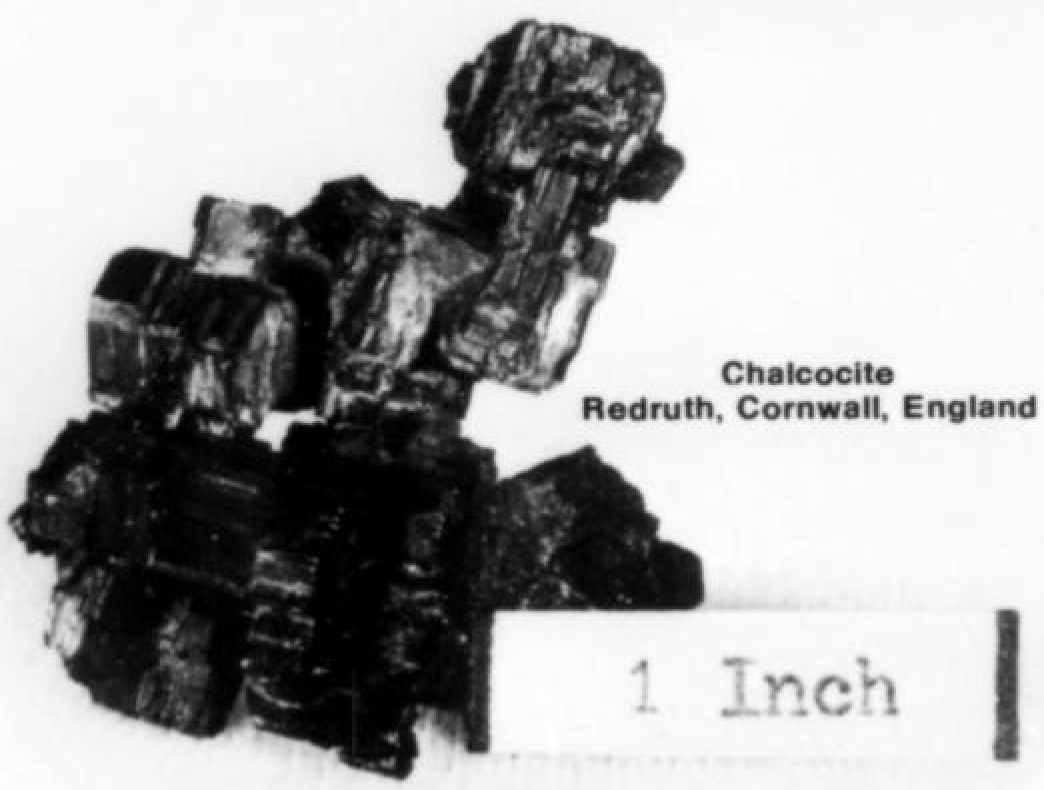

the
Mineralogical
Record
Volume Seven/Number Three
MAY—JUNE 1976
$2.00

Quartz (Japanese twin)
Pedra Preta mine
Brumado, Bahia, Brazil

Vivianite
Llallagua, Bolivia

NEW ACQUISITIONS



Chalcocite
Redruth, Cornwall, England

Magnesite
Pedra Preta mine
Brumado, Bahia, Brazil

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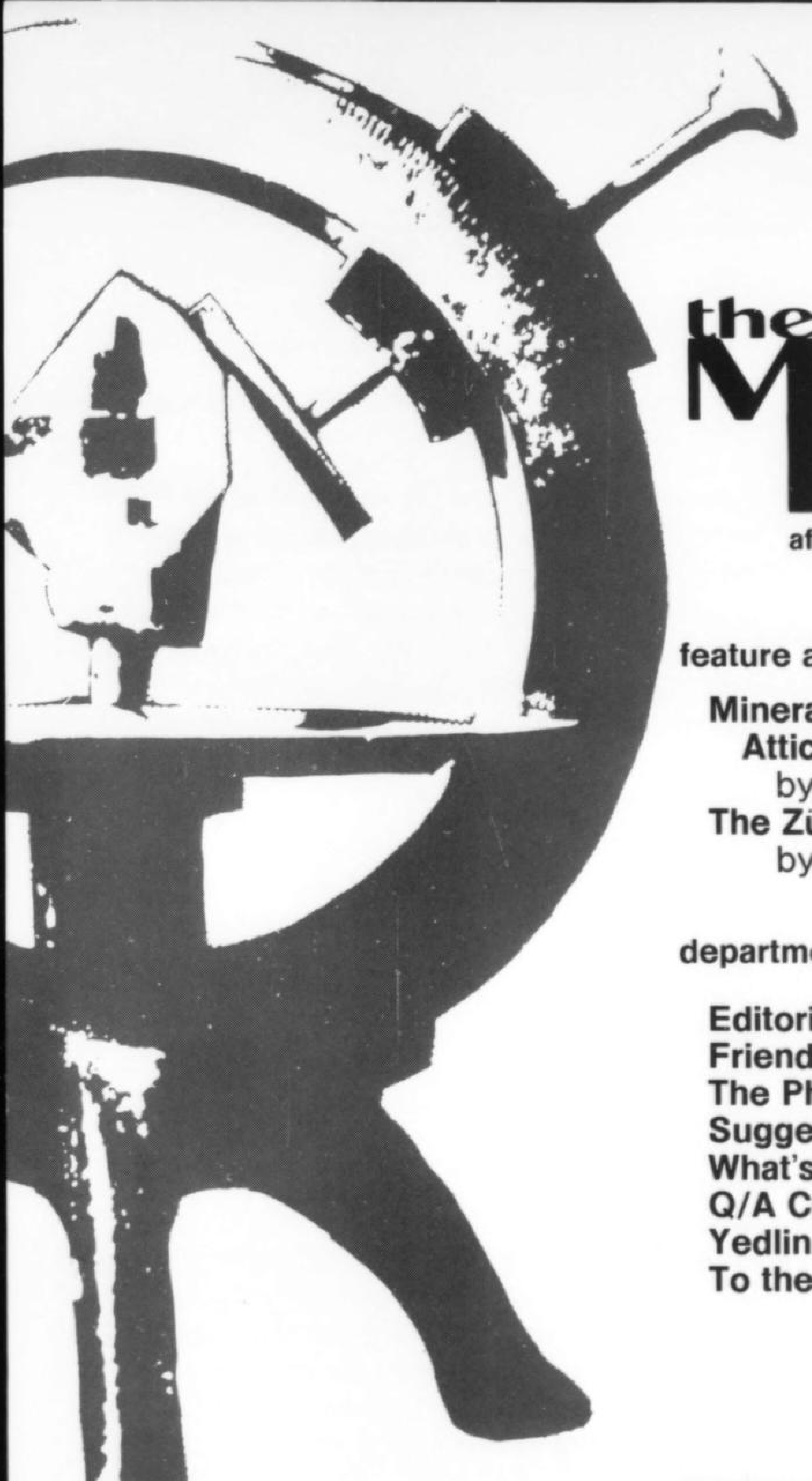

the Mineralogical Record

Volume Seven/Number Three
May—June 1976

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feature articles

departments

BOURNONITE on siderite, from Pribram, Czechoslovakia. Collection of the Mineralogy Museum of Copenhagen, Denmark. Photo: Olaf Medenbach. The crystal is about 1 cm in size.

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editorial matter

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EDITORIAL

COLLECTOR COMPANIES

The closing of mines to collecting is becoming a serious problem for private collectors, researchers and museum curators who want specimens. Liability and inconveniences precipitate most closings. Mine owners, however, are not all unaware of their "responsibility to posterity" or of the potential (although relatively small) profit involved in specimen recovery.

The Phelps Dodge Corporation attempted to resolve this problem by opening a sort of company store in Bisbee, Arizona, dealing in specimens. Mining companies in Panasqueira, Portugal, and Mibladen, Morocco, have also tried this tactic. However the solution left a lot to be desired. Mine personnel often spent company time collecting for the company store, leaving higher-ups to wonder if the profit from minerals could really pay their geologists' salaries and, also, who was going to do the geology while the geologists were collecting. The liability and conservation problems were partially solved but other problems were created.

In response to this dilemma, a relatively new phenomenon has sprung up: the collector company. As discussed regarding the 79 mine* in last issue's "What's New in Minerals?", the procedure consists of getting together a handful of skilled collectors and forming a corporate entity with its own liability insurance. (The hiring of a professional business manager for such companies has proven to be a wise move.) In some cases, temporarily abandoned localities are leased from the owner for a flat rate or a percentage of the gross specimen sales. In other cases, the collector company actually works side by side with miners in a working mine, again often on a concession basis. Phelps Dodge, for instance, now has a contract with a collector company (Wayne Thompson and associates) and thousands of fine specimens from Ajo and Morenci, Arizona, have been saved as a consequence (see this issue's "What's New in Minerals?").

Although there are exceptions (Pala Properties' Boleo venture for example) most retail mineral dealers haven't the time to get involved in direct mining; they have a shop and business to run, and usually prefer to buy wholesale and sell retail. In fact, most wholesalers prefer to buy SUB-wholesale and sell wholesale! The collector company therefore fills an increasingly critical void in the chain.

When this system works, it works beautifully and a great many advantages to the mining company are obtained:

(1) The mining company staff can get back to work, where they belong, because when good specimen areas are revealed the collecting company is there to move in, making it difficult for others to become involved.

(2) Liability for their own safety is borne by the collecting company, and the danger of injury to mining company employees in the collecting situation is eliminated.

(3) Profits, even if relatively small, are garnered by the mining company without having to invest their own people's time, as they would with a company store.

(4) The mining company can receive good publicity and public recognition for its conservation efforts, rather than public scorn for callously and premeditatedly destroying "National Treasures".

(5) In the case of an overly popular abandoned mine (the 79 mine is a fine ex-

*Inspiration is now leasing the 79 and Christmas mines for specimen recovery to a company formed by John Mediz of Globe, Arizona.

ample) the collecting company inherits the responsibility to keep trespassers away, and the liability for them if they get through.

(6) The mining company officials can pride themselves in being interested in more than pure profit. The specimens saved will be admired and studied for generations, long after the deposit has been worked out. A real legacy is left to the country.

Naturally, benefits extend to those outside the mining companies in additional ways:

(1) Specimens are saved which otherwise would be lost. Consider the many fine, old specimens in museums today; these are the legacy of past generations of miners, a precedent which should never be broken. Furthermore, an experienced, "professional" mineral collector has the skill to remove far more material undamaged than the average mine employee could. The time necessary to do a thorough, careful, well-engineered harvest is available to the collector company whereas haste is the rule with mine employees, whether collecting on the sly or not. The association with a collector company thus yields much more material, and material with far less damage.

(2) Valuable geological and mineralogical data are gained when sample-savers are hovering around as mining progresses. Mining companies usually remove ore bodies rather completely and systematically, eliminating the opportunity for researchers to enter the mine at a later date and study an occurrence. Open pit mining is a prime example: a few years ago at Inspiration's Live Oak pit near Globe an occurrence of pseudomalachite generated some interest for awhile and fortunately specimens were saved, thanks to the cooperation of Inspiration. But now, where is that occurrence located? Well, birds are probably flying through it because it is just an open space in the air several hundred feet above the pit floor. Even in the previous century examples can be found: Cornish miners were so thorough in removing ore that it is now often impossible to ascertain the ore minerals mined because not a scrap was left behind. Certainly little opportunity for research was left either, but specimens have fortunately been preserved in museums and private collections.

When samples are collected and notes taken during mining, a three-dimensional picture of the mineralogy can be constructed. Mine geologists usually have no expertise in exotic mineralogy and cannot take the time to chart economically insignificant mineral occurrences, but a collecting company can. Future generations of mineralogists will be drawing on these notes and samples for study and, who knows, maybe a discovery will be made that will generate new profit potentials for the mining companies. One never knows where pure research will lead, and mining companies can rarely afford to indulge in it themselves. So a valuable scientific legacy is left as well.

(3) Although of presumably little interest to the mining company, the collector company will make its little profit (if carefully run) and private collectors all over the world will have new things to bring them pleasure.

We hope mining companies will see the logic behind this approach; we also hope more collector companies will be formed by capable people to get into localities now closed to collecting of any kind. "Locality Preservation", as advocated by the Friends of Mineralogy, in which slowed depletion and access by the greatest number of collectors are fostered, is not always possible. "Specimen Conservation" must then take overriding priority. No one benefits from minerals which stay permanently buried, and the collector company approach is certainly better for everyone then sending everything to the crusher.

W.E.W.

friends of mineralogy

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1975 Annual Report of the Friends of Mineralogy Ad Hoc Committee for Locality Preservation

It is hoped that publication of this report will stimulate readers of the Mineralogical Record to report other successful cases of locality preservation to the Locality Preservation Committee. Descriptions of such cases should be sent to the committee chairman, Mike Groben, at the address given above.

In discussions about locality preservation at regional FM meetings and in informal discussions with various collectors it has become clear that there is no consensus as to the meaning of locality preservation. One collector, in fact, sees continued collecting, which perforce leads to depletion and eventually exhaustion of localities, as directly counter to the goal of locality preservation. Thus, if we are to make any further progress, the meaning of locality preservation must be made perfectly clear.

We offer the following clarification:

PRESERVING THE *OPPORTUNITY* FOR FIELD COLLECTING OF MINERAL SPECIMENS IS THE PRINCIPAL CONCERN OF THE AD HOC COMMITTEE FOR LOCALITY PRESERVATION.

At the last annual meeting in Tucson the committee proposed the following goals and methods for mineral locality preservation.

Purposes

(1) To preserve mineral localities of great mineralogical, geological, historical, and/or economic value where no collecting will be permitted.

(2) To preserve other important mineral localities where collecting will be permitted in such a way as to:

- (a) Slow depletion.
- (b) Allow for accumulation of scientific knowledge.
- (c) Permit access to the greatest number of collectors.
- (d) Prevent the loss or destruction of localities due to changes in land use for such things as building sites, garbage dumps, land fills, etc.

Methods

(1) Purchase or lease of property.
(2) Purchase or lease of rights.
(3) Contractual arrangements with owners for collecting rights.
(4) Donation by property owner.
(5) Staking claims on federal land.
(6) Legislation whereby Government sets locality aside for its historical, scientific, or geologic value.

As one means of promoting these goals, the committee proposed to prepare a collection of case histories illustrating the diverse methods which have been successful in preserving mineral localities. Such a casebook, inexpensively reproduced and widely distributed, could serve as a source of ideas to collectors and clubs faced with specific problems of locality preservation. At president Pemberton's request, sample cases were prepared and are presented here.

These several cases illustrate most of the methods for accomplishing locality preservation that were suggested in our last annual report and are arranged in that order. Thus, Palermo #1 is a locality purchased by two individuals; Mt. Mica, a locality purchased by a company; and Crater-of-Diamonds, a locality purchased by a state. The Dunton quarry is an example of a locality where mining rights have been leased from the property owner. The case of Mont St. Hilaire is an outstanding example of a mineral club successfully negotiating for collecting priviledges at an operating quarry. The Long Hill tungsten mine and the Emery Mines are examples of sites donated to municipal and state governments, respectively. The Lake County sunstone locality is especially interesting because it illustrates two of the proposed methods for locality preservation: the staking of mining claims and governmental action setting localities aside. The Thunder Egg locality, the Petrified Forest, and Sudbury discovery site are further examples of sites being set aside for geologic, historic or scientific values by governmental agencies.

Although these cases represent a wide variety of successful methods of locality preservation, there are not enough cases here to justify the printing and distribution of a casebook. Therefore, we propose to use these cases as a basis for FM columns in the *Mineralogical Record* which would serve to put locality preservation before a wider audience and to solicit more examples for a casebook.

The Cases

(1) Palermo #1 Pegmatite, Groton, New Hampshire
(2) Mt. Mica, Paris, Maine
(3) Crater-of-Diamonds State Park, Murfreesboro, Arkansas

(4) Dunton Quarry, Newry, Maine
(5) Mont St. Hilaire, Montreal, Quebec
(6) Long Hill Tungsten Mine, Trumbull, Connecticut
(7) Emery Mines, Chester, Massachusetts
(8) Sunstone Locality, Lake County, Oregon
(9) Thunder Egg Lake Agate Beds, Fremont National Forest, Oregon
(10) Petrified Forest National Park, Holbrook, Arizona
(11) Discovery Site, Sudbury, Ontario
(12) Selenite Locality, Salt Plains National Wildlife Refuge, Oklahoma

The Palermo #1 Pegmatite North Groton, Grafton County, New Hampshire

by Carl Francis

The Palermo #1 mine in North Groton exposes one of several New Hampshire pegmatites famous for their primary and secondary phosphate minerals. Originally opened in the late nineteenth century for mica, it has since been worked intermittently for beryl, feldspar and quartz. Palermo has been a prime New England collecting locality for decades yielding up important specimens of brazilianite (first and best U.S. locality), wardite (best U.S. locality), and several new species including palermoite (world's only locality), whitlockite, and wolfeite.

Robert Whitmore and Forrest Fogg, two mineral collectors concerned about the growing number of closed localities, purchased the Palermo property in the early summer of 1974 to ensure themselves and others of a place to collect in the future. Now open to collectors on a few basis, Palermo is more productive than ever because of frequent blasting of the phosphate pods. The income from entrance fees and the sale of specimens defrays the costs of liability insurance and continued blasting.

In this current period of activity. Whitmore and Fogg are collaborating with Professor Paul B. Moore of the University of Chicago on a detailed study of the pegmatite. The geochemistry and mineralogy are being investigated carefully and already several new phosphate species have been described. Two of these have been named foggite and whitemoreite in recognition of the outstanding service these two collectors have rendered amateur and professional mineralogy. 9/1/75

Mt. Mica, Paris, Maine

by Mike Groben

Gemmy tourmaline crystals of great beauty and fine clarity were first found in the fall of 1820 by two young boys as they walked over the hill now known as "Mt. Mica." From the time of that first discovery until the early 1900's, sporadic attempts to mine this pegmatite were made with the objective of removing the white, pink, red, green and blue tourmalines which occurred here in fine gemstone quality. Good pockets were discovered occasionally, but by the early 1900's, it was generally felt that the area had been worked out.

In 1926, Howard Irish bought the property. He tried, unsuccessfully, to locate more tourmaline. Then in 1949, he leased the mineral rights to the United Feldspar and Mining Corporation. The only find of any significance made by this company was a pocket containing beryl and quartz. In 1965, he leased the mineral rights for the second time to Frank Perham. Perham worked the pegmatite by himself and in 1967 had the good fortune to find, in one day, two pockets containing pink, red, green, and blue tourmaline.

In April 1973, the property was purchased by Plumbago Mining Company. Limited exploration in 1973 revealed two small tourmaline pockets. Two other pockets were discovered in 1974. At the present time, Plumbago Mining Company has opened the locality to collectors at the rate of $1.50 per person.

Thus, Mt. Mica remains productive today under private ownership as both a potential commercial operation and as a mineral collecting area for the individual collector of pegmatite minerals. 12/8/75

Crater-of-Diamonds State Park Murfreesboro, Arkansas

by Mike Groben

The Crater-of-Diamonds is the most important diamond-bearing kimberlite in the United States. Diamonds were discovered here in August 1906 by a farmer while plowing his field. The land was later purchased by the Arkansas Diamond Company for the purpose of mining diamonds on a commercial basis. All attempts at commercial mining proved to be marginal due to the lack of financing, lawsuits, mysterious fires in the processing plants, plus the fact that diamond recovery was poor, probably due to daily thefts by the workers. Consequently, ownership changed hands on numerous occasions over the years until in 1952 the area was finally purchased by a private party and opened to the public as both a tourist attraction and a collecting site. From 1952 until 1972, the Crater-of-Diamonds remained open to the public for collecting purposes for a small daily fee even though ownership changed hands several more times. Then, in 1972, G. F. Industries, the owner at that time, was forced to liquidate for financial reasons. The high bidder for the property was the State of Arkansas, which offered $750,000.

Over the years more than 60,000 diamonds have been removed from this area, with the largest diamond recovered weighing 40 carats in the rough. Diamonds are still being found by tourists and collectors.

