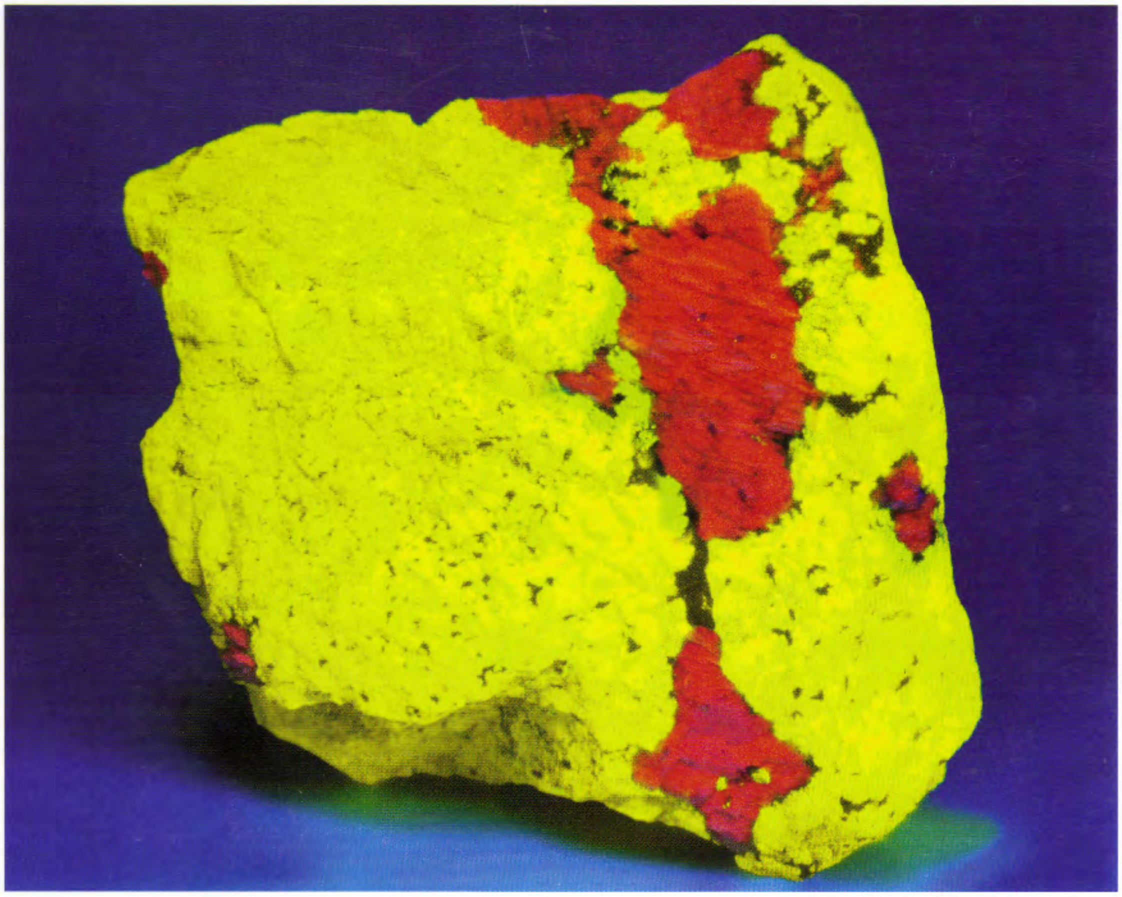
THE PICKING TABLE

JOURNAL OF THE FRANKLIN-OGDENSBURG MINERALOGICAL SOCIETY

Vol. 45, No. 1—Spring 2004 $15.00 U.S.



Inside This Issue:

- The updated Franklin-Sterling species list
- How to photograph fluorescent minerals, part II
- An interview with Dr. Pete Dunn, part II
- The Sussex mineral show you probably missed
- A close-up view of a Franklin classic

The Franklin-Ogdensburg Mineralogical Society, Inc.

Membership Information

Anyone interested in the minerals, mines, or mining history of the Franklin-Ogdensburg, New Jersey, area is invited to join the Franklin-Ogdensburg Mineralogical Society, Inc. (**FOMS**). Membership includes scheduled meetings, lectures, and field trips, as well as a subscription to ***The Picking Table.***

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THE PICKING TABLE

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About the Front Cover: Esperite with calcite, shot using a Canon 620 SLR on automatic aperture priority f/11 with a 100mm macro lens, ISO 100 slide film, with two SuperBright 2000SW lamps and one 50-watt UVP Model 225D held directly over and in front of the specimen on a moderately bright fluorescent blue poster board. The specimen presents rich yellow esperite and bright red calcite. The resulting fluorescent brightness and saturation of the color throughout the photo are very good. Gary Grenier specimen, 4" × 4.5". Photo by Gary Grenier.

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Subscription to *The Picking Table* is included with membership in FOMS. For membership, back issues, and information, write to:

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The Picking Table is the official journal of the Franklin-Ogdensburg Mineralogical Society, Inc. (FOMS), a nonprofit organization. *The Picking Table* is published twice each year and features articles of interest to the mineralogical community that pertain to the Franklin-Ogdensburg, New Jersey, area. Articles related to the minerals or mines of this district are welcome for publication in *The Picking Table*. Prospective authors should address correspondence to:

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The views and opinions expressed in *The Picking Table* do not necessarily reflect those of FOMS or the Editors.

The FOMS Executive Committee also publishes seasonally the *FOMS Newsletter*, which informs members of upcoming activities and events sponsored by FOMS and other local mineral-related organizations.

FOMS is a member of the Eastern Federation of Mineralogical and Lapidary Societies, Inc. (EFMLS).

FRANKLIN-OGDENSBURG MINERALOGICAL SOCIETY, INC.
SPRING 2004 ACTIVITY SCHEDULE

Activities marked with an asterisk (*) are not sponsored by FOMS but may be of interest to its members; such functions may incur fees and/or require membership in other organizations.

Saturday, March 20, 2004

10:00 A.M. to Noon—FOMS Micro Group, Kraissl Hall, Franklin Mineral Museum.

1:30 to 2:30 P.M.—FOMS Meeting and Lecture, Lyceum Hall at Immaculate Conception Church, Franklin, N.J.

Dr. Pete J. Dunn, of the Smithsonian Institution:

"The Irrepressible Charles W. Trotter, Franklin and Sterling Hill's Greatest Warrior!"

Saturday, April 17, 2004

9:00 A.M. to Noon—FOMS Field Trip—Buckwheat Dump, Franklin, N.J.

1:30 to 3:30 P.M.—FOMS Meeting and Lecture, Kraissl Hall, Franklin Mineral Museum

Bob Jenkins:

"The Mines and Minerals of Butte, Montana."

The Franklin Mineral Museum will have a sale of worldwide minerals at 25% Off.

Saturday and Sunday, April 24 and 25, 2004
SPRING SHOW WEEKEND
***32nd Annual New Jersey Earth Science Association (NJESA) Gem & Mineral Show**
and 8th Annual FOMS Outdoor Swap and Sell

These events run concurrently at the Robert E. Littell Community Center, the FOMS Swap and Sell outside and the NJESA Show inside. Donation: $5.00 per person; children under 14 free with paying adult.

Swap and Sell hours: Saturday, 7:30 A.M. to 6:00 P.M.; Sunday, 9:00 A.M. to 5:00 P.M.

For FOMS Swap and Sell information, contact Chet Lemanski after 8:00 P.M. at (609) 893–7366.

NJESA Show hours: Saturday, 9:00 A.M. to 5:30 P.M.; Sunday, 10:00 A.M. to 5:00 P.M.

For NJESA show information, call the Sterling Hill Mining Museum at (973) 209–7212.

*The Franklin Mineral Museum and Sterling Hill Mining Museum will be open during the show.

BANQUET AND AUCTION

*SHMM/FOMS/NJESA banquet and auction starts Saturday at 6:30 P.M. at the Lyceum Hall at Immaculate Conception Church, located at the south end of Main Street in Franklin. This is an all-you-can-eat, BYOB event. Tickets cost $15.00 and seating is limited; for ticket reservations and further information, call the Sterling Hill Mining Museum at (973) 209–7212.

*FIELD COLLECTING

Organized by the Delaware Valley Earth Science Society (DVESS) and the North East Field Trip Alliance (NEFTA).

Trotter Dump, Franklin: Saturday, 9:00 A.M. to 7:00 P.M., then after dark from 7:30 P.M. to 11:00 P.M. No one under 9 years permitted.

Buckwheat Dump, Franklin: Saturday, 10:00 A.M. to 4:00 P.M. Children must be accompanied by an adult.

Facilities fee: $20.00, plus $1.00/lb. daytime rate at both sites and $2.00/lb. evening rate for Trotter Dump.

Sterling Hill, Ogdensburg: Sunday, 9:00 A.M. to 3:00 P.M. No one under 13 permitted.

Facilities fee: $10.00 (includes up to 10 lbs.; additional poundage fee: $1.00/lb.)

For field collecting reservations, contact Jeff Winkler, 55 White Way, Pompton Lakes, NJ 07442, or call (973) 835–2582.

E-mail information at: *TripMaster@UVworld.org*.

STERLING HILL GARAGE SALE

The Fourth Annual Sterling Hill Garage Sale will take place at the Christiansen Pavilion, Sterling Hill Mining Museum, from 1:00 to 3:00 P.M. on Sunday.

Sunday, May 2, 2004

1:30 P.M.—*Annual Miners Tribute and Volunteer Appreciation Day at the Franklin Mineral Museum, including special events and a concert by the famous Franklin Band.

Saturday, May 15, 2004

9:00 A.M. to Noon—†FOMS Field Trip—Mine Run Dump and Passaic and Noble Pits, Sterling Hill Mining Museum, Ogdensburg, N.J.

1:30 to 3:30 P.M.—FOMS Meeting and Lecture—Sterling Hill Mining Museum, Ogdensburg, N.J.

Bernard Kozykowski:

"A Slide Presentation on the Sterling Hill Mining Museum."

Saturday, June 7, 2004

7:30 to 10:30 P.M.—*Spring Night Dig and Mineral Sale at the Buckwheat Dump, Franklin. Sponsored by the Franklin Mineral Museum. Open to the public; poundage fee charged. Doors open at 7:00 P.M. for registration and mineral sale. Eye protection, flashlight, and UV lamp advised.

Saturday, June 19, 2004

1:30 to 3:00 P.M.—FOMS Meeting and Lecture, Kraissl Hall, Franklin Mineral Museum.

Richard Volkert:

"A Virtual Tour of the New Jersey Highlands."

Sunday, June 20, 2004

9:00 A.M. to 3:00 P.M.—†FOMS Field Trip—Lime Crest Quarry, Limecrest Road, Sparta, N.J.

PLEASE NOTE: This event is open to FOMS members only! Proof of membership required.

† FOMS field trips are open only to FOMS members aged 13 or older. Proof of membership is required for all field trips, as well as proper field trip gear: hard hat, protective goggles or glasses, gloves, and sturdy footwear.

Franklin Mineral Museum News

John Cianciulli, Curator
Franklin Mineral Museum
P.O. Box 54, Franklin, NJ 07416

Museum Property and Grounds

The Mildred B. Harden Memorial Pavilion is completed and a beautiful bronze plaque has been affixed to the structure in her honor. Miss Harden, a well-known educator in the Franklin school system, is fondly remembered by countless Franklin, N.J., students and is a part of the legacy of Franklin. It was her style to give selflessly to Franklin's youth, and her generosity did not stop with her passing. The Franklin Mineral Museum is honored to be remembered by Mildred through her generous bequest. In turn, we would like to remember her for all the good she has done for our community. A dedication ceremony is planned for Miners Day and Volunteer Appreciation Day on May 2, 2004.

All of the museum's maps are now stored in a double padlocked steel map case that was installed in Kraissl Hall. Also, a high-security steel door has been installed to replace the museum's overhead garage door. Two new state-of-the-art exhibit cases have replaced the antique china closets in Welsh Hall. In addition, blueprints for the Bill and Mary Welsh memorial plaque are being drawn up by the Sussex County Monument Company.

Acquisitions

The museum recently acquired the largest solid piece of apple-green willemite we have seen from the Franklin Mine. The specimen weighs 21 pounds. This willemite specimen and a large rhythmic-banded gneissic ore specimen were obtained from the late John and Mary Pawluchik of Ogdensburg, N.J. Mary was the sister of the late John Sebastian, a long-time supporter of the Franklin Mineral Museum and former field trip chairman of FOMS.

George Rowe (1868–1947), Franklin Mine Captain from 1906 until 1934 and an avid collector of Franklin minerals, is on the list of Franklin's men of distinction (Dunn, P.J. 1995). Captain Rowe donated his vast mineral collection to Rutgers University Geology Museum in 1940. The Franklin Mineral Museum is now the repository for the personal handwritten journal of Mine Captain George Rowe, along with his prized faceted sphalerite stickpin, some personal correspondence, and news clippings regarding the donation of his collection of minerals to Rutgers. These items are on long-term loan by Miss Amy Morrison, great-granddaughter of Captain Rowe. Miss Morrison would like the museum to exhibit these items in memory of Edward Morrison, D.V.M., her father and grandson of George Rowe.

Sales

E-Bay sales are very good! The market for Franklin-Sterling minerals is growing and there seems to be a worldwide appreciation for our minerals. The museum buys and sells minerals. Inquire at (973) 827–6671.

Research

We regret to say that the museum's so-called "analyzed otavite" specimen is not otavite. It has been found to be manganoan calcite on friedelite. We are also investigating the existence of fluckite from the Franklin-Sterling area. After examining numerous specimens labeled and sold as fluckite using X-ray, EDS, and optical analyses, we have been unable to verify its occurrence from the area. None of the labeled specimens sold as otavites fit the Sid Williams description published in *The Picking Table*, Vol. 28, No. 2, page 3. Both minerals probably do exist from this area, but all of the sold specimens we have examined appear to be the product of an overactive imagination. We will keep trudging away until we see a real one of either or preferably both!

The Franklin Marble amphibole study is ongoing. Dr. Paulus Moore collected some interesting amphiboles from Amity, N.Y., that may be new mineral species. Identical data were obtained for a 1" × 1.5" tabular crystal from the Franklin (Farber) Quarry labeled "pargasite."

Other News

We extend a big thanks to FMM president Steven Phillips for meeting with the new owner and the general manager of Lime Crest and Franklin Quarries and successfully paving the way for future FOMS field trips at both sites. ⚒

News From Sterling Hill

Joseph Kaiser
40 Castlewood Trail
Sparta, NJ 07871

The Warren Museum has undergone extensive renovations. The fluorescent exhibits have been completely rearranged and upgraded, and many new specimens have been put on display. All the displays for fluorescent activators are now grouped together, and there are five single-species cases all in one row: willemite, fluorite, scheelite, sphalerite, and calcite.

The Hesselbacher Room is nearly completed and should be ready by the spring NJESA show. The cases have been painted and the ultraviolet lamps are on order. As part of this room, a fanciful fluorescent display geared toward kids is being created by Lea Anderson. It will include a castle, a volcano, and many attention-grabbing mobiles. All of the items are made using ground-up fluorescent minerals.

In the Zobel Exhibit Hall (the old change house), 15 large display cases have been installed in the shower run. They have been filled with museum-quality, eye-catching mineral specimens. Most of the minerals and show cases were donated by the Oreck family (famous for their vacuum cleaners). Many of the cases are dedicated to specific species or locations.

Mikki Weiss has turned over the responsibility of teacher education to Dr. Earl Verbeek. She will continue to be in charge of the overall educational programs at the museum. Dr. Verbeek is working under a state grant to provide at least 30 hours of instruction for 20 science teachers from northern New Jersey. Programs now being developed will be used in workshops during the spring and summer. Some of the topics include minerals and their uses and geology in mining.

Internet users can check the current status of ongoing events by visiting our website, www.sterlinghill.org.

Field Trip Report:

The Eastern Concrete Materials Quarry, Hamburg, N.J.; 11-15-03

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

Visiting a new collecting site for the first time is always a bit of a challenge. The first challenge for this collector and most of the others I talked to was how to orient oneself within the quarry complex. After first figuring out the right place to park (the southwest corner of the site), I joined the other collectors assembled at the main office for basic orientation and instructions. What had been tantalizing to all who saw it was a large rock placed right in front of the main office: a dramatic example of orange calcite with sinuous bands of dark amphibole. The next challenge of this field trip was to find where it had come from.

From the office area, I walked past a jumble of crushing, sorting, and loading equipment, continued over a little drainage ditch, and found myself centered just about mid-quarry. As I looked toward the northern vertical quarry face, the cross-sectional outline of a hill and valley was apparent. To the southeast side of the quarry the floor dipped downward, paralleling the slope of the valley and a lower vertical face. In this area they were mining benches below the surface level, and I watched the drill rigs working to set up a new blast field; obviously there was no collecting in this active area. To the west and north were large stockpiles of unsorted boulders and

The boulder with folded bands of amphibole in orange calcite displayed at the quarry office. *Bob Boymistruk photo.*

beyond that the remains of the foot of the hill portion of the quarry. Within this central area we were allowed to roam, as long as we kept away from the vertical walls.

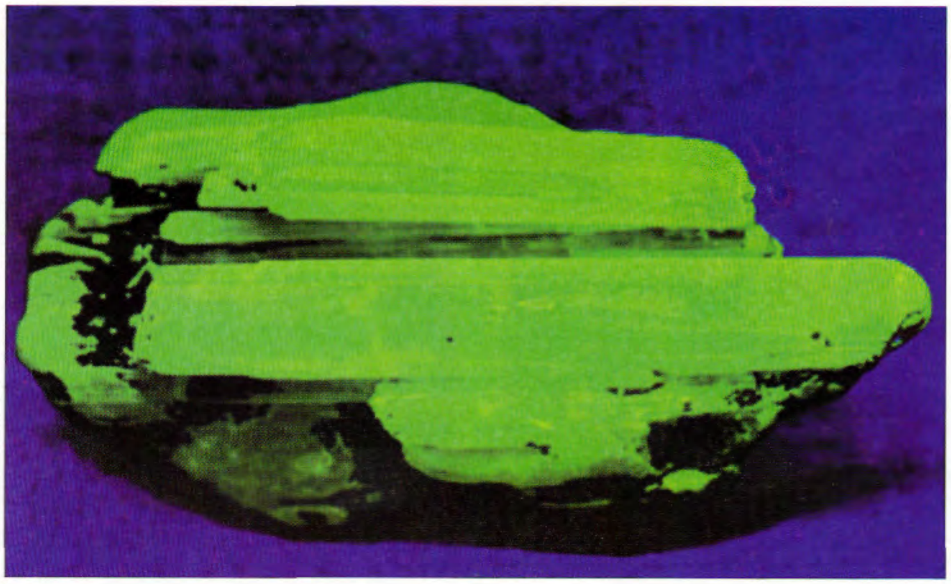
Upon first observation most of the stockpiled rock looked highly metamorphosed, fine-to-medium grained with alternating layers or bands of lighter and darker green minerals. Amphiboles and epidote were abundant, along with a small amount of calcite and occasional hints of pyrite.

