)$ - in free-standing translucent butterscotch-colored crystals as much as 2.5 mm long, associated with and partially covered by a fine mat of acicular tan-white chlorophoenicite. Sterling Hill. Field of view is 6 mm wide. Formerly in the Grenier collection, photo by Gary Grenier.

Figure 5: Holdenite - $(Mn,Mg)_6 Zn_3 (AsO_4)_2 (SiO_4)(OH)_8$ - in pink masses intermixed with calcite, willemite, and rhodochrosite on willemite and franklinite ore from Sterling Hill. The specimen measures 7 x 5 cm and the field of view is 5 x 3 cm. Formerly in the Grenier collection, photo by Gary Grenier.

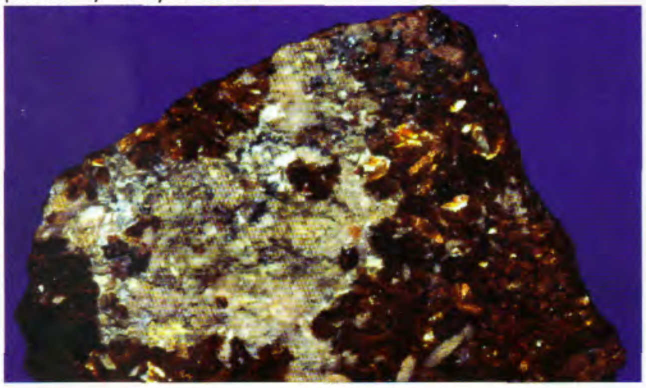


Figure 6: Kraisslite - $(Mn^{2+},Mg)_{24}Zn_3Fe^{3+}(As^{3+}O_3)_2(As^{5+}O_4)_3(SiO_4)_6(OH)_{18}$ - in bronzy red-brown distinctly platy habit with high luster and glassy red internal highlights, with pale pink rhodochrosite on willemite-franklinite ore from Sterling Hill. The specimen measures 7 x 6 cm. Formerly in the Grenier collection, photo by Gary Grenier.

Figure 7: Kraisslite - $(Mn^{2+},Mg)_{24}Zn_3Fe^{3+}(As^{3+}O_3)_2(As^{5+}O_4)_3(SiO_4)_6(OH)_{18}$ - in the commonly found fine-grained compact rounded masses on a seam in willemite-franklinite ore from Sterling Hill. The specimen measures 11 x 5 cm. From the Fred Parker collection, photo by Gary Grenier.

Continued on page 19

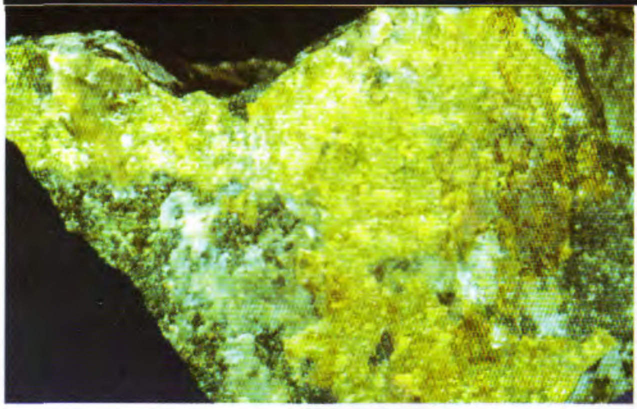


Figure 8: Legrandite – $Zn_2(AsO_4)(OH).H_2O$ - is commonly seen in seam fillings and coatings like this one. However, Sterling Hill legrandite is seldom as rich as this or as lacking common associated minerals such as köttigite.The specimen measures 7 x 5 cm. From the Peter Chin collection, photo by Gary Grenier.

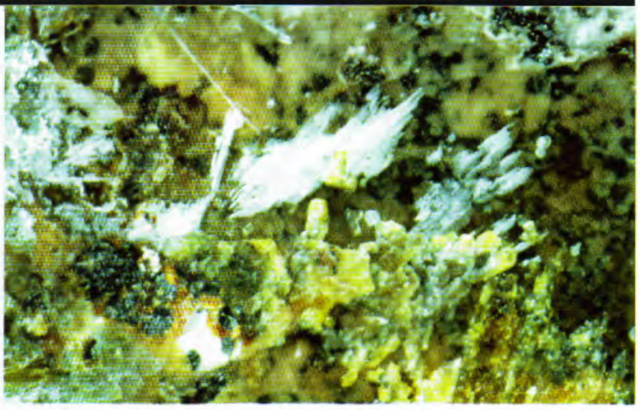


Figure 9: Legrandite – $Zn_2(AsO_4)(OH). H_2O$ - in a flattened radial crystalline coating and free-standing prismatic crystals resting on parasymplesite (white crystals) and associated with köttigite (pale blue crystals) from Sterling Hill. The field of view is 7 x 5 cm and the specimen measures 15 x 13 cm. From the Peter Chin collection, photo by Gary Grenier.

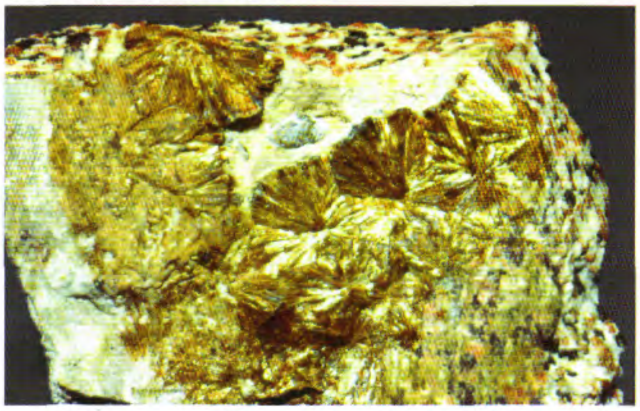


Figure 10: Mcgovernite - $(Mn^{2+},Mg,Zn)_{22}(As^{3+}O_3)(As^{5+}O_4)_3(SiO_4)_3(OH)_{20}$ - showing typical round flattened radial crystal aggregates on a naturally leached carbonate seam in lean willemite ore from Sterling Hill. Notice the unbroken mcgovernite hemisphere in the center of the leached seam. The specimen measures 12 x 12 cm. From the Grenier collection, photo by Gary Grenier.

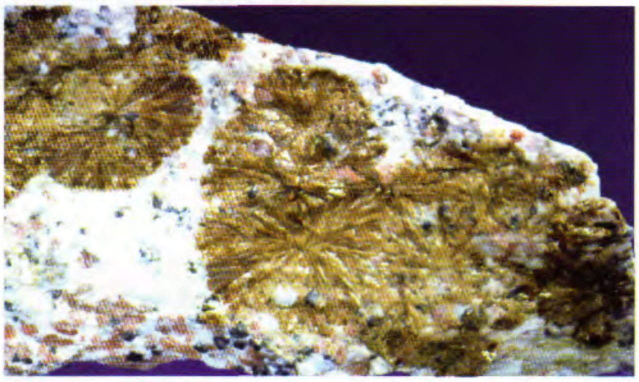


Figure 11: Mcgovernite - $(Mn^{2+},Mg,Zn)_{22}(As^{3+}O_3)(As^{5+}O_4)_3(SiO_4)_3(OH)_{20}$ - showing typical round flattened radial crystal aggregates on red willemite with granular franklinite in calcite from Sterling Hill. The specimen measures 17 x 8 x 6 cm and the field of view is 10 x 7 cm. The largest mcgovernite radial crystal aggregate measures 3 cm across. From the Grenier collection, photo by Gary Grenier.

Figure 12: Scorodite – $Fe^{3+}AsO_4. 2H_2O$ - in a fine equant bipyramidal yellow-orange glassy crystal. The crystal sits in a vug in corroded ore from Sterling Hill. Field of view is 5 mm. From the Philip Betancourt collection, photo by Gary Grenier.

Figure 13: Villyaellenite - $(Mn^{2+},Ca,Zn)_5(AsO_4)_2[AsO_3(OH)]_2.4H_2O$ - in a pink flattened radiating crystal aggregate on ore from Sterling Hill. Field of view is 1 cm wide. From the Philip Betancourt collection, photo by Gary Grenier.