The State of Arkansas has now enlarged the size of the park to 867 acres. Campsites are available, a museum has been constructed with a slide presentation showing how to search for diamonds. The area is now known as "Crater-of-Diamonds State Park" and is operated in a manner similar to the previous private ownership. Admission is $2.00 per person and collecting can be done from 8:00 A.M. to 5:00 P.M. seven days a week, with the collector having the right to keep anything he finds.

Under the present management and ownership, the Crater-of-Diamonds will continue to remain open to collectors permanently as a public-collecting area for diamonds in the State of Arkansas. 11/3/75

Dunton Quarry
Newry, Maine
by Mike Groben

The Newry area consists of five principal collecting sites clustered in the eastern corner of Newry Township, Oxford County, Maine. These five sites are known as (1) the Dunton Gem Quarry, (2) Nevel Quarry, (3) Bell Pit, (4) Scotty Quarry and (5) Rose Quartz Crystal Area. Geologically, the area is basically a pegmatite belt with the host rocks consisting of gabbro and schist. To date, 111 different species of minerals have been discovered here, ranging from fine gemmy tourmaline crystals to rare pegmatite minerals, many of which are microscopic in size.

Tourmaline was first discovered in 1898 by Edmond Bailey, who was a mineral collector. In 1902, a Dr. Abbott in connection with Hollis Dunton, attempted to mine this area on a commercial basis and from this time onward, this particular site has been known as the Dunton Gem Quarry. Numerous explorations and commercial mining attempts have been made sporadically on all five sites over the years, with some of the more successful operations taking place during and shortly after World War II.

The most recent operation commenced in October 1972 when the Plumbago Mining Corporation, a partnership then consisting of three individuals, leased the property from the present owners, International Paper Company. This was accomplished by Mr. Dean McCrillis, one of the partners, who made arrangements with the vice president and head of the Exploration Department of International Paper Company. Final negotiations resulted in a ten-month lease with exclusive mining rights given to Plumbago with the provision that International Paper Company was to receive 50% of the value for everything that was recovered. This lease has since expired and been renegotiated with the new provisions requiring Plumbago to expend an average of $10,000 per year in labor and material for a six-year period terminating in 1979. During this new period, International Paper Co. is to receive 35% of the value for everything that is recovered.

The result of the first year's work in 1972 was a fabulous find of tourmaline which was removed from a pocket approximately 8′ x 8′ x 20′ in size and from which approximately two thousand pounds of tourmaline, much of gem quality, was recovered.

In addition to the private commercial operations being carried on, Plumbago has opened certain areas of the property for mineral collecting by private collectors. These areas are confined, at present, to the dumps where some fine tourmalines have been discovered that were overlooked in the recent mining and screening operations. The fee for collecting is $5.00 per person and this fee, in part, is used to cover the cost of the insurance required by International.

Unless different arrangements are required by International Paper Company in the future, Plumbago Mining Company plans to continue its present collecting policy. The locality will remain open to collectors during the summer months except for periods of active mining. 12/8/75

Mont St. Hilaire and the
Montreal Gem and Mineral Club
by John and Louise Stevenson,
McGill University, Montreal-110, Quebec

During the 1950's quarries were developed on the northeast flank of Mont St. Hilaire, Quebec, to provide aggregate of crushed nepheline syenite for a growing construction industry. Mont St. Hilaire is a monadnock, an igneous plug cutting through the Ordovician limestones of the St. Lawrence lowland, and rising some 1,000 feet above the plain. It is about twenty miles south of Montreal. The major part of the mountain is a nature conservation area belonging to McGill University and was bequeathed under terms that require its strict preservation. Thus, when the present quarries have finished their excavations, that will be the end of large-scale collecting at St. Hilaire. The quarries are now close to the boundary of University property, and it is a question how deep it would be profitable to continue the excavation. More than 140 minerals have been identified from this site and at least 20 new minerals have thus far been described, so it is an important location for both mineral collectors and research mineralogists.

The main quarry was originally known as the Uni-Mix quarry, but was also referred to as the Desourdy quarry because it was owned and operated by members of the Desourdy family as Desourdy Construction Limitee. The Desourdys were active in highway and building construction, especially in the area south of Montreal.

In 1957 the Montreal Gem and Mineral Club scheduled the first of their official trips to the area. Arrangements were made on an informal basis with the management, and club members looked after their own safety regulations.

In 1963 interest in the St. Hilaire area was greatly increased by the finding of a large and beautiful crystal of rose serandite (a rare manganese analogue of pectolite) and a member of other unusual and beautiful minerals.

With greater interest in the site, the number of collectors increased, and fear for their safety was often expressed by club members, especially as the quarry became progressively more dangerous with larger excavations. In 1965, for the first time, it was found necessary to bar junior members from field trips there, and in 1966 the company ruled that no one under 18 years of age would be admitted to the quarry. However, the quarry was still open to our senior members, who made arrangements for visits on weekends when the quarry was not operating, and who paid the wages for a watchman to be on duty.

At a club meeting in 1966, a presentation was made to Raymond Desourdy as an expression of thanks for the cooperation of the company. A special case of particularly beautiful St. Hilaire minerals, collected by club officers, H. Budgen and M. Stitt, was presented.

In 1967 the quarry was sold to De-Mix Limitee and the legal adviser to the new owners immediately asked them to close the quarry to all collectors. He had made a weekend visit to the quarry and had noted that, despite rules to the contrary, many visitors, including children, were freely roaming around the site without hard hats or safety goggles, and without proper supervision. He felt that patroling the site would be difficult and costly, and that the company was exposing itself to the possibility of serious damage suits.

The quarry was, in fact, closed to collectors for several weeks in 1967 while officers of the club met with De-Mix executives, and it was finally arranged that the club agree to act as agent for visits by collectors, for their scheduling and supervision. After a time it was found that this was a difficult and time-consuming task for a volunteer group, and outside groups began to deal directly with the company (or indirectly, by crawling over or under a remote fence).

In 1973 the relations between collectors and the De-Mix company reached a new low when a collector's hammer was scooped up with the rock and passed through the crusher. More than $3,000 worth of damage was alleged to have been done. Although collecting was allowed to continue, it is obvious that since that time the company has discouraged frequent collecting. For example, the Montreal Gem and Mineral Club field trip originally scheduled for early May, 1974, was not allowed until September after numerous objections were raised. The impasse was eventually solved when the club offered to take out its own insurance policy to cover its field trips. For a $100 fee, the club was insured, and since the minimum length of time for the policy was 30 days, the club was able to schedule a second trip in October, before the expiration date of the insurance. Under a similar arrangement, a field trip was held in May, 1975, but there is no assurance that club members will have access to the property indefinitely.

Nevertheless, Montreal Gem and Mineral Club members have good reason for pride in their eighteen years of collecting at Mont St. Hilaire. Through their efforts, unique and valuable specimens that would otherwise have been lost in the crusher, have been permanently preserved. 7/3/75

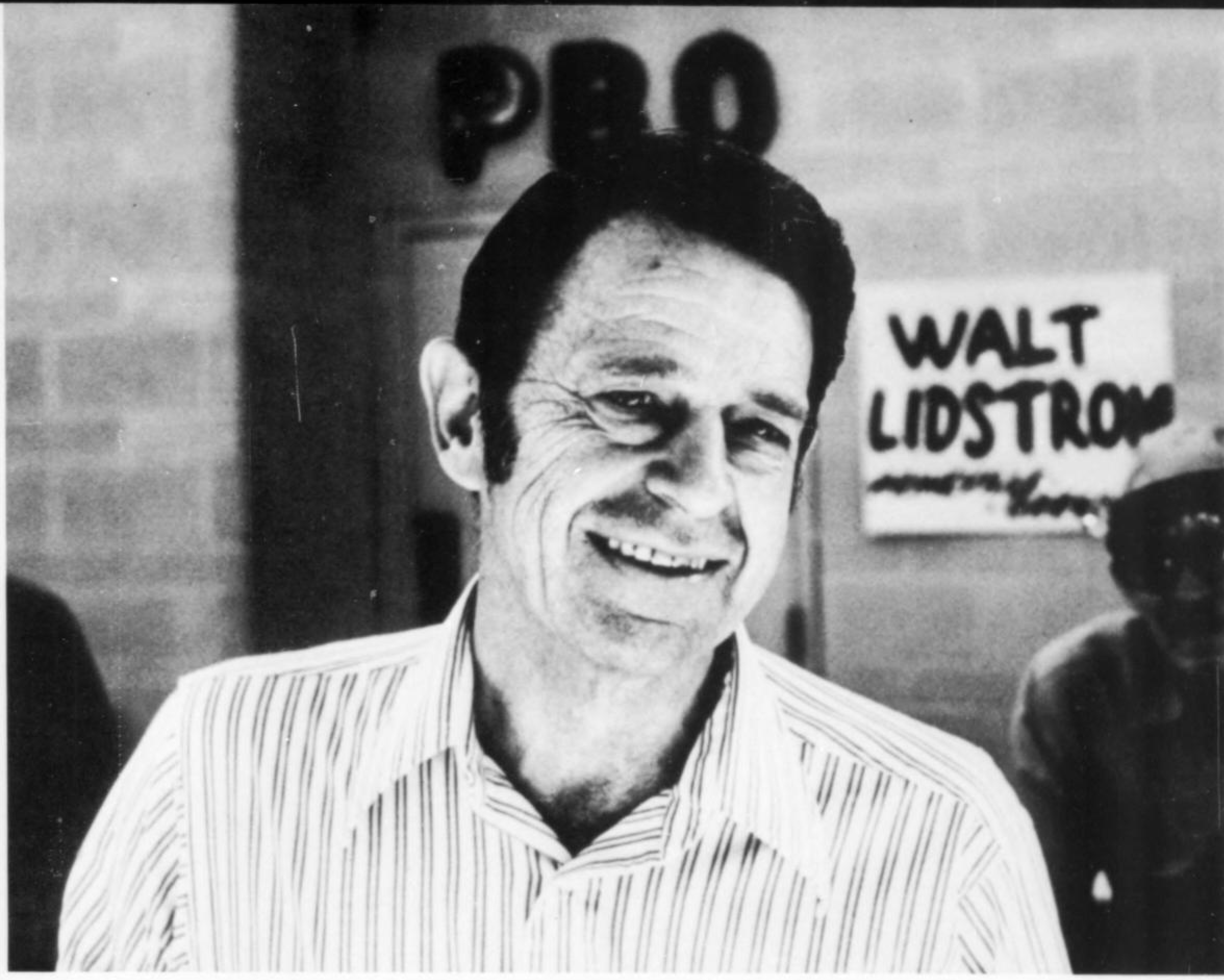
(To be continued)

NOTICE!

If you have not received a dues notice or paid your 1976 dues for Friends of Mineralogy membership, please send a check or money order (for $5.00 payable to Friends of Mineralogy) to the new Secretary at this address:

Robert Trimingham
5319 Charlotte Way
Livermore, CA 94550

Please include your mailing address and phone number (with area code) for inclusion in a forthcoming roster of members. If you need an FM name badge, indicate this also. Membership cards and badges will be mailed as soon as possible. All dues for 1976 should be paid immediately.



Walt Lidstrom

1920-1976

by Margaret Lidstrom Sorenson

Walt Lidstrom passed away of cancer on February 22 in Tucson, Arizona.

His interest in minerals began in 1939, collecting the fine Oregon plume agates and other rock, as a hobby. This led to his first show in 1960 when he presented an unprecedented variety of top grade slabbed materials. As the business grew, his interest shifted into the mineral field, where his self-learned knowledge and keen eye soon made him a leading expert.

He used this expertise and a thoughtfully simple presentation of a volume of quality specimens to transform the trend of the entire mineral business. He, more than any other single individual, has been responsible for the change in the mineral business the last fifteen years from a Ma-and-Pa-backyard operation into a professional, top-level business. He thrived on competition; the more dealers who came in with new ideas and who traveled the world in search of fine specimens, the more the business grew and the more pleased he became. His purchases from so many different sources, from the specimens brought in by a college student digger all the way to the large lots of foreign material, were a continuous, major encouragement to the excitement he generated. His own enthusiasm transmitted itself to the individual supplier, right on through the trimming, washing, and labeling of the specimens, and finally on to the customer. He was well known and beloved for his wit, his fairness, and his sincere concern in all his dealings.

Walt had many things he still wanted to accomplish in his lifetime. When he knew his situation was hopeless, he nonetheless made the trip to Tucson to see so many of his friends again. His last gesture to all of us was one of courage, of encouragement and humor, and of excitement for the future of the mineral business. We will long feel the void of his absence. Yet, he touched us all in a very special, individual way that will remain as an inspiration and a lasting tribute to his memory and to the many things he did accomplish, so very well.

The F. John Barlow Collection

by Wendell E. Wilson
The Mineralogical Record
P. O. Box 783
Bowie, MD. 20715

This fall I packed up my photo equipment and drove to Appleton, Wisconsin, to meet F. John Barlow. I had seen some of his fine collection at the Tucson Show but we had never been introduced, so I was happy to have the opportunity to meet him, see his entire collection, and take some pictures for this column. I was impressed; in little more than four years of active collecting Mr. Barlow has accumulated well over 500 unusually fine display pieces, from thumbnails to cabinet specimens. While many people spend decades trying to assemble a competition thumbnail collection of 50 specimens, Mr. Barlow now has over 200. His larger specimens won him the Best In Show award and a blue ribbon at the 1975 Tucson Show. Most of this he keeps in an attractive room lined with cases and heavy (though inconspicuous) security.

Those who are familiar with Mr. Barlow's collection may say I have not photographed his most "significant" specimens. This is true only to the extent that in choosing 18 specimens from over 500 I have given preference to the most photogenic among them. I should also mention the problems in taking pictures on a trip. Principally there is the lack of opportunity for retakes, and also the limited time during which one can impose upon one's host. Naturally a set of photos taken under such circumstances are bound to appear less polished than those done in the leisure of one's own home. Anyway, if you notice a profusion of burn-outs, multiple shadows and lint fibers (all against my previously published suggestions) I can only offer this feeble defense for not practicing what I preach. Of course anyone else contributing photos to this column is welcome to use these same excuses!

Getting back to Mr. Barlow's collection, there were, as you might imagine, a great many impressive pieces which I do not show here for one reason or another. A pair of gemmy, blue, half-inch wilkeite crystals from Minas Gerais, an 8-inch by 1 1/2-inch, doubly terminated, gemmy green elbaite also from Minas Gerais, and a cabinet specimen of up-to-2-inch ruby-red rhodochrosite crystals on white quartz from the Urad mine, Clear Creek, Colorado, are the first that come to mind. It is also hard to overlook a flat case containing around 75 crystals of elbaite and associated minerals from a single gem pocket in the Tourmaline Queen mine, Pala, California. Mr. Barlow had the thrill of personally collecting these in July of 1974 with Bill Larson, Ed Swoboda and Peter Bancroft of Pala Properties. Above the case is a 950 lb. reconstructed tourmaline pocket made from lepidolite, wall rock, quartz, morganite, and tourmaline taken from the same 1974 find. The display was carefully assembled by Dr. Peter Bancroft from random blocks and crystals to simulate the look of the original pocket. Needless to say, Mr. Barlow's mineral room is a real experience to behold, and his collection already ranks among the major private U. S. collections.

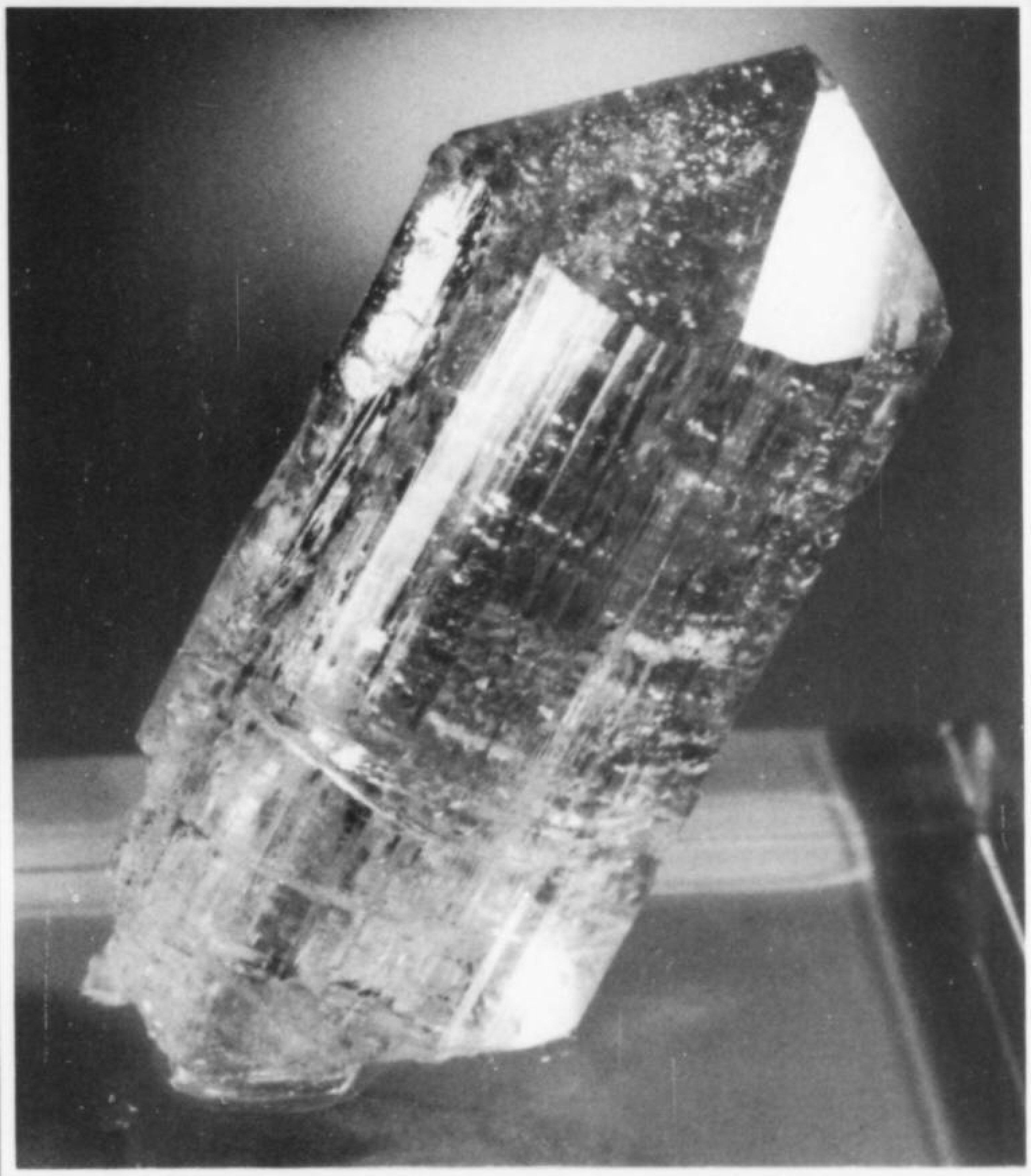


Figure 1, left. **Euclase** (very pale blue-green, 5.5 cm tall) from near Ouro Preto, Minas Gerais Brazil. See M.R. 2, 10.