Toward the middle of the quarry, the rock changed and so did my outlook for the rest of the day. There were small piles of darker weathered rock and nearby outcrops showing euhedral crystals. Many rocks had cavities lined with crystals from 1 to 10 cm in length. The calcite had weathered out and left the more resistant minerals behind. After expending a lot of effort to extract some small apatite crystals, I found a large boulder with pale green scapolite crystals that had been less severely weathered than some. They averaged about 2 by 4 cm and had scapolite's typical deep-red fluorescence in shortwave ultraviolet light.

A little farther on I found an area where several collectors were dismantling a boulder that produced cleaner white scapolite in crude crystals, in a matrix of pink to orange blocky calcite. This observation proved to be the key to finding collectible specimen material: look for any distinct zones or pods of calcite that gave the crystals room to grow. Almost dead-center on the quarry floor was a large rock pile that had a swarm of collectors working it over and extracting the best crystal specimens of the day, again primarily from the orange calcite pods. Here I was shown several specimens of apatite crystals up to 5 cm by 20 cm long, and brown titanite crystals as much as 7 cm long. Alas, the largest titanite shattered as it was being removed. I looked fondly at a 2 cm by 4 cm rock-locked titanite and decided to leave it for someone else.

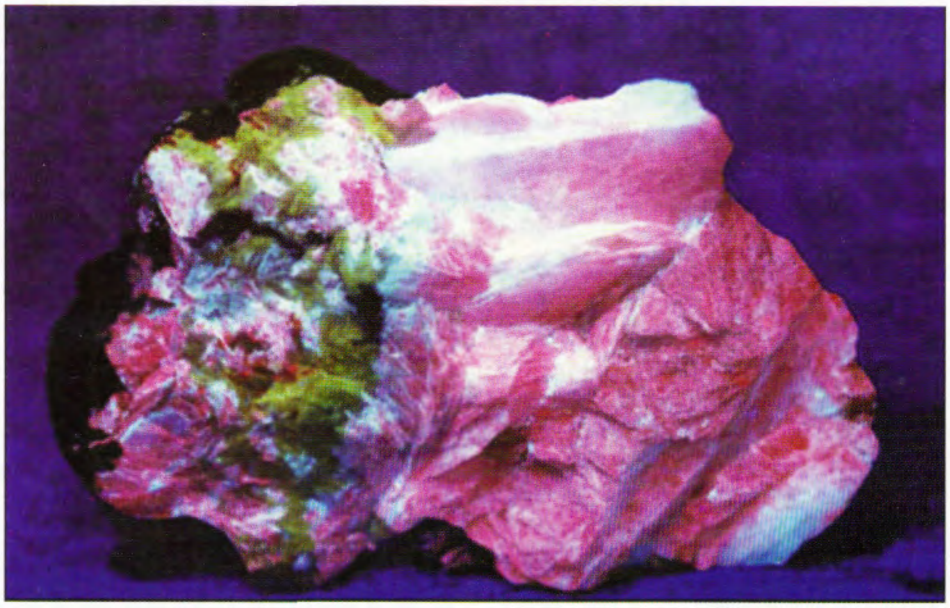
The finest apatite crystal I saw that day was a sharp, doubly terminated brown crystal 6 cm long, a dead ringer for material from Otter Lake, Ontario, Canada, a locality that also produces titanite and scapolite. The most conspicuous large crystals seen were found on a meter-sized boulder whose face was covered in weathered brown hedenbergite crystals as large as 10 cm by 6 cm. The cores of these crystals were still green with a thick brown rind. There were also numerous zones of alpine-cleft-type openings with abundant microcrystals of epidote, actinolite, and albite lining the narrow cavities. Many of these cavities were clean and unweathered, making for fine microspecimens.

Most collectors I spoke with were pleasantly surprised and optimistic about the potential for future collecting at the Hamburg quarry. I believe I speak for all the FOMS members present in thanking the management of the quarry for the privilege to collect in this working site. ⚒



Willemite from the Trotter Mine, Franklin

Shot using a Honeywell Pentax SLR, aperture set to f/6 with a 50mm macro lens, ISO 100 slide film, with one SuperBright 2000SW lamp held directly over and slightly in front of the specimen on a moderately bright fluorescent blue textured velour fabric. The fluorescent response shows the willemite crystals' form and rich fluorescent green color throughout. The crystals in daylight are gem-quality pale yellow. George Elling specimen; measures 1.75" × 2.75". Photo by Gary Grenier.



Margarosanite with nasonite from Franklin

Shot using a Honeywell Pentax SLR, aperture set to f/6 with a 50mm macro lens, ISO 100 slide film, with one SuperBright 2000SW lamp held directly over and slightly in front of the specimen on a moderately bright fluorescent blue textured velour fabric. The fluorescent response shows the margarosanite fluorescing red, white, and bluish white and shows the platy crystalline habit of the species. Accompanying the margarosanite is pale yellow–fluorescing nasonite. In daylight the margarosanite is a pearly-white platy mass. George Elling specimen; measures 2" × 3". Photo by Gary Grenier.

The Art of Fluorescent Mineral Photography, With Special Attention to the Minerals of Franklin and Sterling Hill

PART II

Gary Grenier
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Laurel, MD 20725

Introduction

Continuing where I left off in the first part of this "how-to" feature, I will now discuss particulars for shooting the most popular Franklin-Sterling Hill fluorescent species and assemblages. In addition, I will show you how to set up a multiple ultraviolet (UV) light-source studio that will dramatically improve your UV light photography. A section of frequently asked questions follows as does a handy table of shot bracket data, which is provided to guide you in shooting with manual SLR cameras.

6: Photographing the More Popular Franklin and Sterling Hill Fluorescent Minerals

In this section, I have prepared an alphabetical list of the most popularly collected fluorescent minerals and assemblages from Franklin and Sterling Hill, along with suggestions for photographing them. This discussion is not intended to provide complete assemblage details or present every fluorescent occurrence and color of every known fluorescent species from Franklin and Sterling Hill. It is intended to provide some practical observations and general guidance to the collector/photographer. Abbreviations used here are as follows: FL = fluoresces; LW = longwave; SW = shortwave. Most common fluorescent responses are listed; less common responses are given in parentheses.

- **Aragonite: FL cream LW (FL green SW)** This species was widely collected from Franklin and Sterling Hill. I have had success with SW lamps on Sterling Hill material, having recorded both cream and pale green colors from well-crystallized specimens, as there are usually no competing fluorescent species. Most specimens of aragonite that respond to SW UV will require longer exposures to bring out the cream and pale green colors.
- **Barite: FL cream SW (FL yellow SW/LW, white SW, and pale green LW)** This species was widely collected from Franklin and Sterling Hill. Massive granular Franklin barite with calcite is the easiest to photograph since it is generally well balanced with its calcite matrix. The Sterling Hill 600-foot-level barite is among the brightest SW fluorescent minerals I have photographed. To accurately record the bright cream-white response, you will need to sacrifice the red-fluorescing calcite matrix. Some of the most pleasing photos of this find were taken of specimens that had a high ratio of barite to calcite. Very few barite-willemite combinations have been recorded and generally they have come from Franklin finds. Photographs of these combinations have shown the challenge to be keeping the exposure correct for the willemite while still catching the less brightly fluorescing barite. Some barite specimens found in the upper workings at Sterling Hill provided SW and LW responses that are dramatically different from each other. Both can be accurately recorded with little color shifting or reciprocity failure.
- **Bustamite: FL cherry red LW/SW** This species was widely collected from Franklin but is rare from Sterling Hill. Sterling Hill bustamite is nonfluorescent, as is most bustamite from Franklin. Though most fluorescent Franklin bustamite is LW-dominant, some examples fluoresce well under SW. Its rich cherry-red fluorescence can easily be masked or overwhelmed by the brighter green-fluorescing willemite and orange-fluorescing clinohedrite with which it is often associated. If willemite and clinohedrite are present in small amounts or absent, your odds of recording the red response of bustamite under SW are significantly improved. Otherwise, try a LW lamp to mute the clinohedrite and willemite responses and bring out or intensify the bustamite response. Care should be taken not to overexpose the bustamite, as you will lose the cherry red and produce an uncharacteristic calcite-like red-orange.

- **Calcite: FL orange-red SW (FL pink, orange, cream, white, green-blue, yellow, violet)** Many shades of red and orange can be found in fluorescent calcite under LW and SW. Calcite can be particularly challenging when it is the matrix for willemite. Some of the best SW photographs of calcite give it a slightly muted red appearance when compared with the accompanying brightly green-fluorescing willemite. However, in many photos of this classic combination there are thin yellow lines (which the eye does not see) along the contact between the calcite matrix and the willemite grains. This is caused by the film's emulsion sensitivity and not necessarily an overexposure, though one explanation is that green and red fluorescent colors, when mixed, produce yellow. Some of the best calcite photos are of the hardystonite and calcite assemblage where willemite and clinohedrite are minor constituents. Both the calcite and hardystonite will match closely in exposure durations and give the expected balanced exposure images. Some of the "hottest" fluorescent calcites are microcrystalline druses. These unassuming specimens usually have fluorescent calcite present on nonfluorescent matrices of dolomite or serpentine. However, they are champs for the photographer and have very strong fluorescent responses requiring shorter-than-average exposure durations. Another calcite assemblage that is a favorite of mine came out of Sterling Hill with highly fluorescent and phosphorescent exsolution willemite in tephroite and sonolite. These specimens, while having very bright willemite, likewise have very bright calcite. In fact, some of the brightest calcite I have seen has come from this assemblage. Unfortunately, this assemblage is difficult to catch on film because there is quite a bit of calcite-willemite-contact color shifting. The color shift on film is that of the willemite to yellow at the calcite contact.
- **Clinohedrite: FL orange SW** This species was widely collected from Franklin and does not occur at Sterling Hill. Its orange SW fluorescence has distinguished it among other species. One of the most popular assemblages for colorful and attractive photographs is the classic four-color hardystonite-willemite-clinohedrite-calcite combination. Literally tons of this material are retained in collections simply for its fluorescent attraction. Sometimes esperite adds a fifth color. A well-balanced clinohedrite-hardystonite-calcite specimen will present few exposure problems, but it will be easy to overexpose the willemite if it is present in the specimen. If esperite is also present, hardystonite and calcite will have to be slightly underexposed to balance the exposure of the brighter esperite and willemite. If you fail to balance your exposure in favor of esperite and willemite, both will appear bright yellow-white to white, while the hardystonite violet-blue will have a beautiful blue velvet look and the clinohedrite an intense orange to orange-white appearance. Clinohedrite masses and crystals alike offer few problems for the photographer, as the intensity of the fluorescent response usually does not vary from specimen to specimen.
- **Corundum: FL cherry red LW** This species was widely collected from the Franklin Marble in the local quarries and zinc mines. The ruby variety of corundum is usually found in a nonfluorescent calcite and feldspar matrix with an assortment of accessory species that includes fluorescent margarite and phlogopite. Both of these species may fluoresce under SW, but corundum fluoresces best under LW. So photographed, corundum specimens will usually show only the red fluorescence of ruby. Exposure times may be a little longer than average, but your results should be excellent without film color shifts.
- **Cuspidine: FL orange-yellow SW** This was an extremely rare species from a very limited Franklin occurrence prior to recent discoveries of additional occurrences in Franklin dump material. The original assemblage is that of cuspidine with hardystonite, clinohedrite, nasonite, andradite, and glaucochroite crystals. In this assemblage, cuspidine will photograph with an orange-yellow SW response similar in intensity to that of clinohedrite. This original assemblage should not be difficult to photograph, but it may prove difficult to find. One of the newer assemblages is composed of franklinite, glaucochroite, willemite, and calcite, with minor fluorite. The challenge of this assemblage will be to get the orange-yellow of cuspidine on film next to and intermingled with the more brightly fluorescing willemite. When the willemite is correctly exposed, the cuspidine will be nearly indistinguishable on film. You may have to sacrifice some of the willemite to overexposure to catch the cuspidine. Under midwave UV, cuspidine fluoresces pale violet of moderate intensity, and the green willemite response is substantially muted. This may offer the photographer an opportunity to capture on film a better-balanced shot with little or no color shift.
- **Datolite: FL cream SW** This species was collected only from Franklin and is very difficult to catch on film. Glassy, transparent masses and vuggy crystal masses in manganaxinite are the types most often seen in collections. However, the transparency of massive datolite with manganaxinite and willemite may be troublesome. The datolite may act as a window and permit the willemite and manganaxinite beneath to fluoresce through the weaker cream-fluorescing datolite. If you are fortunate enough to find an isolated fluorescent mass of datolite, the shot will be no more difficult than shooting calcite, though with a slightly longer exposure time.
- **Diopside: FL blue SW, cream LW** This species from the Franklin Marble has been popular due to its widespread availability at Franklin, Sterling Hill, and the neighboring quarries. It is often mixed with fluo-

rescent phlogopite and nonfluorescent calcite. Its relatively bright pale blue fluorescence, when combined with yellow-fluorescing phlogopite, is a pleasing color combination and not difficult to catch accurately on film. Some of the brightest fluorescent diopside was recovered at Sterling Hill during post-1990 tunnel excavations on the adit level. This diopside was found in elongated pods in nonfluorescent calcite and is easy to photograph.

- **Esperite: FL lemon-yellow SW** This species was found and collected only at Franklin. Due to its bright yellow fluorescence, some collectors consider it to be one of most exciting species to collect. However, it can be particularly difficult to photograph. Several combinations of the esperite-hardystonite-clinohedrite-willemite assemblage offer the photographer dramatic photographic opportunities. The first difficulty you will notice is that of exposure. Esperite very quickly saturates film to the disadvantage of hardystonite and calcite. The second challenge will be to capture the true lemon yellow and not the green-yellow that film color shifts usually produce. The third difficulty, which may be resolved by your film selection, is that of willemite and esperite in combination blending to one green-yellow response. Some very dramatic specimens of esperite and willemite are those in which the esperite is in vein-like masses cutting massive willemite. Starting your bracket of shots at 1 second and finishing at 3 or 4 seconds may give you very little difference in the color of the esperite compared to the color-shifted willemite. Ektachrome slide film is a poor performer in catching blues and greens. I have found that most print films are a little better, but Kodachrome and Fuji Provia slide films are the best. Fortunately, esperite is so bright that most any film you try will capture it. Once you have chosen a film that will catch the difference between willemite and esperite, you will be challenged by the four-, five-, and six-color specimens. These specimens will be among the most dramatic that you can photograph and perhaps the most tricky, as it is difficult to have all species correctly exposed simultaneously. Careful specimen selection is critical, as is working with personal trade-offs in overexposures and underexposures to achieve acceptable results. Another dramatic and difficult-to-photograph example of esperite is the popular "wispy" esperite or esperite "feathers" in a hardystonite matrix. The challenge here is not the esperite, but the hardystonite. The drama is set by the contrast of the wild patterns of wispy, brightly fluorescing esperite against a violet-fluorescing hardystonite background. It is easy to lose the hardystonite to underexposure and end up with wild yellow esperite patterns in a black field. When you manage to show the violet-fluorescing hardystonite without losing the yellow fluorescence of esperite to overexposure, you will have a photo worth keeping.
- **Fluorapatite: FL orange or blue SW (FL "peach" SW)** Both the Franklin and Sterling Hill mining areas produced a variety of fluorapatite assemblages in which the SW orange fluorescence varies in response from weak to strong. In addition, the various assemblages included willemite, calcite, bustamite, and other species that fluoresce more strongly. The challenge to the photographer will be to select a specimen that has a high percentage of fluorapatite coverage compared with the brightly fluorescent competing species such as willemite or calcite. Other fluorapatite assemblages may provide an easier photo opportunity and include matrices of andradite, calcite, and minor franklinite. These specimens usually have no willemite present to compete with the SW orange fluorapatite response.
- **Fluorite: FL blue-green SW/LW, FL violet-blue LW (FL white LW)** This species was collected from both Franklin and Sterling Hill. Both mining areas produced many assemblages in which both SW and LW fluorescent specimens have been collected. A variety of fluorite known as chlorophane has the distinction of losing its blue-green fluorescent response if left in the light for prolonged periods of time. Some local fluorite does not fluoresce. Most fluorite specimens, crystallized or massive, are generally weak responders to SW UV lamps and are easily overwhelmed by the fluorescence of the associated calcite and willemite. A better photo opportunity can be secured by using the LW lamp to bring out the fluorite and mute the willemite and calcite. The photographer should select a specimen that has a high percentage of fluorite coverage compared with the brightly fluorescent competing species. Other fluorite assemblages that may provide easier photo opportunities include matrices of pyrochroite, chlorophoenicite, and slip-faced franklinite on which the fluorite was the last to form. The majority of these specimens are from Sterling Hill; on some the fluorite forms discrete individual crystals. An interesting fluorite assemblage was found at Sterling Hill in the early 1990s that contained veins of sphalerite with masses of purple fluorite and pale yellow to white radial willemite crystals in ore. The sphalerite fluoresces both LW and SW, as does the fluorite. The combination of the three species is very attractive and not altogether impossible to catch on film.
- **Hardystonite: FL violet to violet-blue SW/LW** This species was found only at Franklin. Due to its violet-blue fluorescence and the other fluorescent minerals for which it is often the matrix, it has been widely collected. Literally tons of hardystonite boulders were used as road metal for the railway bringing ore from the Parker Shaft to the Palmer Mill. In the mid-1980s, one end of this abandoned railbed became a famous collecting locality known as the Mill Site. Hardystonite is particularly difficult to photograph due to

the other more brightly fluorescent species present in most specimens. Look for specimens of hardystonite in calcite with minor amounts of willemite. You will have very little difficulty shooting a longer exposure time to catch the SW violet-fluorescing hardystonite and orange-red-fluorescing calcite correctly exposed, with minor amounts of yellow-green-fluorescing willemite "burn-out." Another pleasing combination is that of hardystonite with minor calcite and coatings of clinohedrite. Various combinations of the esperite-hardystonite-clinohedrite-willemite-calcite assemblage also offer the photographer dramatic photographic opportunities. The first difficulty you will notice is that of exposure. Hardystonite requires longer exposures, to the disadvantage of esperite and willemite which are then overexposed and washed out. Another dramatic and difficult-to-photograph example is previously described under esperite: hardystonite with wispy esperite.