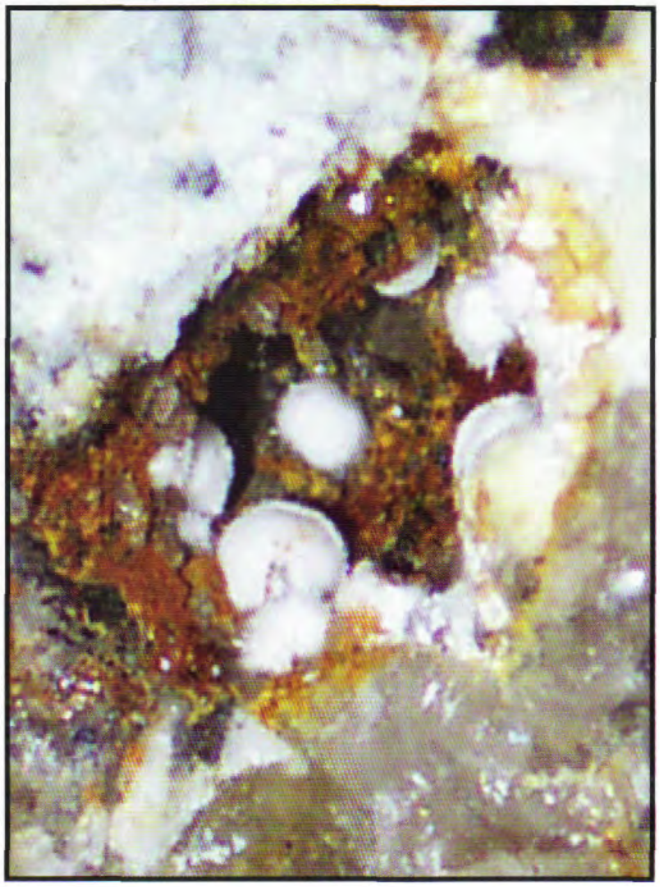
Mineral Species New to the Local List

Above **Fig. 1**: the new mineral rouaite in blue-green spherules up to 0.25 mm in brecciated pale-colored rhodonite, with copper sulfides and other unidentified minerals from the 700' level, Sterling Hill Mine. Size: 8x6.5x2.5 cm.

Photos by Carol Cianciulli

Fig. 2: Reflective pearly-white mica is paragonite from Sterling Hill, Ogdensburg, NJ.

Fig. 3: White spherules of crystal aggregates of dundasite from Sterling Hill, Ogdensburg, NJ.



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Cooper, Susan B., and Dunn, Pete J. (1997) *Magnificent Rocks: The Story of Mining, Men, and Minerals at Franklin and Sterling Hill, New Jersey.* Privately printed. $15.00 ($3.00 postage)

Dunn, Pete J. (1997) The Story of Franklin and Sterling Hill. Privately printed. $15.00 ($3.00 postage)

Dunn, Pete J. (1995) *Franklin and Sterling Hill, New Jersey: the world's most magnificent mineral deposits.* Privately printed. Part One, bibliography and chapters 1-3; Part Two, chapter 4-12; Part Three, chapters 13-17; Part Four, chapters 18-23; Part Five, chapters 24-26, appendices, and indices; First Supplement, chapters S1-S5; and Second Supplement, chapters S6-S10. $30 each (+$ 5.00 postage) for Parts One through Five, $25.00 each (+ $5.00 postage) for First and Second Supplements, or $200.00 (+ $15.00 postage) for the complete set of seven.

Frondel, Clifford and Baum, John L. (1974) Structure and Mineralogy of the Franklin Zinc-Iron-Manganese Deposit, Franklin, New Jersey. Economic Geology, 69, 2, pp. 157-180. Photocopies only are available. $2.50 (+ $1.25 postage)

Horuzy, Paul (editor) (1990) The Odyssey of Ogdensburg and the Sterling Zinc Mine. Privately printed, Sterling Hill Mining Company. $6.50 (+ $1.75 postage)

Shuster, Elwood D. (1927) Historical Notes of the Iron and Zinc Mining Industry in Sussex County, New Jersey. Privately printed. Franklin Mineral Museum reprint. $3.00 (+$0.75 postage)

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Paragonite

$NaAl_2\square AlSi_3O_{10}(OH)_2$

Added to the Franklin-Sterling Hill Species List

by
James E. Rumrill
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Towaco, NJ 07082
and
Tony Nikischer
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During a Morris Museum Mineralogical Society field trip to Sterling Hill on June 9, 2001, one of us (JER) uncovered a colorless, micaceous mineral unlike any previously described from the locality. It had an unusually high luster and foliated morphology, and it was dissimilar to other micas the authors had previously seen from Sterling Hill. A sample of this mineral, together with associated unidentified species, was submitted to Excalibur Mineral Company for examination by energy dispersive spectroscopy (EDS).

Utilizing a Phillips 525-M Scanning Electron Microscope equipped with an EDAX Super Ultra-Thin Window Energy Dispersive Spectroscopy CDU detector, several flakes of the mineral were examined. At 20Kv operating voltage across a tungsten filament with a nominal spot size of 100 microns, several analyses were conducted. Surprisingly, the material was consistently sodium dominant, and an average of several analyses showed:

Na_2O	6.81%
Al_2O_3	43.46%
SiO_2	46.79%
K_2O	0.78%
CaO	1.47%
MgO	0.68%
	99.99%

These results were in excellent agreement for paragonite, a dioctahedral mica that had not been previously described from either Sterling Hill or Franklin. A fragment was then submitted for X-ray diffraction (XRD) study to Andy Roberts at the Geological Survey of Canada. Utilizing a Debye-Scherrer camera, a confirming XRD film for this uncommon mica was obtained. Hence, we confidently recommend the addition of this species to the Franklin-Sterling Hill list. A brief description of the exposure that supplied this material follows:

As one passes the storage buildings on the way to the Passaic Pit, a horseshoe-shaped area known locally as the Fill Quarry, is encountered on the left. Facing this area, the Franklin Marble is on the left and most of the rear of the horseshoe. At a point in the rear marble wall, 20 feet from the merger of marble into ore, a considerable deposit of massive pyrite was located within a clinochrysotile/microcline/diopside calcsilicate body within the marble. A lot of this pyrite had been pried off the marble cliff, probably by Sterling Hill personnel for benefit of mineral collectors who were primarily interested in the showy massive pyrite. The paragonite was found in this same calcsilicate body, and it too was heavily collected during this trip. A small amount of paragonite-bearing material, however, likely still remains in the upper levels of the calcsilicate body in the Franklin Marble wall.

While abundant, centrally located massive pyrite was the most noticeable part of this assemblage, it is by no means the major component. The main matrix components include clinochrysotile, diopside and microcline, along with calcite in lesser amounts. The visible portion of the assemblage extends 5 feet above the ground and is several feet wide at its widest point where it meets the ground. In addition to the paragonite that occurs in small, colorless flakes as much as several millimeters across in the upper portion of the calcsilicate body, graphite, rutile, quartz, siderite and titanite have also been both visually and EDS-confirmed in this assemblage.

Acknowledgements: We extend our special thanks to Andy Roberts at the Geological Survey of Canada, who graciously performed the XRD studies on the material. One of us (JER) has maintained the studied material in his private collection, and additional material has been donated to the Franklin Mineral Museum for its reference collection.

Photo Fig. 2 page 20: Paragonite showing reflective surfaces of pearly - white mica with clinochrysotile, microcline, diopside, calcite and minor sulfide (pyrite). This material has been mislabelled as muscovite, "white margarite" and chlorite in old collections. A specimen labelled as "margarite ?" (#2067) from the "Sunny" Cook collection is on display with the micas in the local room of the Franklin Mineral Museum and is an excellent example of this new mineral for the area.