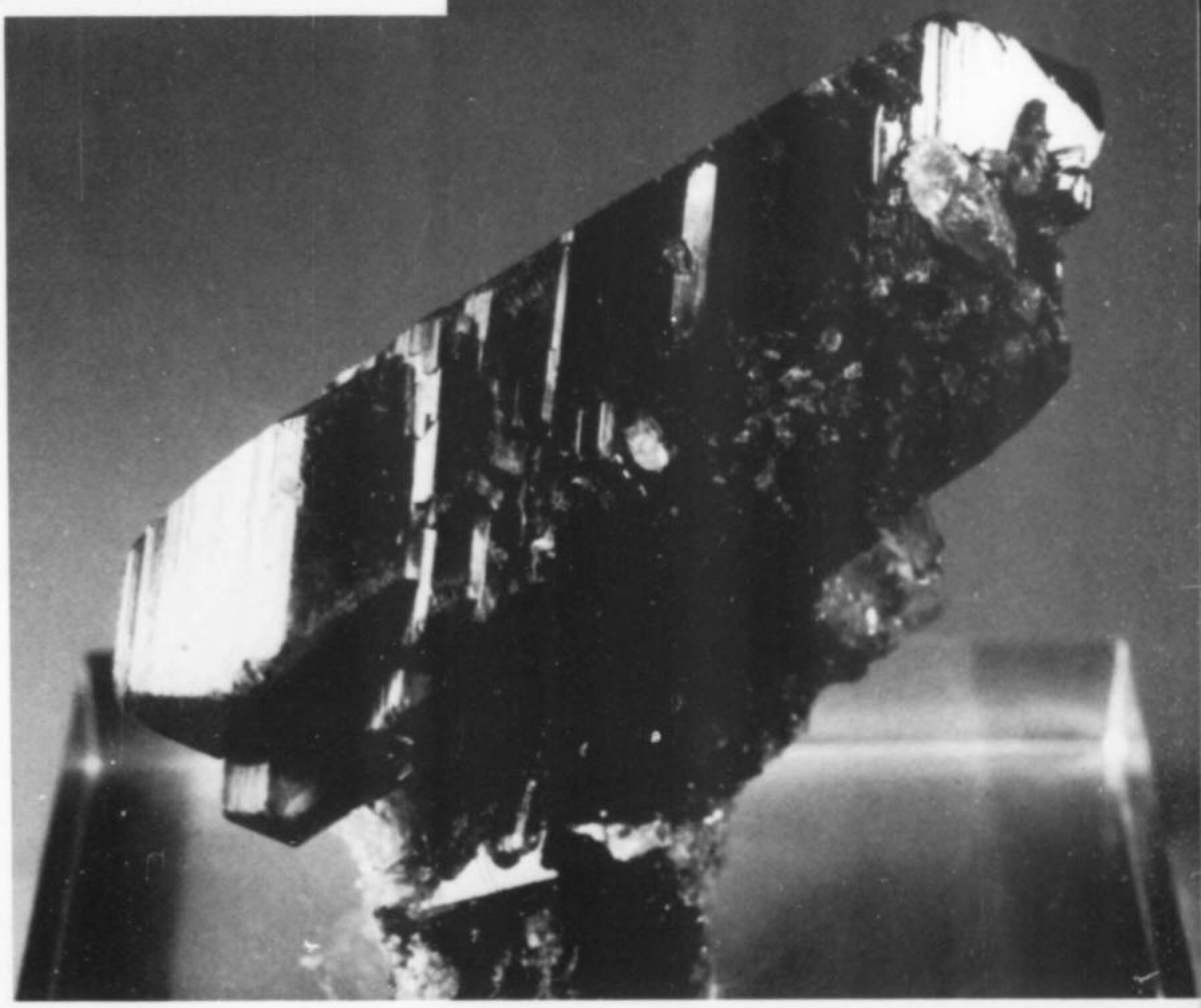


Figure 2, right. **Vivianite**, doubly terminated, on matrix (deep green, 6.5 cm long), from Poopo, Bolivia. See M.R. 6, 125. Figure 3, left. **Rhodochrosite** (brilliant red, 3.5 cm tall) from Hotazel, South West Africa.

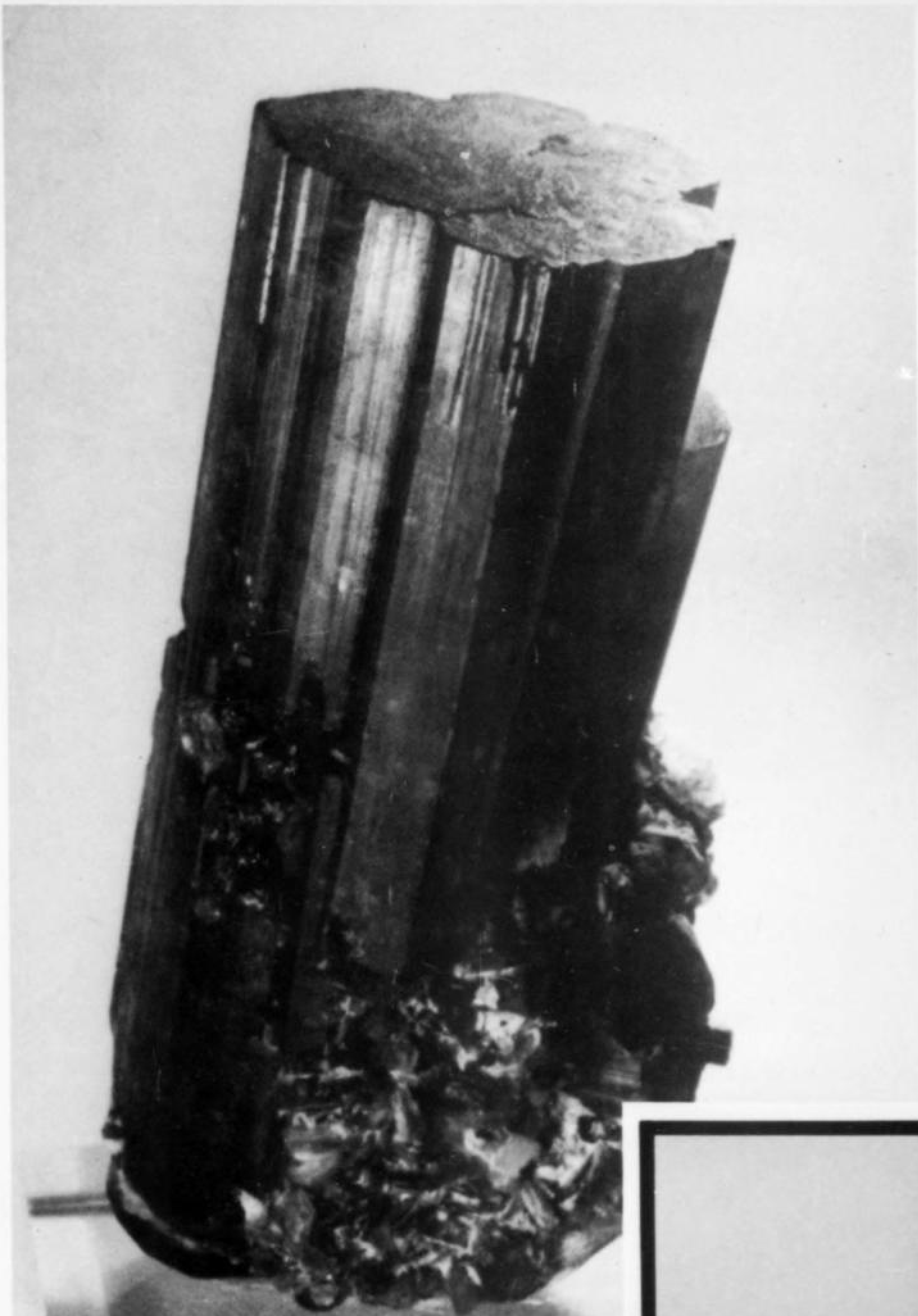
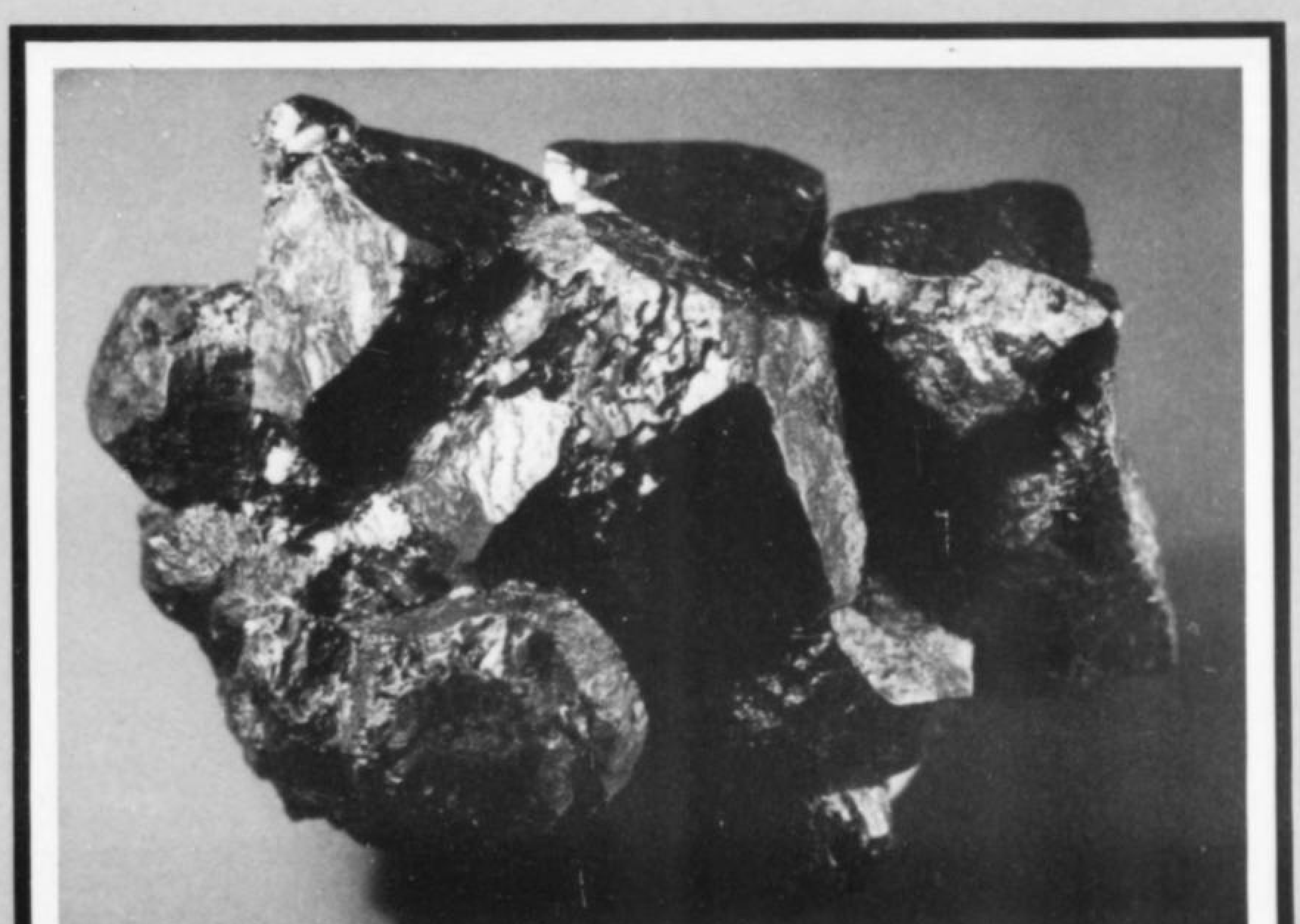


Figure 4, above. **Elbaite**, var. rubellite (rich pink, 10 cm tall) probably the best tourmaline ever produced by the Stewart mine, Pala, California.

Figure 5, below. **Amblygonite** (pale yellow, 4.2 by 3 cm) from near Linopolis, Minas Gerais, Brazil. Linopolis, although not on most maps, is also the town nearest the brazilianite localities.

Figure 6, above. **Fluorapatite** (grayish purple, 4.5 cm tall) from Panasqueira, Portugal. See M.R. 2, 73. Figure 7, below. **Acanthite** after argentite (black, largest crystal is 2 by 1.5 cm) from Colquechaca, Bolivia.



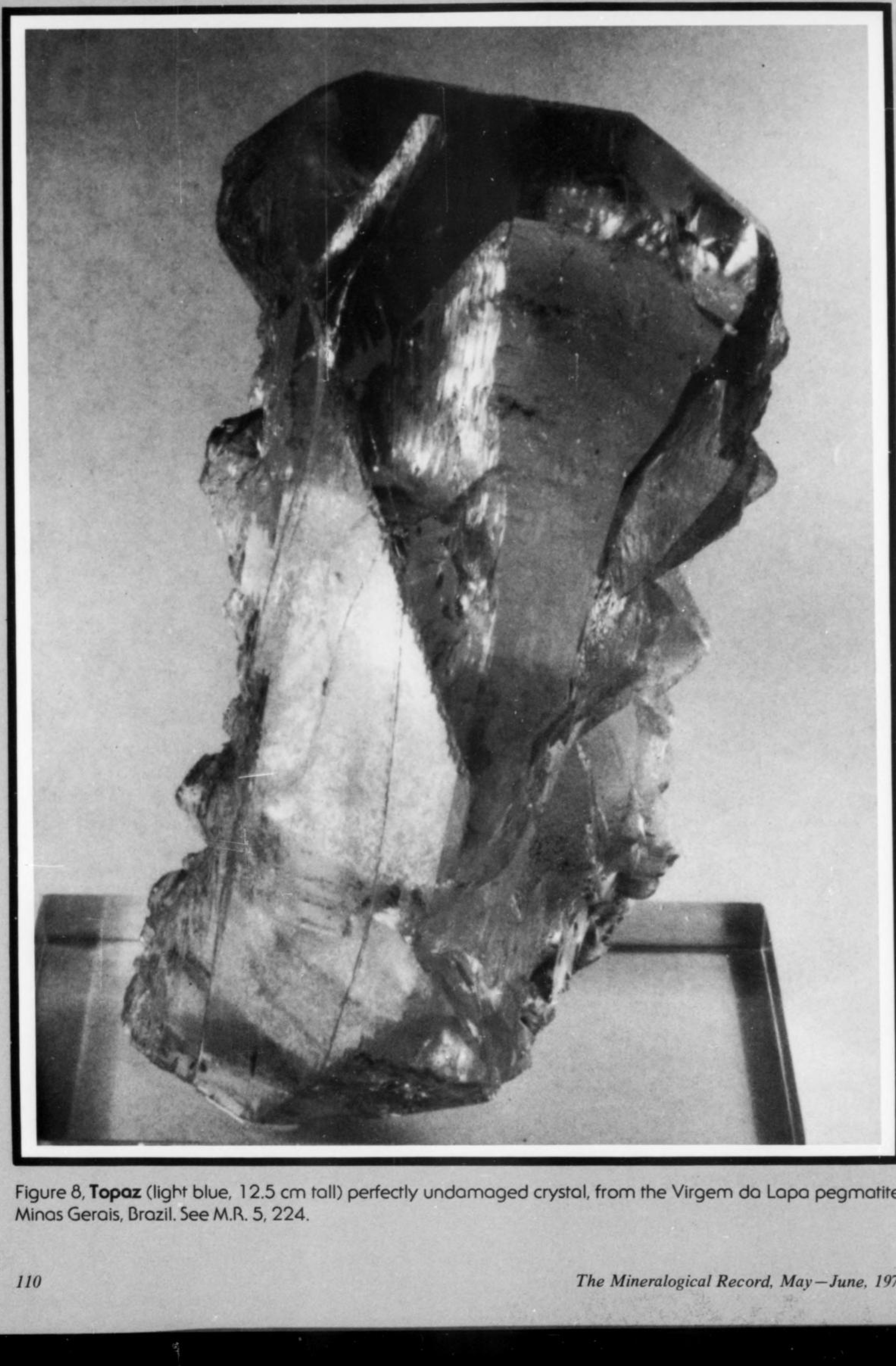


Figure 8, **Topaz** (light blue, 12.5 cm tall) perfectly undamaged crystal, from the Virgem da Lapa pegmatite, Minas Gerais, Brazil. See M.R. 5, 224.

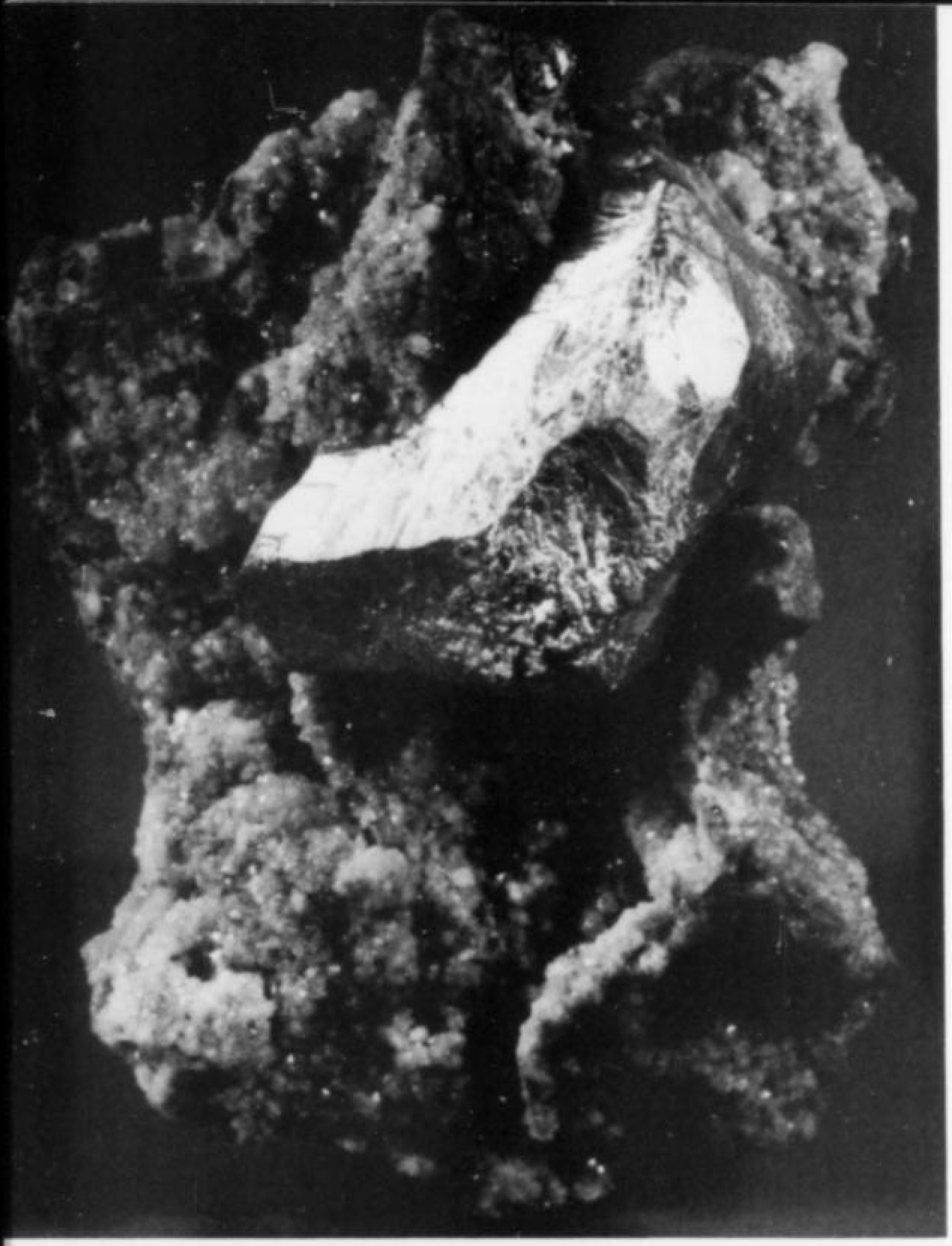
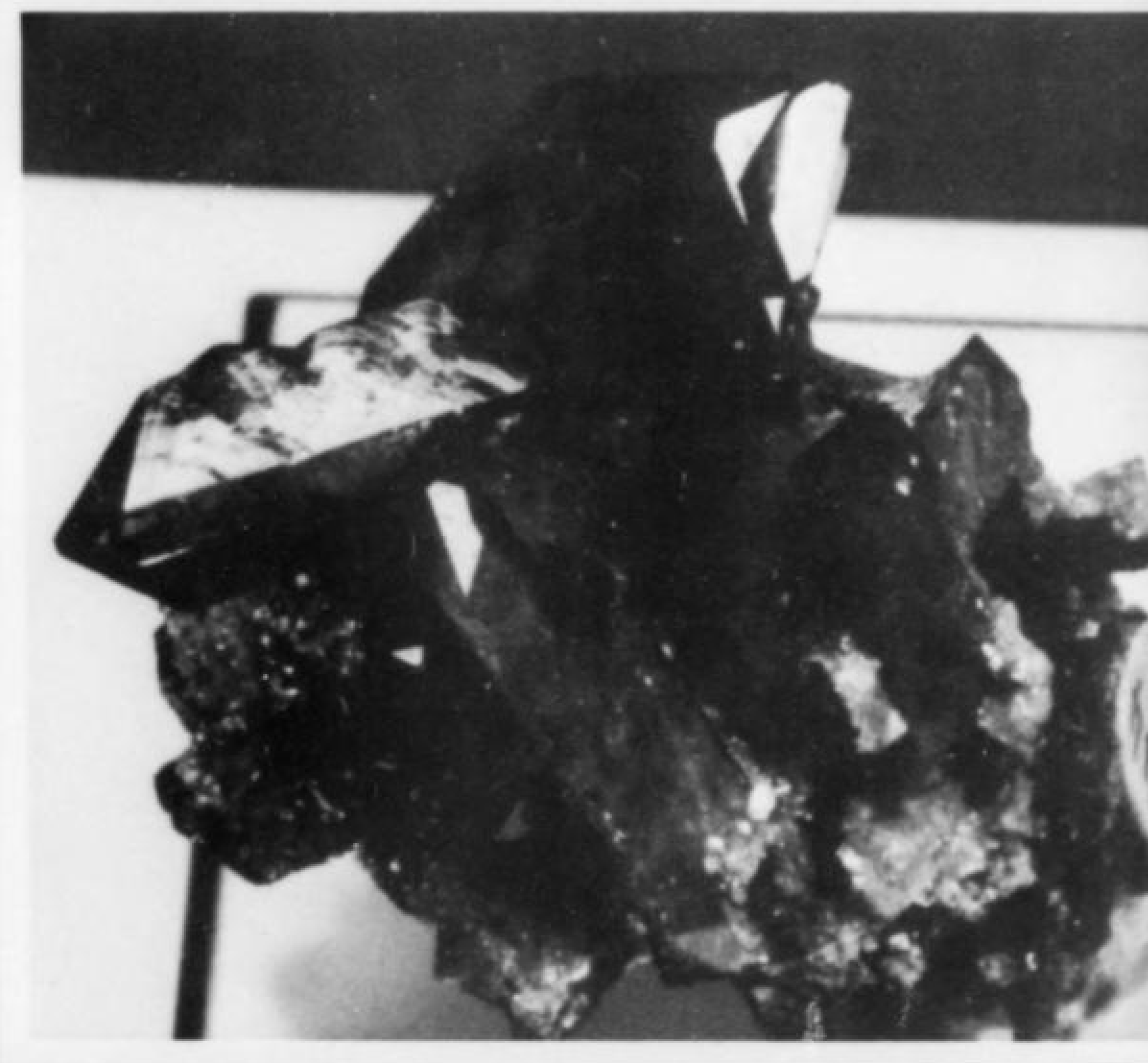


Figure 9, above. **Copper** on Quartz (crystal is 4 cm wide) from the Keeweenaw Peninsula of Michigan. Figure 10, right. **Quartz,** var. Amethyst (deep purple, 16 cm tall) probably the second best specimen found at Traversella, Italy. See M.R. 4, 39.