- **Hydrozincite: FL blue SW** Both Franklin and Sterling Hill mining areas produced a variety of hydrozincite assemblages in which the SW blue-white fluorescence varies in response from weak to strong. In addition, the various assemblages include willemite, calcite, sphalerite, and other species that fluoresce as brightly or more so. Some of my most photogenic hydrozincite specimens came from boulders found in the Passaic Pit in the early 1990s. Hydrozincite is a weathering mineral, here found as powdery coatings (and, rarely, fine radial crystals) on seams in calcite-rich lean ore. These specimens are among the easiest and most dramatic of the hydrozincite finds to photograph. The later Sterling Hill find of thick tan-to-gray veins of hydrozincite with zincite, exsolution willemite, and granular franklinite ore are pale in comparison, at least in their SW response. However, due to the presence of exsolution willemite, these specimens can produce fine photos.
- **Johnbaumite: FL orange SW** This species was found at Franklin and Sterling Hill. Both mines produced small numbers of johnbaumite specimens from very limited and specific assemblages. The orange fluorescence of johnbaumite is similar to that of fluorapatite and varies in intensity. Johnbaumite found in one particular assemblage from Sterling Hill is very difficult to photograph, due to the brightly fluorescent calcite and willemite matrix. Franklin johnbaumite is associated with less brightly fluorescent calcite and is much easier to photograph. These specimens usually have little or no willemite present to compete with the orange-fluorescing johnbaumite. However, specimens may be difficult to find.
- **Manganaxinite: FL red SW (FL red LW)** This species was relatively abundant at Franklin and is rare from Sterling Hill. Franklin manganaxinite is often the matrix for many fluorescent species, including barite, margarosanite, nasonite, clinohedrite, calcite, willemite, datolite, roeblingite, prehnite, cahnite, charlesite, and xonotlite. Its red fluorescent response varies considerably from specimen to specimen, and suitable specimens should be selected carefully. You should have little difficulty in photographing manganaxinite, but some of the associated mineral fluorescences, notably the pale yellow of nasonite and the peach-pink of prehnite, may present a challenge. In this case, manganaxinite may photograph a very hot red when you increase exposure times to catch the fluorescences of nasonite and prehnite.
- **Margarosanite: FL blue and red SW (FL orange LW)** This species was collected from Franklin in multiple assemblages. Margarosanite is relatively easy to photograph due to its bright pale blue response. It is also easy to overexpose as white, because it is found with dimmer fluorescent species such as nasonite, prehnite, pectolite, roeblingite, minehillite, charlesite, gypsum, datolite, and microcline. Many examples of margarosanite fluoresce blue-white and red under SW UV light. As noted in Part I, the red fluorescence is not usually noticed by the human eye unless it is the dominant color. However, the film will record the red fluorescence that is often intermixed with pale blue. Some fine platy masses of margarosanite produce very attractive and colorful photos because of this dual color response. A popular assemblage includes orange-fluorescing wollastonite in weakly red-fluorescing microcline, with native lead and weakly violet-fluorescing minehillite. The margarosanite in this assemblage is often platy and very brightly fluorescent. The resulting photographs often fail to pick up the minehillite due to its weak fluorescent response. However, wollastonite and margarosanite together are a classic color combination from Franklin and can yield excellent photographs. Another classic margarosanite assemblage includes orange-fluorescing clinohedrite and/or pectolite, red-pink fluorescing roeblingite, and peach-pink fluorescing prehnite. The margarosanite is platy, white, and massive in daylight and is often associated with franklinite, ganophyllite, and hendricksite. These specimens are particularly bright under SW UV and are easily adapted to more colorfully fluorescent background materials. While you may lose the paler fluorescing peach-pink prehnite, most hand specimens are so visually busy with three or four other bright fluorescent responses that a properly exposed photo will be very pleasing. Some margarosanite was found on the Palmer Shaft Mill Site during the mid-1980s as disseminated masses and traces in hyalophane, celsian, and grossular. This assemblage was known prior to its rediscovery on the Mill Site and often traded for its colorfully fluorescent margarosanite patterns. These specimens are often mixed with willemite and minor amounts of clinohedrite.
- **Minehillite: FL violet SW** This species was found

only at Franklin and has been reported to fluoresce best under a midwave UV lamp. I have been able to photograph minehillite successfully using a SW lamp. Minehillite associated with microcline, native lead, and minor amounts of margarosanite is among the easiest species to photograph, though it requires longer-than-average exposure times. If your minehillite specimen has only minor amounts of the competing brighter fluorescent species, then they should not be a problem.

- **Nasonite: FL pale yellow SW** This species was found only at Franklin and is easily overlooked in some of the more complex assemblages due to its pale yellow SW fluorescence. Good photos can result from selecting a nasonite specimen that is mostly fluorescent nasonite and lacks the more brightly fluorescent species such as manganaxinite, margarosanite, and willemite. The yellow fluorescence of nasonite is easier to catch without color shifts than those of esperite or prehnite. Most crystallized nasonite specimens fluoresce poorly, but one assemblage is particularly bright. This assemblage contains massive fine-grained nasonite mixed with datolite, associated with compact platy margarosanite as fillings in massive breccia-like hancockite and manganaxinite. These specimens will provide some very exciting photographs. Most other nasonites fluoresce a weaker yellow and can be photographed only when most of the specimen is nasonite. The challenge may be to find this rare species as the primary mineral in any hand specimen.
- **Norbergite: FL yellow SW** This species was found in the Franklin Marble throughout the Franklin and Sterling Hill mining district. Both mines and the local marble quarries produced similar assemblages of fluorescent norbergite. For the most part the calcite matrix is nonfluorescent, leaving the yellow-orange fluorescent norbergite masses and crystals with few fluorescent associations. Exposure durations will be longer than for the brighter minerals (e.g., willemite) found in the orebodies. Also keep in mind that it is easy to overexpose acid-etched norbergite crystals, as they are often brighter than most grains and masses of norbergite.
- **Pectolite: FL orange SW** This species was found only at Franklin. It is rarer than originally thought, as the fairly abundant orange-fluorescing radiating fibrous mineral thought for many years to be pectolite has been re-identified as wollastonite. True Franklin pectolite is for the most part granular, not fibrous, and associated with prehnite. Orange-fluorescing pectolite may be a challenge due to its comparably dim fluorescence, but it will provide satisfactory photographs because of the associated species found in most specimens. These include not only prehnite, but also willemite, margarosanite, roeblingite, xonotlite, and others. Franklin pectolite requires longer-than-average exposures, and the brighter-fluorescing species, such as margarosanite and willemite, may be slightly overexposed. In brighter-fluorescing pectolite specimens, the exposure time is no different from that of clinohedrite, which pectolite tends to resemble on film.
- **Prehnite: FL orangish-pink SW** This species was found at Franklin but not Sterling Hill. It is commonly associated with many of the Parker Shaft minerals, including hancockite, willemite, and barite. Less common matrices include those discussed under margarosanite, pectolite, and roeblingite. Prehnite is predictable in that its "peach-colored" fluorescence is among the most difficult to catch on film. Prehnite is usually not as bright as other fluorescing minerals associated with it, so film insensitivity and reciprocity failure will affect the results. The fluorescent color most often recorded on film for prehnite, regardless of the length of the exposure, is gray to bluish white. Fluorescent prehnite is found in one well-known assemblage associated with roeblingite, barite, clinohedrite, charlesite, and gypsum, in a matrix of franklinite, ganophyllite, and hendricksite. In this colorfully fluorescing assemblage, prehnite is a minor constituent and easily overlooked. In addition, when photographed the prehnite has much the same appearance as barite and gypsum, making it virtually indistinguishable on film from those minerals. An attractive assemblage that is easier to photograph under UV is that of prehnite and nasonite, which are both massive and equally bright in most examples. These specimens provide a dramatic color contrast under SW UV: Prehnite's fluorescence is pinker than usual, and nasonite's yellow fluorescence is stronger. As a result, these specimens are easier to photograph successfully than other prehnite assemblages. This species will be a challenge to any photographer regardless of exposure duration.
- **Roeblingite: FL red SW** This species was collected from Franklin but not Sterling Hill. It is another of the so-called Parker Shaft suite of minerals. The off-white nodules and fine-grained masses are associated with many fluorescent species previously discussed, such as prehnite, pectolite, clinohedrite, nasonite, margarosanite, manganaxinite, charlesite, gypsum, and more. Roeblingite is among the easier species to photograph, as it has a calcite-like response in many shades and intensities of red. For the more complex assemblages, you will need to judge the exposure duration based on the associated species, as they will be brighter responders to UV light. If you avoid overexposing the majority of the specimen, the roeblingite response will be less intense. One of the most difficult challenges is the combination of fluorescent manganaxinite and roeblingite. This occurs in specimens where the manganaxinite is a fine-grained matrix for irregular, discrete masses of roeblingite. To the naked

eye, florescent roeblingite is easily distinguished, but on film it tends to blend with the red fluorescence of manganaxinite. When roeblingite is found in a prehnite-pectolite matrix, the resulting photograph provides easy definition to the roeblingite, as the prehnite looks bluish-gray-white, like margarosanite. On film, overexposed roeblingite often resembles calcite. However, most fluorescent roeblingite is relatively easy to photograph.

- **Scheelite: FL yellow, cream, blue SW** This species was found occasionally at Franklin and in one rare occurrence at Sterling Hill. Some excellent specimens have been recovered from the dark pyroxene boulders on the Trotter Dump, where the scheelite formed in seams along with fluorapatite, willemite, calcite, and microcline. Specimens of orange-fluorescing apatite and yellow-fluorescing scheelite are attractive and easily photographed. Scheelite is among the brighter fluorescent species and should be relatively easy to photograph.
- **Sphalerite: FL orange, yellow-orange, orange-yellow, pink, and blue LW (FL orange SW)** Sphalerite is a mineral from both Franklin and Sterling Hill, though it was more abundant at Sterling Hill. The North Ore Body there produced so-called "golden sphalerite," yellow-orange glassy masses that fluoresce moderately bright yellow-orange with blue highlights. Additionally, the black ore in the cross-member produced glassy white masses of sphalerite that fluoresce both orange and blue. Most sphalerite specimens from Franklin and Sterling Hill are more strongly fluorescent under LW UV. If you wish to photograph the associated fluorescent willemite and/or calcite as well, a SW lamp will be needed. The results will depend on the specimen, which should be surveyed under both LW and SW UV prior to shooting. Some of the most interesting photos of fluorescent sphalerite are of specimens with colorless sphalerite masses that fluoresce dominantly blue. Sphalerite will provide some excellent and attractive photographs, but care should be taken when choosing specimens, as willemite can easily overwhelm sphalerite on film.
- **Tremolite: FL blue SW (FL yellow LW)** This species was found in the Franklin Marble at the Franklin and Sterling Hill mines and the quarries, though the most noteworthy fluorescent specimens have come from the quarries. The calcite matrix is almost always nonfluorescent, leaving the slender prismatic crystals of tremolite to fluoresce with few fluorescent associations. Exposure durations will be longer than average as tremolite is not a brightly fluorescent species, but in the absence of other competing fluorescent species tremolite is an easy species to photograph.
- **Turneaureite: FL orange SW** This rare apatite-group mineral was found at Franklin but not Sterling Hill. It has a typical fluorapatite-like response and until its description in 1986 as a separate species was considered a form of svabite. In daylight turneaureite is gray; its matrix is orange calcite with brown andradite. It is relatively easy to photograph under SW UV because the intensity of calcite and turneaurite are fairly evenly matched.
- **Uvite: FL yellow SW** This species of tourmaline is found in quarries in the Franklin Marble and is collected primarily for its distinctive hemimorphic green and brown crystals. Most of these fluoresce a moderately bright yellow under SW UV. As most uvites are found in a matrix of nonfluorescent calcite, they are easily photographed using longer-than-average exposures.
- **Willemite: FL green SW (FL yellow SW)** Willemite is an ore mineral from both Franklin and Sterling Hill, and is present in virtually every specimen from the orebodies. As such, it should be among the first species you master with your camera. It will not be difficult to find a range of intensities in willemite's fluorescence under SW UV, but most willemite is as bright as or brighter than associated fluorescent minerals. However, one of the most challenging aspects of photographing willemite is that often what you see is not what appears on film. The fluorescence of willemite is generally yellowish green rather than true green, but depending on exposure the film will record green to yellow-green to greenish-yellow to yellow to nearly white. Even though reciprocity failure usually occurs during long exposure, due to film emulsion insensitivity some films will incur color shifts and fail to record willemite's true color during short exposures. Because of these variations, you may need to photograph a "control set" of willemite specimens as standards for comparison for both expected results and previews prior to photographing. Some of the most interesting willemites, regardless of fluorescent color and associations, are acicular crystals in nonfluorescent matrices. These matrices for such crystals may include bementite or hetaerolite and are very dramatic in revealing crystals individually, in parallel, and in oriented networks. Another classic combination is that of reddish willemite, variety troostite, in blocky to stout prismatic hexagonal crystals in calcite. The classic color combination of green-fluorescing willemite and red-fluorescing calcite is made more dramatic by willemite's crystal forms and outlines. Specimens of massive willemite with calcite from both orebodies can be found in numberless patterns that will provide hours of entertainment with the camera and a UV lamp and produce excellent photographs.
- **Wollastonite: FL orange to yellow SW** This species was found and collected from Franklin and Sterling Hill, both of which produced large quantities of wollastonite specimens in distinct assemblages. Sterling

Hill specimens typically fluoresce more yellow than orange and some fluoresce a weak pinkish-orange. Franklin specimens are highly sought after from several distinct assemblages. One of the more unusual is the fibrous form of wollastonite, which was originally thought to be pectolite; this has a strong chalky orange fluorescence under SW UV and photographs well. The most abundant type of Franklin wollastonite, with medium- to large-sized grains of wollastonite in calcite with barite, likewise offers an excellent photographic opportunity. Perhaps the most notorious and hard-to-collect specimens are the solid gray masses with calcite, bustamite, hardystonite, and willemite. These are perhaps the brightest fluorescent wollastonites in existence. As a tribute to their brightness, it will be difficult to expose the wollastonite correctly and not underexpose the matrix of willemite, calcite, and hardystonite. On the whole, fluorescent wollastonite will present few problems and yield many exciting and dramatic photographs.

- **Xonotlite: FL violet SW** This species was collected only from Franklin and is found in many examples from the Parker Shaft suite of rare and unusual minerals. Its bright violet response under SW UV and its acicular habit make it distinctive among the many other fluorescent species from this assemblage. It is bright enough to be an excellent choice to shoot in manganaxinite matrices containing other fluorescent species. Xonotlite may be associated with fluorescent manganaxinite, barite, margarosanite, nasonite, clinohedrite, calcite, willemite, datolite, roeblingite, thomsonite, prehnite, cahnite, and charlesite, among others. As these minerals have widely varying fluorescent intensities and colors, capturing these specimens on film is one of the ultimate Franklin challenges.
- **Zincite: FL yellow LW/SW** Zincite is an ore mineral from both Franklin and Sterling Hill, and almost all of it is red and nonfluorescent. However, excellent fluorescent zincite was found at Sterling Hill as pale yellow fine-grained veins in ore. The ore usually includes fluorescent willemite and calcite which under SW UV are brighter than the yellow-fluorescing zincite. Consequently, the best photos of this assemblage are taken under LW and SW UV lamps used simultaneously. Each zincite specimen should be viewed under both LW and SW UV, and both together, to select the most photogenic response under UV light.
- **Znucalite: FL green SW** This species was found in the North Ore Body at Sterling Hill. It was found as a crust on nonfluorescent calcite. Znucalite's low-intensity green response under SW UV is hard to capture on film, as long exposures are required. In consequence, weakly fluorescing backgrounds will become much brighter on film and may complement or overwhelm the pale green fluorescence of znucalite. Additionally, color shifts due to long exposure and film reciprocity failure will cause the dull green fluorescence to appear more yellow and less green. Thankfully, no willemite is present in znucalite specimens, which reduces the degree of difficulty of using long exposures since there are no competing fluorescent responses. Underexposure of znucalite yields gray-green outlines of the specimens; such results are virtually useless.

More than 80 Franklin and Sterling Hill fluorescent species are reported by Richard Bostwick in his checklist, which is published annually in the program of the Franklin-Sterling Gem & Mineral Show. I have provided photographic guidance for 33 of these species. Generally speaking, be aware that exposure duration will be the most persistent problem to overcome for each specimen. Furthermore, trusting automatic cameras and built-in metering systems may not produce the results you want. Each specimen will have its own set of problems to solve before you will achieve a photographic result worth keeping.

7: Multiple Ultraviolet Lamp Setup for Photography

I have experimented successfully with multiple UV lamp setups in stands using the same settings as if one lamp source were used. However, these lamps were low wattage (between 6 and 9 watts) and did not materially add to the brightness of the fluorescent response. The overall effect was to cause more of the specimen sides to fluoresce that would have remained dark by using one lamp. Thus, adding a second 6-watt lamp did not materially alter the exposure brackets or f-stop setting. Nor did the addition of a second lamp equally bright or 20% brighter materially intensify the fluorescent response of the specimens. This has remained consistent regardless of the brand or maker of UV lamp equipment. The table of exposure settings that can be found in section 10, Photography Data by Species, is a result of recording the exposure bracket times using 6- to 9-watt UV lamps and ISO 100 film with the f-stop set at f/5.6.

The advantage of adding multiple lamps is to illuminate the sides and shadows of a specimen as well as the background material. To achieve this and intensify the fluorescent response of the specimens, larger lamps may be used in an array. For example, a 50-watt UVP UVLS-225D was set up on an overhead stand and two UV Systems SuperBright 2000 lamps were set up to flank the specimens. This setup, shown in Figure 1, provides a significant improvement in balancing the UV light being delivered to the specimens and the surrounding background. By overwhelming the photo stage area and specimen with UV light, several photographic advantages are gained. Increasing the fluorescent intensity of the specimen and background material reduces reciprocity failure and provides a "long" exposure at f/11 of 1.5 seconds or less. Other improvements include improved depth of field, better focus, and less recorded vibration. The high-wattage multi-UV lamp array favors the automatic SLR and digital camera alike.

If you have several UV sources that are matched in wavelength, such as two UV Systems SuperBright 2000SW lamps and one UVS-225D display lamp, a powerful combination of angled UV light can be built. As shown in Figure 1, use wood blocks to raise and hold the UVS-225D stationary above the specimen. Then place two SuperBright 2000SW lamps on their sides, angled at 45 degrees to the specimen, to light the sides of the specimen and background. This may be an expensive prospect for most photographers, but it does provide solutions to several issues that you will have if you use just one UV lamp.