Dundasite

$PbAl_2(CO3)_2(OH)_4 \cdot H_2O$

Added to the Franklin-Sterling Hill Species List

By Donald S. Lapham III
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Lockport, NY 14094

The first collecting opportunity at the Noble Pit for members of the Sterling Hill Mining Museum Foundation was on Saturday, May 24, 1997. This was the first occasion since the Franklin-Ogdensburg Mineralogical Society field trips of the 1960's when the "saddle" between the Passaic and Noble Pits was available to the general public. Collecting with me that day were my parents, Donald and Audray Lapham. We were removing specimens of galena from a seam on the Passaic Pit side of the "saddle". My father handed me a specimen that contained a small, 1-centimeter diameter vug in massive feldspar and quartz with associated galena. Inside the vug we observed 1 mm, white spherical clusters of an unknown acicular mineral and clear prisms of cerussite. The white mineral was preliminarily assumed to be aragonite. We were all impressed with the sharpness and bright white color of the acicular clusters.

At the time I was working at FMC Corporation's Research Center in Plainsboro, New Jersey. I took the specimen to the SEM laboratory to see if an elemental analysis could give a hint as to the identity of the white acicular mineral. Energy dispersive spectroscopic (EDS) analysis suggested a carbonate of lead and aluminum. The normalized weight percents were found to be 25.89% Pb, 15.11% Al, and 59.00% O. A database search turned up the possibility that a mineral with that composition might be dundasite. Further research indicated that dundasite forms radiating aggregates of white acicular crystals. A sample was later submitted to Tony Nikischer of Excalibur Mineral Company for SEM EDS analysis. Using an EDAX "Super Ultrathin Window" energy dispersive spectroscopy detector in a Philips 525M scanning electron microscope operated at 20KV, a small sample was analyzed. Tony confirmed the work done at the FMC Corporation lab that the material was probably a carbonate of both lead and aluminum. He found 60.44% PbO_2, 11.98% Al_2O_3, and 27.57% CO_2. He was unable to perform X-ray diffraction (XRD) analysis due to the small size of the specimen. A longer exposure, more sensitive XRD camera would be needed. The specimen sat in my collection for several years and survived my relocation from New Jersey to Buffalo, New York. A chance visit to the Royal Ontario Museum (ROM) in Toronto one day led to the discovery that the type of XRD camera necessary to obtain a quality X-ray pattern was in service in their analytical lab. I approached Malcolm Back of the ROM and he agreed to perform the necessary analysis. Using a 57.4 mm diameter Gandolfi camera with Cu/Ni radiation, Malcolm confirmed that the Sterling Hill material had the X-ray pattern of dundasite. The film is filed under index number 02-29 at the ROM. Malcolm also performed qualitative EDS analysis on a Semco Nanolab 7 SEM equipped with Kevex EDS, confirming the FMC Corp. and Excalibur Mineral Co. elemental analyses.

The specimen was examined by John Cianciulli of the Franklin Mineral Museum to confirm its Sterling Hill origin. John agreed that the specimen closely resembled other specimens collected from the saddle between the Passaic and Noble Pits. He commented that he had seen the white crystallized material before and had also assumed it was aragonite. John also examined the specimen for fluorescent response. The dundasite exhibited cream (unsaturated yellow) fluorescence under shortwave, midwave, and longwave ultraviolet light. No phosphorescence was observed. The ultraviolet lamps used were, respectively, a UV Systems Super-Bright 2000SW, a UVP UVM-57, and a UVP UVL-225D. John also confirmed that the white chalky mineral making up the matrix of the specimen was feldspar, probably albite, and it fluoresced red under short wave UV. The dundasite was noted to form spherical aggregates of fine silky white needles in vugs as well as flattened sprays on the quartz and feldspar of the matrix. The specimen was divided into two portions. One portion was donated to the Franklin Mineral Museum where it has been assigned index number 2158 and the other portion resides in my personal collection.

Acknowledgements: I would like to thank Bill Poinsett of the FMC Corp. Analytical Services Department, Tony Nikischer of Excalibur Mineral Co., and Malcolm Back of the ROM for their excellent analytical services that lead to the addition of this mineral to the Franklin-Ogdensburg mineral list. I would also like to thank John Cianciulli for his assistance in certifying the origin of the sample and its fluorescent responses. Finally I would like to thank my parents for their support and enthusiasm in my hobby.

Photo Fig. 3, page 20: Dundasite appearing as spherical aggregates up to 2 mm[2] of fine silky white needles in a goethite-lined vug in albite and quartz with galena and minute cerussite xls. Field of view is 1.5 cm x 1 cm. This mineral was previously thought to be aragonite because of that mineral's similar appearance.

"My Impressions"...continued

I decided to walk around the show and stretch my legs since this was its last day and it was getting close to teardown time. I came upon Dick Bostwick talking with one of the display judges for the EFMLS. The gentleman was telling Dick that the fluorescent exhibits were fabulous and that he thought it a shame that no one competed. I believe that Dick's response went something like this: "If I asked my exhibitors to compete, most would never display. Besides, every one of these cases is a winner and I'm very grateful that each and every one of these people wants to display their minerals."

Now it was almost 5:00 P.M., closing time for the show until next April. I could sense the impatience of many of the exhibitors. A bunch of people were in the fluorescent display room, which was still dark, admiring their own exhibits and others. There were also exhausted people walking around, zombie-like, waiting for closing time so that they could do more work tearing down and become even more exhausted. Some of the dealers were already packing up their specimens and getting ready for the long trek home. Five P.M. finally arrived and the public left. The dealers who weren't already packing began that tedious job. Doors were thrown open, lights were turned on or off, depending on where you were at the show, display cases were unlocked, and exhibits carefully packed away.

When the lights were turned on in the fluorescent display room, we found that an expensive specimen labeled johnbaumite had been stolen sometime on Sunday afternoon. It was parked on top of a display case, a habit of long standing for its owner. However, anyone in the room could have reached over and picked it up, and someone besides the owner did. A casual theft? Perhaps. However, the fact that the "johnbaumite" was flanked by two inexpensive specimens which weren't disturbed meant the thief knew exactly what he/she was doing.

The dealers were finally out of the Littell Center and Hardyston School. A bunch of us, a.k.a. The Dirty Dozen, folded tables, collapsed display cases, took down black plastic, and made sure that the pool table was moved into its proper place. All of this was done with the rain coming down outside in sheets, and lightning and thunder erupting. Somehow the light and noise were transformed into mysterious harmony by passing through the high windows of the Littell Center to brighten up the now dark, dingy room which a few hours ago was crowded, noisy, and quite cheerful.

Finally we finished loading the big Ryder truck with signs, electrical equipment, risers, liners, cases, UV lamps, and whatever else had been on it when we began loading on Thursday, now a lifetime ago. The huge truck led the procession with about six cars behind it. We seemed to be the only ones on the road this late Sunday evening, winding our way slowly up to Sterling Hill, to strain muscles one more time, and put most of the equipment to bed until the next show.

Minerals were stolen but most were returned; we caught two thieves and one got away. Altogether the show weekend was a great success, with happy dealers, many heroes, and good friends being together.

Eastern Federation of Mineralogical and Lapidary Society's President Bob Livingston examines New Jersey Earth Science Association's check for $1,000.00 at their annual Gem and Mineral Show's banquet/auction.

Photo by Tema Hecht.

MINERAL SPECIES FOUND AT FRANKLIN-STERLING HILL, NEW JERSEY

Mineral Species List Updated Fall Of 2002

Courtesy of the Franklin Mineral Museum Inc.