Figure 11, below. **Grossular** (orange, large crystal is 2 cm) from Asbestos, Quebec, Canada.

Figure 12, above. **Zoisite**, var. Tanzanite (purplish blue, about 5.5 cm tall, 470 carats) from the Umba Valley of Tanzania.

Figure 13, below. **Topaz** on matrix (golden orange, crystal is 4.5 cm tall) probably from near Ouro Preto, Minas Gerais, Brazil. See M.R. 2, 10.



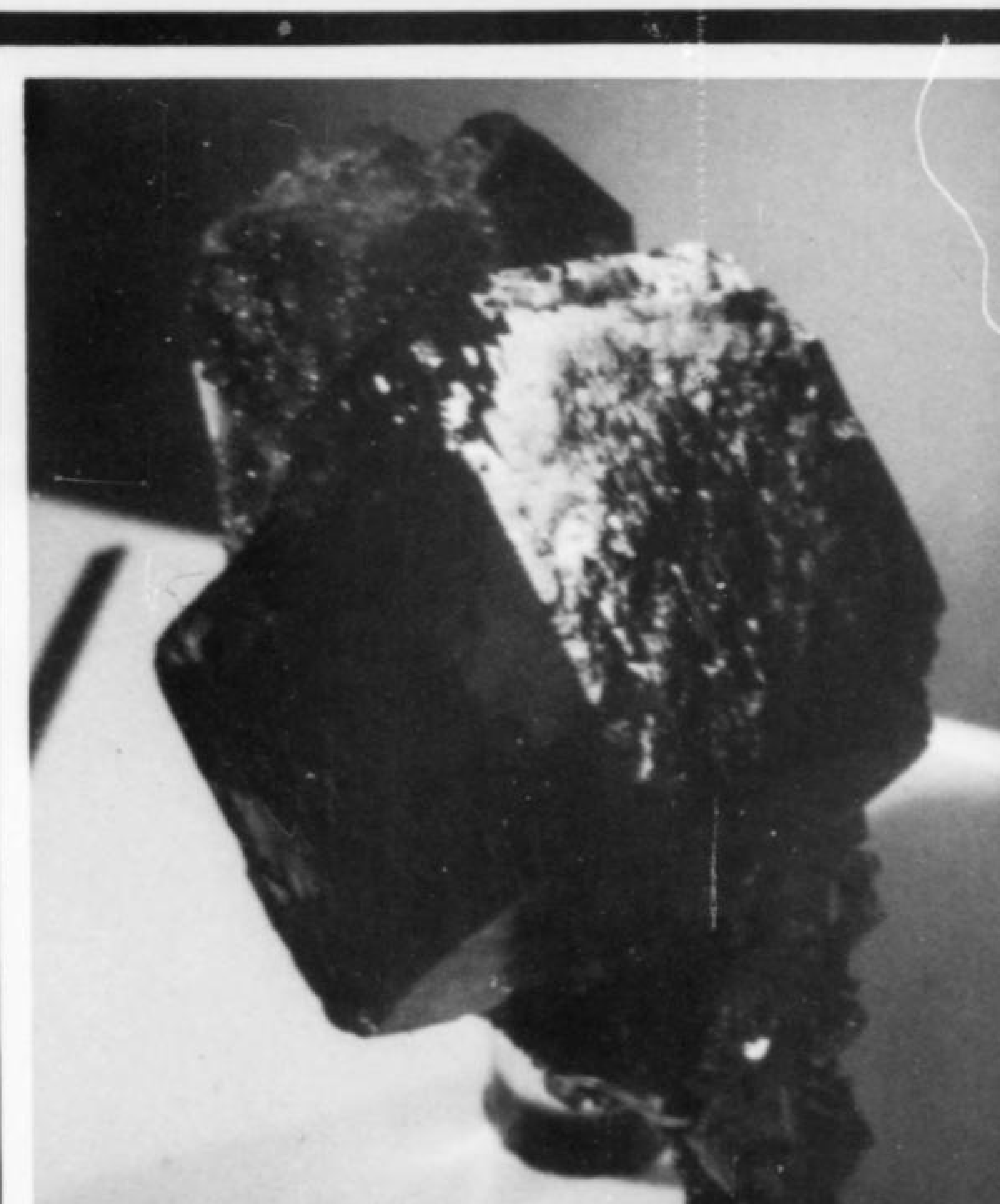


Figure 14, left. **Scorodite** (greenish blue, 2.5 cm wide) from Tsumeb, South West Africa.

Figure 15, below left. **Smithsonite** (green, nearly transparent, 1 cm) from Tsumeb. South West Africa. This extraordinary little crystal won the best-in-species award, for TN size, at the 1976 Tucson Show.

Figure 17, below. **Quartz**, var. asteriated Rose (pink, 6.3 cm) from Brazil, cut in Idar-Oberstein. Normally lapidary items are tabu in the Record, but this exceptionally sharp star is a property of this specimen which is only visible after careful shaping and polishing.

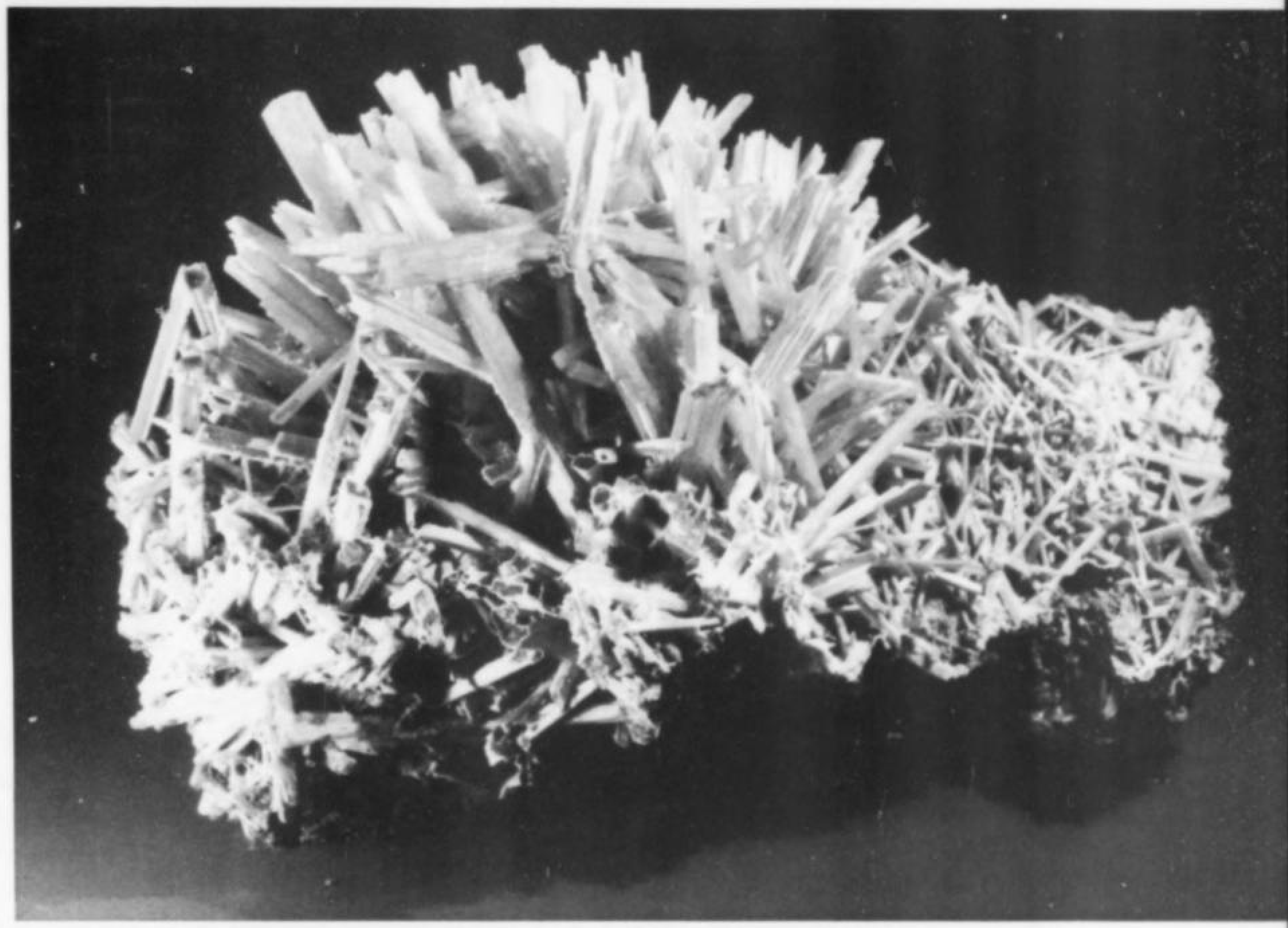


Figure 16, above. **Crocoite** (orange-red, 15 cm wide), from the Adelaide Proprietary mine near Dundas, Tasmania. See M.R. 3, 111.

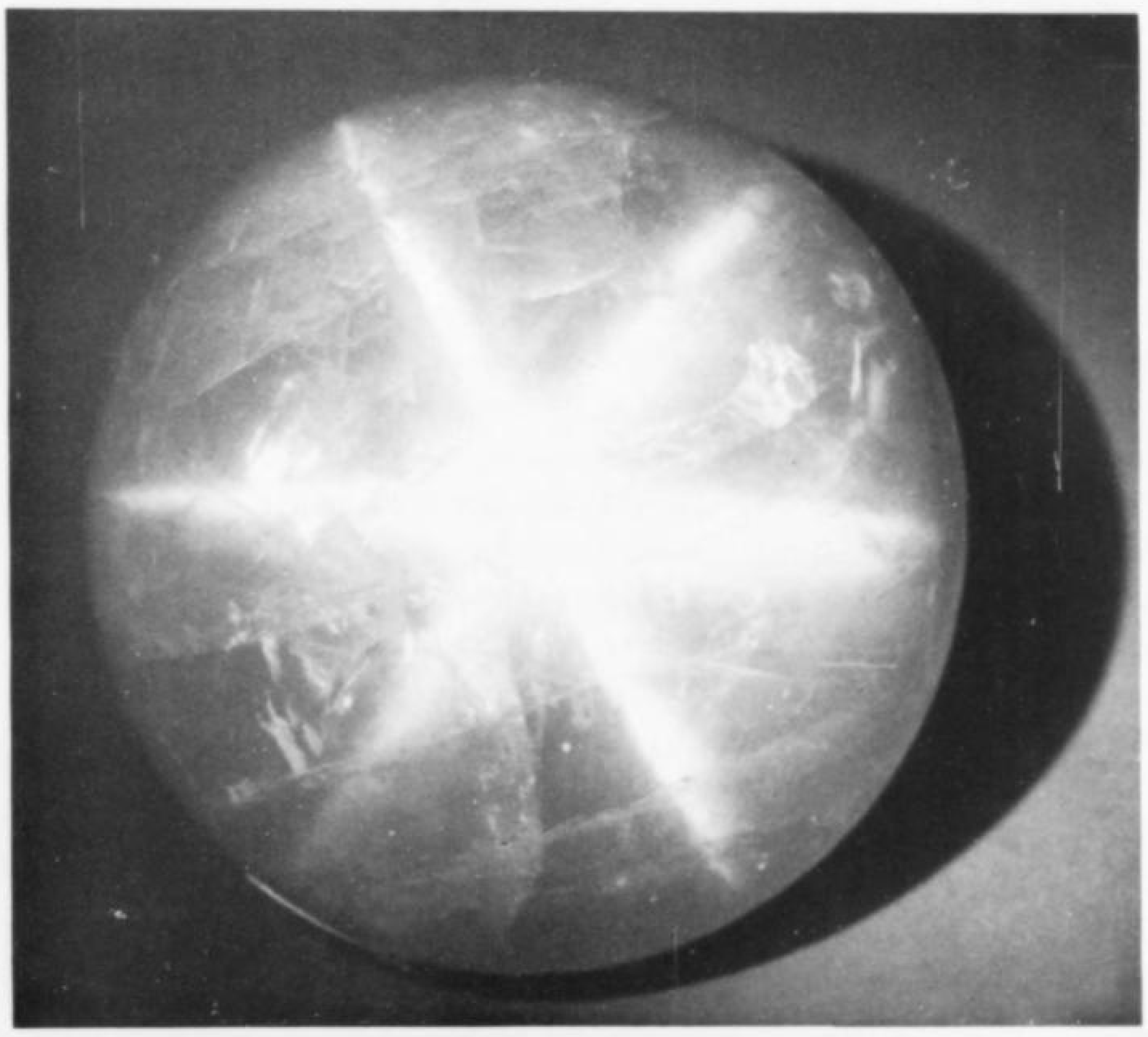
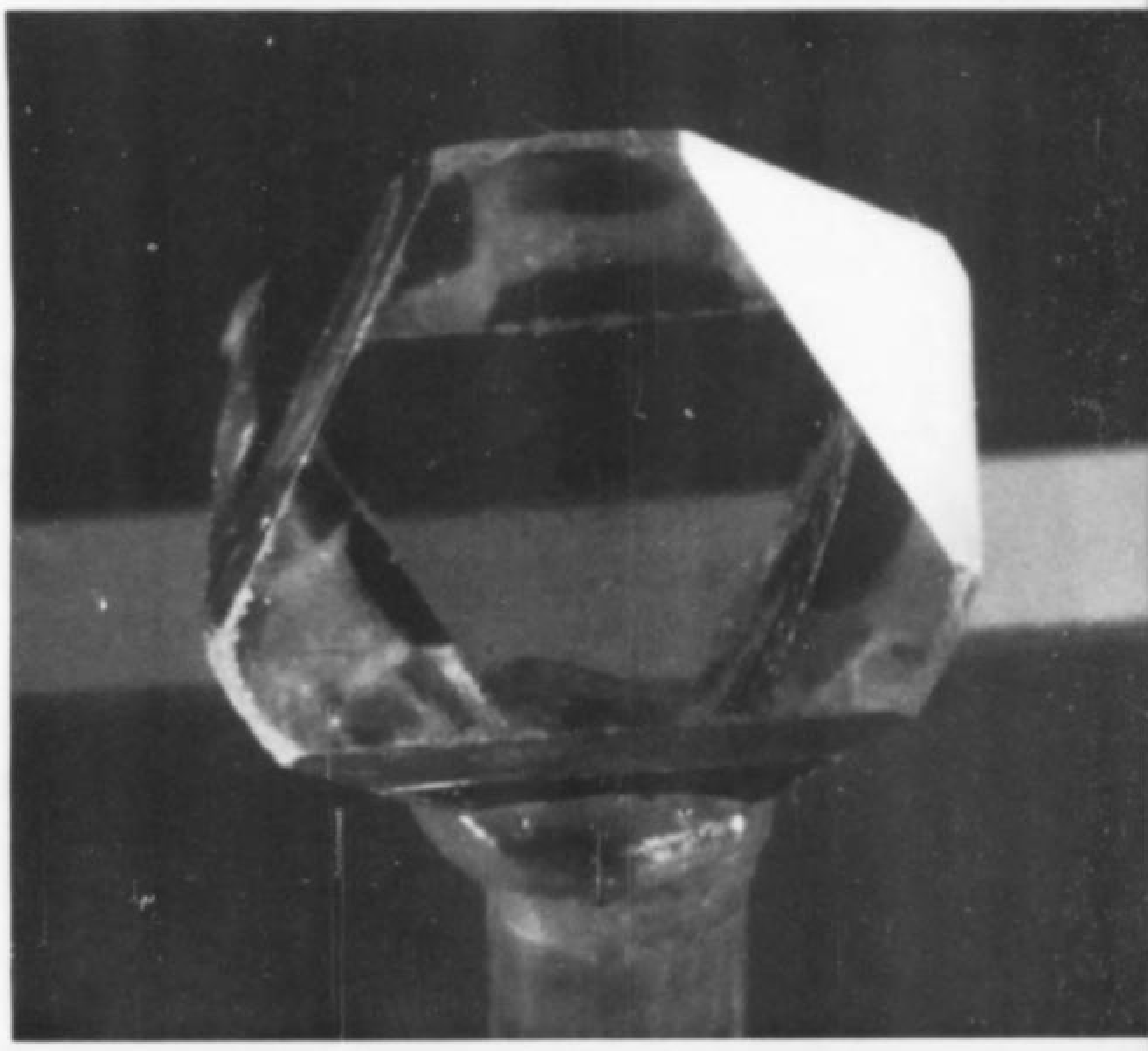


Figure 18, below. **Diamond** (colorless, 6.3 cts., 1 cm) Sierra Leone.



MINERALS of the LAURIUM MINES ATTICA, GREECE

by William Kohlberger **121 Ross Avenue Hackensack, New Jersey 07601**

INTRODUCTION

The Laurium mines, on the Attica peninsula, are located approximately 25 miles southeast of Athens, on the coast of the Aegean Sea, in the southeast corner of the Greek mainland. First worked by the Myceneans, the Athenians later mined lead and silver starting about 600 B.C. Abandoned in 100 A.D., the mines were not reworked until the middle nineteenth century, when a French zinc mining company renewed operations, which are still underway.

The deposits of ore are located in two major rock series, the Plaka and the Kamaréza. The lower and more northern, the Plaka series, consists of two layers of limestone separated by schist. The Plaka series is discordant with the Kamaréza series (marble, mica schist, calcschist, marble). Mylonites are observed at the bottom of the Plaka series. The primary ore is concentrated in the lower Plaka series limestone and in the Kamaréza calcschist, but it occurs throughout the region. Most of the secondary ore is in the Kamaréza marbles.