Care should always be taken to match the fluorescent intensity of the specimen to the background so that the background does not reflect onto the specimen or is brighter than the fluorescent subject. This photographer error is overlooked through the lens as the appreciation of the longer exposure time and its effect on the film cannot be seen until the photos or slides come back from the processor. Suffice it to say that the background will be overexposed and the subject specimen will be underexposed.

8: Fluorescence as a Diagnostic Tool

Each of us has personal favorites in our collections that we take out and examine from time to time. Some collectors prefer to collect and study the rarer species from Franklin and Sterling Hill. In both cases the fluorescent response is often a diagnostic aid in determining exactly where on the specimen the species can be found, as well as the identity of the species. To that end, Richard Bostwick annually updates the aforementioned checklist of Franklin and Sterling Hill fluorescent minerals, which is a concise summary of known fluorescent minerals from the area, along with their fluorescent responses. There is no room in such a checklist for mineral descriptions, details of assemblages, or subtleties of fluorescence like

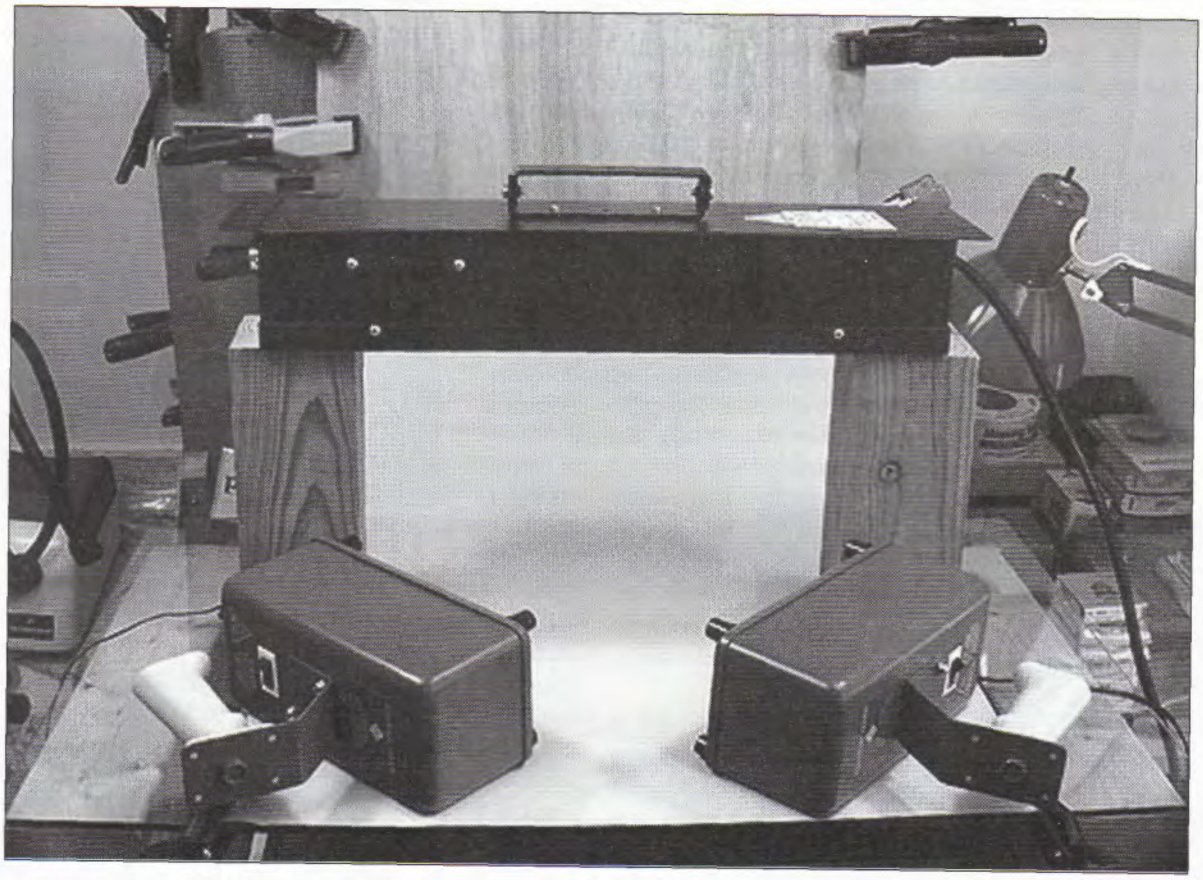

Figure 1. The author's preferred setup for photographing fluorescent minerals. Note the use of three UV lamps and the flexed continuous sheet of construction paper used as a background.

intensity, hue, and saturation. Some more detailed references are given in the References section on page 21, but it cannot be emphasized too strongly that identifying minerals solely on the basis of fluorescence is very risky.

Of special note is the fluorescent response that does not match any listed or expected response. There are discoveries to be made. Such a fluorescence may be an unrecorded variation for a known species in the area, or a species new to the deposit, or perhaps one entirely new to science. It is exciting to make these discoveries, and in this area the photograph can be of tremendous assistance in describing the mineral to others in ways that may be able to help identify the species. However, be prepared for surprises when using fluorescence as a diagnostic tool in identifying minerals. Many minerals have similar fluorescences. They also can form fine-grained mixtures of two or more species whose fluorescences are blended. Some fluorescent minerals will coat others, or underlie them. It cannot be stressed enough that fluorescent responses must be treated as helpful diagnostic tools and not replace other more trustworthy forms of qualitative and quantitative chemical and optical analysis.

I have lost count of the number of times that a collector has described a fluorescent specimen's colorful display to me in writing or over the phone and expected me to provide the name of the fluorescing species with absolute certainty. Most often identification cannot be made without seeing the specimen. Even with a careful description of the specimen, and conscientious use of the camera to catch its fluorescence, it may be necessary to see the specimen first-hand before a visual identification can be made. However, having a really good image may save analysis expenses by assisting in the weeding out of least likely species. At the very least, having a good color photograph or digital image will permit the sharing of information and perhaps be enough to engage others to discuss the nature of your find.

9: Frequently Asked Questions

Question: If I only have a digital camera, can I take good images using my ultraviolet lamp?
Answer: Perhaps. You will need to read the manufacturer's handbook to determine if your digital camera will take long-exposure images in low-light conditions. Of course, trying the camera may be helpful and even successful; however, you will need to know how much manual control you can set up in the camera to be more precise and predictable. Furthermore, finding out what color shifts and reciprocity failure results will occur will require the trial and error method, as most camera makers have little interest in photographing fluorescence and are unlikely to write down what their product will not do.

Question: What is the best film and speed to use?
Answer: I have found that the best films for photographing fluorescent minerals are Kodak Ektachrome and Fuji Provia. Both are ISO 100 slide films.

Question: Why can't I shoot ISO 400 or 800 films?
Answer: The grain structure of the film is larger, which is why the film reacts faster to light. The larger the grain size of the emulsion, the faster the light absorption. However, the film makers had to trade resolution for speed. In short, films with larger grain size record less detail per square millimeter of film. Since less detail is recorded, less can be seen when enlarged. This translates into reduction of sharpness or resolution in the prints, which may be distracting or blurry if ISO 800 film is used to photograph fluorescent minerals.

Question: I have both digital and film cameras. Which is better to use and why?
Answer: There are several reasons to use both cameras; however, film cameras are still better at reproducing the colors of fluorescent minerals. Reciprocity failure in films is reduced by every generation of new films, and has become more predictable. However, the same cannot be said for digital cameras, which vary in their sensitivity to low-light conditions. Some perform well, while others may fail across a wide range of the visible light spectrum and produce a greenish image when shooting any fluorescent mineral that exceeds 1 second in exposure duration. I suggest that if you are going to use a digital camera to photograph fluorescent minerals, you should try the camera before buying it. Most digital cameras have few manual features and will automatically increase the ISO rating in low-light conditions. This automatic feature may permit an image to be shot, but the results will be grainy and cannot be corrected in PhotoShop®. I use both cameras, but depend on the film-based camera for publishable results. The digital camera has merit in making a quick record of the setup, angle, and overall lighting effect, without having to wait for the film to be processed.

Question: How many ultraviolet lamps do I need to take photographs?
Answer: As a rule, one UV lamp of 6 watts or more will be sufficient. However, more UV lamps are useful to illuminate the full specimen and its background.

Question: How do I select a UV lamp for taking photographs of minerals, and which wavelength should I get, longwave, shortwave, or midwave?
Answer: The majority of minerals that fluoresce, particularly at Franklin and Sterling Hill, react best under shortwave UV. If you can get only one lamp, get a shortwave lamp. Longwave lamps are also called "black lights" and are inexpensively produced for other uses. These lamps will produce fluorescence in many minerals, but many of them also emit much visible light; these in

particular should be avoided for fluorescent mineral photography. Cleaner longwave lamps are available specifically for mineral fluorescence, but should be second in line behind shortwave lamps. Midwave lamps are still the domain of the specialist.

Question: When can automatic camera settings be used on the newer-model film and digital cameras?
Answer: Automatic settings on the newer cameras are a blessing for those shooting quickly at family outings and vacations, but not when attempting fluorescent mineral photography. There is a real need to control and balance the settings of your camera film when shooting with UV. Most cameras are not pre-set with automatic programs to the extent a photographer needs for low-light photography. However, trying the camera never hurts and may be rewarded with exceptional results. Most Canon, Nikon, Pentax, Contax, and Minolta cameras are made to be used in a wide range of unusual lighting conditions. Check the manufacturer's specifications for meter sensitivity and shutter speeds of longer than 1 second. If the specifications indicate long exposures are possible in program or aperture priority modes, then you have a winner and simply need to set the aperture and shoot.

Question: How do you compensate for very brightly fluorescent willemite and weakly fluorescent calcite?
Answer: Generally there is no way to balance the fluorescences of brightly fluorescing willemite and dimly fluorescing calcite on film, regardless of how attractive a specimen is to the eye. I tend to push the willemite by slightly overexposing it to bring out the calcite. This is achieved by using a bracket of exposures that starts out correct for the willemite and ends being correct for the calcite. One of the shots in the middle of the spread should be a happy medium where the willemite still retains its green color and the calcite is bright and easily distinguishable.

10: Photography Data by Species

The following table provides recommended camera shutter-speed bracket settings for shooting ISO 100 slide or print films in manual or automatic SLR cameras set to manual mode for shutter speed and aperture. The table of values were recorded using one 6- to 15-watt UV light source with a dull fluorescent to black background for the subject mineral. Please note that as brighter fluorescent backgrounds are used and/or higher-wattage UV lamps are used individually or together, the average shutter-speed brackets should be adjusted downward (not shown in the following table) to 2 seconds.

Although the listed f-stop is f/5.6, you can set it at f/8 and still get a successful shot within the bracket. The more brightly fluorescent species, such willemite, esperite, or wollastonite, will permit trade-offs of shutter speed to gain depth of field by increasing the f-stop to f/11 or f/16 and increasing the exposure time bracket by 1 second.

Franklin & Sterling Hill Mineral Fluorescence

TABLE OF FLUORESCENT SPECIES & EXPOSURE BRACKETS
All settings based on using one 6- to 15-watt UV light source

#	Species	Fluorescent Responses as Recorded by Richard Bostwick	Locality	SW-LW Best Response	Bracketed Exposure Times @f/5.6 ISO 100
1	Albite	FL red SW	Sterling Hill	SW	4 to 6 seconds
2	Aragonite	FL cream LW (FL green SW)	Sterling Hill	SW	4 to 7 seconds
3	Barite	FL cream SW (FL yellow SW/LW, FL white SW and pale green LW)	Sterling Hill	SW	3 to 5 seconds
			Franklin	SW	4 to 6 seconds
4	Barylite	FL violet SW (Conspicuous under iron arc)	Franklin	SW	4 to 7 seconds
5	Bassanite	FL violet SW	Sterling Hill	SW	4 to 6 seconds
6	Bustamite	FL cherry red LW	Franklin	SW	5 to 7 seconds
			Franklin	LW	4 to 6 seconds

7	Cahnite	FL cream SW	Franklin	SW	4 to 7 seconds
8	Calcite	FL orange-red SW (Also FL pink, orange, cream, white, green-blue, yellow, violet)	Franklin	SW	4 to 6 seconds
			Sterling Hill	SW	4 to 6 seconds
9	Canavesite	FL violet LW	Sterling Hill	SW	6 to 8 seconds
10	Celestine	FL cream LW (FL violet SW)	Sterling Hill	SW	4 to 7 seconds
11	Cerussite	FL yellow LW	Sterling Hill	SW	4 to 7 seconds
12	Chabazite	FL green SW	Sterling Hill	SW	4 to 7 seconds
13	Charlesite	FL pale blue SW coated with cream FL gypsum	Franklin	SW	4 to 7 seconds
14	Chondrodite	FL yellow, yellow-orange SW	Franklin	SW	4 to 6 seconds
15	Clinohedrite	FL orange SW	Franklin	SW	3 to 5 seconds
16	Corundum	FL cherry red LW	Franklin	LW	5 to 7 seconds
			Sterling Hill	LW	5 to 7 seconds
17	Cuspidine	FL orange-yellow SW	Franklin	SW	4 to 6 seconds
18	Datolite	FL cream SW	Franklin	SW	3 to 5 seconds
19	Diopside	FL blue SW, cream LW	Franklin	SW	4 to 6 seconds
			Sterling Hill	SW	3 to 6 seconds
20	Dypingite	FL blue SW/LW	Sterling Hill	SW	4 to 7 seconds
21	Epsomite	FL cream LW	Sterling Hill	SW	5 to 7 seconds
22	Esperite	FL lemon-yellow SW	Franklin	SW	2 to 4 seconds
23	Fluoborite	FL cream SW	Sterling Hill	SW	4 to 6 seconds
24	Fluorapatite	FL orange or blue SW (FL "peach" SW)	Franklin	SW	4 to 6 seconds
			Sterling Hill	SW	4 to 6 seconds
25	Fluorapophyllite	FL white SW	Franklin	SW	5 to 7 seconds
			Sterling Hill	SW	5 to 7 seconds
26	Fluorite	FL blue-green SW/LW, FL violet-blue LW (FL white LW)	Franklin	SW	4 to 6 seconds
27	Guerinite	FL white SW	Sterling Hill	SW	4 to 6 seconds
28	Gypsum	FL cream, pale blue, pale violet SW	Sterling Hill	SW	4 to 6 seconds
29	Hardystonite	FL violet to violet-blue SW/LW	Franklin	SW	4 to 6 seconds
30	Hedyphane	FL cream orange SW	Franklin	SW	4 to 6 seconds
31	Hemimorphite	FL white LW (FL green SW)	Sterling Hill	SW	5 to 7 seconds
			Sterling Hill	LW	4 to 6 seconds
32	Hodgkinsonite	FL deep cherry red LW	Franklin	LW	5 to 7 seconds
33	Humite	FL pale yellow SW	Sterling Hill	SW	6 to 8 seconds
34	Hyalophane	FL red SW	Franklin	SW	5 to 7 seconds
35	Hydrotalcite	FL cream LW	Sterling Hill	LW	4 to 6 seconds
36	Hydroxyapophyllite	FL weak white SW	Franklin	SW	6 to 8 seconds
37	Hydrozincite	FL blue SW	Franklin	SW	4 to 6 seconds
			Sterling Hill	SW	4 to 6 seconds
38	Johnbaumite	FL orange SW	Franklin	SW	4 to 7 seconds
			Sterling Hill	SW	4 to 7 seconds
39	Junitoite	FL pale yellow LW	Franklin	LW	6 to 8 seconds
40	Magnesiohornblende	FL greenish blue SW	Franklin	SW	5 to 7 seconds
41	Manganaxinite	FL red SW	Franklin	SW	3 to 6 seconds
42	Margarite	FL yellow SW/LW	Franklin	SW	6 to 8 seconds
43	Margarosanite	FL blue and red SW (FL orange LW)	Franklin	SW	4 to 5 seconds
44	Marialite	FL yellow SW and pink LW	Franklin	SW	5 to 7 seconds
45	Mcallisterite	FL cream SW	Sterling Hill	SW	6 to 8 seconds
46	Meionite	FL pinkish red SW (also FL pink, orange, yellow, cream LW/SW)	Franklin	SW	5 to 7 seconds
47	Meta-ankoleite	FL green SW	Sterling Hill	SW	6 to 8 seconds
48	Metalodevite	FL green SW	Sterling Hill	SW	6 to 8 seconds

49	Microcline	FL blue or red SW	Franklin	SW	4 to 6 seconds
50	Minehillite	FL violet SW	Franklin	SW	5 to 7 seconds
51	Monohydrocalcite	FL green SW	Sterling Hill	SW	6 to 8 seconds
52	Nasonite	FL pale yellow SW	Franklin	SW	5 to 7 seconds
53	Newberyite	FL cream LW	Sterling Hill	SW	6 to 8 seconds
54	Norbergite	FL yellow SW	Franklin	SW	4 to 6 seconds
			Sterling Hill	SW	4 to 6 seconds
55	Pargasite	FL greenish blue SW	Franklin	SW	6 to 8 seconds
56	Pectolite	FL orange SW	Franklin	SW	5 to 7 seconds
57	Pharmacolite	FL weak violet SW	Sterling Hill	SW	6 to 8 seconds
58	Phlogopite-1M	FL yellow SW	Franklin	SW	5 to 7 seconds
59	Picropharmacolite	FL white LW	Sterling Hill	LW	6 to 8 seconds
60	Powellite	FL yellow SW	Sterling Hill	SW	4 to 6 seconds
61	Prehnite	FL orangish pink SW	Franklin	SW	5 to 7 seconds
62	Quartz	FL yellow or green SW	Franklin	SW	5 to 7 seconds
			Sterling Hill	SW	5 to 7 seconds
63	Roeblingite	FL red SW	Franklin	SW	4 to 6 seconds
64	Samfowlerite	FL weak red SW	Franklin	SW	6 to 8 seconds
65	Scheelite	FL yellow, blue SW	Franklin	SW	4 to 6 seconds
66	Smithsonite	FL white SW	Franklin	SW	5 to 7 seconds
			Sterling Hill	SW	5 to 7 seconds
67	Sphalerite	FL orange, yellow-orange, orange-yellow, and blue LW (FL orange SW)	Franklin	SW & LW	5 to 7 seconds
			Sterling Hill	SW & LW	5 to 7 seconds
68	Spinel	FL cherry red LW	Franklin	LW	5 to 7 seconds
69	Strontianite	FL violet SW/LW	Sterling Hill	SW & LW	5 to 7 seconds
70	Talc	FL cream SW	Franklin	SW	5 to 7 seconds
71	Thomsonite	FL cream SW	Franklin	SW	5 to 7 seconds
72	Tilasite	FL yellow SW	Sterling Hill	SW	4 to 6 seconds
73	Titanite	FL yellow-orange SW	Franklin	SW	4 to 6 seconds
			Sterling Hill	SW	4 to 6 seconds
74	Tremolite	FL blue SW (FL yellow LW)	Franklin	SW	5 to 7 seconds
75	Turneaureite	FL orange SW	Franklin	SW	4 to 6 seconds
76	Uranospinite	FL green SW	Sterling Hill	SW	5 to 7 seconds
77	Uvite	FL yellow SW	Franklin	SW	5 to 7 seconds
78	Willemite	FL green SW (FL yellow SW)	Franklin	SW	2 to 4 seconds
			Sterling Hill	SW	2 to 4 seconds
79	Wollastonite	FL orange to yellow SW	Franklin	SW	2 to 4 seconds
			Sterling Hill	SW	2 to 4 seconds
80	Xonotlite	FL violet SW	Franklin	SW	4 to 6 seconds
81	Zincite	FL yellow LW/SW	Sterling Hill	SW & LW	5 to 7 seconds
82	Zircon	FL orange SW	Franklin	SW	5 to 7 seconds
			Sterling Hill	SW	5 to 7 seconds
83	Znucalite	FL green SW	Sterling Hill	SW	5 to 7 seconds

Note: This table covers only the minerals for which I have recorded photography data. It is adapted from Richard Bostwick's checklist, "Fluorescent Minerals of Franklin and Sterling Hill, N.J.," annually updated and published in the program of the Annual Franklin-Sterling Gem and Mineral Show.