☐	Acanthite	Ag_2S
☐	Actinolite	$Ca_2(Mg,Fe^{2+})_5Si_8O_{22}(OH)_2$
☐	Adamite	$Zn_2(AsO_4)(OH)$
☐	Adelite	$CaMg(AsO_4)(OH)$
☐	Aegirine	$NaFe^{3+}Si_2O_6$
☐	Akrochordite	$Mn_4^{2+}Mg(AsO_4)_2(OH)_4 \cdot 4H_2O$
☐	Albite	$NaAlSi_3O_8$
☐	Allactite	$Mn_7(AsO_4)_2(OH)_8$
☐	Allanite-(Ce)	$(Ce,Ca,Y)_2(Al, Fe^{2+},Fe^{3+})_3(SiO_4)_3(OH)$
☐	Alleghanyite	$Mn_5^{2+}(SiO_4)_2(OH)_2$
☐	Almandine	$Fe_3^{2+}Al_2(SiO_4)_3$
☐	Analcime	$Na[AlSi_2O_6] \cdot H_2O$
☐	Anandite	$Ba,Fe_3^{2+}Fe^{3+}Si_3O_{10}S(OH)$
☐	Anatase	TiO_2
☐	Andradite	$Ca_3Fe_2^{3+}(SiO_4)_3$
☐	Anglesite	$PbSO_4$
☐	Anhydrite	$CaSO_4$
☐	Annabergite	$Ni_3(AsO_4)_2 \cdot 8H_2O$
☐	Anorthite	$CaAl_2Si_2O_8$
☐	Anorthoclase	$(Na,K)AlSi_3O_8$
☐	Antlerite	$Cu_3^{2+}(SO_4)(OH)_4$
☐	Aragonite	$CaCO_3$
☐	Arsenic	As
☐	Arseniosiderite	$Ca_2Fe_3^{3+}(AsO_4)_3O_2 \cdot 3H_2O$
☐	Arsenopyrite	FeAsS
☐	Atacamite	$Cu_2^{2+}Cl(OH)_3$
☐	Augite	$(Ca,Na)(Mg,Fe,Al,Ti)(Si,Al)_2O_6$
☐	Aurichalcite	$(Zn,Cu^{2+})_5(CO_3)_2(OH)_6$
☐	Aurorite	$(Mn^{2+},Ag,Ca)Mn_3^{4+}O_7 \cdot 3H_2O$
☐	Austinite	$CaZn(AsO_4)(OH)$
☐	Azurite	$Cu_3^{2+}(CO_3)_2(OH)_2$
☐	Bakerite	$Ca_4B_4(BO_4)(SiO_4)_3(OH)_3 \cdot H_2O$
☐	Bannisterite	$KCa(Fe^{2+},Mn^{2+},Zn,Mg)_{20}(Si,Al)_{32}O_{76}(OH)_{16} \cdot 4\text{-}12H_2O$
☐	Barite	$BaSO_4$
☐	Barium-pharmacosiderite	$BaFe_8^{3+}(AsO_4)_6(OH)_8 \cdot 14H_2O$
☐	Barylite	$BaBe_2Si_2O_7$
☐	Barysilite	$Pb_8Mn(Si_2O_7)_3$
☐	Bassanite	$2CaSO_4 \cdot H_2O$
☐	Baumhauerite	$Pb_3As_4S_9$
☐	Bementite	$Mn_8^{2+}Si_6O_{15}(OH)_{10}$
☐	Berthierite	$FeSb_2S_4$
☐	Bianchite	$(Zn,Fe^{2+})(SO_4) \cdot 6H_2O$
☐	Biotite (series name)	$K(Mg,Fe^{2+})_3(Al,Fe^{3+})Si_3O_{10}(OH,F)_2$
☐	Birnessite	$Na_4Mn_{14}O_{27} \cdot 9H_2O$
☐	Bornite	Cu_5FeS_4
☐	[1]*Bostwickite	$CaMn_6^{3+}Si_3O_{16} \cdot 7H_2O$
☐	Brandtite	$Ca_2(Mn^{2+},Mg)(AsO_4)_2 \cdot 2H_2O$
☐	Breithauptite	NiSb
☐	Brochantite	$Cu_4^{2+}(SO_4)(OH)_6$
☐	Brookite	TiO_2
☐	Brucite	$Mg(OH)_2$
☐	Bultfonteinite	$Ca_2SiO_2(OH,F)_4$
☐	Bustamite	$(Mn^{2+},Ca)_3Si_3O_9$

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	Cahnite	$Ca_2B(AsO_4)(OH)_4$
	Calcite	$CaCO_3$
	Canavesite	$Mg_2(CO_3)(HBO_3)\cdot 5H_2O$
	Carrollite	$Cu(Co,Ni)_2S_4$
	Caryopilite	$(Mn^{2+},Mg)_3Si_2O_5(OH)_4$
	Celestine	$SrSO_4$
	Celsian	$BaAl_2Si_2O_8$
	Cerussite	$PbCO_3$
	Chabazite-Ca	$(Ca_{0.5}\ K,Na)_4[Al_4Si_8O_{24}]\cdot 12H_2O$
	Chalcocite	Cu_2S
	Chalcophanite	$(Zn,Fe^{2+},Mn^{2+})Mn_3^{4+}\ O_7\cdot\ 3H_2\ O$
	Chalcopyrite	$CuFeS_2$
	Chamosite	$(Fe^{2+},Mg,Fe^{3+})_5Al(Si_3,Al)O_{10}(OH,O)_8$
2*	Charlesite	$Ca_6(Al,Si)_2(SO_4)_2B(OH)_4(OH,O)_{12}\cdot 26H_2O$
	Chloritoid	$(Fe^{2+},Mg,Mn)_2Al_4Si_2O_{10}(OH)_4$
3*	Chlorophoenicite	$(Mn,Mg)_3Zn_2(AsO_4)(OH,O)_6$
	Chondrodite	$(Mg,Fe^{2+})_5(SiO_4)_2(F,OH)_2$
	Chrysocolla	$(Cu^{2+},Al)_2H_2Si_2O_5(OH)_4\cdot nH_2O$
4*	Cianciulliite	$Mn^{2+}(Mg,Mn^{2+})_2Zn_2(OH)_{10}\cdot 2\text{-}4H_2O$
	Clinochlore	$(Mg,Fe^{2+})_5Al(Si_3Al)O_{10}(OH)_8$
	Clinochrysotile	$Mg_3Si_2O_5(OH)_4$
	Clinoclase	$Cu_3^{2+}(AsO_4)(OH)_3$
	Clinohedrite	$CaZnSiO_4\cdot H_2O$
	Clinohumite	$(Mg,Fe^{2+})_9(SiO_4)_4(F,OH)_2$
	Clinozoisite	$Ca_2Al_3(SiO_4)_3(OH)$
	Clintonite	$CaMg_2Al_3SiO_{10}(OH)_2$
	Conichalcite	$CaCu^{2+}(AsO_4)(OH)$
	Connellite	$Cu_{19}^{2+}Cl_4(SO_4)(OH)_{32}\cdot 3H_2O$
	Copper	Cu
	Corundum	Al_2O_3
	Covellite	CuS
	Cryptomelane	$K(Mn^{4+},Mn^{2+})_8O_{16}$
	Cummingtonite	$Mg_7Si_8O_{22}(OH)_2$
	Cuprite	$Cu_2^{1+}O$
	Cuprostibite	$Cu_2(Sb,Tl)$
	Cuspidine	$Ca_{16}(Si_2O_7)_4(F,OH)_8$
	Cyanotrichite	$Cu_4^{2+}Al_2(SO_4)(OH)_{12}\cdot 2H_2O$
	Datolite	$Ca_2B_2Si_2O_8(OH)_2$
	Descloizite	$PbZn(VO_4)(OH)$
	Devilline	$CaCu_4^{2+}(SO_4)_2(OH)_6\cdot 3H_2O$
	Digenite	Cu_9S_5
	Diopside	$CaMgSi_2O_6$
	Djurleite	$Cu_{31}S_{16}$
	Dolomite	$CaMg(CO_3)_2$
	Domeykite	Cu_3As
	Dravite	$NaMg_3Al_6(BO_3)_3Si_6O_{18}(OH)_4$
	Duftite	$PbCu(AsO_4)(OH)$
	Dundasite	$PbAl_2(CO_3)_2(OH)_4\cdot H_2O$
	Dypingite	$Mg_5(CO_3)_4(OH)_2\cdot 5H_2O$
	Edenite	$NaCa_2Mg_5Si_7AlO_{22}(OH)_2$
	Epidote	$Ca_2(Fe^{3+},Al)_3(SiO_4)_3(OH)$
	Epsomite	$MgSO_4\cdot 7H_2O$
	Erythrite	$Co_3(AsO_4)_2\cdot 8H_2O$
	Esperite	$PbCa_3Zn_4(SiO_4)_4$
	Euchroite	$Cu_2^{2+}(AsO_4)(OH)\cdot 3H_2O$
	Eveite	$Mn_2^{2+}(AsO_4)(OH)$