The primary minerals formed under alkaline conditions. Stalactitic structures found in the karstic structures on both sides of the Plaka-Kamaréza discordance indicate the sulfides were deposited in veins by low-temperature hydrothermal solutions. The solutions flowed through the cavities and the minerals precipitated from them. Probable presence of considerable quantities of H_2CO_3 in adjacent cavities provided a reducing agent and favored formation of sulfides in sinuous digitated bands closely associated with stalactitic structures and covered by a twenty cm thick layer of massive sulfides. The sulfides in the karsts, as grains, are covered by scalenohedrons and concentric, rosette-like layers of calcite.

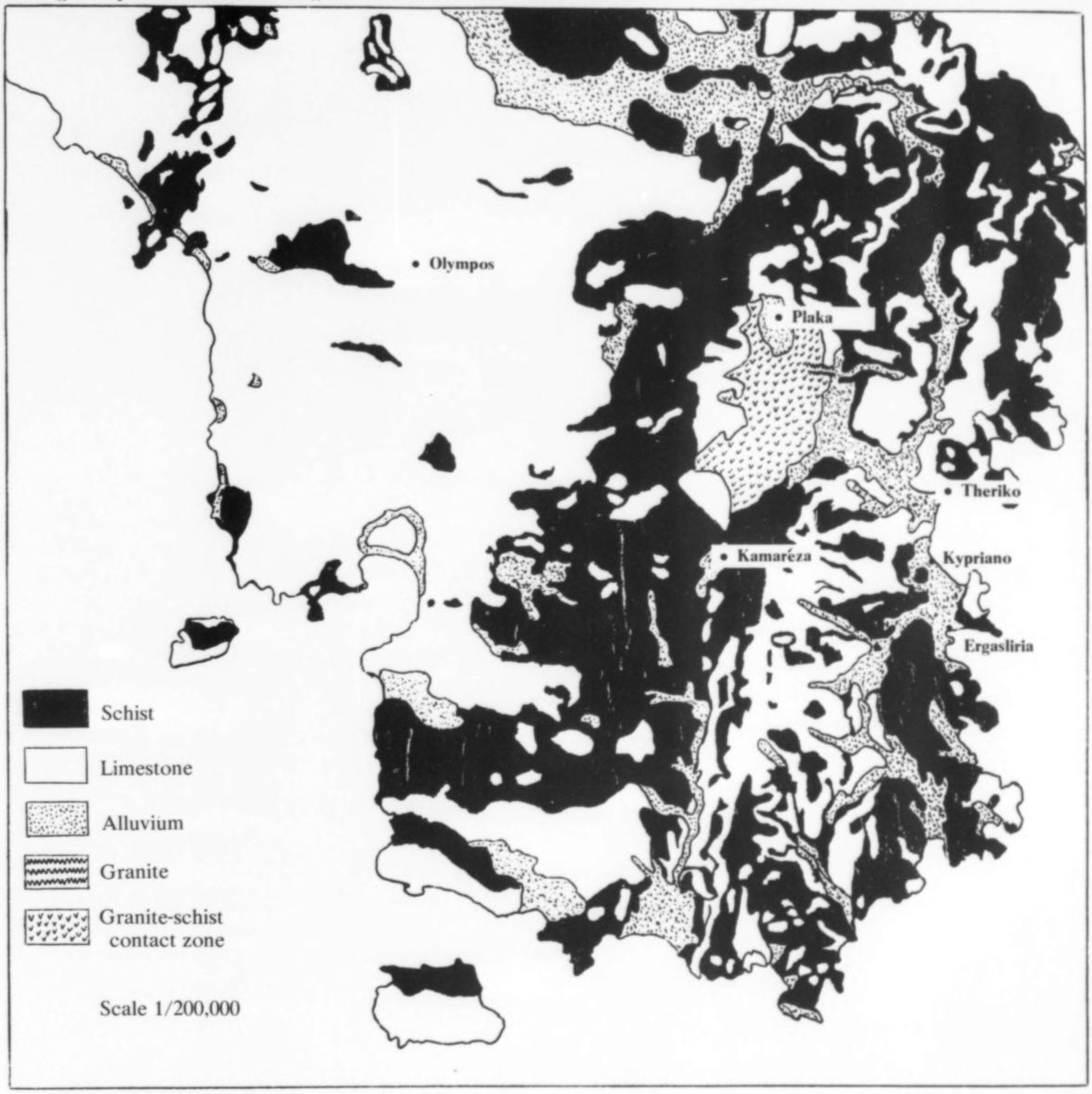
Thousands of mine shafts have been sunk since the discovery of the Laurium deposits. Many do not have names, many had names that have not been preserved, and it is not known exactly which minerâls came from each individual shaft. The names "Plaka mine" and "Kamaréza mine" are the names of the two major mines worked by the French. Only two mine names are referred to in this paper, both for simplicity and for the lack of more specific information. Trends are observable in the literature which indicate that the Ni-Mn minerals and most of the Fe minerals with a poorly developed secondary zone are characteristic of the Plaka region, while the Kamaréza region has extensive secondary ore deposits. The mine names are meant only to indicate the mineralization of a region and help clarify relationships between association suites. Concerning lead slag occurrences, specific locality names are not generally given; Daviot (1899), however, states localities for laurionite (and, presumably, all other slag minerals) as "Baie de Pacha" and "Panormo." These names could not be correlated with the Daviot map or any other map examined, and are therefore of little use.

Colors, when specifically described (*i.e.*, "methyl green"), refer to Ridgway's *Color Standards and Nomenclature* (1912). In the table, "Mineral Association Suites." an attempt has been made to list species in an approximate order of abundance within each suite.

ON THE LAURIUM LEAD SLAG ALTERATION PRODUCTS

Though Laurium possesses interesting primary and secondary ore zones which produce some of the finest specimens of smithsonite, annabergite, adamite and others, the most unique aspect of the region is the presence of the secondary lead slag products, formed by action of sea water on lead not recovered from smelted ore. The slag products form as fine, mostly microscopic crystals in gas bubble cavities. Laurium, with its fine secondary zinc and nickel minerals, would have been a classic locality even if there had been no slags; but it would not rank with Långban, Sweden; Franklin, New Jersey; Chuquicamata, Chile; Cornwall, England; and a handful of others as one of the unique mineral localities in the world. Laurium is great because it is a unique environment; lead and sea are in close proximity. Man also happened to be part of that environment. Man found the lead and saw its potential uses. The lead was removed and treated. The slag remained, and was returned to the environment. That which was created from the lead man removed must be considered man-made because man saw its use - he reasoned that something could be done with it. The slag, however, had no use for man; man acted as a random element in the environment, as an act of nature. As the formation of slag was not caused by a conscious effort of man, it is an accidental product of its environment. If it is said that an act of man negates the validity of a mineral species, then the only true minerals are those still in the ground. It requires an act of man to open a mine, take out a mineral, put it in a museum, and so on. These are still considered valid minerals even though man has made a conscious effort to remove them from their environment. If the limitation is refined, that man should have no hand in the formation of minerals, all the orpiment and arsenolite in old light-altered realgar specimen is man-made. Man removed the realgar from the mine, causing it to alter; if it were still in the mine, no new minerals would have formed until natural conditions caused them to. The crux of the problem is man's unique capability above all other

Geologic map of Laurium, showing mine locations after Daviot (1899).



factors in an environment; his ability to reason and cause actions through conscious effort. All other natural phenomena follow specific laws under specific conditions; man, however, does not act in a manner which can be predicted by an equation. Man is unpredictable and must be considered a random element in any environment.

Man can reason, but his reasoning ability is not always applied. When a man's purpose is to form a chemical compound, the compound formed must be considered man-made. Man uses his reasoning ability to create and control all elements involved and the conditions. When man accidentally has a part in the formation of a chemical compound, the compound should be considered natural - a part of nature. Man is still a part of nature.

In recent years the definition of a mineral has been more difficult to determine. Every rule that was formerly recognized now has some kind of exception. To maintain a strict rule that man cannot be a factor in mineral formation is to make a very complex problem simplistic. With the unpredictable actions and reasoning abilities of man involved, the problems in determining what a true mineral and what a true mineral occurrence is are tremendously more involved than the problems incurred in physical properties such as crystal structure and constant chemical formula.

Science cannot prematurely elevate man to a position in which he is considered completely independent of environment and natural events. As he is in danger of destroying it, nothing could be further from the truth.

MINERAL ASSOCIATION SUITES

Zone P1: Plaka mine, Primary Ore Zone association
- Barite
- Calcite
- Quartz
- Galena
- Sphalerite
- Pyrite
- Chalcopyrite
- Marcasite
- Chalcocite
- Digenite
- Djurleite
- Covellite
- Hematite
- Siderite
- Rhodochrosite
- Gersdorffite
- Silver
- Gold (?)

Zone K1: Kamaréza mine, Primary Ore Zone association
- Barite
- Calcite
- Quartz
- Galena
- Sphalerite
- Pyrite
- Chalcopyrite
- Arsenopyrite
- Marcasite
- Chalcocite
- Digenite
- Djurleite
- Covellite
- Tetrahedrite
- Silver
- Bismuth (?)
- Gold (?)

Zone P2: Plaka mine, Secondary Ore Zone association

Suite P2a: Ubiquitous
- Barite
- Calcite
- Goethite
- Lepidocrocite
- Pyrite
- Marcasite
- Aragonite

Suite P2b: Zn-Pb association
- Smithsonite
- Cerussite
- Anglesite

Suite P2c: Ni-Mn association
- Garnierite
- Annabergite
- Pyrolusite
- Romanechite

Suite P2d: As association
- Orpiment
- Realgar
- Arsenolite

Zone K2: Kamaréza mine, Secondary Ore Zone association

Suite K2a: Ubiquitous
- Barite
- Calcite
- Gypsum
- Goethite
- Lepidocrocite
- Endellite
- Aragonite
- Allophane

Suite K2b: Zn-Cu association
- Smithsonite
- Hemimorphite
- Malachite
- Azurite
- Adamite
- Serpierite
- Hydrozincite
- Euchroite
- Olivenite
- Aurichalcite
- Zincaluminite
- Zinc-melanterite
- Brochantite
- Atacamite
- Glaucokerinite
- Cyanotrichite
- Copper
- Cuprite
- Willemite
- Austinite
- Ktenasite
- Mixite
- Greenockite
- Conichalcite (?)

Suite K2c: Pb association
- Fluorite
- Cerussite
- Anglesite
- Pyromorphite
- Mimetite
- Wulfenite
- Vanadinite
- Phosgenite
- Hydrocerussite
- Matlockite

Suite K2d: Fe association
- Scorodite
- Pharmacosiderite
- Jarosite
- Plumbojarosite
- Natrojarosite
- Pyrite
- Marcasite
- Beudantite
- Arseniosiderite

Zone S3: Secondary Lead Slag association
- Quartz
- Smithsonite
- Phosgenite
- Laurionite
- Cerussite
- Paralaurionite
- Anglesite
- Hydrocerussite
- Fiedlerite
- Matlockite
- Georgiadesite
- Boleite
- Pseudoboleite
- Cumengite
- Diaboleite (?)

Zone P4: Plaka mine, Contact Metamorphic association
- Quartz
- Calcite
- Chalcopyrite
- Hornblende
- Penninite
- Troilite

DESCRIPTIONS OF LAURIUM MINERALS

NATIVE ELEMENTS

Gold - Au

None found on any specimen examined and not described in any located article. Presumably in very small amounts in ore veins (Putzer, 1948).

Silver - Ag

Present as an impurity in galena, from 800 to 5000 grams per ton. Also reported as a secondary mineral (Putzer, 1948).

Copper - Cu

Found in the Kamaréza mine as isolated grains and spongy filaments in the secondary ore zone (Daviot, 1899).

Bismuth - Bi

Not found on any specimens or described in any of the literature examined. Presumably as small grains or granular masses in the ore veins (Putzer, 1948).

SULFIDES

Troilite - FeS

Found in the contact zone between the Plaka granodiorite and the Kamaréza schist near the Plaka mine ore body associated with P4 minerals.

Pyrite - FeS_2

Common in ore veins at the Plaka and Kamaréza mines as grains and fine small crystals with P1 and K1 associations. Crystals occur as cubes, pyritohedrons, octahedrons and tetrahedrons. Observed from Kamaréza mine as pseudomorphs after striated 1cm tetrahedrite tetrahedrons in an open cavity in primary ore with micro crystals of arsenopyrite, colorless quartz, white calcite, massive granular chalcocite and twisted scales of covellite. In the karstic structures of the primary ore zone as 1 to 2mm grains which form the cores of sphalerite spherolites which are covered by rosette-like concentric layers of white or brown calcite. As micro pyritohedrons (negative) replaced by colorless transparent calcite with galena, chalcopyrite and quartz (Leleu, 1967).

Gersdorffite - NiAsS

From the Plaka mine as dark blue-gray compact masses in primary ore zone with P1 associates, garnierite and annabergite.

Marcasite - FeS_2

In the karst structures of the Kamaréza and Plaka mines as grains to 1mm with pyrite, calcite and sulfides (Leleu, 1967). Also reported in secondary ore zone (Putzer, 1948).

Arsenopyrite - FeAsS

Found in the primary ore zone as fine small (to 2mm observed) simple crystals with granular galena, large white rhombohedral calcite crystals, black granular and small rough tetrahedrons of sphalerite, granular chalcopyrite and small colorless quartz crystals. As more complex fine 2mm crystals with pyrite pseudomorphs after tetrahedrite, micro pyrite cubes, colorless quartz crystals, massive granular chalcocite and scaly covellite.

Chalcocite - Cu_2S

Occurs as fine grains in the primary ore zones of the Plaka and Kamaréza mines in veins with P1 and K1 associations, intimately associated with covellite.

Djurleite - $Cu_{1.96}S$

Digenite - Cu_9S_5

As phase change oxidation products of chalcocite.

Sphalerite - (Zn,Fe)S

Common with P1 and K1 associations as black to light brown grains and small rough tetrahedral crystals. Crystals rare. In karst structures as light brown grains with pyrite cores; grains are coated with concentric layers of white or brown calcite, with granular galena, marcasite, pyrite, chalcopyrite, chalcocite, covellite and cerussite. Sphalerite is the most common mineral in the karsts (Leleu, 1967).

Galena - PbS

From the Kamaréza and Plaka mines as small veins, rognons and granular masses with P1 and K1 associations. Crystals small, rare and indistinct. Contains small amounts of As and Sb as impurities, and economically recoverable amounts of Ag (to 5kg per ton). In karsts as grains to 1mm or as cores of sphalerite grains (Leleu, 1967).

Covellite - CuS

As minute scaly twisted plumose aggregates with P1 and K1 associations, intimately associated with chalcocite.

Greenockite - CdS

In secondary ore zone as powdery coatings on smithsonite.

Chalcopyrite - $CuFeS_2$

Found as grains and pseudo-octahedral micro crystals in the Plaka and Kamaréza mines with P1 and K1 associations. As grains with sulfides and calcite in the karsts (Leleu, 1967).

Realgar - AsS

From the Plaka mine as small rough translucent crystals in an open seam in colloform dark green-yellow orpiment.

Orpiment - As_2S_3

As radial fibrous colloform dark green-yellow masses from the Plaka mine with P2d associates. Also, with arsenolite, as a decomposition product of realgar.

SULFOSALTS

Tetrahedrite - $(Cu,Fe)_{12}Sb_4S_{13}$

From the Kamaréza mine as sharp irregular striated 5mm crystals in a seam in massive ore, replaced by pyrite, associated with micro cubic pyrite, arsenopyrite crystals, quartz crystals, calcite crystals, granular chalcocite and covellite.

FLUORIDES

Fluorite - CaF_2

Occurs in the Kamaréza mine as cubes and nodular masses with barite with K1 association. As irregular pink

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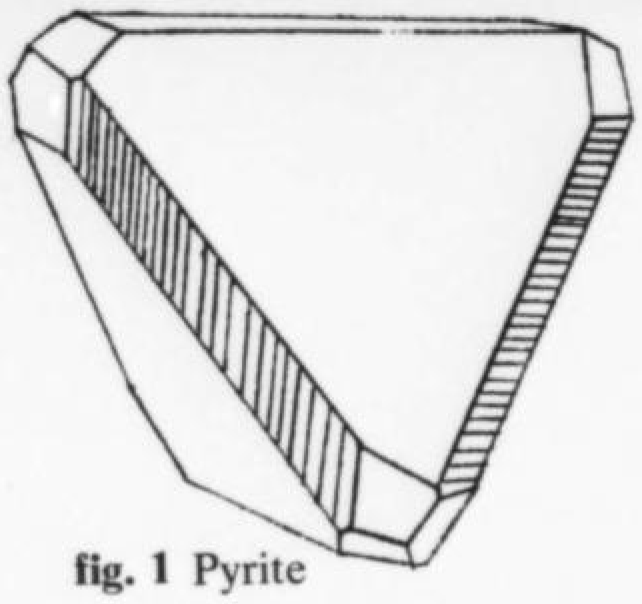