Special Note of Appreciation

My thanks to Mark Boyer, Peter Chin, Tema Hecht, Dick Bostwick, Earl Verbeek, and Maureen Verbeek for their encouragement, supporting editorial guidance, and assistance on this article.

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Photographers' Guide to Fluorescent Images of Franklin and Sterling Hill, New Jersey, Minerals

PART II

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Laurel, MD 20725

Part I of this series (*The Picking Table*, Fall 2003) covered examples of ultraviolet (UV) light source photography with manual cameras. The following collection of images reveals some of the advantages and disadvantages of using digital and automatic SLR cameras in various setups and with various types of specimens. The photographs were selected to illustrate one or more photographic techniques, bearing in mind that the photographer always attempts to capture exactly what is seen.

The photographs were shot using either an Olympus 2500L 2.5 megapixels digital camera or Nikon 4500 4.0 megapixels digital camera or a Canon 620 35mm SLR camera with a 100mm macro lens. Only the Canon 620 35mm camera required a haze 2A interference filter, and Kodak Ektachrome or Fuji Provia ISO 100 slide film. The UV light source is identified in each shot caption. Additionally noted and shown are differences in color representation, fluorescent intensity balance in multi-color specimens, multiple UV light sources, and fluorescent background selections.

Please remember that when shooting digital images, the photographer must perform a few processing steps after taking a shot. For example, the image must be transferred from the camera to a computer, where it can be edited and sized. For publishing purposes, TIFF format is suggested; however, JPEG files that are kept in high-resolution large format also publish well. ⚒

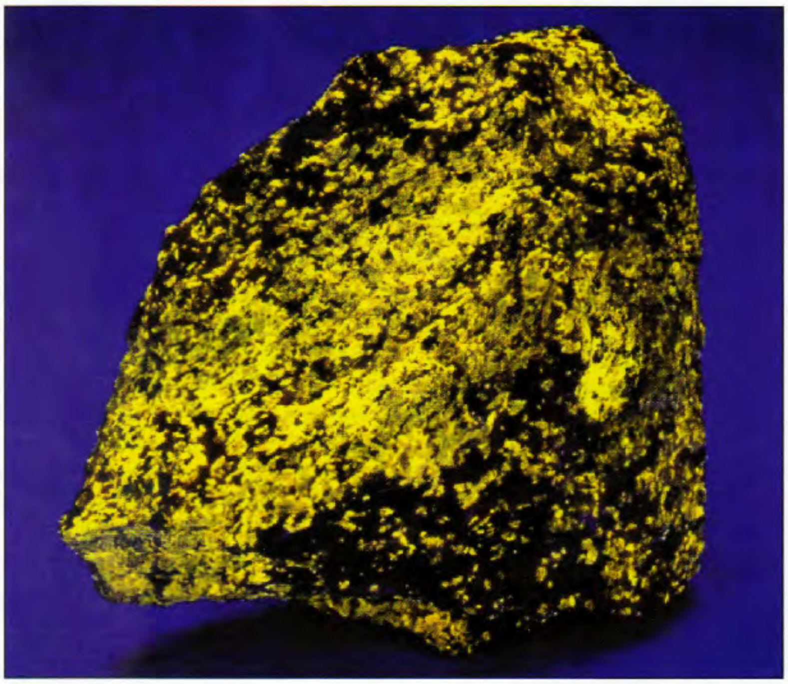


Figure 1. Wollastonite from Sterling Hill
Shot using a Canon 620 SLR on automatic aperture priority f/11 with a 100mm macro lens with two SuperBright 2000SW lamps and one 50-watt UVP Model 225D lamp held directly over and in front of the specimen on a moderately bright fluorescent blue poster board. The specimen presents a rounded front face that requires a little effort and higher f-stop to keep in focus. The resulting fluorescent brightness and saturation of the color throughout the photo are very good. The background is a pleasing contrast to the wollastonite and its intensity does not compete with the mineral. Dick Bostwick specimen, 4" × 4". Photo by Gary Grenier.

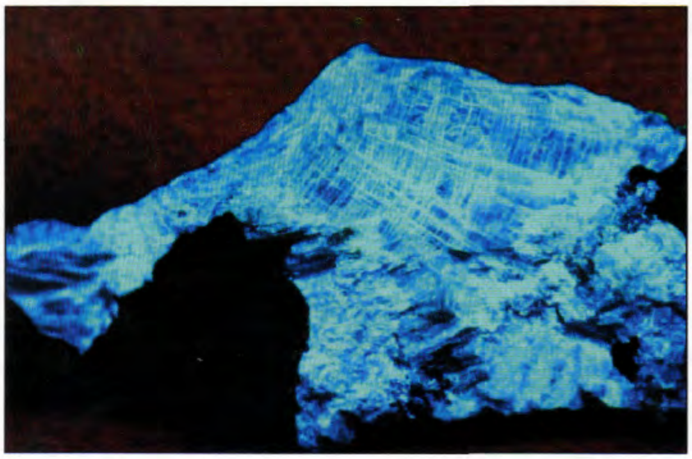
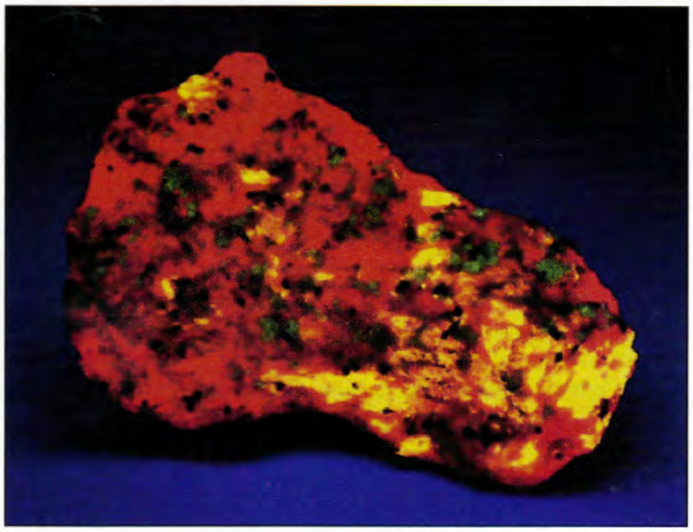


Figure 2. Margarosanite and willemite from Franklin
Shot using an Olympus 2500L digital camera set to shutter priority, aperture set on automatic, and resolution on high with two SuperBright 2000SW lamps held directly over and in front of the specimen, which is placed on a moderately bright fluorescent red fabric. The intense blue-white margarosanite is easily photographed when no competing fluorescent species are present, as in this specimen. The red-fluorescing fabric background is out of focus and provides a pleasing contrast to the margarosanite. The radial platy habit of margarosanite can be easily seen in this image. Specimen measures 2.5" × 3". Photo by Gary Grenier.

Figure 3. Wollastonite, calcite, and barite from Franklin
Shot using a Canon 620 SLR on automatic aperture priority f/11 with a 100mm macro lens with two SuperBright 2000SW lamps and one 50-watt UVP Model 225D lamp held directly over and in front of the specimen on a moderately bright fluorescent blue poster board. The brightness and saturation of the colors throughout the photo are very good. The barite blue-gray responses are clearly visible due to the contrasting red-fluorescing calcite. The blue-fluorescing background further contrasts the wollastonite and calcite. Dick Bostwick specimen, 3.5" × 6.5". Photo by Gary Grenier.



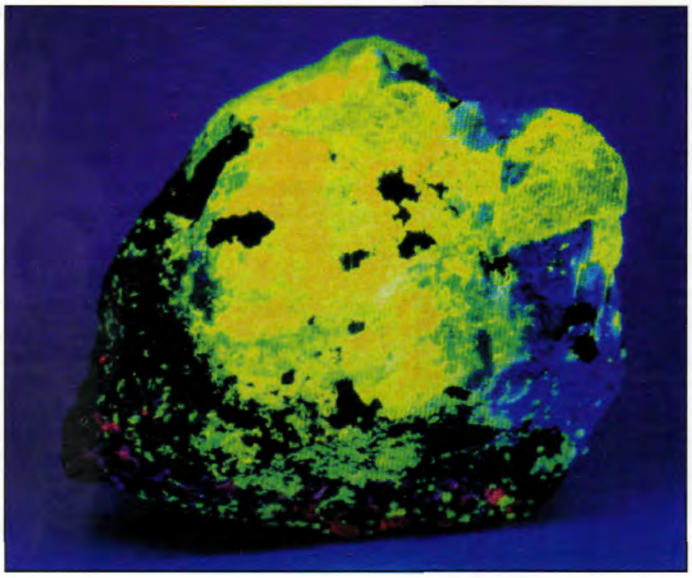
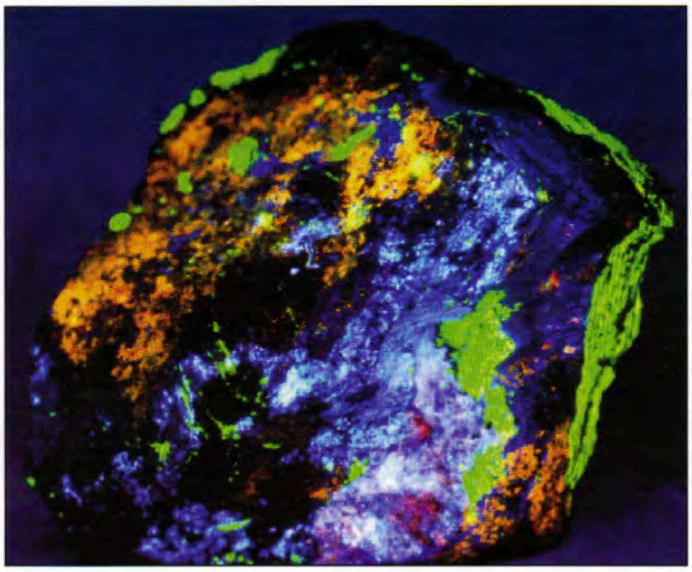


Figure 4. Esperite, willemite, hardystonite, and calcite from Franklin
Shot using a Nikon 4500 digital camera set to aperture priority, shutter on automatic, and resolution on high with two SuperBright 2000SW lamps held directly over and in front of the specimen on a moderately bright fluorescent blue poster board. The yellow-fluorescing esperite and green-fluorescing willemite are among the brightest fluorescent species from Franklin and the most difficult to balance with the dimmer red-fluorescing calcite and violet-blue-fluorescing hardystonite. These specimens are among the most popular to collect and the most difficult to photograph. Gary Grenier specimen, 3" × 4". Photo by Gary Grenier.

Figure 5. Margarosanite, clinohedrite, willemite, and calcite from Franklin
Shot using an Olympus 2500L digital camera set to aperture priority, shutter on automatic, and resolution on high with two SuperBright 2000SW lamps held directly over and in front of the specimen on a dimly fluorescent blue poster board. The specimen is particularly difficult to photograph due to its irregular concave shape, resulting in several areas being out of focus. To compensate for this, the aperture could have been set to f/16 or f/22. Be aware, however, that the duration of the exposure may go beyond the working limits of the camera CCD and cause color distortions. Attractive four-color fluorescent specimens like this one are highly sought after. This specimen photographs well due to the disseminated nature of the margarosanite and large amount of clinohedrite. Even so, the willemite shows areas of overexposure. Specimen measures 4.5" × 5". Photo by Gary Grenier.



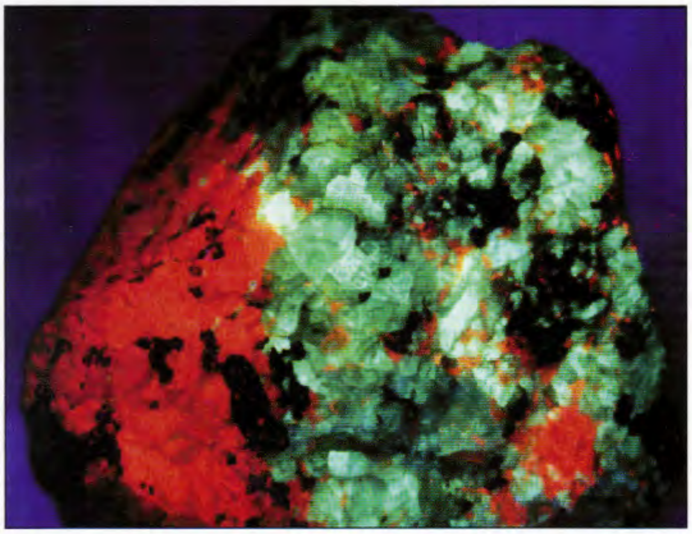
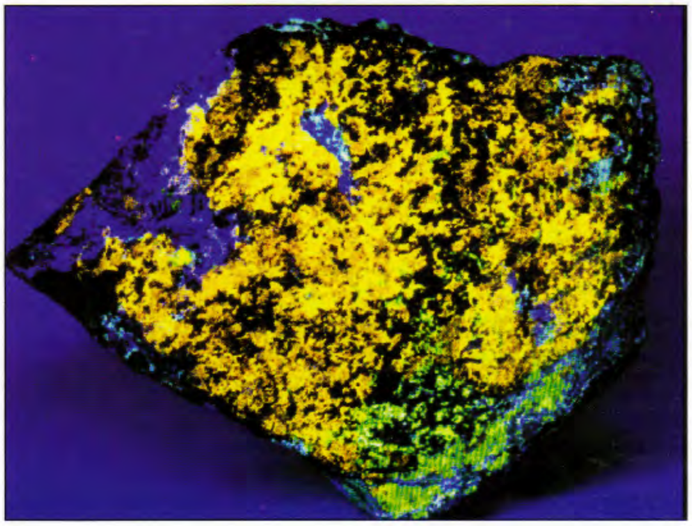


Figure 6. Barite and calcite from Franklin
Shot using a Canon 620 SLR on automatic, light meter set to average, aperture priority f/6 with a 100mm macro lens with two SuperBright 2000SW lamps. The lamps were positioned to illuminate the face of the specimen, as well as the medium-bright blue fluorescent poster board background. The barite and calcite are equally intense, with the barite showing a couple of hot spots. Calcite can be seen fluorescing in the barite. Had the barite been brighter, the calcite would have been underexposed and darker. Specimen measures 4" × 4". Photo by Gary Grenier.

Figure 7. Clinohedrite, hardystonite, and willemite from Franklin
Shot using a Canon 620 SLR on automatic, light meter set to average, aperture priority f/8 with a 100mm macro lens with two SuperBright 2000SW lamps. The lamps were positioned to illuminate the flat face of the specimen, as well as the medium-bright blue fluorescent poster board background. The orange-fluorescing clinohedrite dominates and demonstrates the fluorescent balance of the specimen. The green-fluorescing willemite shows areas of overexposure (centers show yellow) and the violet-blue-fluorescing hardystonite is easily seen. Fortunately, there are few extremes in this specimen, which has little willemite and few nonfluorescent areas. Specimen measures 3.5" × 4.5". Photo by Gary Grenier.



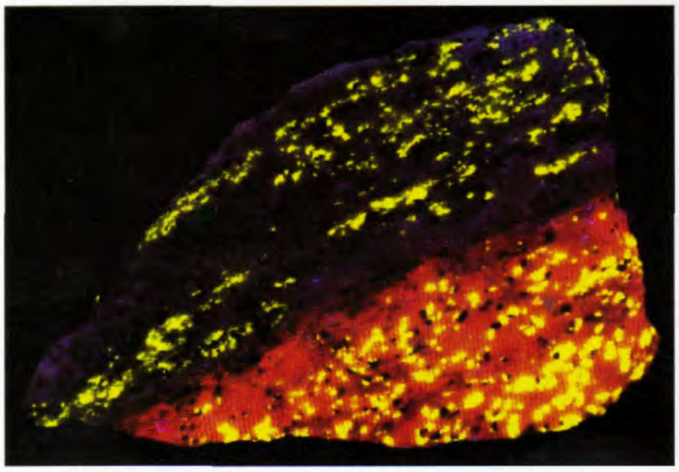


Figure 8. Wollastonite from Sterling Hill
Shot on a "black field" of nonfluorescent poster board

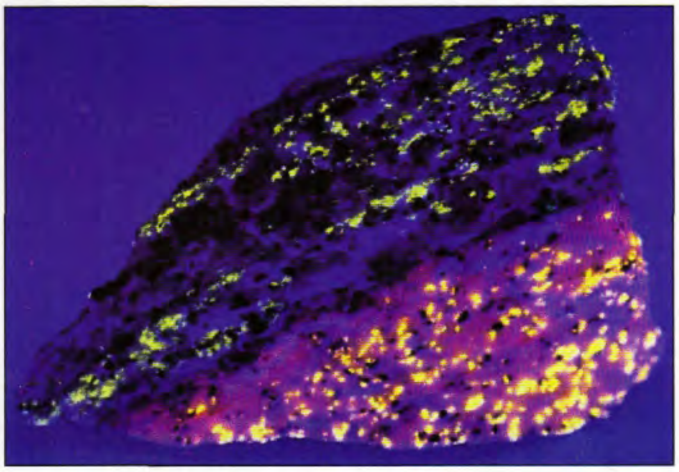


Figure 9. Wollastonite from Sterling Hill
Shot on a moderately bright fluorescent blue poster board

Figures 8 and 9. Wollastonite from Sterling Hill
Two shots of the same wollastonite specimen demonstrate the photographic effects of different background materials. Both photographs were shot using a Canon 620 SLR on automatic aperture priority f/11 with a 100mm macro lens with two SuperBright 2000SW lamps and one 50-watt UVP Model 225D lamp held directly over and in front of the specimen. The specimen is not highly saturated with brightly fluorescent responses and presents orange-fluorescing wollastonite grains in red-fluorescing calcite in contact with nonfluorescent calcite that includes yellow-fluorescing wollastonite grains. Figure 8 accurately captures the fluorescent responses by using a "black field" nonfluorescent background material. Figure 9 demonstrates why the brighter blue background material should not be used. The blue fluorescence of the poster board is reflecting onto the specimen, washing out the mineral fluorescence and causing the automatic camera light meter to underexpose the dimmer-fluorescing calcite. It is wise to match background fluorescent intensity to the specimen or even choose a less intense contrasting fluorescent background. Dick Bostwick specimen, 2.5" × 4". Photo by Gary Grenier.