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☐		Fayalite	$Fe_2^{2+}SiO_4$
☐		Feitknechtite	$B\text{-}Mn^{3+}O(OH)$
☐		Ferrimolybdite	$Fe_2^{3+}(Mo^{6+}O_4)_3 \cdot 8H_2O$ (?)
☐	**	Ferristilpnomelane	$(K,Na)_2(Fe^{3+},Mg,Fe^{2+})_{48}(Si,Al)_{72}(O,OH)_{216}.nH_2O$
☐		Ferro-actinolite	$Ca_2Fe_5^{2+}Si_8O_{22}(OH)_2$
☐		Ferro-axinite	$Ca_2Fe^{2+}Al_2BSi_4O_{15}(OH)$
☐	**	Ferrostilpnomelane	$(K,Na,Ca)_4(Fe^{2+},Mg,Zn)_{48}(Si,Al)_{72}(OH,O)_{216}.nH_2O$
☐		Fluckite	$CaMn^{2+}H_2(AsO_4)_2 \cdot 2H_2O$
☐		Fluoborite	$Mg_3(BO_3)(F,OH)_3$
☐		Fluorapatite	$Ca_5(PO_4)_3F$
☐		Fluorapophyllite	$KCa_4Si_8O_{20}(F,OH) \cdot 8H_2O$
☐		Fluorite	CaF_2
☐		Forsterite	Mg_2SiO_4
☐		Fraipontite	$(Zn,Al)_3(Si,Al)_2O_5(OH)_4$
☐	5*	Franklinfurnaceite	$Ca_2(Fe^{3+}{}_3,Al)Mn^{3+}Mn_3^{2+}Zn_2Si_2O_{10}(OH)_8$
☐		Franklinite	$(Zn,Mn^{2+},Fe^{2+})(Fe^{3+},Mn^{3+})_2O_4$
☐	6*	Franklinphilite	$(K,Na)_4(Mn^{2+}, Zn, Mg, Fe^{3+})_{48}(Si,Al)_{72}(O,OH)_{216} \cdot 6H_2O$
☐		Friedelite	$Mn_8^{2+}Si_6O_{15}(OH,Cl)_{10}$
☐		Gageite-1tc	$(Mn^{2+},Mg,Zn)_{42}Si_{16}O_{54}(OH)_{40}$
☐		Gageite-2M	
☐		Gahnite	$ZnAl_2O_4$
☐		Galena	PbS
☐		Ganomalite	$Pb_9Ca_5Mn^{2+}Si_9O_{33}$
☐		Ganophyllite	$(K,Na)_2(Mn,Al,Mg)_8(Si,Al)_{12}O_{29}(OH)_7 \cdot 8\text{-}9H_2O$
☐		Genthelvite	$Zn_4Be_3(SiO_4)_3S$
☐		Gersdorffite	NiAsS
☐	7*	Gerstmannite	$(Mg,Mn^{2+})_2ZnSiO_4(OH)_2$
☐		Glaucochroite	$CaMn^{2+}SiO_4$
☐		Glaucodot	(Co,Fe)AsS
☐		Goethite	*a*-$Fe^{3+}O(OH)$
☐		Gold	Au
☐		Goldmanite	$Ca_3(V^{3+},Al,Fe^{3+})_2(SiO_4)_3$
☐		Graphite	C
☐		Greenockite	CdS
☐		Grossular	$Ca_3Al_2(SiO_4)_3$
☐		Groutite	$Mn^{3+}O(OH)$
☐		Guerinite	$Ca_5H_2(AsO_4)_4 \cdot 9H_2O$
☐		Gypsum	$CaSO_4 \cdot 2H_2O$
☐		Haidingerite	$CaHAsO_4 \cdot H_2O$
☐		Halotrichite	$Fe^{2+}Al_2(SO_4)_4 \cdot 22H_2O$
☐		Hancockite	$(Pb,Ca,Sr)_2(Al,Fe^{3+})_3(SiO_4)_3(OH)$
☐	8*	Hardystonite	$Ca_2ZnSi_2O_7$
☐		Hastingsite	$NaCa_2(Fe_4^{2+}Fe^{3+})Si_6Al_2O_{22}(OH)_2$
☐	9*	Hauckite	$(Mg,Mn^{2+})_{24}Zn_{18}Fe_3^{3+}(SO_4)_4(CO_3)_2(OH)_{81}$(?)
☐		Hausmannite	$Mn^{2+}Mn_2^{3+}O_4$
☐		Hawleyite	CdS
☐		Hedenbergite	$CaFe^{2+}Si_2O_6$
☐		Hedyphane	$Pb_3Ca_2(AsO_4)_3Cl$
☐		Hellandite-(Y)	$(Ca,Y)_6(Al,Fe^{3+})Si_4B_4O_{20}(OH)_4$
☐		Hematite	*a*-Fe_2O_3
☐		Hemimorphite	$Zn_4Si_2O_7(OH)_2 \cdot H_2O$
☐	10*	Hendricksite-1M	$KZn_3AlSi_3O_{10}(OH)_2$
☐		Hercynite	$Fe^{2+}Al_2O_4$
☐		Hetaerolite	$ZnMn_2^{3+}O_4$
☐		Heulandite-Na	$(Na,Ca_{0.5}K)_9[Al_9Al,Si_{27}O_{72}] \cdot \sim 24H_2O$
☐		Hexahydrite	$MgSO_4 \cdot 6H_2O$
☐	11*	Hodgkinsonite	$Mn^{2+}Zn_2(SiO_4)(OH)_2$