fig. 1 Pyrite

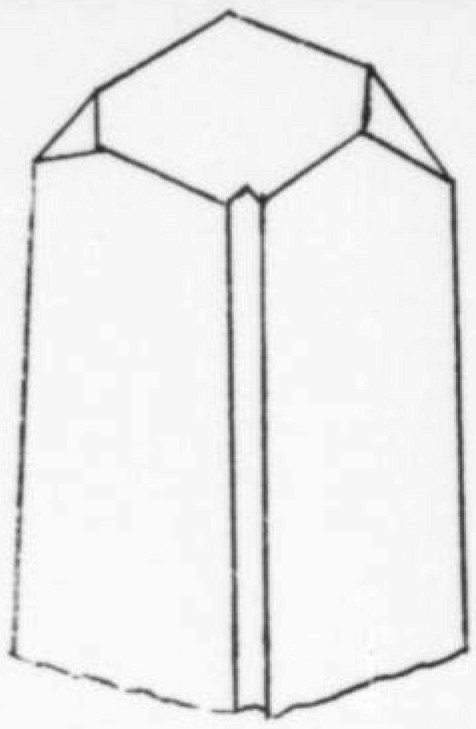


fig. 2
Arsenopyrite

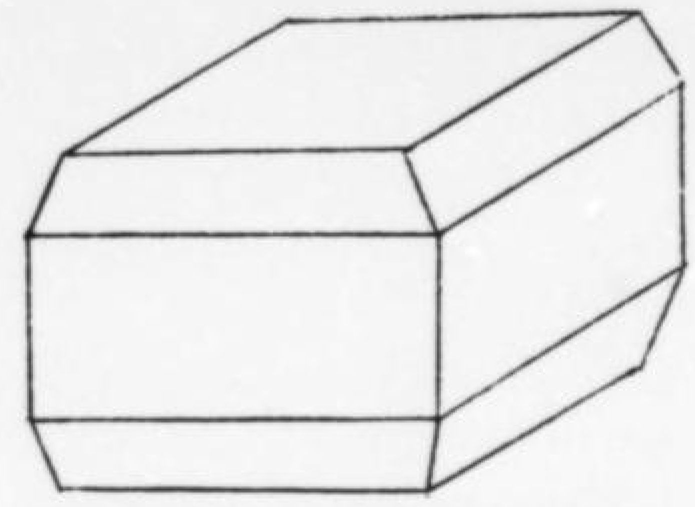


fig. 3 Boleite and pseudoboleite

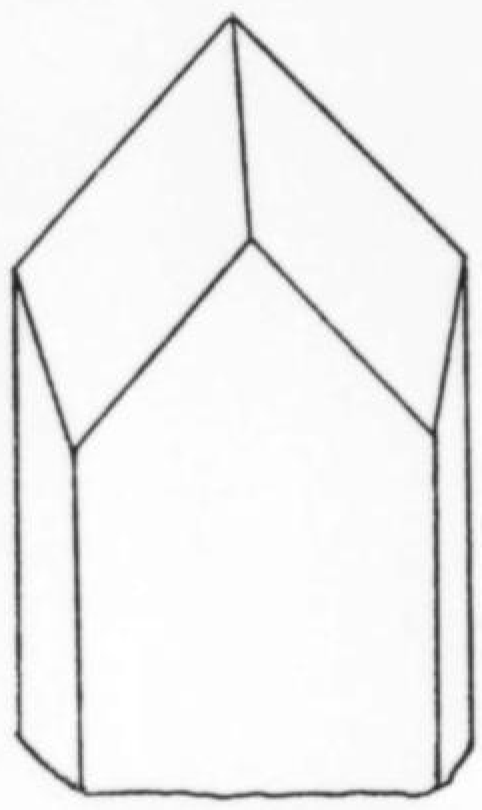


fig. 4 Laurionite

fig. 5 Laurionite

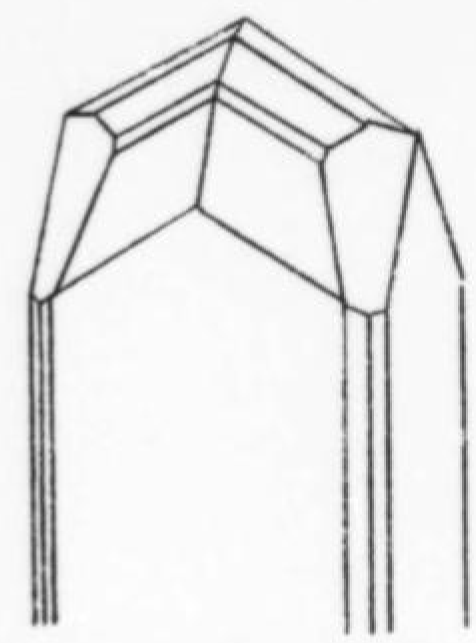


fig. 6 Laurionite

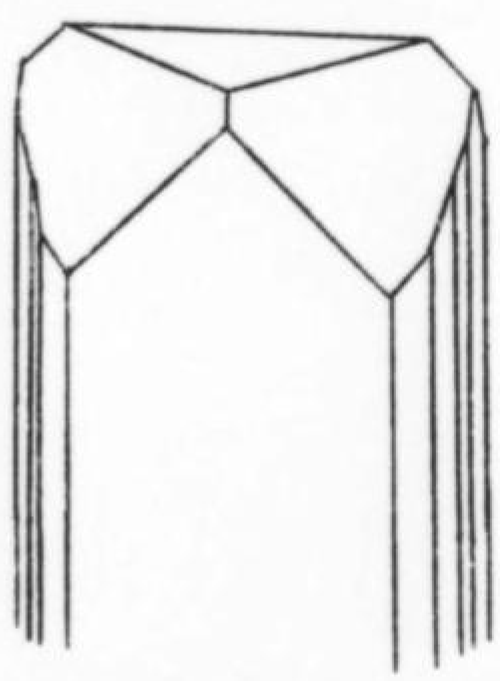


fig. 7 Laurionite

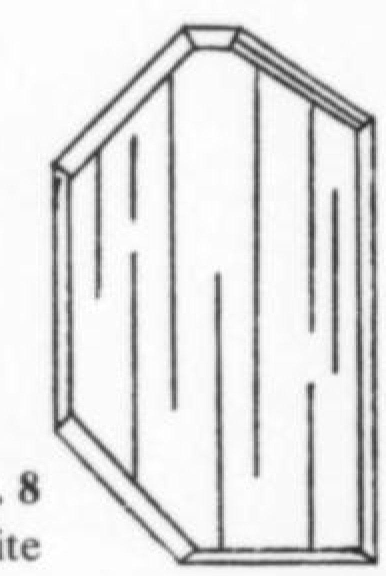


fig. 8
Paralaurionite

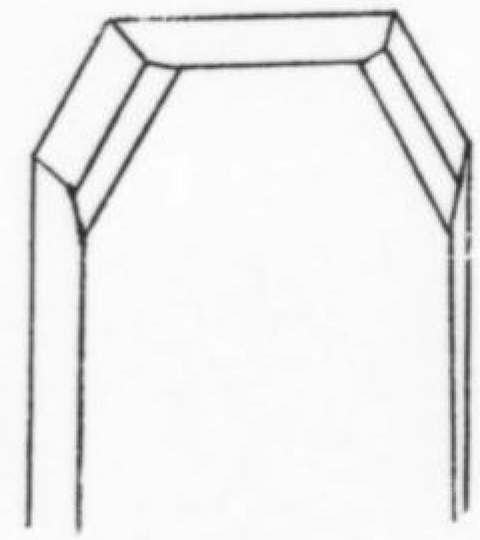


fig. 9 Paralaurionite

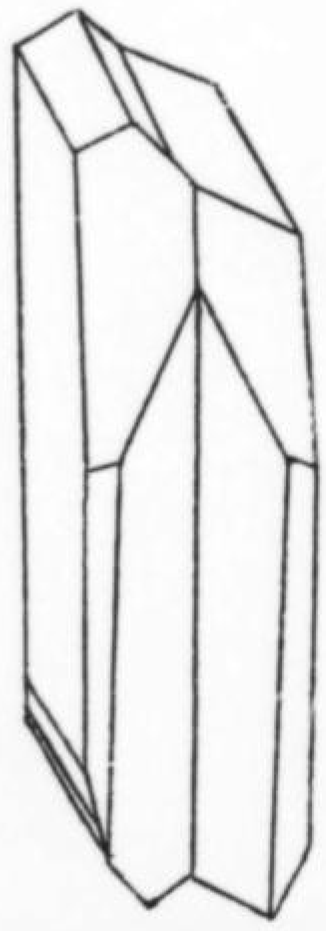


fig. 10
Paralaurionite

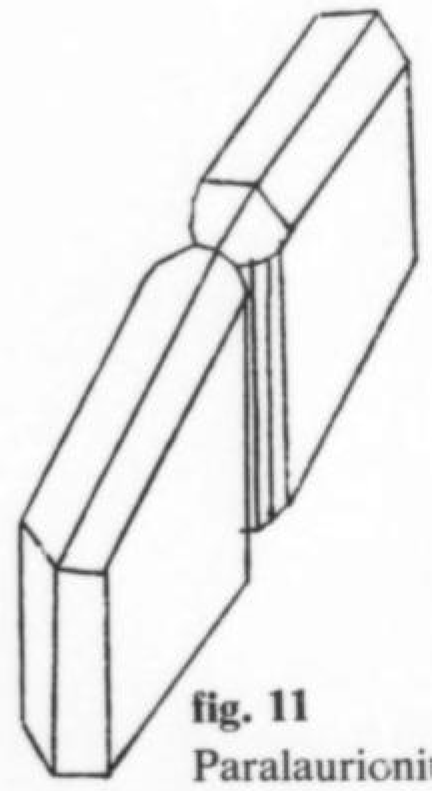
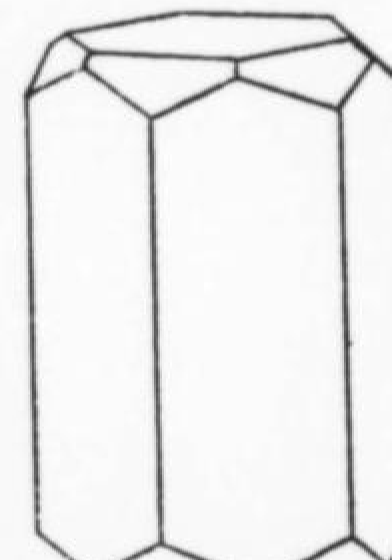