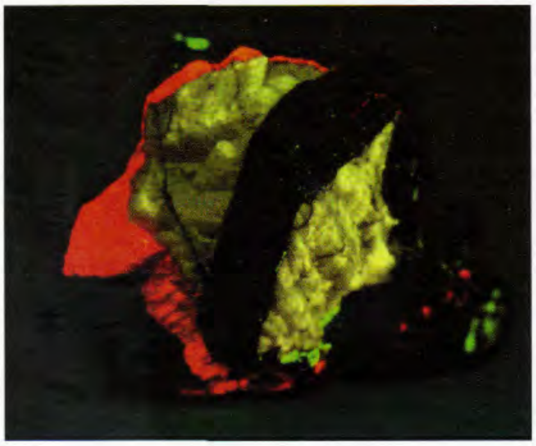


Figure 10. Fluorite, calcite, and willemite from Franklin
Shot using a Nikon 4500 digital camera set to aperture priority, shutter on automatic, and resolution on high with two SuperBright 2000SW lamps held directly over and in front of the specimen on a poorly fluorescent green poster board. The cream-white-fluorescing fluorite distinguishes the nonfluorescent dark rhodonite crystal in the center of the image. The fluorite and calcite fluorescent responses are of equal intensity and well presented. The camera meter was set to average, which improved the fluorescent responses due to the large nonfluorescent area in the center of the image. The low-light digital image is grainy, as the camera automatically pushed the film speed to 400. Calcite-red reflections can be seen in the out-of-focus darker areas of the specimen. The background is also out of focus. Both are results of the camera automatically reducing the shutter priority in low light to the equivalent of f/4. Gary Grenier specimen, 2.5" × 3". Photo by Gary Grenier.

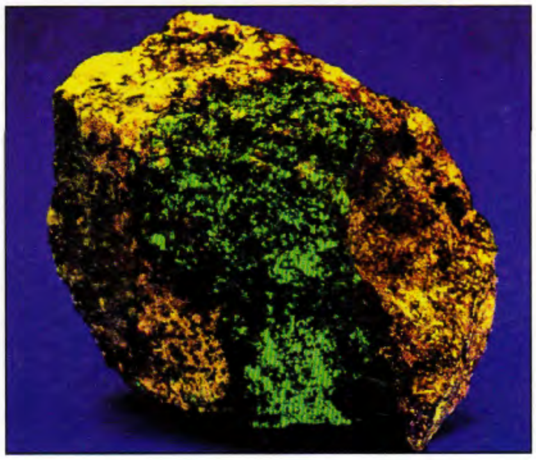


Figure 11. Wollastonite with willemite from Franklin
Shot using a Canon 620 SLR on automatic aperture priority f/11 with a 100mm macro lens with two SuperBright 2000SW lamps and one 50-watt UVP Model 225D lamp held directly over and in front of the specimen on a moderately fluorescent blue poster board. The brightness and saturation of the colors throughout the photo are very good. Only the areas of the specimen where the willemite overlies the wollastonite are mixed yellow-orange responses noted. Earl Verbeek specimen, 3" × 3.5". Photo by Gary Grenier.

An Interview With Dr. Pete J. Dunn Regarding His Historical Treatise on Franklin and Sterling Hill

PART II

Maureen Verbeek
82 Struble Road
Branchville, NJ 07826

Dr. Pete J. Dunn is the author of an important new treatise on the history of iron and zinc mining in the Franklin-Sterling Hill area, *Mine Hill in Franklin and Sterling Hill in Ogdensburg, Sussex County, New Jersey: Mining History, 1765–1900*. This article is a continuation of the interview conducted with Dr. Dunn, which first appeared in the Fall 2003 issue of *The Picking Table* (Vol. 44, No. 2, pp. 29–36). In this second installment, I wish to give the reader a sense of the rewards and frustrations of researching, writing, and publishing a work of this magnitude.

Maureen: *Why did you limit your treatise to the years before 1900?*

Dr. Dunn: There were a number of factors in this decision; they are given here without priorities.

Clearly, after the beginning years, this story is one of disparate interests, corporate and personal, all contending quite vigorously with each other for control and dominance. Not only were they each trying to make the best business deals they could; they were also quite interested in destroying or limiting each other. Nearly all of this collection of battles, travails, and frauds, large and small, significant and trivial, settled and unsettled, was put to rest on February 2, 1897, in the Great Consolidation of almost all Franklin and Sterling Hill mining interests.

The *new* New Jersey Zinc Company still had to contend with Richard Wayne Parker, who was not a party to the Great Consolidation, but this problem was really small potatoes; the great wars were over. This treatise reaches into the 1900s only as far as needed to clear up some very messy matters initiated in the late 1800s and to close up the subject of bold fraud, that is, before the mineral collectors descended.

Aside from such messy, lingering matters, the end of the 1800s was a great turning point in the history of Franklin and Sterling Hill, and a natural point to terminate the early history. There were interesting developments in the years immediately after the turn of the century, including sufficient exploration to define the limits of major parts of the Franklin zinc orebody, the selection of a new overall manager (Robert M. Catlin), the continuing development of the new town and new smelter at Palmerton, Pennsylvania, the choice of a master mining method at Franklin, and the development of the Palmer Shaft and Palmer Mill complex. The company also had to cope with the nuts and bolts of consolidating too many mines, too many smelters, too many offices, and too many peripheral businesses in too many localities, among other aspects. Franklin, Ogdensburg, and Palmerton were all developed as good communities by the company.

However, the subsequent history of the now-consolidated New Jersey Zinc Company was largely a duller one of new mining technologies, a new smelter, new smelting technologies, new products to sell, the growth of research laboratories, the development of all the accouterments of a massive corporation, and other growth. Mining activity at Franklin and Sterling Hill became a bit routine, especially when compared with that which had preceded it.

The first decade of the 1900s was followed by the reopening of the Sterling Hill Mine, the development of the Sterling Mill, the surge of activity during World War I, and other events. The turn of the century was also a turning point in the corporate culture. The New Jersey Zinc Company would be very well managed, tightly controlled, and fairly secretive. In the 1930s, the company hired its first full-time geologists, Allen Pinger and John L. Baum. The absence of contentious mining litigation meant that, unlike the past, few of the evolving company's local problems and hassles now made it into print. There is still information to be gleaned from the company's records at Rutgers, but things were nowhere near as exciting as they were in the 19th century.

Other factors in choosing 1900 as an end point for my treatise were my need to begin the process of publication and the collateral need to firmly define the scope of this epic. I saw no downside to limiting the period to 1765 to 1900, in good part for reasons given above.

Maureen: *Besides Dr. Fowler, were there any other personalities that struck you as particularly positive or negative?*

Dr. Dunn: There were a number of other characters who, for better or worse, had a substantial effect on Franklin and Sterling Hill.

Surely Colonel Samuel Fowler of Franklin was one of these, although markedly different in ethical practice than his esteemed father (pages 129–131, 148–151, and, in particular, pages 324–327).

Oakes Ames of Easton, Massachusetts, brought the skills of a financier and careful manipulator to Franklin and Sterling Hill, and he is featured in numerous parts of Volumes One, Two, and Three, and in particular on page 323. Ames was a master at working behind the scenes.

James L. Curtis of New York City was the ultimate scoundrel and master manipulator of mineral rights at Franklin and Sterling Hill (pages 327–330). He fomented a lot of fraud. He would have run circles around the less-skilled characters we have in the local mineral culture today.

Moses Taylor was probably the most astute and well-connected businessman to come to Franklin, a perspicaceous and prescient man, and a formidable enemy. He melded his interests in railroads and iron mining into a substantial empire, much of the local part of it owned by the Franklin Iron Company, and he personally brought the New Jersey Zinc Company to its knees in 10 years and forced its liquidation and death.

Charles August Heckscher of Philadelphia was a German immigrant intimately connected with his family's interests in the coal industry in Pennsylvania, and he was an astute businessman. His mighty battles with Charles W. Trotter provided the most intense period of litigation in Franklin's history. Unlike Trotter, August Heckscher, as he preferred to be known, was a no-nonsense, hard-nosed businessman who solved problems on the spot, today. I think he and I would have worked well together. He was closely associated in his business in Franklin with John Price Wetherill.

John Price Wetherill of Bethlehem, Pennsylvania, was a descendant of the well-known lead-based-paint manufacturing family in Philadelphia. He was a son of Samuel Wetherill, who was the inventor of the Wetherill furnace used to smelt franklinite. J. Price Wetherill, as he preferred to be known, was a mining engineer and was allied with August Heckscher; together they formed the Lehigh Zinc and Iron Company in 1881 and coped and contended with the resilient and stubborn Charles W. Trotter until 1887. This interaction was a great saga in Franklin's history.

Richard Wayne Parker of Newark, New Jersey, was a very good lawyer who represented many mining men and mining companies in several diverse litigations. He then entered the Franklin mining scene in his own right and made rewarding contracts with Charlotte Rutherfurd; these were eventually acquired by the Sterling Iron and Zinc Company. He conducted his business dealings with a bit more wisdom than anyone else except Moses Taylor, and finally sued the New Jersey Zinc Company and won this last significant lawsuit on mineral rights.

After Dr. Fowler, Charles W. Trotter of Brooklyn is my nominee for the second most outstanding positive personality. My context and possible bias should be stated: I have seen more of Mr. Trotter's personal correspondence than that of anyone else; therefore, he is more known to me than the others. That having been said and carefully considered, I think he was a fascinating figure. Trotter mined at both Sterling Hill and Franklin over 14 years. Alone against odds, he persevered. He was involved in a great many legal fights with, among others, John Silsby, the New Jersey Zinc Company, August Heckscher, and the Lehigh Zinc and Iron Company. He won almost all of them, and emerged along the way with big bundles of money.

Charles W. Trotter was bullheaded, frustrating, stubborn, and tough. He was a difficult man in many respects. He was tight with money, made a bunch of truly stupid legal agreements, hired poorly skilled men in his early Franklin years, broke his contract and agreements with the Lehigh men, and yet persevered against substantial odds, winning lawsuits again and again against well-heeled, massive opponents. He also punched the New Jersey Zinc Company right in the nose, repeatedly, and got away with it. He was indeed Franklin and Sterling Hill's greatest warrior, but I'm truly delighted I never had to work with him; he would have driven me nuts. I think his theme song would have been: "I'll do it my way." Sometimes a single, well-focused person can accomplish things a committee never could.

Charles W. Trotter left his fingerprints and footprints on Franklin and Sterling Hill, and, in the passage of only 14 years, large parts of it spent in courtrooms, he managed to leave truly indelible and strong marks on our mineral culture. His name lives on in our local lexicon, and adorns 1,074 running feet of the west limb of the Franklin orebody on the north half of Mine Hill in Franklin. I hope my efforts within my treatise will cause his name to live on in many minds and hearts forever. I would love to have had numerous opportunities to meet with him. Long live our memory of Franklin and Sterling Hill's greatest warrior!

The foregoing men were principal characters in the history of Franklin and Sterling Hill, and all are described as such in this treatise.

Many other persons played significant roles. Among these were some men of stature like William Alexander (Lord Stirling), Francis Alger, William L. Ames, John T.

Bird, John I. Blair, William P. Blake, John H. Brown, John E. Burrows, George Convers, Daniel H. Curtis, Christian Detmold, William E. Dodge, Alexander Farrington, John George, Daniel Haines, Charles T. Jackson, William I. J. Kemble, Richard Manning, Timothy Marshall, John T. Nixon, John S. Noble, Stephen S. Palmer, Wyatt W. Pierce, Edwin Post, Theodore Runyon, Joseph H. Scranton, John Silsby, William C. Squier, Jonathan Trotter, Francis Van Dyke, Joseph A. Van Mater, Samuel Wetherill, and Samuel Price Wetherill.

Maureen: *What were some of the human-relationship aspects of your long-term research? Were there any upside or downside events or situations that you recall? Were there things that you found perplexing in different ways?*

Dr. Dunn: In one case, I had been assured by many librarians up and down the East Coast that certain records did not exist from "way back then." After about 15 years of perseverance, I found a librarian who knew they existed and where they were. My elation was boundless and the timing was superb; that librarian was due to retire in just three more days. Her knowledge was a significant door opener in my research, and she did some great work for me in those last three days to pave the way for my efforts.

I visited many archives numerous times. In one special case, although I had visited only once, a wonderful and attentive archivist remembered one of my many quests. Some 10 months after I visited, my lab phone rang one day and, out of the blue, she identified herself and said, "Dr. Dunn, I just found a bunch of photographs of the Franklin furnace!" I was totally amazed at her memory and great thoughtfulness in contacting me.

Before I visited many repositories, the Mormons had come with microfilming equipment. These archival efforts of the Church of the Latter Day Saints were truly wonderful, and the contemporary staff I interacted with in Utah and elsewhere were superb as well. They really try to help researchers and truly want to. Their records were of significant assistance to me as well.

Maureen: *Were there any out-of-the-way paths in your historical research?*

Dr. Dunn: Back in the mid-1990s, I was seeking information on the immigration of the miners. Of all the ethnic groups that came to the Franklin-Sterling Hill mines, only the story of the Hungarians was recorded, in Hungarian, by Rev. János Makár, their last priest. His book was translated by August J. Molnar and later republished in English in 1969.[1] Because I wanted more information on immigration than Rev. Mákar had provided, I tried to read an article published in 1933 by his predecessor as the local priest, Rev. Pal Ferenczy.[2]

However, I had much difficulty reading and translating the Hungarian text. In considering the context and writings of Rev. Ferenczy, I needed assistance, and I wanted the insights of his peers. I therefore began telephoning Hungarian priests in search of help or guidance and was fortunate to encounter Rev. Ernest M. Kosa of Sparta, who was very helpful. He provided me with the names of other priests who might be of help. In this way, I found Rev. Imre Bertalen in Rockville, Maryland, and he provided me with an overview of the contents of Rev. Ferenczy's text. As it turned out, this text dealt wholly with church matters and did not contain what I sought, but the pathway to learning this was delightful.

Maureen: *Concerning only your own writing efforts, were there any significant frustrations?*

Dr. Dunn: There was one particularly vexatious and annoying circumstance that was repeated a number of times. There were a number of instances where by dint of assiduous, long-term, hard work over years, I was able to deduce some actions that had to have taken place, but I could not prove it. I then prepared carefully crafted paragraphs setting out my reasoning and tying together the few tenuous trails of weak evidence to develop my derivative argument that something actually happened, although I had no direct proof. Having done so, I felt like a successful detective, and I then inserted this detailed argument in my treatise where appropriate.

Later on, commonly years later, I found the needed evidence, in the form of documents or testimonies. On the one hand, I was elated that my deductions were wholly correct and were now proven. On the other hand, I had to rip out and toss out most of my own meticulous writing and use the primary evidence. Trashing that text which I had worked so hard to create was tough.

Maureen: *One day I met you in the Sussex County Hall of Records, where a large portion of your research transpired. At that time you were researching real estate and mineral rights transactions in the record books of the time. Most people have only a vague concept of the level of mental resolve it takes to tackle a project such as yours. Can you explain the discipline it takes?*

Dr. Dunn: Living at a great distance, but having many, many hundreds of hours of work to do elsewhere necessitated an all-out maximum effort each time I was in the "Holey Land," in New Brunswick (Rutgers University), or in Trenton (State Library and State Archives), as well as Bethlehem, Allentown, and Palmerton in Pennsylvania, and many other places. Almost all my research was done at a distance; this required much dreadful highway time on nasty highways and too many nights in motels. Trenton does not even have a hotel, so Amtrak was not a solution for me. If one is planning a stretch of very long research days, with many more similar stretches of research time looming into future years, it is necessary to force a discipline. It often meant working almost beyond mental exhaustion.

The word *discipline* can have some abstract dimensions. In the case of this historical treatise, there were some special ramifications. My scientific training and extensive publishing were valuable assets. There were times when significant parts of the grand story made no sense or were contradictory; the data did not knit together well. At such times, I had to tell myself the data were fine; the problem was with me; and I had to go back on the highway again and again, and reread and reinterpret the confusing documents. I did this a lot more than I wanted to.

Some parts of my research were redone several times, and I had to revisit institutions numerous times. There were several reasons for this; the principal one is that as a researcher's intimacy with his subject grows in depth, new questions emerge, ones that were not on his mind when the original research was done. As the story of lot #10 at Sterling Hill is explained in Volume 4, the complexity of the mineral rights leasings could be absurdly intricate. It took about four years to wrestle these mineral rights on lot #10 into my text and to be confident of my understanding.

The overall task was enormous; it grew much larger than I envisioned and in directions I could not have foreseen. One can be easily swamped by a great volume of very confusing data. Some matters were not resolved by me until the passage of decades of effort.

Heavy books on high shelves reachable only by steep ladders make for a recipe for disaster and much arthritic discomfort. Photocopying heavy books in Trenton for hours can drain not only stamina but some deeper aspects of one's spirit as well. Many times I wished I was 30 years old and could do the task over 20 to 30 years, but that was a dream wish.

Maureen: *Why did you choose the kind of books you have used consistently in your publications, and what effort was involved in the actual publishing?*

Dr. Dunn: I chose to self-publish, and that decision flowed in part from necessity. Both my monograph (1995–1996) and the current historical treatise are works of highly localized interest. There is no wide audience, and the efforts are large. Even within the targeted and admittedly narrow audience, there are not many purchasers. Thus, there is no profit for a commercial publisher.

The decision to self-publish had downsides and upsides. I had to find my own editors and proofreaders, but, on the upside, I was not limited by any editor's judgment or any publisher's business-oriented decisions. I alone would decide content and length; all comments by others were advisory to me. This freedom, enjoyed by few authors, was worth the intense frustrations and abundant hassles of managing the publishing process. Overall, it has been very satisfying to have been able to write about Franklin and Sterling Hill in the lengthy detail the subject deserves, in the detail needed for good comprehension by the reader, and without any limitations imposed by commercial profit decisions.