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☐	12*	Holdenite	$(Mn^{2+},Mg)_6Zn_3(AsO_4)_2(SiO_4)(OH)_8$
☐		Hübnerite	$Mn^{2+}WO_4$
☐		Humite	$(Mg,Fe^{2+})_7(SiO_4)_3(F,OH)_2$
☐		Hyalophane	$(K,Ba)Al(Si,Al)_3O_8$
☐		Hydrohetaerolite	$Zn_2Mn_4{}^{3+}O_8 \cdot H_2O$
☐		Hydrotalcite	$Mg_6Al_2(CO_3)(OH)_{16} \cdot 4H_2O$
☐		Hydroxyapophyllite	$KCa_4Si_8O_{20}(OH,F) \cdot 8H_2O$
☐		Hydrozincite	$Zn_5(CO_3)_2(OH)_6$
☐		Illite	$K_{0.65}Al_{2.0}?Al_{0.65}Si_{3.35}O_{10}(OH)_2$
☐		Ilmenite	$Fe_2{}^{2+}TiO_3$
☐		Jacobsite	$(Mn^{2+},Fe^{2+},Mg)(Fe^{3+},Mn^{3+})_2O_4$
☐	13*	Jarosewichite	$Mn_3{}^{2+}Mn^{3+}(AsO_4)(OH)_6$
☐		Jerrygibbsite	$Mn_9{}^{2+}(SiO_4)_4(OH)_2$
☐		Johannsenite	$CaMn^{2+}Si_2O_6$
☐	14*	Johnbaumite	$Ca_5(AsO_4)_3(OH)$
☐		Junitoite	$CaZn_2Si_2O_7 \cdot H_2O$
☐		Kaolinite	$Al_2Si_2O_5(OH)_4$
☐		Kentrolite	$Pb_2Mn_2{}^{3+}Si_2O_9$
☐	15*	Kittatinnyite	$Ca_4Mn_2{}^{2+}Mn_4{}^{3+}Si_4O_{16}(OH)_8 \cdot 18H_2O$
☐		Köttigite	$Zn_3(AsO_4)_2 \cdot 8H_2O$
☐	16*	Kolicite	$Mn_7{}^{2+}Zn_4(AsO_4)_2(SiO_4)_2(OH)_8$
☐	17*	Kraisslite	$(Mn^{2+},Mg)_{24}Zn_3Fe^{3+}(As^{3+}O_3)_2(As^{5+}O_4)_3(SiO_4)_6(OH)_{18}$
☐		Kutnahorite	$Ca(Mn^{2+},Mg,Fe^{2+})(CO_3)_2$
☐		Larsenite	$PbZnSiO_4$
☐		Laumontite	$Ca_4[Al_8Si_{16}O_{48}] \cdot 18H_2O$
☐	18*	Lawsonbauerite	$(Mn^{2+},Mg)_9Zn_4(SO_4)_2(OH)_{22} \cdot 8H_2O$
☐		Lead	Pb
☐		Legrandite	$Zn_2(AsO_4)(OH) \cdot H_2O$
☐	19*	Lennilenapeite	$K_{6-7}(Mg,Mn^{2+},Fe^{2+},Zn)_{48}(Si,Al)_{72}(O,OH)_{216} \cdot 16H_2O$
☐		Leucophoenicite	$Mn_7{}^{2+}(SiO_4)_3(OH)_2$
☐		Linarite	$PbCu^{2+}(SO_4)(OH)_2$
☐		Liroconite	$Cu_2{}^{2+}Al(AsO_4)(OH)_4 \cdot 4H_2O$
☐		Lizardite	$Mg_3Si_2O_5(OH)_4$
☐		Löllingite	$FeAs_2$
☐		Loseyite	$(Mn^{2+},Zn)_7(CO_3)_2(OH)_{10}$
☐		Magnesiohornblende	$\square Ca_2[Mg_4(Al,Fe^{3+})]Si_7AlO_{22}(OH)_2$
☐		Magnesioriebeckite	$\square Na_2(Mg_3,Fe_2{}^{3+})Si_8O_{22}(OH)_2$
☐	20*	Magnesium-chlorophoenicite	$(Mg,Mn)_3Zn_2(AsO_4)(OH,O)_6$
☐		Magnetite	$Fe^{2+}Fe_2{}^{3+}O_4$
☐		Magnussonite	$Mn_5{}^{2+}As_3{}^{3+}O_9(OH,Cl)$
☐		Malachite	$Cu_2{}^{2+}(CO_3)(OH)_2$
☐		Manganaxinite	$Ca_2Mn^{2+}Al_2BSi_4O_{15}(OH)$
☐		Manganberzeliite	$(Ca,Na)_3(Mn^{2+},Mg)_2(AsO_4)_3$
☐		Manganese-hörnesite	$(Mn^{2+},Mg)_3(AsO_4)_2 \cdot 8H_2O$
☐		Manganhumite	$(Mn^{2+},Mg)_7(SiO_4)_3(OH)_2$
☐		Manganite	$Mn^{3+}O(OH)$
☐		Manganocummingtonite	$\square Mn_2Mg_5Si_8O_{22}(OH)_2$
☐		Manganosite	$Mn^{2+}O$
☐		Manganpyrosmalite	$(Mn^{2+},Fe^{2+})_8Si_6O_{15}(OH,Cl)_{10}$
☐		Marcasite	FeS_2
☐		Margarite	$CaAl_2?Al_2Si_2)O_{10}(OH)_2$
☐		Margarosanite	$Pb(Ca,Mn^{2+})_2Si_3O_9$
☐		Marialite	$3NaAlSi_3O_8 \cdot NaCl$
☐		Marsturite	$NaCaMn_3{}^{2+}Si_5O_{14}(OH)$

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☐		Mcallisterite	$Mg_2B_{12}O_{14}(OH)_{12}\cdot 9H_2O$
☐	21*	Mcgovernite	$(Mn^{2+},Mg,Zn)_{22}(As^{3+}O_3)(As^{5+}O_4)_3(SiO_4)_3(OH)_{20}$
☐		Meionite	$3CaAl_2Si_2O_8\cdot CaCO_3$
☐		Meta-ankoleite	$K_2(UO_2)_2(PO_4)_2\cdot 6H_2O$
☐		Metalodevite	$Zn(UO_2)_2(AsO_4)_2\cdot 10H_2O$
☐		Metazeunerite	$Cu^{2+}(UO_2)_2(AsO_4)_2\cdot 8H_2O$
☐		Microcline	$KAlSi_3O_8$
☐		Mimetite	$Pb_5(AsO_4)_3Cl$
☐	22*	Minehillite	$(K,Na)_{2-3}Ca_{28}Zn_4Al_4Si_{40}O_{112}(OH)_{16}$
☐		Molybdenite-2H	MoS_2
☐		Monazite-(Ce)	$(Ce,La,Nd,Th)PO_4$
☐		Monohydrocalcite	$CaCO_3\cdot H_2O$
☐	23*	Mooreite	$(Mg,Zn,Mn^{2+})_{15}(SO_4)_2(OH)_{26}\cdot 8H_2O$
☐		Muscovite-1M	$KAl_2\square AlSi_3O_{10}OH_2$
☐		Nasonite	$Pb_6Ca_4Si_6O_{21}Cl_2$
☐		Natrolite	$Na_2[Al_2Si_3O_{10}]\cdot 2H_2O$
☐	24*	Nelenite	$(Mn^{2+},Fe^{2+})_{16}Si_{12}As_3{}^{3+}O_{36}(OH)_{17}$
☐		Neotocite	$(Mn^{2+},Fe^{2+})SiO_3\cdot H_2O(?)$
☐		Newberyite	$MgHPO_4\cdot 3H_2O$
☐		Niahite	$(NH_4)(Mn^{2+},Mg,Ca)PO_4\cdot H_2O$
☐		Nickeline	$NiAs$
☐		Nontronite	$Na_{0.3}Fe_2{}^{3+}(Si,Al)_4O_{10}(OH)_2\cdot nH_2O$
☐		Norbergite	$Mg_3(SiO_4)(F,OH)_2$
☐		Ogdensburgite	$Ca_2(Zn,Mn,{}^{2+})Fe_4{}^{3+}(AsO_4)_4(OH)_6\cdot 6H_2O$
☐		Ojuelaite	$ZnFe_2{}^{3+}(AsO_4)_2(OH)_2\cdot 4H_2O$
☐		Oligoclase	$(Na,Ca)Al(Al,Si)Si_2O_8$
☐		Orthochrysotile	$Mg_3Si_2O_5(OH)_4$
☐		Orthoclase	$KAlSi_3O_8$
☐		Orthoserpierite	$Ca(Cu^{2+},Zn)_4(SO_4)_2(OH)_6\cdot 3H_2O$
☐		Otavite	$CdCO_3$
☐	25*	Parabrandtite	$Ca_2Mn^{2+}(AsO_4)_2.2H_2O$
☐		Paragonite	$NaAl_2\square AlSi_3O_{10}(OH)_2$
☐		Pararammelsbergite	$NiAs_2$
☐		Parasymplesite	$Fe_3{}^{2+}(AsO_4)_2\cdot 8H_2O$
☐		Pargasite	$NaCa_2(Mg_4Al)Si_6Al_2O_{22}(OH)_2$
☐		Pectolite	$NaCa_2Si_3O_8(OH)$
☐	**	Pennantite-1a	$Mn_5{}^{2+}Al(Si_3Al)O_{10}(OH)_8$
☐	26*	Petedunnite	$Ca(Zn,Mn^{2+},Fe^{2+},Mg)Si_2O_6$
☐		Pharmacolite	$CaHAsO_4\cdot 2H_2O$
☐		Pharmacosiderite	$KFe_4{}^{3+}(AsO_4)_3(OH)_4\cdot 6\text{-}7H_2O$
☐		Phlogopite-1M	$KMg_3AlSi_3O_{10}(OH)_2$
☐		Picropharmacolite	$H_2Ca_4Mg(AsO_4)_4\cdot 11H_2O$
☐		Piemontite	$Ca_2(Al,Mn^{3+},Fe^{3+})_3(SiO_4)_3(OH)$
☐		Powellite	$CaMoO_4$
☐		Prehnite	$Ca_2Al_2Si_3O_{10}(OH)_2$
☐		Pumpellyite-(Mg)	$Ca_2MgAl_2(SiO_4)(Si_2O_7)(OH)_2\cdot H_2O$
☐		Pyrite	FeS_2
☐		Pyroaurite	$Mg_6Fe_2{}^{3+}(CO_3)(OH)_{16}\cdot 4H_2O$
☐		Pyrobelonite	$PbMn^{2+}(VO_4)(OH)$
☐		Pyrochroite	$Mn^{2+}(OH)_2$
☐		Pyrophanite	$Mn^{2+}TiO_3$
☐		Pyroxmangite	$Mn^{2+}SiO_3$
☐		Pyrrhotite	$Fe_{1-x}S$
☐		Quartz	SiO_2