fig. 11
Paralaurionite

fig. 12 Penfieldite



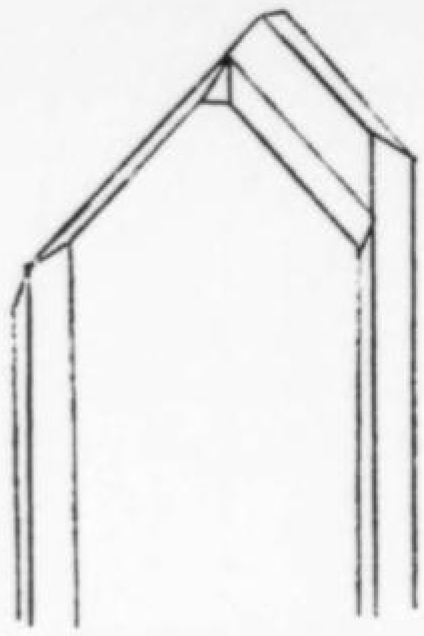


fig. 13 Fiedlerite

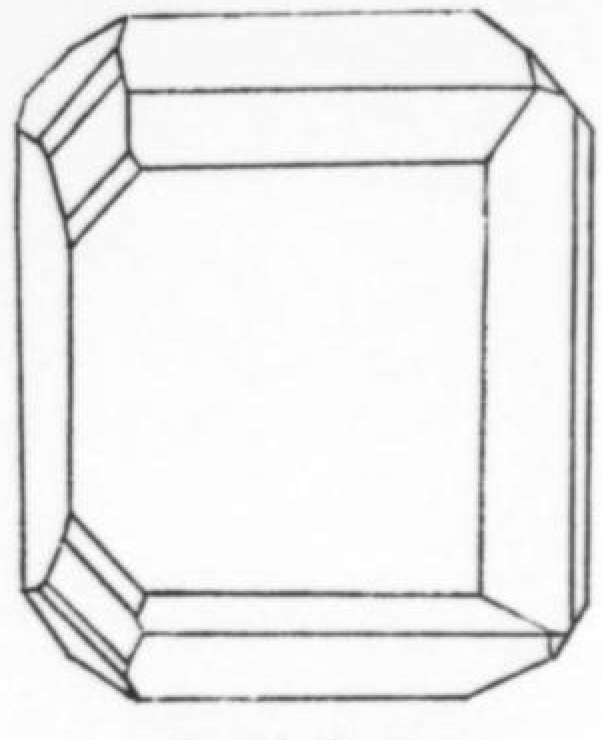


fig. 14 Fiedlerite

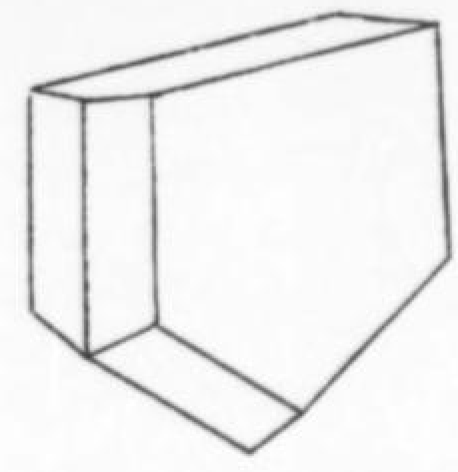


fig. 15 Hemimorphite

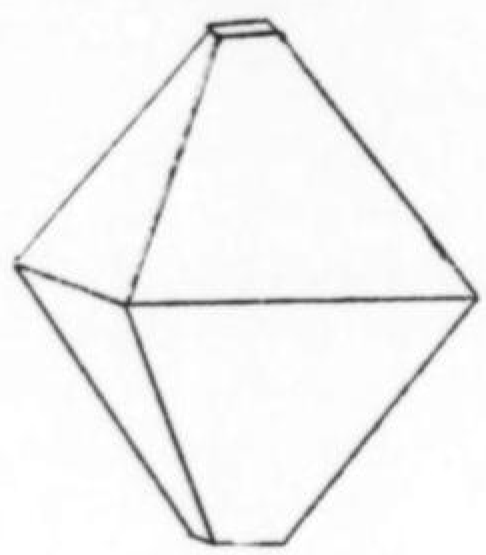


fig. 16 Scorodite

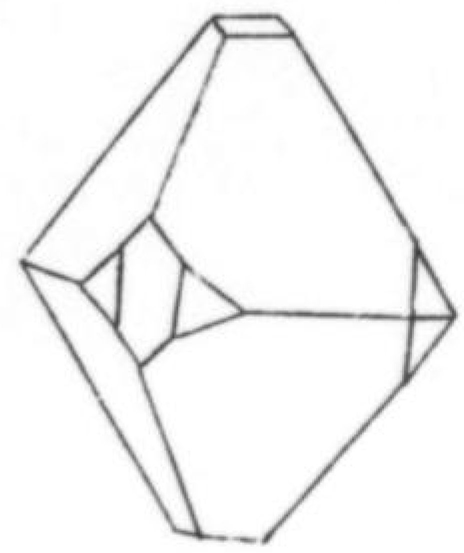


fig. 17 Scorodite

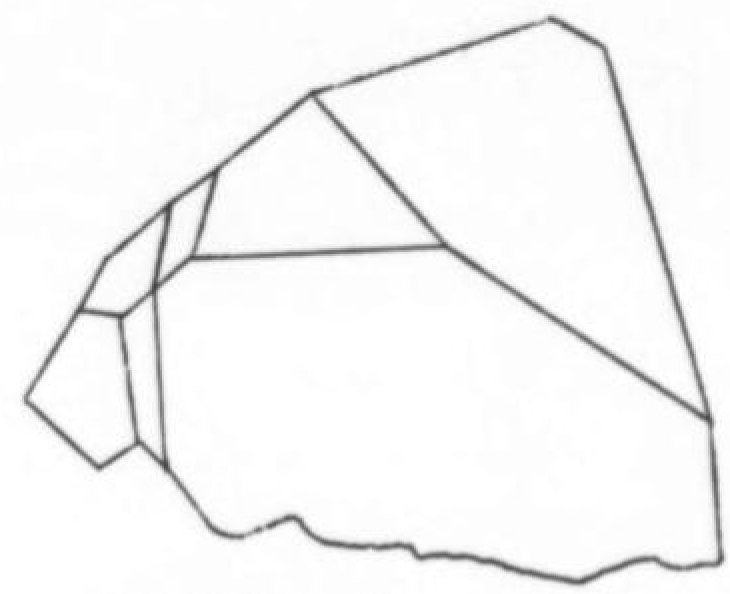


fig. 18 Scorodite

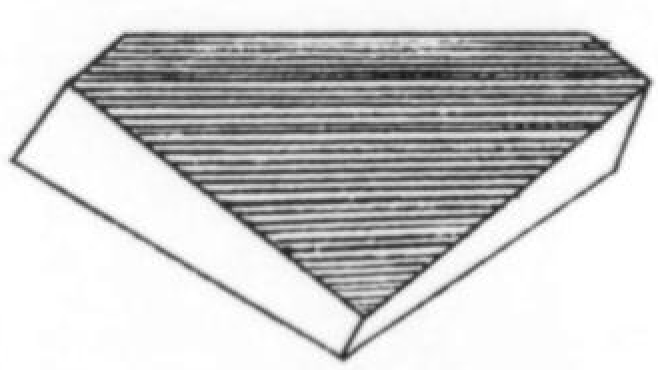


fig. 19 Arseniosiderite

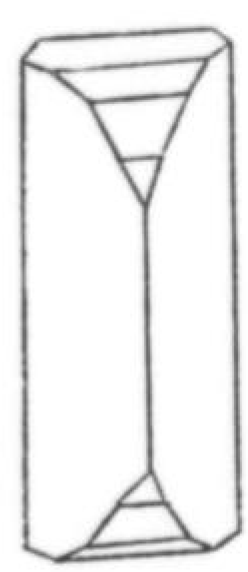


fig. 20 Adamite

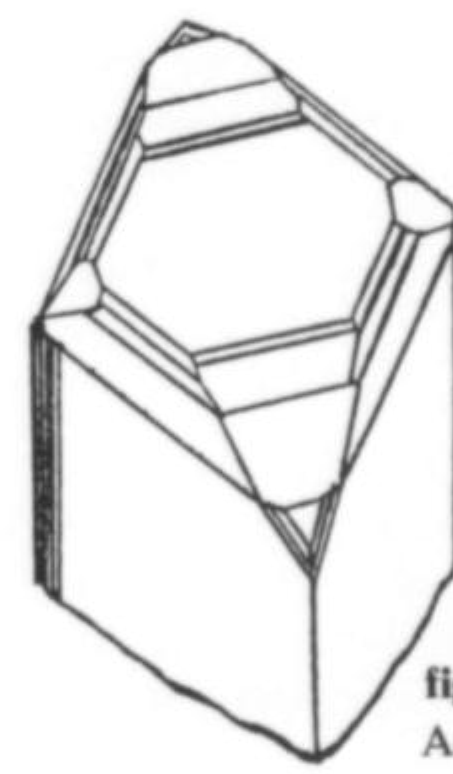


fig. 21 Adamite

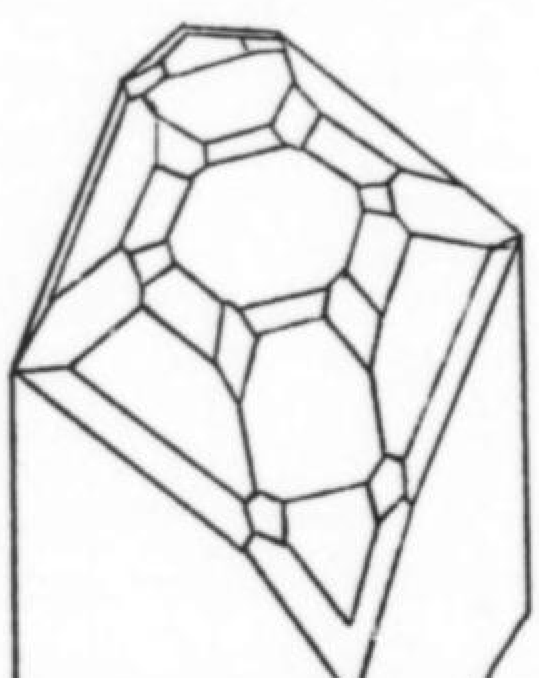


fig. 22 Adamite

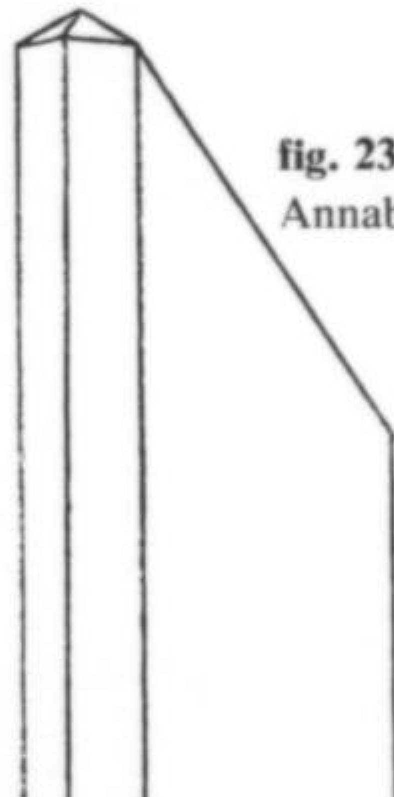


fig. 23 Annabergite

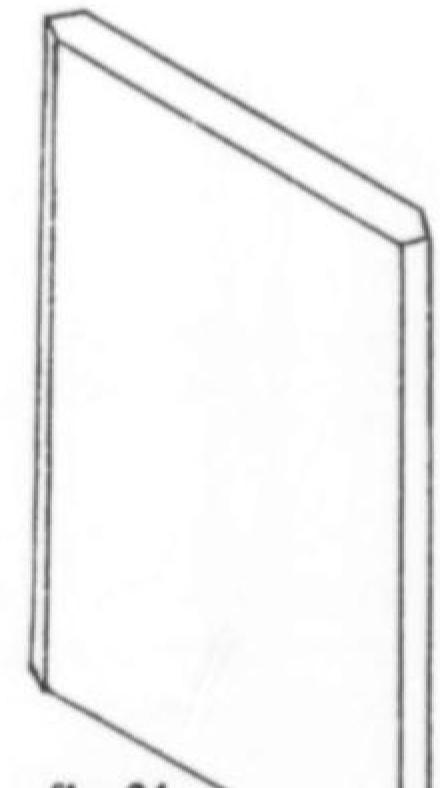


fig. 24 Annabergite

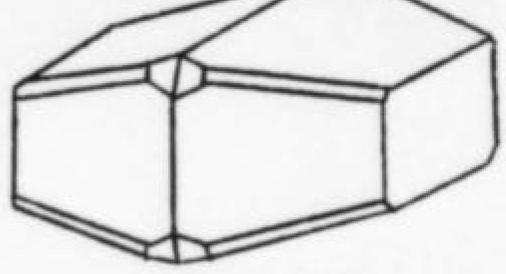


fig. 25 Georgiadesite

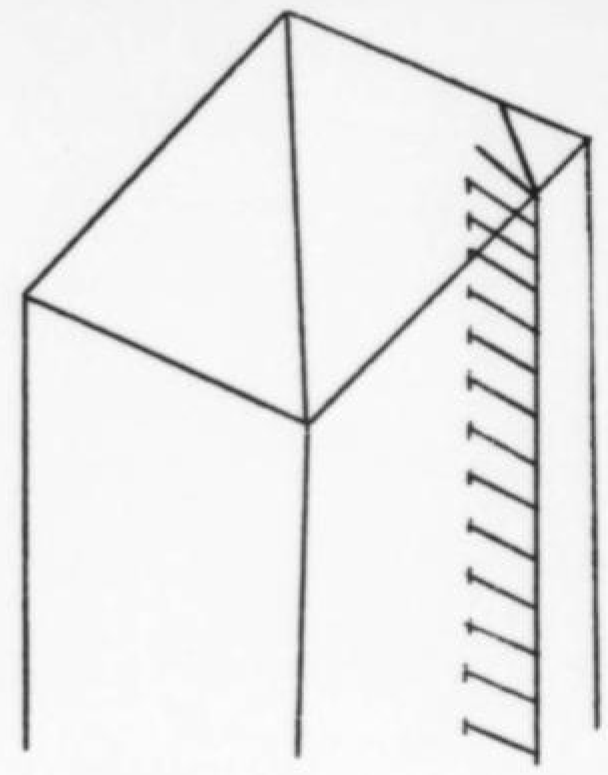


fig. 26 Gypsum

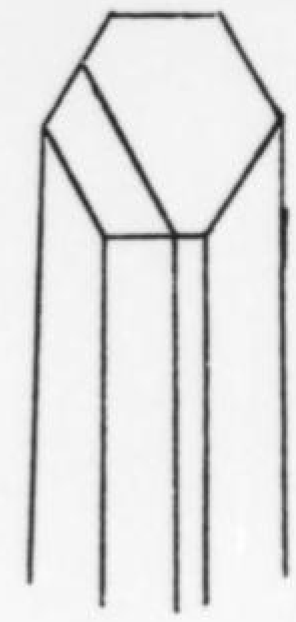


fig. 27 Gypsum

fig. 28 Ktenasite

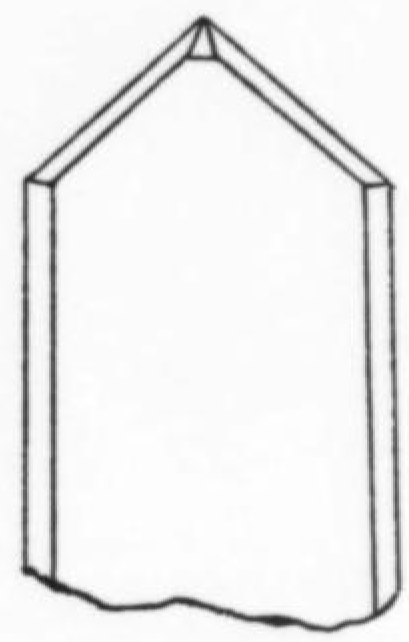


fig. 29 Serpierite

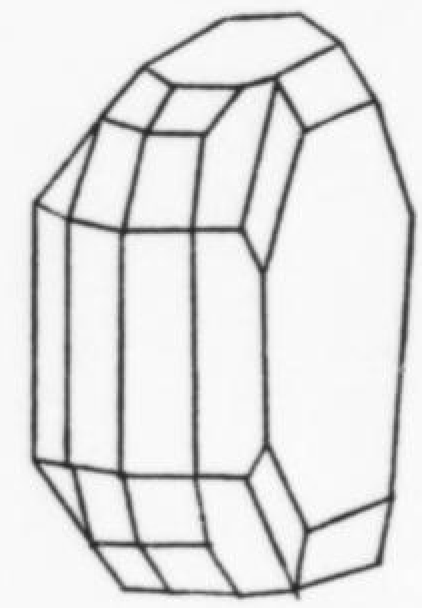


fig. 30 Anglesite

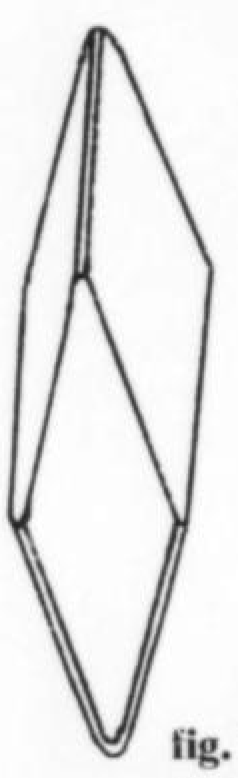


fig. 31 Smithsonite

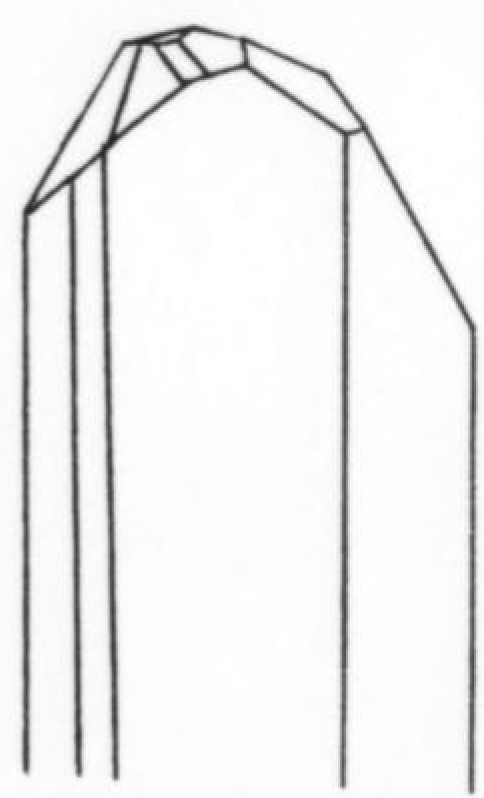


fig. 32 Azurite

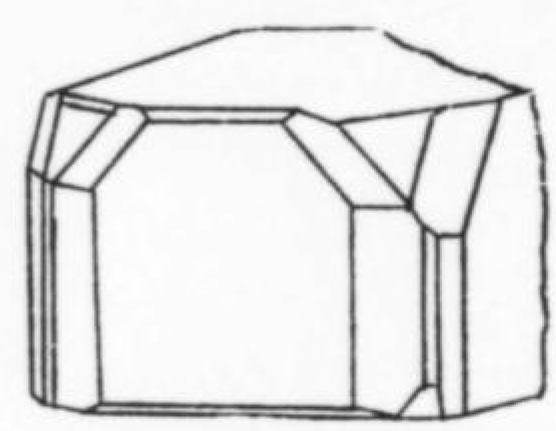


fig. 33 Phosgenite

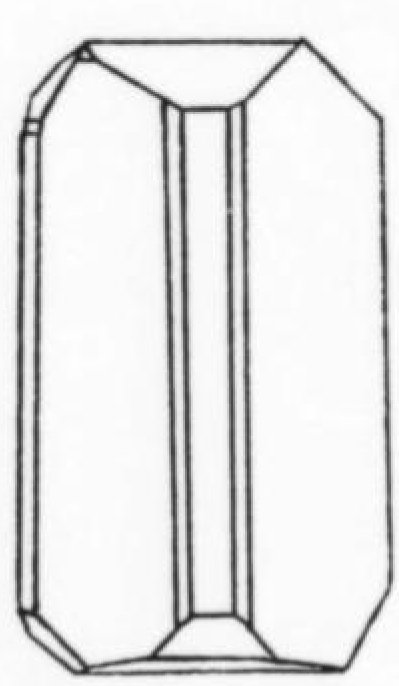


fig. 34 Phosgenite

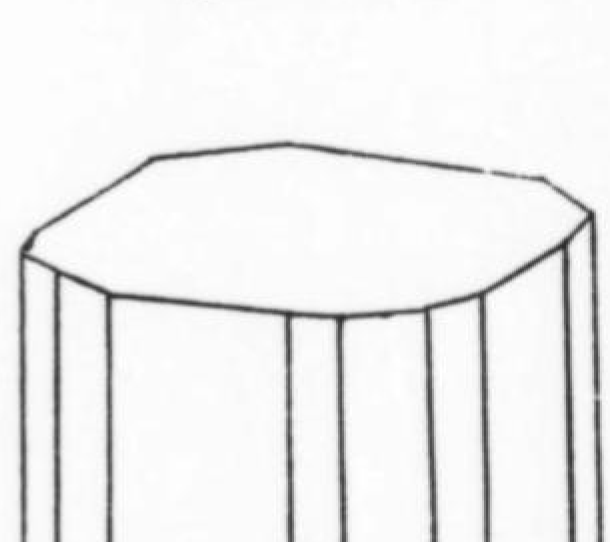


fig. 35 Phosgenite

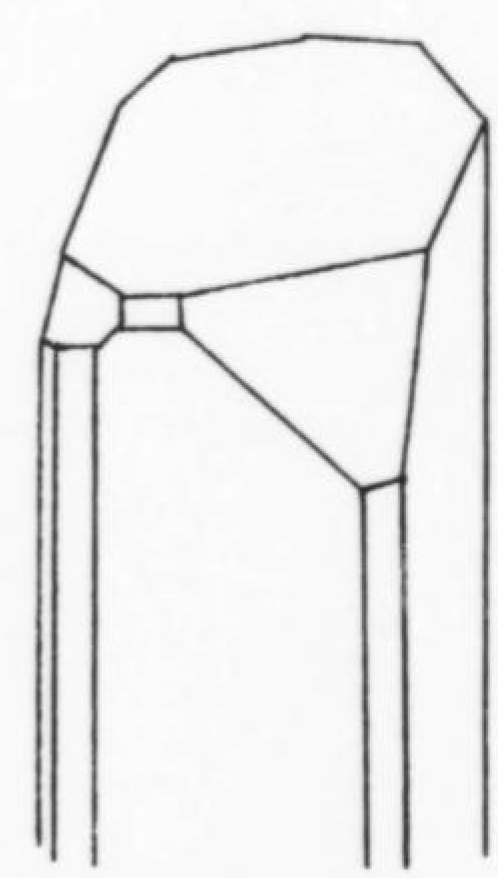


fig. 36 Phosgenite

SOURCES OF CRYSTAL DRAWINGS

Figure 1 - Pyrite (Goldschmidt, 6:132, fig. 494).
Figure 2 - Arsenopyrite (Kohlberger; AMNH Pyrite #1644).
Figure 3 - Boleite and pseudoboleite (*Min. Rec.*, **4**, 263, fig. 1-3).
Figure 4 - Laurionite (Palache, fig. 4).
Figure 5 - Laurionite (Palache, Berman and Frondel, II, 63).
Figure 6 - Laurionite (Goldschmidt, 5:86, fig. 5).
Figure 7 - Laurionite (Goldschmidt, 5:86, fig. 3).
Figure 8 - Paralaurionite (Goldschmidt, 6:68, fig. 2).
Figure 9 - Paralaurionite (Palache, Berman and Frondel, II, 65).
Figure 10 - Paralaurionite (Palache, fig. 12).
Figure 11 - Paralaurionite (Palache, fig. 14).
Figure 12 - Penfieldite (Gordon, fig. 4).
Figure 13 - Fiedlerite (Palache, fig. 17).
Figure 14 - Fiedlerite (Goldschmidt, 4:1, fig. 1).
Figure 15 - Hemimorphite (Goldschmidt, 5:10, fig. 24).
Figure 16 - Scorodite, var. "lossenite" (Adapted from Goldschmidt, 8:40, fig. 3; AMNH Lossenite #17158).
Figure 17 - Scorodite (Goldschmidt, 8:40, fig. 3; AMNH #15528).
Figure 18 - Scorodite (Kohlberger; AMNH #15528).
Figure 19 - Arseniosiderite (Kohlberger; AMNH #26272).
Figure 20 - Adamite (Goldschmidt, 1:1, fig. 3).
Figure 21 - Adamite (Ungemach, fig. 2).
Figure 22 - Adamite (Ungemach, fig. 3).
Figure 23 - Annabergite (Barth, fig. 1(b)).
Figure 24 - Annabergite (Kohlberger; Kohlberger #Kg1g1).
Figure 25 - Georgiadesite (Goldschmidt, 4:19, fig. 1).
Figure 26 - Gypsum (Daviot, p. 418).
Figure 27 - Gypsum (Daviot, p. 419).
Figure 28 - Ktenasite (Kokkoros, p. 342).
Figure 29 - Serpierite (Goldschmidt, 8:24, fig. 1).
Figure 30 - Anglesite (Goldschmidt, 1:38, fig. 34).
Figure 31 - Smithsonite (Adapted from Goldschmidt, 9:76, fig. 7; AMNH #8307).
Figure 32 - Azurite (Kohlberger; AMNH #8810).
Figure 33 - Phosgenite (Goldschmidt, 6:89, fig. 12).
Figure 34 - Phosgenite (Kohlberger; AMNH #18911).
Figure 35 - Phosgenite (Adapted from Goldschmidt, 6:89, fig. 8; AMNH #18911).
Figure 36 - Phosgenite (Kohlberger; AMNH #18911).

Note: "AMNH" (American Museum of Natural History) or "Kohlberger" followed by a number indicates collection and catalog number of source specimen.

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crystals with mimetite and K2 association in the secondary ore zone (Roberts, Rapp and Weber, 1974).

CHLORIDES

Atacamite - $Cu_2Cl(OH)_3$

No specimens examined contained atacamite. Reported by Putzer (1948) as a secondary mineral. Probably occurs in the Kamaréza mine with K2a and K2b associations (Palache, Berman and Frondel, 1951).

Diaboleite - $Pb_2CuCl_2(OH)_4$

As micro deep blue square tabular crystals. As the only source of information on the Laurium occurrence examined is a photograph in Rapp, Roberts and Weber (1974), the associations and source of this mineral cannot be described here. Diaboleite could have formed either in the secondary ore zone of the Kamaréza mine or in the lead slags.

Cumengite - $Pb_4Cu_4Cl_8(OH)_8 \cdot H_2O$

Pseudoboleite - $Pb_5Cu_4Cl_{10}(OH)_8 \cdot 2H_2O$

Boleite - $Pb_9Cu_8Ag_3Cl_{21}(OH)_{16} \cdot H_2O$

All found as minute blue crystals with long prismatic phosgenite crystals in slag. Boleite found as cubes and cubes overgrown with pseudoboleite or cumengite. Cumengite found as tabular single crystals or overgrowths on boleite. Pseudoboleite, previously found only as overgrowths on boleite mentioned above, has been reported as a single crystal. Crystals found and described by Roland Rouse (Yedlin, 1973b).

Matlockite - PbFCl

Occurs very rarely in lead slag with S3 association as indistinct yellow-orange micro crystals, singly or in subparallel aggregates; crystals usually translucent to opaque (Lacroix, 1896). Also reported as an alteration product of galena with K2c association (Putzer, 1948).

Laurionite - PbCl(OH)

In slag with phosgenite and other S3 associates as tabular single and composite crystals to 1cm long. Colorless to light grayish, transparent; one of the more common slag minerals.

Paralaurionite - PbCl(OH)

As transparent colorless micro crystals in slag with S3 association, intimately with penfieldite, fiedlerite and phosgenite. Almost all crystals are twinned.

Penfieldite - $Pb_2Cl_3(OH)$

As prismatic and elongated prismatic colorless transparent crystals to 3cm long in divergent aggregates in cavities in lead slag. Associated with S3 minerals, intimately with paralaurionite and phosgenite.

Fiedlerite - $Pb_3Cl_4(OH)_2$

Rare slag mineral as crystals (usually rough) to 2mm long, grayish white and transparent. Twins are common. With S3 association, intimately with phosgenite.

OXIDES AND HYDROXIDES

Hematite - Fe_2O_3

Occurs as black grains in ore at the Plaka mine with P1, P2a and P2c associations; most closely associated with siderite.

Goethite - FeO(OH)

Lepidocrocite - gamma-FeO(OH)

Ubiquitous throughout Laurium mining area as decomposition product of Fe minerals (limonite).

Pyrolusite - MnO_2

Romanechite - $BaMn^{2}Mn^{4}_{8}O_{16}(OH)_4$

As black sooty masses in the Plaka mine, alteration products of Mn minerals (psilomelane, wad inc.). Pyrolusite also reported as polianite, a varietal term usually implying occurrence of crystals. From the secondary ore zone (Putzer, 1948).

Cuprite - Cu_2O

Found as small cubes, octahedrons and dodecahedrons (altered to a steel gray color) in the secondary ore zone of the Kamaréza mine (Daviot, 1899).

Arsenolite - As_2O_3

With orpiment as an alteration product of realgar. From the Plaka mine.

SILICATES

Willemite - Zn_2SiO_4

In the secondary ore zone of the Kamaréza mine in small amounts with the K2b association as small poorly formed crystals (Daviot, 1899).

Hornblende - $(Ca,Na)_{2-3}$ $(Mg,Fe^{2},Fe^{3},Al)_5(Al,Si)_8$ $O_{22}(OH)_2$

Near the Plaka mine at the contact between Plaka granodiorite and Kamaréza schist with the P4 association.

Penninite - $(Mg,Fe,Al)_6(Si,Al)_4O_{10}(OH)_8$

Occurs in the contact between Plaka granodiorite and Kamaréza schist near the Plaka mine with the P4 association.

Garnierite - $(Ni,Mg)_3Si_2O_5(OH)_4$

As green waxy masses intimately associated with annabergite closely adjacent to Zone P1. The annabergite occurs as sparse radial crystal aggregates in cavities in garnierite.

Allophane - hydrous aluminum silicate

Occurs uncommonly in the Kamaréza mine translucent waxy white, blue or green colloform masses; more common as coatings (Daviot, 1899).

Endellite - $Al_2Si_2O_5(OH)_4 \bullet 4H_2O$

Very common as white, pink, grayish white or bluish white nodules, sometimes quite large (Daviot, 1899).

Hemimorphite - $Zn_4Si_2O_7(OH)_2 \bullet H_2O$

As crusts of colorless transparent micro crystals in colloform aggregates in cavities in porous white limestone. Closely resembles Sterling Hill, New Jersey material.

Quartz - SiO_2

Most common as white masses occurring throughout the ore body; gray massive in slag. Also found as small (2mm) colorless transparent crystals in the primary and secondary ore zones. Very fine violet transparent micro crystals, in a common amethyst crystal form, occur in the K2d suite.

PHOSPHATES, ARSENATES and VANADATES

Scorodite - $FeAsO_4 \bullet 2H_2O$

As opaque brown pseudo-octahedral acute pyramids to 1mm on ferruginous quartz. The crystals have thin coatings of iron hydroxide and thin partial overgrowths of minute greenish-yellow beudantite rhombohedrons ("lossenite"). From the Kamaréza mine. (Pearl, 1950; Lacroix, 1915). Also as fine transparent amber or gray micro with the K1 and K2d associations.

Pharmacosiderite - $Fe_3(AsO_4)_2(OH)_3 \bullet 5H_2O$

As whitish gray colloform masses or small cubes or octahedrons on fractures from the Kamaréza mine (Daviot, 1899). In the K2d association as clusters of dark green and pale yellow micro cubes, modified cubes and octahedrons in cavities in porous limonite. Octahedral crystals were dark green and were associated with dark green and pale yellow cubes of pharmacosiderite, gray scorodite micro crystals and white fibrous gypsum crystals.

Arseniosiderite - $Ca_3Fe_4(AsO_4)_4(OH)_4 \bullet 4H_2O$

Occurs at the Kamaréza mine with the K2d association in very minute translucent brownish yellow platy crystals in dense yellow powdery limonite. Closely associated with quartz (including some amethyst?), pharmacosiderite and pyrite, all in micro crystals (pyrite in balls of octahedrons or as individuals).