On the printing side, I looked at a lot of methods to produce the work and finally settled on a printing instrument called a Xerox Docutech. By employing multiple options for electronic scanning, it reproduces superb photographs very well (see Jack Baum's portrait in the monograph, Part Two, page 220), and it reproduces old and worn photographs with nice or quite tolerable results. The printing machine is massive; paper and covers go in one end, and books pop out the other end in 30 to 50 seconds, all bound and ready to read, but hot to the touch!

I then focused on printing shops that employed this technology in Virginia and nearby states, and visited many of them in person. I sought to see copies of books they had produced using the Docutech system. I also examined copies of the current output of their printing shop, whether printed offset or in other ways, so as to evaluate their attention to quality control. I left samples of some photograph-bearing camera-ready pages of my intended work, for the printers to print using the Docutech system and mail to me, so I could assess the quality of their outputs using the Docutech technology. There was quite a difference in quality among them. This process really narrowed the cluster of acceptable printing shops.

I then studied sections of Docutech technical manuals, revisited some of the better printers, quizzed their Docutech hands-on operators, and decided which ones had acquired the most expertise and highest skill level. My perceptions of the shop managers' attitude, their attention to detailed oversight, and their needed tolerance for fussy and pesky self-publishing authors. This process led me to a very good printing shop with a superb hands-on manager; we still work very well together after making 16 books over a period of nine years.

As to what effort was required in the actual publishing, I had to do all the layout work myself and think long and hard about matters that I had never considered before. I ripped up the product and started over a number of times. My task was to prepare the most perfect original copy I could, and carry it to the printer in person. The printer would then present me with a proof (sometimes called a galley proof) that was, in essence, a complete copy of the final book, with binding, covers and all.

I would then examine this for errors made by the printer's staff or flaws introduced by the scanning process or the Docutech instrument and its internal procedures. I would return this proof marked up for corrections; the printer would make them; and I would carefully examine the next proof, and so on until there were no noticeable errors. Each proof had to be examined in intimate detail; the Docutech instrument or operator could inadvertently introduce new problems with each proof, but few books went through many proof cycles.

When the books were ready and delivered, I sat down for many nights and examined each and every book separately. There would be no recourse after they went to New Jersey. Rejects were returned and replaced, and then the books were taken to the "Holey Land," a happy moment.

My five-volume monograph with two supplemental volumes is about 1,008 pages long; my historical treatise of seven volumes is 1,102 pages; the yellow book (*The Story of Franklin and Sterling Hill*) is 128 pages, and the children's book by Susan Cooper and myself (*Magnificent Rocks*) is 74 pages. All in all, it sums to about 2,312 pages in 16 books. Maybe I will rest soon. I have not done a coffee-table book yet, though.

Maureen: *So far, have there been any serious problems with the publishing end of the process?*

Dr. Dunn: Self-publishing without the aid of a wholly external editor is really quite difficult. I look forward to being free of these burdens someday. The only serious problem was the typographical error on the cover and opening pages of Volume One. That was really a crushing blow. Three hundred copies had already gone to New Jersey before the typo was found by Herb Yeates, a friend, who called gently to break the bad news.

I was pretty hard on myself for three days and nights, much harder than others would have been, but the deed was done. I had 207 additional copies here in Mount Vernon, and I agonized about them for five weeks. Finally, I knew in my mind that I could never take them to New Jersey or send them anywhere at all, now knowing of the error. In the sixth week I took a razor blade, destroyed all 207 copies, and put them in the trash. That was a bad week.

Maureen: *Why did you choose a blue cover for your history treatise, and why did you choose that specific drawing of a library to accompany the dedication?*

Dr. Dunn: The cover color is part of a larger plan. My monograph was covered in bluish gray to give it a scholarly appearance. *The Story of Franklin and Sterling Hill* was covered in yellow to draw the roving eye of the general public. The cover of Susan Cooper's *Magnificent Rocks* was roughly the color of fluorescent willemite, so as to attract children, its intended audience. The historical treatise is blue because I think the combination of light blue and dark blue is truly elegant.

This library drawing was chosen because repositories were the prime source for much of this study. This drawing also reminds me of some of the repositories I visited, with endless shelves of information waiting to be gathered, and cabinets, cabinet tops, benches, helpful staff, and high ladders such as the ones I had to climb all too often.

Maureen: *For those who might not read every section right away, but will read some parts first, might you indicate some of the more interesting or important parts of Volumes Two and Three, with references, like you did earlier for Volume One?*

Dr. Dunn: Some highlights include:

- The South Boston Iron Company's mining in 1845 at Sterling Hill, the first narrative we have of mining there (Volume 2, pages 146–148).
- Sterling Hill zinc ore at the Crystal Palace in the Great Exhibition in London: Sterling Hill on the world's stage (Volume 2, pages 164–167).
- Prospecting for zinc ore: the glacial complications and creative dowsers (Volume 2, pages 168–169).
- The early New Jersey Zinc Company mining superintendents at Sterling Hill (Volume 2, page 195).
- The photograph of the first mine office at Sterling Hill and, separately, the adjacent drawing indicating that the present, cross-sectional profile of the east side of Sterling Hill was partially established by 1854 (Volume 2, page 196).
- The dumping of Franklin ore into Lake Hopatcong and its implications for mineral collectors (Volume 2, page 198).
- Carting: a day-to-day operation (Volume 2, pages 204–206).
- Economic evaluation of the zinc ores by Francis Alger (Volume 2, page 209).
- The descriptions of the salamanders by Nuttall and the naming of franklinite by Berthier (both in Volume 2, page 228).
- Dr. Fowler's letters (Volume 2, pages 228–229).
- The Franklin-centered railroad map (Volume 2, page 242).
- Samuel Wetherill's description of men suffering from "painters' colic" (Volume 2, pages 247–248).
- Alexander Farrington's description of the efforts of George Ballou (Volume 2, page 248).
- The neat map of the local farms, many of which are featured in this story (page 260).
- The lovely painting of Sterling Hill by Emma Marshall; the original is on exhibit in the Ogdensburg Borough Hall (Volume 2, page 281).
- The Passaic Mining and Manufacturing Company's mining superintendents at Sterling Hill (Volume 2, page 282).
- Frederick Canfield's story of collecting hemimorphite at Sterling Hill (Volume 2, page 286).
- Edwin Squier's description of Timothy Marshall's detective work (Volume 2, page 292), and his

description of the American Zinc Company (Volume 2, page 299).
- Disasters in Jersey City (Volume 2, pages 308–309).
- The 1833 interests of Cleveland and Van Hosen at Sterling Hill (Volume 3, page 314).
- The manipulators: Oakes Ames, Colonel Fowler, and James L. Curtis (Volume 3, page 323).
- The 1854 anthracite blast furnace in Franklin (Volume 3, page 347).
- Alexander Farrington's making of zinc oxide in Franklin in 1856–1857 (Volume 3, page 359).
- The results of the Great Franklinite Case (Volume 3, page 410, fourth paragraph).
- The closing of the Sterling Hill Mine after the Civil War, 1865–1866 (Volume 3, page 415).
- The Buckwheat Mine at Franklin (Volume 3, page 417).
- The economic use of willemite (Volume 3, page 421).
- Intrigue: Edmund Miller as a strawman bogus purchaser for Oakes Ames (Volume 3, page 436).
- Moses Taylor, his arrival, acquisitions, and consortium (Volume 3, page 442).
- The iron horse comes to Franklin (Volume 3, page 456).
- The great 1873 anthracite furnace at Franklin (Volume 3, page 464).
- The demise of Franklin's iron industry (Volume 3, page 468).

References

1. Mákar, J. (1969) *The Story of an Immigrant Group in Franklin, New Jersey*. (Translated by August J. Molnar). Privately published by János Makár, 11 Evans Street, Franklin, New Jersey, 170 pp.
2. Ferenczy, P. (1933) *A Franklini Magyar Református Egyház: Huszonöt ves Története*. Published by Magyar Reformed Church of Franklin, New Jersey, 24 pp. ⚒

A Classic Specimen From the Franklin Mineral Museum Collection

Figure 1. Franklin Mineral Museum specimen no. 2000. An extraordinary cluster of crystals of johannsenite, manganaxinite, and caryopilite on ore from the Franklin Mine. Size: $4^1/_4$" × $2^1/_2$" × $2^1/_2$" (11 × 6.5 × 6.5 cm). Red box indicates the approximate area of close-up in Figure 2.

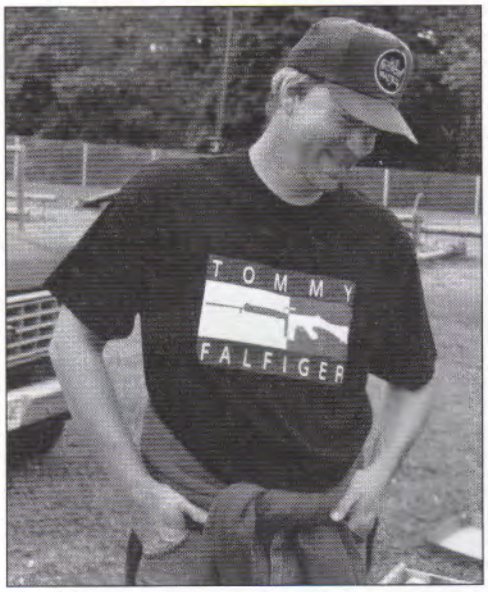
Figure 2. Close-up of specimen no. 2000 showing light-colored, bristle-like johannsenite crystals, amber-colored manganaxinite crystals, and dark brown caryopilite crystals. Field of view is approximately 4 cm. This outstanding specimen is from the famous SPEX/Gerstmann Collection, which was acquired by the Franklin Mineral Museum in 1986. Ewald Gerstmann purchased this specimen from Mr. George Pigeon.

Photos courtesy of the Franklin Mineral Museum archives.

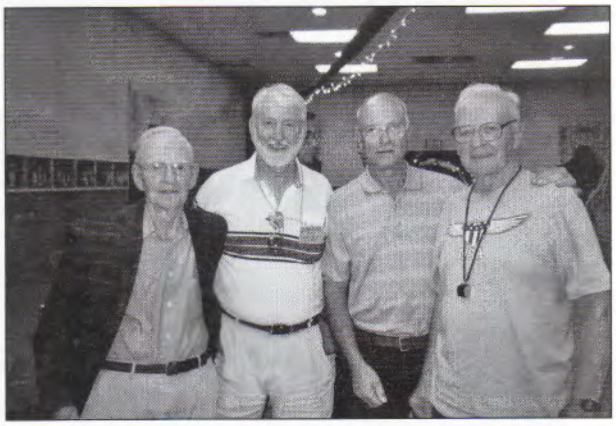
Scenes From the 47th Annual Franklin-Sterling Gem and Mineral Show, Sept. 27 & 28, 2003

Show committee member Lee Lowell and show chairman Tom Webb size up the situation. *Paul Shizume photo.*

Greg Lesinski, the human bulldozer, unwinds at the banquet and auction. *Paul Shizume photo.*



Pat Radomski . . . cool, unassuming, yet somehow intimidating. *Dick Bostwick photo.*

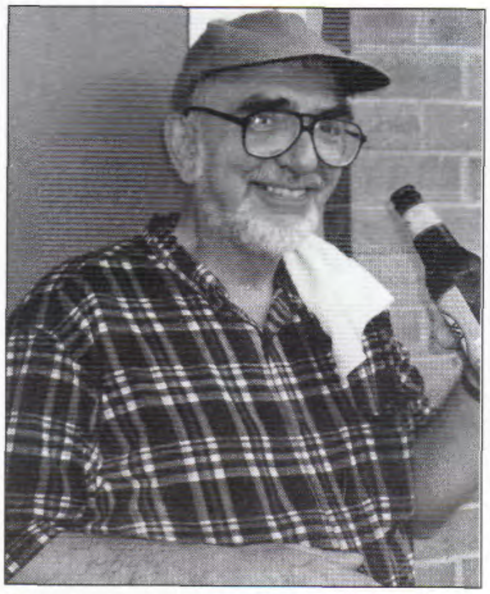


Ralph Thomas, John Ebner, Fred Young, and Joe Klitsch up past their bedtime yet still smiling. *Tema Hecht photo.*

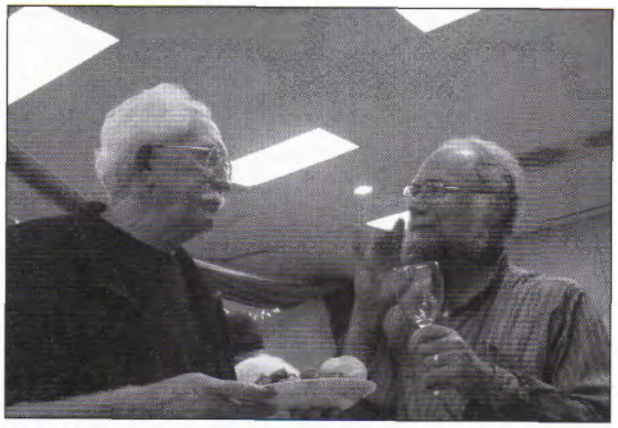
Mark Cole sets up his table of Greenland treasures. *Dick Bostwick photo.*

Lou Cherepy, Jr., brings bargains in bones, books, bottles, and boxes. *Dick Bostwick photo.*

Scenes From the 47th Annual Franklin-Sterling Gem and Mineral Show, Sept. 27 & 28, 2003



Terry Szenics takes a refreshing break after a midafternoon downpour. *Tema Hecht photo*.



Greg Anderson and Dick Bostwick discuss something arcane and irrelevant. *Paul Shizume photo*.

Ed Letscher contemplates making a bid at the auction. *Paul Shizume photo*.

Digger and dealer Kurt Hennig open for business. *Dick Bostwick photo*.

Power bidders Bob Boymistruk, Bill Kroth, and George Elling. *Paul Shizume photo*.

Greg Jacobus makes sure it glows before he bids. *Dick Bostwick photo*.

Scenes From the 47th Annual Franklin-Sterling Gem and Mineral Show, Sept. 27 & 28, 2003

Auctioneer Vandall King imparts the spark of life to Ray Klingler. *Dick Bostwick photo.*

Phil Persson, Bob Jenkins, Mark Boyer, and Claude Poli wonder what's going on. *Paul Shizume photo.*

Current FOMS president Dick Bieling maintains his composure. *Tema Hecht photo.*

OK, guys. Which one of you is Steve Kuitems and which one is Gary Grenier? *Tema Hecht photo.*

Van King seems bemused and befuddled by the auction antics. *Paul Shizume photo.*

Tema Hecht shares the love with a bewildered Joe Klitsch. *Dick Bostwick photo.*

Another Sussex Mineral Show

Gavin Malcolm
The Cottage
Hazel Grove
Hindhead
Surrey, UK GU26 6BJ

In November 2003, three members of FOMS, Richard Belson, Gavin Malcolm, and Michael Doel, got together to give a display of fluorescent minerals for the 1,000 visitors attending the annual Sussex Mineral Show. If you are wondering if you missed the local Sussex show there in New Jersey, then I have to tell you that this show is in West Sussex, United Kingdom, where the Sussex Mineral and Lapidary Society has a full and lively annual program for U.K. mineral collecting and offers talks very similar to FOMS programs. However, we British do tend to go slightly further afield in our pursuits of collecting. We also have a program of "group geo-tourism"; that is, one partner concentrates on being a tourist while the other collects rocks. We have had highly successful trips to India; Tsumeb, Namibia; and in 2005, we hope to head for Franklin, N.J., and eastern North America.

This year's show contained two cabinets, six foot by three, one with the latest Philips BLB tubes for longwave and the other with a set of SuperBright lamps for the shortwave case.

Not only do the mineral collectors seek out our darkroom, but a lucky dip from a large box of fluorescent pieces ensures that the younger guests leave clutching a shining trophy.

The longwave cabinet was a fantastic display of brilliant colors—orange from the sodalites and hackmanites from Canada and Afghanistan; purple and white from fluorites with aragonite from Weardale, U.K.; and gigantic septarian nodule slices from the Norfolk coast of England that fluoresce yellow and rival the large wernerites. The fine sphalerites from Franklin struggled against this blast of color.

The shortwave cabinet was full of Franklin memories, many self-collected by the U.K. team: exsolution willemite specimens from Sterling Hill in 1999; "crazy calcite" from the Trotter Dump in 2000; green willemite from Trotter 2001; wollastonite from a heavy hammer session on the saddle at Sterling Hill in 2002; diopside and norbergite from the outcrop in the new housing development at Whispering Woods Road near Sterling Hill; all against a background of large plates of classic willemite/calcite from John Kolic's efforts on the east limb at Sterling Hill.

There were many fine specimens from the Franklin Mineral Museum and from exchange sessions at the Buckwheat and Trotter dumps, including four-color specimens with esperite and clinohedrite, a large hardystonite, and a fluorapatite from the Trotter digs.

Our thanks to Dick Hauck, Steve Misiur, the Sterling Hill Mining Museum team, Claude Poli, Jeff Winkler, Don Halterman, John Cianciulli, and Steve Phillips, the many friends who pointed us in the right directions, and to Bill McMullen, whose magnificent display of Greenland minerals graced the Warren Museum and who only had tugtupites to swap with us at the 2001 show.

While Franklin remains the Fluorescent Mineral Capital of the World, some of our U.K. pieces are rivals for brightness and interest. Fluorites from Weardale are well known, but just up the valley the barytocalcite combined with witherite from Nenthead displays in bright pink and white; scheelite from the Carrock mine fluoresces bright blue, sometimes in combination with apatite fluorescing yellow. Terlingua-style calcite comes from our trips to the Mendip Hills. It usually fluoresces and phosphoresces bright blue shortwave and pink longwave; this year it was combined with lemon-fluorescing calcite in some specimens. Red, white, and blue calcites are also abundant in the Mendips. New finds have included barite sprays in nodules at Sidmouth, Devon, fluorescing an intense blue-white.

Wales has produced nodules containing green-fluorescing wavellite with interesting patterns, and banalsite, a rare feldspar mineral, which fluoresces deep red similar to the eucryptite from New Hampshire. A banalsite specimen is on its way to the Warren Museum. The barite mine at Strontian in beautiful western Scotland still produces calcites, barite, and strontianite with swirls of red, yellow, and white. Collectors are welcome depending on the quality of scotch they bring!