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☐		Rammelsbergite	$NiAs_2$
☐		Realgar	AsS
☐	27*	Retzian-(La)	$(Mn^{2+},Mg)_2(La,Ce,Nd)(AsO_4)(OH)_4$
☐	28*	Retzian-(Nd)	$Mn_2^{2+}(Nd,Ce,La)(AsO_4)(OH)_4$
☐		Rhodochrosite	$Mn^{2+}CO_3$
☐		Rhodonite	$(Mn^{2+},Fe^{2+},Mg,Ca)SiO_3$
☐		Richterite	$Na(Ca,Na)Mg_5Si_8O_{22}(OH)_2$
☐		Roeblingite	$Pb_2Ca_6Mn^{2+}(Si_6O_{18})(SO_4)_2(OH)_2 \cdot 4H_2O$
☐		Romeite	$(Ca,Fe^{2+},Mn^{2+},Na)_2(Sb,Ti)_2O_6(O,OH,F)$
☐		Rosasite	$(Cu^{2+},Zn)_2(CO_3)(OH)_2$
☐		Rouaite	$Cu_2(NO_3)(OH)_3$
☐		Roweite	$Ca_2Mn_2^{2+}B_4O_7(OH)_6$
☐		Rutile	TiO_2
☐		Safflorite	$(Co,Fe)As_2$
☐	29*	Samfowlerite	$Ca_{28}Mn_6Zn_4(Be,Zn)_4Be_{12}(SiO_4)_{12}(Si_2O_7)_8(OH)_{12}$
☐		Sarkinite	$Mn_2^{2+}(AsO_4)(OH)$
☐		Sauconite	$Na_{0.3}Zn_3(Si,Al)_4O_{10}(OH)_2 \cdot 4H_2O$
☐		Schallerite	$(Mn^{2+},Fe^{2+})_{16}Si_{12}As_3^{3+}O_{36}(OH)_{17}$
☐		Scheelite	$CaWO_4$
☐		Schorl	$NaFe_3^{2+}Al_6(BO_3)_3Si_6O_{18}(OH)_4$
☐	30*	Sclarite	$(Zn,Mg,Mn^{2+})_4Zn_3(CO_3)_2(OH)_{10}$
☐		Scorodite	$Fe^{3+}AsO_4 \cdot 2H_2O$
☐		Seligmannite	$PbCuAsS_3$
☐		Sepiolite	$Mg_4Si_6O_{15}(OH)_2 \cdot 6H_2O$
☐		Serpierite	$Ca(Cu^{2+},Zn)_4(SO_4)_2(OH)_6 \cdot 3H_2O$
☐		Siderite	$Fe^{2+}CO_3$
☐		Sillimanite	Al_2SiO_5
☐		Silver	Ag
☐		Sjogrenite	$Mg_6Fe_2^{3+}(CO_3)(OH)_{16} \cdot 4H_2O$
☐		Skutterudite	$CoAs_{2-3}$
☐		Smithsonite	$ZnCO_3$
☐		Sonolite	$Mn_9^{2+}(SiO_4)_4(OH,F)_2$
☐		Spangolite	$Cu_6^{2+}Al(SO_4)(OH)_{12}Cl \cdot 3H_2O$
☐		Spessartine	$Mn_3^{2+}Al_2(SiO_4)_3$
☐		Sphalerite	$(Zn,Fe)S$
☐		Spinel	$MgAl_2O_4$
☐		Starkeyite	$MgSO_4 \cdot 4H_2O$
☐		Sterlinghillite	$Mn_3^{+2}(AsO_4)_2 \cdot 4H_2O$
☐		Stibnite	Sb_2S_3
☐		Stilbite-Na	$(Na,Ca_{0.5,}K)_9[Al_9Si_{27}O_{72}] \cdot 28H_2O$
☐		Stilbite-Ca	$(Ca_{0.5},Na,K)_9[Al_9Si_{27}O_{72}] \cdot 28H_2O$
☐		Strontianite	$SrCO_3$
☐		Sulfur	S
☐		Sussexite	$Mn^{2+}BO_2(OH)$
☐		Synadelphite	$(Mn^{2+},Mg,Ca,Pb)_9(As^{3+}O_3)(As^{5+}O_4)_2(OH)_9 \cdot 2H_2O$
☐		Synchysite-(Ce)	$Ca(Ce,La)(CO_3)_2F$
☐		Talc	$Mg_3Si_4O_{10}(OH)_2$
☐		Tennantite	$(Cu,Ag,Fe,Zn)_{12}As_4S_{13}$
☐		Tephroite	$Mn_2^{2+}SiO_4$
☐		Tetrahedrite	$(Cu,Fe,Ag,Zn)_{12}Sb_4S_{13}$
☐		Thomsonite	$Ca_2Na[Al_5Si_5O_{20}] \cdot 6H_2O$
☐		Thorite	$(Th,U)SiO_4$
☐		Thortveitite	$(Sc,Y)_2Si_2O_7$
☐		Thorutite	$(Th,U,Ca)Ti_2(O,OH)_6$
☐		Tilasite	$CaMg(AsO_4)F$
☐		Titanite	$CaTiSiO_5$
☐		Todorokite	$(Mn^{2+},Ca,Mg)Mn_3^{4+}O_7 \cdot H_2O$

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□	31*	Torreyite	$(Mg,Mn^{2+})_9Zn_4(SO_4)_2(OH)_{22}\cdot 8H_2O$
□		Tremolite	$?Ca_2Mg_5Si_8O_{22}(OH)_2$
□		Turneaureite	$Ca_5[(As,P)O_4]_3Cl$
□		Unnamed amphibole	$Ca_2(Mg,Al)_5(Si,Al)_8O_{22}(OH)_2$
□		Uraninite	UO_2
□		Uranophane	$Ca(UO_2)_2[SiO_3(OH)]_2\cdot 5H_2O$
□		Uranospinite	$Ca(UO_2)_2(AsO_4)_2\cdot 10H_2O$
□		Uvite	$(Ca,Na)(Mg,Fe^{2+})_3Al_5Mg(BO_3)_3Si_6O_{18}(OH,F)_4$
□		Vesuvianite	$Ca_{10}Mg_2Al_4(SiO_4)_5(Si_2O_7)_2(OH)_4$
□		Villyaellenite	$(Mn^{2+},Ca,Zn)_5(AsO_4)_2[AsO_3(OH)]_2\cdot 4H_2O$
□	32*	Wallkilldellite	$Ca_4Mn_6^{2+}As_4^{5+}O_{16}(OH)_8\cdot 18H_2O$
□	33*	Wawayandaite	$Ca_{12}Mn_4^{2+}B_2Be_{18}Si_{12}O_{46}(OH,Cl)_{30}$
□		Wendwilsonite	$Ca_2(Mg,Co)(AsO_4)_2.2H_2O$
□		Willemite	Zn_2SiO_4
□		Wollastonite	$CaSiO_3$
□		Woodruffite	$(Zn,Mn^{2+})Mn_3^{4+}O_7.1\text{-}2H_2O$
□		Wulfenite	$PbMoO_4$
□		Wurtzite	$(Zn,Fe)S$
□		Xonotlite	$Ca_6Si_6O_{17}(OH)_2$
□	34*	Yeatmanite	$Mn_9^{2+}Zn_6Sb_2^{5+}Si_4O_{28}$
□		Yukonite	$Ca_2Fe_3^{3+}(AsO_4)_4(OH)\cdot 12H_2O(?)$
□		Zinalsite	$Zn_2AlSi_2O_5(OH)_4\cdot 2H_2O$
□		Zincite	$(Zn,Mn^{2+})O$
□		Zinkenite	$Pb_9Sb_{22}S_{42}$
□		Zircon	$ZrSiO_4$
□		Znucalite	$CaZn_{11}(UO_2)(CO_3)_3(OH)_{20}\cdot 4H_2O$

Minerals Unique to Franklin and Sterling Hill = 34
Total Mineral Species = 357
Changes to the list: dundasite - added; paragonite - added; rouaite - added hellandite to hellandite-(Y)- changed.