You may see pictures of these U.K. fluorescents and many more on the Russell Society website (www.russellsoc.org). We are looking forward to spring and this year's field program and hopefully for the opportunity to visit and join FOMS members again for the latest finds in Sussex County, *New Jersey*. ⚒

Mineral Species Found at Franklin and Sterling Hill, New Jersey

Mineral species list updated Spring 2004.
Courtesy of the Franklin Mineral Museum.
Minerals unique to Franklin and Sterling Hill = 32 (**bold**)
Total mineral species found at Franklin and Sterling Hill = 360

- ○ 1. Acanthite
- ○ 2. Actinolite
- ○ 3. Adamite
- ○ 4. Adelite
- ○ 5. Aegirine
- ○ 6. Akrochordite
- ○ 7. Albite
- ○ 8. Allactite
- ○ 9. Allanite-(Ce)
- ○ 10. Alleghanyite
- ○ 11. Almandine
- ○ 12. Analcime
- ○ 13. Anandite
- ○ 14. Anatase
- ○ 15. Andradite
- ○ 16. Anglesite
- ○ 17. Anhydrite
- ○ 18. Annabergite
- ○ 19. Anorthite
- ○ 20. Anorthoclase
- ○ 21. Antlerite
- ○ 22. Aragonite
- ○ 23. Arsenic
- ○ 24. Arseniosiderite
- ○ 25. Arsenopyrite
- ○ 26. Atacamite
- ○ 27. Augite
- ○ 28. Aurichalcite
- ○ 29. Aurorite
- ○ 30. Austinite
- ○ 31. Azurite
- ○ 32. Bakerite
- ○ 33. Bannisterite
- ○ 34. Barite
- ○ 35. Barium-pharmacosiderite
- ○ 36. Barylite
- ○ 37. Barysilite
- ○ 38. Bassanite
- ○ 39. Baumhauerite
- ○ 40. Bementite
- ○ 41. Berthierite
- ○ 42. Bianchite
- ○ 43. Biotite (series name)
- ○ 44. Birnessite
- ○ 45. Bornite
- ○ 46. **Bostwickite**
- ○ 47. Brandtite
- ○ 48. Breithauptite
- ○ 49. Brochantite
- ○ 50. Brookite
- ○ 51. Brucite
- ○ 52. Bultfonteinite
- ○ 53. Bustamite
- ○ 54. Cahnite
- ○ 55. Calcite
- ○ 56. Canavesite
- ○ 57. Carrollite
- ○ 58. Caryopilite
- ○ 59. Celestine
- ○ 60. Celsian
- ○ 61. Cerussite
- ○ 62. Chabazite-Ca
- ○ 63. Chalcocite
- ○ 64. Chalcophanite
- ○ 65. Chalcopyrite
- ○ 66. Chamosite
- ○ 67. **Charlesite**
- ○ 68. Chloritoid
- ○ 69. **Chlorophoenicite**
- ○ 70. Chondrodite
- ○ 71. Chrysocolla
- ○ 72. **Cianciulliite**
- ○ 73. Clinochlore
- ○ 74. Clinochrysotile
- ○ 75. Clinoclase
- ○ 76. Clinohedrite
- ○ 77. Clinohumite
- ○ 78. Clinozoisite
- ○ 79. Clintonite
- ○ 80. Conichalcite
- ○ 81. Connellite
- ○ 82. Copper
- ○ 83. Corundum
- ○ 84. Covellite
- ○ 85. Cryptomelane
- ○ 86. Cummingtonite
- ○ 87. Cuprite
- ○ 88. Cuprostibite
- ○ 89. Cuspidine
- ○ 90. Cyanotrichite
- ○ 91. Datolite
- ○ 92. Descloizite
- ○ 93. Devilline
- ○ 94. Digenite
- ○ 95. Diopside
- ○ 96. Djurleite
- ○ 97. Dolomite
- ○ 98. Domeykite
- ○ 99. Dravite
- ○ 100. Duftite
- ○ 101. Dundasite
- ○ 102. Dypingite
- ○ 103. Edenite
- ○ 104. Epidote
- ○ 105. Epsomite
- ○ 106. Erythrite
- ○ 107. Esperite
- ○ 108. Euchroite
- ○ 109. Eveite
- ○ 110. Fayalite
- ○ 111. Feitknechtite
- ○ 112. Ferrimolybdite
- ○ 113. Ferristilpnomelane
- ○ 114. Ferro-actinolite
- ○ 115. Ferro-axinite
- ○ 116. Ferrostilpnomelane
- ○ 117. Flinkite

○ 118. Fluckite
○ 119. Fluoborite
○ 120. Fluorapatite
○ 121. Fluorapophyllite
○ 122. Fluorite
○ 123. Fluoro-edenite
○ 124. Forsterite
○ 125. Fraipontite
○ 126. **Franklinfurnaceite**
○ 127. Franklinite
○ 128. **Franklinphilite**
○ 129. Friedelite
○ 130. Gageite-1Tc
○ 131. Gageite-2M
○ 132. Gahnite
○ 133. Galena
○ 134. Ganomalite
○ 135. Ganophyllite
○ 136. Genthelvite
○ 137. Gersdorffite
○ 138. **Gerstmannite**
○ 139. Glaucochroite
○ 140. Glaucodot
○ 141. Goethite
○ 142. Gold
○ 143. Goldmanite
○ 144. Graphite
○ 145. Greenockite
○ 146. Grossular
○ 147. Groutite
○ 148. Guerinite
○ 149. Gypsum
○ 150. Haidingerite
○ 151. Halotrichite
○ 152. Hancockite
○ 153. **Hardystonite**
○ 154. Hastingsite
○ 155. **Hauckite**
○ 156. Hausmannite
○ 157. Hawleyite
○ 158. Hedenbergite
○ 159. Hedyphane
○ 160. Hellandite-(Y)
○ 161. Hematite
○ 162. Hemimorphite
○ 163. **Hendricksite-lM**
○ 164. Hercynite
○ 165. Hetaerolite
○ 166. Heulandite-Na
○ 167. Hexahydrite
○ 168. **Hodgkinsonite**
○ 169. **Holdenite**
○ 170. Huebnerite
○ 171. Humite
○ 172. Hyalophane
○ 173. Hydrohetaerolite
○ 174. Hydrotalcite
○ 175. Hydroxyapophyllite
○ 176. Hydrozincite
○ 177. Illite
○ 178. Ilmenite
○ 179. Jacobsite
○ 180. **Jarosewichite**
○ 181. Jerrygibbsite
○ 182. Johannsenite
○ 183. Johnbaumite
○ 184. Junitoite
○ 185. Kaolinite
○ 186. Kentrolite
○ 187. **Kittatinnyite**
○ 188. Koettigite
○ 189. **Kolicite**
○ 190. **Kraisslite**
○ 191. Kutnahorite
○ 192. Larsenite
○ 193. Laumontite
○ 194. **Lawsonbauerite**
○ 195. Lead
○ 196. Legrandite
○ 197. **Lennilenapeite**
○ 198. Leucophoenicite
○ 199. Linarite
○ 200. Liroconite
○ 201. Lizardite
○ 202. Loellingite
○ 203. Loseyite
○ 204. Magnesiohornblende
○ 205. Magnesioriebeckite
○ 206. Magnetite
○ 207. Magnussonite
○ 208. Malachite
○ 209. Manganaxinite
○ 210. Manganberzeliite
○ 211. Manganese-hoernesite
○ 212. Manganhumite
○ 213. Manganite
○ 214. Manganocummingtonite
○ 215. Manganosite
○ 216. Manganpyrosmalite
○ 217. Marcasite
○ 218. Margarite
○ 219. Margarosanite
○ 220. Marialite
○ 221. Marsturite
○ 222. Mcallisterite
○ 223. **Mcgovernite**
○ 224. Meionite
○ 225. Meta-ankoleite
○ 226. Metalodevite
○ 227. Metazeunerite
○ 228. **Mg-chlorophoenicite**
○ 229. Microcline
○ 230. Mimetite
○ 231. **Minehillite**
○ 232. Molybdenite-2H
○ 233. Monazite-(Ce)
○ 234. Monohydrocalcite
○ 235. **Mooreite**
○ 236. Muscovite-1M
○ 237. Nasonite
○ 238. Natrolite
○ 239. **Nelenite**
○ 240. Neotocite
○ 241. Newberyite
○ 242. Niahite
○ 243. Nickeline
○ 244. Nontronite
○ 245. Norbergite
○ 246. Ogdensburgite
○ 247. Ojuelaite
○ 248. Oligoclase
○ 249. Orthochrysotile
○ 250. Orthoclase
○ 251. Orthoserpierite
○ 252. Otavite
○ 253. **Parabrandtite**
○ 254. Paragonite
○ 255. Pararammelsbergite
○ 256. Pararealgar
○ 257. Parasymplesite
○ 258. Pargasite
○ 259. Pectolite
○ 260. Pennantite-la
○ 261. **Petedunnite**
○ 262. Pharmacolite
○ 263. Pharmacosiderite
○ 264. Phlogopite-lM
○ 265. Picropharmacolite
○ 266. Piemontite
○ 267. Powellite
○ 268. Prehnite
○ 269. Pumpellyite-(Mg)
○ 270. Pyrite
○ 271. Pyroaurite
○ 272. Pyrobelonite
○ 273. Pyrochroite
○ 274. Pyrophanite
○ 275. Pyroxmangite
○ 276. Pyrrhotite
○ 277. Quartz
○ 278. Rammelsbergite
○ 279. Realgar
○ 280. **Retzian-(La)**
○ 281. **Retzian-(Nd)**
○ 282. Rhodochrosite
○ 283. Rhodonite
○ 284. Richterite
○ 285. Rouaite
○ 286. Roeblingite
○ 287. Romeite
○ 288. Rosasite

- ○ 289. Roweite
- ○ 290. Rutile
- ○ 291. Safflorite
- ○ 292. **Samfowlerite**
- ○ 293. Sarkinite
- ○ 294. Sauconite
- ○ 295. Schallerite
- ○ 296. Scheelite
- ○ 297. Schorl
- ○ 298. **Sclarite**
- ○ 299. Scorodite
- ○ 300. Seligmannite
- ○ 301. Sepiolite
- ○ 302. Serpierite
- ○ 303. Siderite
- ○ 304. Sillimanite
- ○ 305. Silver
- ○ 306. Sjögrenite
- ○ 307. Skutterudite
- ○ 308. Smithsonite
- ○ 309. Sonolite
- ○ 310. Spangolite
- ○ 311. Spessartine
- ○ 312. Sphalerite
- ○ 313. Spinel
- ○ 314. Starkeyite
- ○ 315. Sterlinghillite
- ○ 316. Stibnite
- ○ 317. Stilbite-Ca
- ○ 318. Stilbite-Na
- ○ 319. Strontianite
- ○ 320. Sulfur
- ○ 321. Sussexite
- ○ 322. Synadelphite
- ○ 323. Synchysite-(Ce)
- ○ 324. Talc
- ○ 325. Tennantite
- ○ 326. Tephroite
- ○ 327. Tetrahedrite
- ○ 328. Thomsonite
- ○ 329. Thorite
- ○ 330. Thortveitite
- ○ 331. Thorutite
- ○ 332. Tilasite
- ○ 333. Titanite
- ○ 334. Todorokite
- ○ 335. **Torreyite**
- ○ 336. Tremolite
- ○ 337. Turneaureite
- ○ 338. Unnamed amphibole*
- ○ 339. Uraninite
- ○ 340. Uranophane
- ○ 341. Uranospinite
- ○ 342. Uvite
- ○ 343. Vesuvianite
- ○ 344. Villyaellenite
- ○ 345. **Wallkilldellite**
- ○ 346. **Wawayandaite**
- ○ 347. Wendwilsonite
- ○ 348. Willemite
- ○ 349. Wollastonite
- ○ 350. Woodruffite
- ○ 351. Wulfenite
- ○ 352. Wurtzite
- ○ 353. Xonotlite
- ○ 354. Yeatmanite
- ○ 355. Yukonite
- ○ 356. Zinalsite
- ○ 357. Zincite
- ○ 358. Zinkenite
- ○ 359. Zircon
- ○ 360. Znucalite

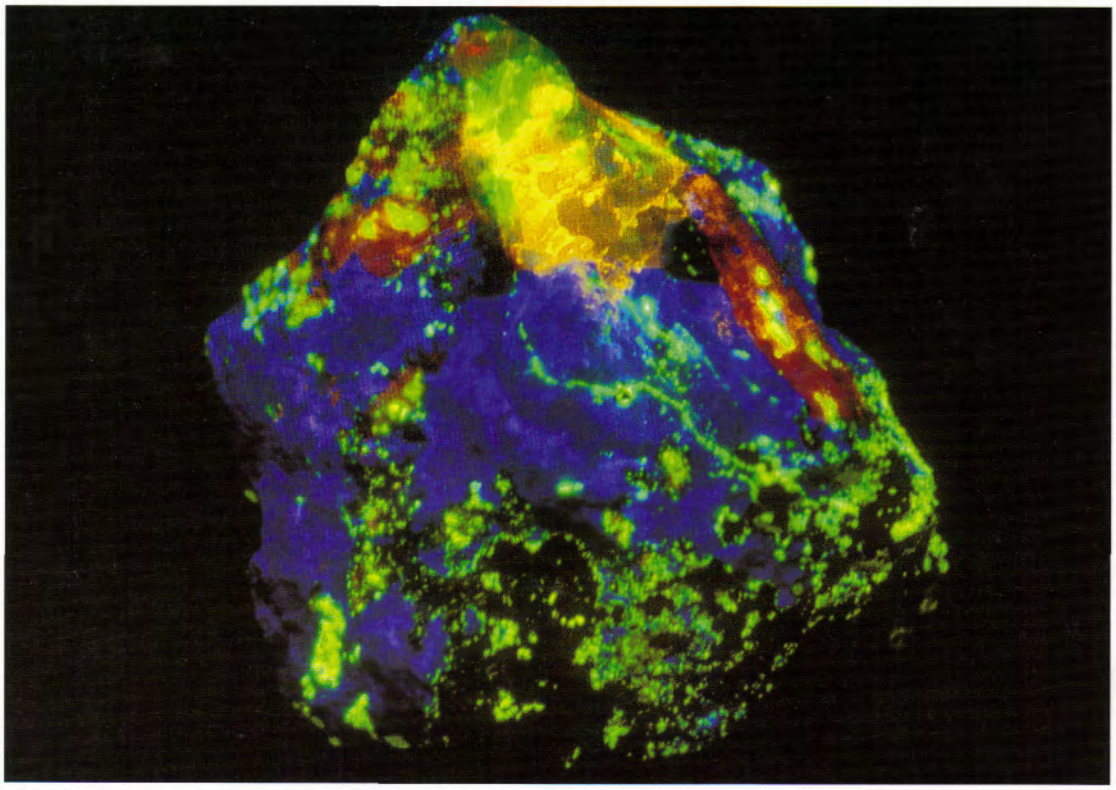
*Formerly known as hornblende. Due to change in nomenclature by the IMA, this amphibole is now listed as unnamed; however, its chemical formula suggests that it is probably the hypothetical mineral cannilloite.

☙ CORRECTIONS ☙

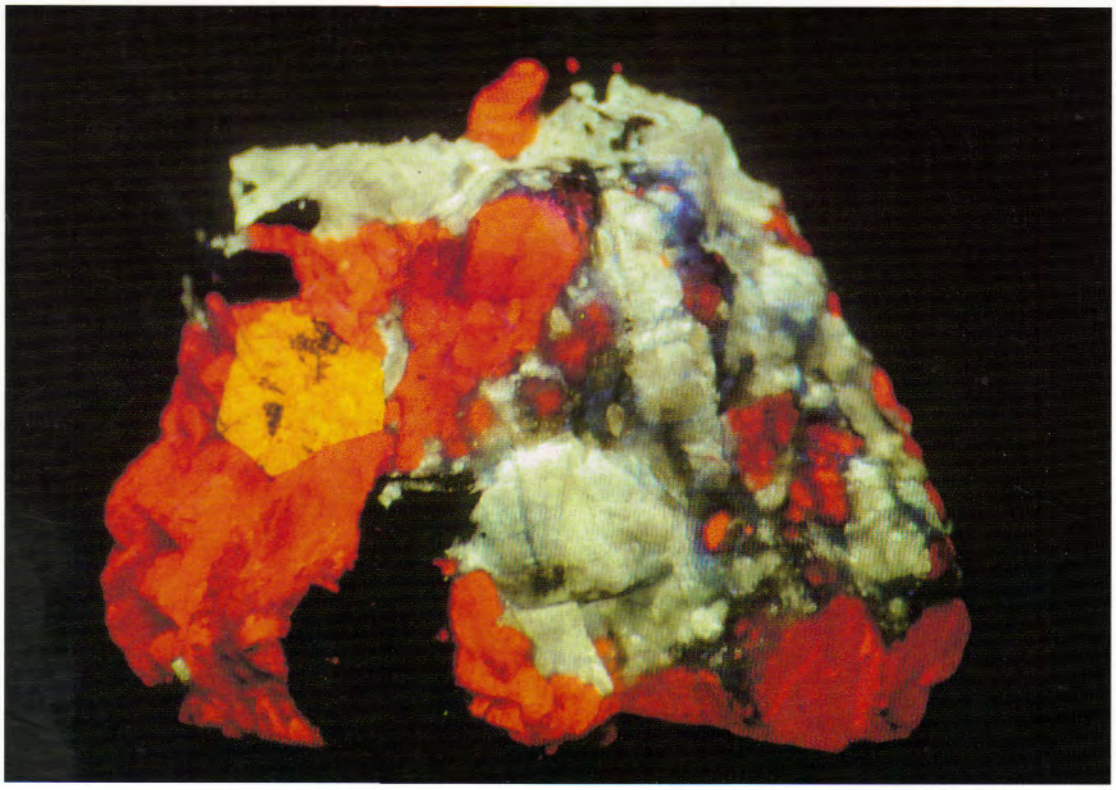
The Picking Table regrets the following errors that appeared in the Fall 2003 issue:

The description of the front cover photograph erroneously stated that the bladed rhodonite specimen was donated to the Franklin Mineral Museum. This specimen was actually purchased by the museum in 2003 for $10,000.

On the back cover, the margarosanite/manganaxinite specimen photograph was mistakenly credited to John Cianciulli. This photo was actually taken by Bob Boymistruk.



Bustamite, clinohedrite, hardystonite, willemite, and translucent barite from Franklin, N.J., photographed under shortwave UV. Approx. 4.25" × 3.75" (11 × 9.5 cm). Privately owned. Bob Boymistruk photo.



Johnbaumite crystal cross-section in calcite with barite from Sterling Hill, photographed under shortwave UV. Approx. 3.75" × 3.25" (9.5 × 8 cm). Privately owned. Bob Boymistruk photo.