Number plus * = unique to Franklin -Sterling Hill
**formula from Dr. Pete J. Dunn's monograph "Franklin and Sterling Hill, New Jersey: the world's most magnificent mineral deposits"

Above: Mr. and Mrs Anthony Faller. (Mr . Faller is chairman, AFMLS Endowment Fund). **Left:** Kevin O'Shea, rowdy table stalwart, with that tell-tale end of night glow. *Photos by Tema Hecht*

A Franklin Wedding

July 27, 2002 was a very special day in Franklin, New Jersey!

It was so special we put down our picks, shovels, jewelers loupes and fossils, cleared the cobwebs from our minds and meandered over to the gazebo at the Franklin Pond to watch two best friends declare their friendship and love for each other.

Franklin mayor *Edward Allen* performed the marriage ceremony, and John Cianciulli and Carol Durham exchanged their vows in front of all their friends.

The Franklin Mineral Museum curator and confirmed bachelor became a husband and his administrative assistant became his wife, creating a new partnership dedicated to recording and preserving the cultural, geological and mineralogical history of The Franklin-Sterling Hill mining community.

The wedding reception was held at another famous Franklin landmark: The Franklin Firehouse. Site of the famous Parker Shaft, parking there is as close as you can get to this source of the famous lead silicate minerals so desirable to many Franklin collectors.

However, once we entered the reception hall, we quickly forgot about these rare minerals because we were introduced to a couple whose talents went far beyond their day-to-day curatorial duties.

We knew John could tune up a car, but not many of us knew he could tune up his guitar and sing to his own accompaniment.

We knew he could identify any assemblage of rare Franklin minerals, but not many of us knew he could assemble the graphics, scan the photos, and create the computer disc used to print this publication.

We knew Carol could type *70* words a minute and successfully collect past-due FOMS dues, but not many of us had seen her other organizational skills at work.

She easily became a gracious hostess, capable of keeping a crowd of incurable mineral collectors happy and enjoying themselves without the help of a mineral to talk about (although some probably spent a few quiet moments coveting the mineral deposit that lay directly beneath the banquet hall).

John quickly became the singing master of ceremonies to complement Carol's hostess duties, and we all settled down to enjoy the food prepared by John's sister, Lynn.

Cold hors d'oeuvres and hot meats and pasta were set-up on long tables like the banquet hall of an old English castle, while nearby keg and bottled beverages beckoned the thirsty.

The entertainment was provided by a DJ, but John became the music director, and the dancing, although slow to start (some of us, after all, are long past 35), eventually got lively.

John is no stranger to music. He was raised in a musical family. His father was a musician, composer and arranger. His sister, Connie, plays the violin; another sister, Lynn, plays the piano; and brother, Phil plays the 4-string tenor guitar and clarinet.

Having been a performer of folk and political satire music in his early days touring the coffee house circuit, John easily took charge of the evening's entertainment.

To cap off the evening the DJ announced an elimination dance based on the wedding anniversaries reached by the participants.

Starting with the newlyweds, a crowded dance floor easily got past the one, five, ten, and 20 year eliminations. At 30 years the crowd thinned out. At 40 years only a few couples remained. At 42 years the Beilings had to sit down. At 52 years, three couples remained: the newlyweds, who were the judges, another couple, and the Baums, who were sitting the dance out but were still eligible to compete.

At 60 years the only remaining couples were the Franklin Mineral Museum's curator team of John and Carol Cianciulli, and the curator emeritus team of Jack and Augusta Baum.

The Baums then announced that they "have been married for 62 years", and they became the clear winners of the dance contest.

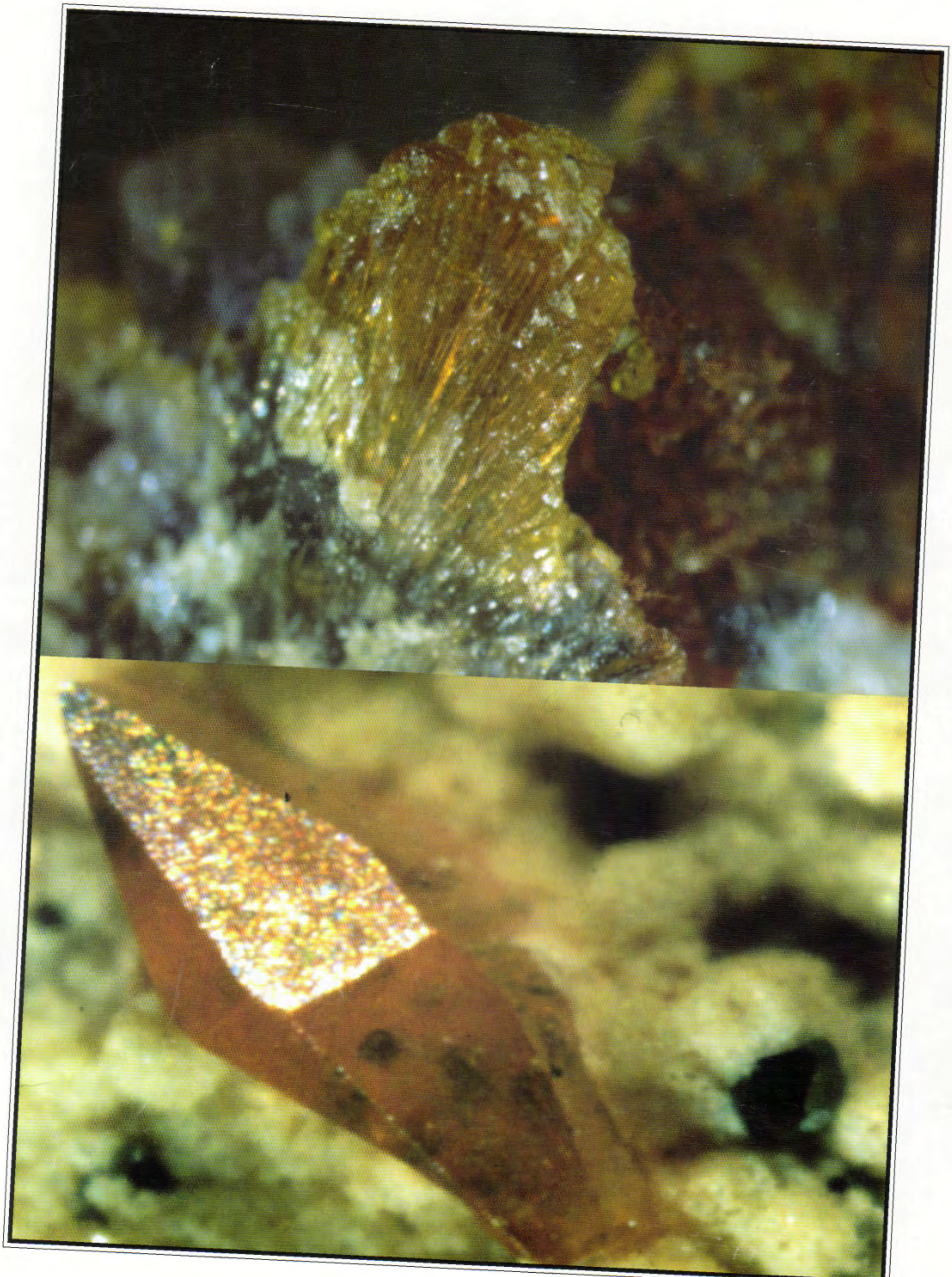
The party slowly wound down, and it was noted by some that within the Franklin-Sterling Hill mineral community, the couples married the longest and the shortest could both be visited at the Franklin Mineral Museum.

The happy couple.

Franklin mayor Edward Allen performs the ceremony.

The Cianciulli brothers, Phil on left, and John.

See back inside cover for more photos.



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