Adamite - $Zn_2(AsO_4)(OH)$

Most commonly as coatings and crusts with adamantine luster in cellular smithsonite (usually green, bluish green or grayish green) in porous friable limestone from the Kamaréza mine. As globular aggregates of indistinct intergrown micro crystals to about 2mm across. Sometimes as twins of three crystals penetrating at sixty degree angles (Daviot, 1899). Also occurs lining small cavities in limonite as druses of indistinct intergrown micro crystals, or as simple rough scattered individuals. Crystals are rare. Laurium adamite is cuprian.

Annabergite - $(Ni,Co)_3(AsO_4)_2 \bullet 8H_2O$

Magnesian variety ("cabrerite") occurs as fine radial groups of green tabular crystals with smithsonite (usually green). Annabergite cavities adjacent to P1 zone.

Olivenite - $Cu_2(AsO_4)(OH)$

From the K2b suite of the Kamaréza mine as fine acicular transparent green crystals to 1cm long in radial aggregates. Closely associated with micro azurite crystals and smithsonite balls.

Euchroite - $Cu_2(AsO_4)(OH) \bullet 3H_2O$

Found as crusts to several square cm across of small green crystals on limonite from the K2b suite of the Kamaréza mine (Morrissey, 1968).

Pyromorphite - $Pb_5(PO_4)_3Cl$

Occurs with the K2c association in the Kamaréza mine as a decomposition product of galena (Putzer, 1948).

Mimetite - $Pb_5(AsO_4)_3Cl$

As fine orange opaque micro crystals from the Kamaréza mine with the K2c association, intimately with fluorite. As a decomposition product of galena (Putzer, 1948).

Vanadinite - $Pb_5(VO_4)_3Cl$

Found at an unspecified locality (Kamaréza mine?) as a blackish green massive incrustation on quartz (Daviot, 1899).

Georgiadesite - $Pb_3(AsO_4)Cl_3$

Occurs in slags as white or yellowish brown equant micro crystals in gas bubble cavities with S3 association. One of the rarest slag minerals.

Austinite - $CaZn(AsO_4)(OH)$

Cuprian variety occurs in the Kamaréza mine as colloform aggregates of dark green intergrown drusy micro crystals in small cavities in limonite. Crystals are sharp and smooth-faced but most faces are obscured because of penetration into each other.

Mixite - $Cu_{12}Bi_2(AsO_4)_6(OH)_{12}\bullet6H_2O$

Found as radial aggregates of acicular methyl green micro crystals on limestone with micro azurite crystals.

Beudantite - $PbFe_3(AsO_4)(SO_4)(OH)_6$

Occurs in the Kamaréza mine as very thin coatings of minute greenish yellow rhombohedrons with the K2d association, intimately with calcite, ferruginous red quartz and scorodite. Beudantite as partial coatings of the type described above on brown-red opaque scorodite crystals composed the mixture formerly known under the name "lossenite." (Pearl, 1950; Lacroix. 1915).

MOLYBDATES

Wulfenite - $PbMoO_4$

An alteration product of galena in the Kamaréza mine, with the K2c association (Putzer, 1948).

SULFATES

Natrojarosite - $NaFe_3(SO_4)_2(OH)_6$

Occurs in the Kamaréza mine as a near-surface oxidation product of Fe minerals; as cinnamon-buff very fine grained masses; pure masses often large.

Jarosite - $KFe_3(SO_4)_2(OH)_6$

From the Kamaréza mine as very fine granular (grains reflective) large brown masses with limonite and smithsonite.

Plumbojarosite - $PbFe_6(SO_4)_4(OH)_6$

As cinnamon-buff fine grained powdery masses from the surface of the Kamaréza mine; visually indistinguishable from natrojarosite. Formed from a reaction of pyrite and galena in acid oxidizing conditions (Mumme and Scott, 1966). Masses can be quite large.

Gypsum - $CaSO_4\bullet2H_2O$

Very common in the secondary ore zone of the Kamareza mine. All common crystal forms have been found; more rarely as fine transparent prismatic crystals to 1m long or as hexagonal prismatic twins. Sometimes as parallel aggregates (to 010) of opaque pink single and twinned crystals in long columns. Some crystals silky white. (Daviot, 1899).

Barite - $BaSO_4$

Predominant gangue of the secondary ore zones of the Kamaréza and Plaka mines, occurring as white nodules, lamellar aggregates to 10cm long and tabular crystals associated with P2 and K2 suites (Putzer, 1948).

Zinc-melanterite - $(Zn,Cu,Fe)SO_4\bullet7H_2O$

From the Kamaréza mine as gray-white powdery masses with the K2b association; can occur in large masses.

Zincaluminite - $Zn_6Al_6(SO_4)_2(OH)_{26}\bullet5H_2O$

Occurs in the Kamaréza mine with the K2b association as white platy colloform crusts; intimate associates include serpierite and smithsonite.

Glaucokerinite - $(Cu,An)_{10}Al_4(SO_4)(OH)_{30}\bullet2H_2O$ (?)

From the Kamaréza mine as radial fibrous warty colloform masses and 3mm thick waxy crusts on smithsonite. Color banded, turquoise blue to white; greenish, gray or brownish when impure. Associated with sphalerite, smithsonite, gypsum, adamite, malachite, pyrite, galena, fluorite, calcite, azurite, ktenasite, serpierite and limonite (Dittler and Koechlin, 1932; Kokkoros, 1950; Palache, Berman and Frondel, 1951).

Ktenasite - $(Cu,Zn)_3(SO_4)(OH)_4\bullet2H_2O$

Occurs very rarely in the Kamaréza mine as blue-green crystals to 1mm either coating a thin crust of glaucokerinite or perched between crystals in radial aggregates of serpierite crystals (Kokkoros, 1950).

Brochantite - $Cu_4(SO_4)(OH)_6$

Formerly known from Laurium as "kamarezite," occurs from the Kamaréza mine with K2b associates as sky blue colloform aggregates on white colloform smithsonite (AMNH "kamarezite" 17984). Also as rough crystals.

Cyanotrichite - $Cu_4Al_2(SO_4)(OH)_{12}\bullet2H_2O$

Sparingly from the Kamaréza mine with K2b associates.

Serpierite - $Ca(Cu,Zn)_4(SO_4)_2(OH)_6\bullet3H_2O$

Found rarely with the K2b association in the Kamaréza mine as radial and divergent aggregates of venetian blue crystals to 3mm long or porcelain blue and venetian blue crystalline lumps on cavernous colloform smithsonite.

Anglesite - $PbSO_4$

Occurs in the Plaka and Kamaréza mines as an earthy alteration product of galena with the P2b and K2b associations. Also occurs uncommonly in lead slag as fine colorless transparent micro crystals with the S3 association (Daviot, 1899).

CARBONATES

Calcite - $CaCO_3$

Found throughout the mines as massive vein filling and rhombohedral, scalenohedral and flattened hexagonal crystals; colorless or transparent, dimensions to at least 3cm. Found replaced by brown smithsonite and after micro pyrite pyritohedrons in the primary ore zone. Occurs in the karsts as white to brown rosette-like concentric layers coating sulfides (Leleu, 1967).

Rhodochrosite - $MnCO_3$

From the Plaka mine with the P1 association, intimately with siderite and pyrite, as rose-white granular masses; crystals very rare (Daviot, 1899).

Siderite - $FeCO_3$

As platy brown granular masses from the Plaka mine with the P1 association, intimately with rhodochrosite, hematite, garnierite, pyrite and gersdorffite. Crystals rare (Daviot, 1899).

Aragonite - $CaCO_3$

Occurs throughout the secondary ore zones as white or green or blue tinted coralloidal aggregates and as small colorless acicular crystals (Daviot, 1899).

Smithsonite - $ZnCO_3$

Occurs throughout the secondary ore zones as colloform, earthy, stalactitic and compact masses; colors white, blue, green, yellow, red and brown in all shades, sometimes banded. From the surface of the Plaka mine as spongy masses; from the surface of the Kamaréza mine as chalky white plates or, more uncommonly, cavernous masses on limonite. Occurs in the lower regions of both mines as compact yellowish masses or veins (yellow color caused by Cd impurity; other colors caused by various oxides). As poor white to colorless micro crystals on limonite and as pseudomorphs after calcite scalenohedrons (Daviot, 1899).

Hydrozincite - $Zn_5(CO_3)_2(OH)_6$

From the Kamaréza mine as powdery white coatings on smithsonite with K2b associates.

Malachite - $Cu_2(CO_3)(OH)$

With the K2b association in the Kamaréza mine as colloform masses, coatings or earthy masses (Daviot, 1899). Also observed as a fine pseudomorph after a 12mm azurite crystal (AMNH Azurite 8810).

Azurite - $Cu_3(CO_3)_2(OH)_2$

As fine indigo blue translucent crystals to 11mm long, as globular crystalline aggregates and crystals replaced by malachite. Crystals are smooth and sharp, generally of flattened prismatic habit with complex terminations. Occurs occasionally from the Kamaréza mine with the K2b association (Daviot, 1899).

Aurichalcite - $(Zn,Cu)_5(CO_3)_2(OH)_6$

Occurs with the K2b association in the Kamaréza mine as very minute radial aggregates of acicular sky-blue crystals on colloform green smithsonite, intimately associated with serpierite, or as acicular matted subparallel aggregates filling cavities in limonite.

Cerussite - $PbCO_3$

With the K2c and P2c associations as earthy gray or frequently red (colored by a small amount of iron oxide) masses as an alteration product of galena. In the Plaka mine, distinct twins are found in small amounts. Also found in the lead slags as small crystals with the S3 association (Daviot, 1899).

Phosgenite - $Pb_2(CO_3)Cl_2$

Reported from the Kamaréza mine as an alteration product of galena with the K2c association. In slag as very fine yellow or colorless transparent crystals to 2mm long with the S3 association (Putzer, 1948).

Hydrocerussite - $Pb_3(CO_3)_2(OH)_2$

From the Kamaréza mine as an alteration product of galena with the K2c association. Occurs rarely in lead slag as pearly gray transparent hexagonal plates in cavities with the S3 association (Lacroix, 1896).

Bismutite - $Bi_2(CO_3)O_2$

Reported from Laurium (Putzer, 1948). Presumably as earthy coatings in the secondary ore zone as an alteration product of bismuth.

INVALIDATED MINERAL NAMES

The following invalidated names appear in the Laurium literature in reference to valid species, mixtures and varieties.

Cabrerite = magnesian Annabergite
Calamine = Hemimorphite
Calamine = (Daviot, 1899; Fuchs and deLaunay, 1893) = Smithsonite
Carphosiderite = Natrojarosite
Cordillerite (AMNH 17104) = massive Annabergite
Halloysite (Daviot, 1899) = Endellite
Kamarezite = Brochantite
Lossenite = Scorodite + Beudantite
Polianit (Putzer, 1948) = Pyrolusite
Psilomelane = Romanechite
Sommairite = Zinc-melanterite

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RESEARCH DEFINITIONS

The following phrases, frequently found in technical writings, are defined below for your enlightenment. They are adapted from *A glossary for research reports*, by C. D. Graham, Jr., which appeared in *Metal Progress*, Vol. 71, No. 5, May, 1957. Graham had evidently read one too many scientific papers by the time he composed this clever compilation.

phrase	definition
"It has long been known..."	I haven't bothered to look up the original reference.
"Of great theoretical and practical importance..."	Interesting to me.
"While it has not been possible to provide definite answers to these questions..."	The experiments didn't work out, but I wanted to publish anyway.
"Extremely high purity"	Composition unknown except for the exaggerated claims of the supplier.
"Three of the samples were chosen for detailed study."	The results on the others didn't make sense and were ignored.
"Accidentally stained during mounting"	Accidentally dropped on the floor.
"Handled with extreme care during the experiments"	Not dropped on the floor.
"A fiducial reference line on the specimen"	A scratch.
"Although some detail has been lost in reproduction, it is clear from the original micrograph that..."	It is impossible to tell from the original micrograph.
"Typical results are shown"	The best results are shown.
"The most reliable data are those of Jones..."	Jones was a student of mine.
"Agreement with the predicted curve is excellent."	Fair.
"...good."	Poor.
"...satisfactory."	Doubtful.
"...fair."	Imaginary.
"Correct within an order of magnitude"	Wrong.
"It is believed that..."	I think...
"It is generally believed that..."	A couple of other guys think so too.
"It might be argued that..."	I have such a good answer for this objection that I shall now raise it.
"It is clear that much additional work will be required for a complete understanding of..."	I don't understand it.
"Thanks to Joe Glotz for assistance with the experiment, and to John Doe for valuable discussions."	Glotz did the work and Doe explained what it meant to me.

Suggestions for Authors

I. GENERAL

(1) *Articles.* Both professional and amateur mineralogists are invited to contribute articles for publication. Articles submitted will be judged according to accuracy and according to whether we feel they will be of interest to, and intelligible by, our readership. Lack of writing experience is no hindrance; the editorial staff is available to assist with rewriting whenever necessary.

A survey (*M.R.* **4**, 15) has shown that readers are strongly interested in locality mineralogy and specimen mineralogy. Other topics relating to mineralogy, and to mineralogists in particular, will be considered. Non-scientific articles of practical or incidental interest to collectors will also be considered.

The level of technicality must be such that readers with only a minimal background in chemistry, physics, geology, and mineralogy can still understand the article. Our purpose is to educate and inform, and this purpose is not served by articles intelligible *only* to highly-educated specialists. Our publication was conceived as a bridge between amateur and professional journals. Articles of interest to professional mineralogists are strongly desired, providing they are of intermediate technical level and are also of some interest to amateur mineralogists. Lengthly tabular numerical data are discouraged. Tables of x-ray data will not be accepted unless MARKEDLY different from existing data, or entirely new. As a general rule, a greater degree of technicality should be accompanied by a greater degree of conciseness.

(2) *Photographs.* Specimen and locality photographs are eagerly solicited with articles; they are considered important because they provide information in a unique way while adding to the visual appeal of the magazine.

Photographers are invited to submit photographs even if unaccompanied by an article. The photographs may be used in other articles, the various columns, or possibly on the cover (color only, of colorful specimens, for the cover). See section II-4 for details. Full credit will be given to the photographer in any case. We would like to develop a file of photos to choose from as required. It is even possible that particularly exciting photos may, by themselves, inspire articles. We will wish to keep these file photos indefinitely until published, but receipt will be acknowledged.

Where authors are unable to provide photos with articles it may be possible for the editorial staff to provide such photos, or appropriate photos may already be available from the above-mentioned photo file. Of course good photographs by the author may also be used if deemed appropriate by the editor.

II. SCRIPT AND PHOTO REQUIREMENTS

(1) Manuscripts must be type-written, page-numbered, double-spaced, on 8-1/2 X 11-inch paper or European equivalent. Figure captions should be typed together (rather than individually on figures) to facilitate typesetting, UNLESS only the photos are submitted without an accompanying article. Use Roman type (pica or elite); do not use script type or all-caps style.

(2) Underline once for *italics*, wavey underline for **bold-face type**. Two typewriter hyphens will be interpreted as a dash, but leave a space at either end (- -).

(3) The manuscript should be carefully checked for errors before submission, as these are not the responsibility of the editorial staff.

(4) Photo illustrations must be in the form of black and white, approximately 5 X 7-inch, glossy prints. Please do not crop photos right down to the specimen edges; leave a border or let us do all cropping. We normally cannot convert 35mm *color* prints, negatives, or transparencies into good black and white prints, although we can make an attempt for good locality photographs. We further recommend that authors do not make such conversions for themselves unless large-format film is being used; sharpness will be significantly better in photos originally taken with black and white film. We can improve low-contrast prints, but prints with too much contrast will only get worse through the printing process. Specimen photos must be accompanied by at least the following data: (a) species name and locality, (b) specimen or crystal size, (c) specimen color (if B&W photo), (d) specimen owner, (e) photographer's name if a photo credit is desired. Other data of interest regarding the specimen is desirable when available. Color photos for articles can only rarely be used. Color photos without articles, for our photo file, will always be accepted. When submitting photographs, do not mount them or write on the back; submit them in small, separate, labeled envelopes.

(5) References in the text should be given by quoting the author's surname and date of publication, e.g. "Kearns (1975)" or "(Kearns, 1975)". Full references should be listed at the end of the article in alphabetical order by author surname, double-spaced, in the following manner:

KEARNS, L. (1975) Fluoborite -- a new locality. Mineralogical Record, 6, 174-175.

Within the title capitalize only the first word and proper nouns, except German titles wherein the same capitalization is used as in the original title as published. The author's name should be all in capital letters. The "6" in the above example is the volume number, "174-175" are the inclusive page numbers. Do not give volume *and* number unless the journal begins each of its numbers with page 1, rather than beginning number 1, with page 1 and numbering consecutively throughout the year as this journal does.

(6) Authors should give their complete mailing address under the article title so that readers may write to them directly.

(7) Two copies of the article and figures should be enclosed to expedite reviewing (one copy may contain xeroxed photos rather than original prints). It is advised that authors retain a third copy for themselves as a safeguard against postal misplacement. The manuscript, when mailed, might be insured for the cost of the enclosed photos.

(8) One full magazine page, without titles or figures, is about 1,000 words; from this authors may estimate the potential published length of their articles.

(9) Use of the metric system is encouraged but not required; mixing of metric and English units is not allowed except for the use of miles with smaller metric units.

(10) Our format policy is to put acknowledgments at the end, just before references, rather than at the beginning with the introduction.

III. PROGRESS OF ARTICLES SUBMITTED

(1) Articles submitted will be acknowledged within two weeks.

(2) Articles will be reviewed usually within 60 days.

(3) After review, articles may be returned to the author for rewriting if necessary.

(4) After the final version is accepted, it takes approximately six months for the article to be published. This interval is variable and depends upon the number of articles already on hand and the timeliness of the article.

(5) The final typed draft is then submitted for typesetting. A galley copy is printed and, if time permits, this copy is sent to the author to be checked for typographical errors. Any alterations other than typesetting errors made at this time result in extra charges to us, and so such changes are strongly discouraged.

(6) Approximately 25 reprints are available, on request, to the author. There is no page charge or reprints charge to the author (but a contribution toward our costs will, of course, be greatly appreciated when possible).

IV. DUPLICATION AVOIDANCE

It is strongly advised that authors beginning a project for publication in the *Record* submit a short letter with an outline to the editor describing the proposed article. In this way the editor can keep track of articles in progress, and put authors in contact with each other when duplication of effort appears possible.

V. POST-PUBLICATION DISCUSSION

If a critical letter from a reader is received which, in the view of the editor, merits publication, the letter will first be submitted to the article author so that a reply (optional) may be composed for publication with the letter.

VI. GUIDELINES FOR LOCALITY ARTICLES

New authors in particular are advised to visit their local library and see Appendix II and other sections of the following publication for an excellent guide in compiling a locality article.

RIDGE, J.D. (1958) Selected bibliographies of hydrothermal and magmatic mineral deposits. *Geol. Soc. Amer. Memoir 75*, 199 p.

ACCESS TO DEMIX QUARRY MONT ST-HILAIRE

As of now, we wish to inform all VISITORS of the regulations now applying to this coming summer's 1976 field trips to the quarry.

The present proposal is the best we can offer to persons interested in collecting minerals on the grounds of DEMIX LTEE., St-Hilaire, Quebec.

The quarry owned by DEMIX LTEE., must operate seven days a week from April to October. The Management of the company has been kind enough to MINERAL COLLECTORS in allowing them to enter the quarry on the following days:

May	16	&	17	August	21	&	22
June	19	&	20	September	18	&	19
July	17	&	18	October	16	&	17

VISITORS will not be welcome on any other days and they will not be allowed to trespass on the PROPERTY.

PROCEDURES:

In all mines and quarries operated in Quebec, it is compulsory to wear a hard hat, goggles and proper shoes. Visitors must comply to these regulations.

VISITING HOURS WILL BE RESTRICTED TO 9A.M. until 4 P.M.

THE FEE WILL BE $40.00 FOR EACH GROUP/DAY.

Upon registering at the gate, you will be asked to prove that your group is covered by a *civil liability insurance* policy of at least $500,000.00 applying to both people and property and sign a document attesting this fact.

In order to facilitate planning of all visits, we ask all those interested in collecting at the quarry to make the reservations via postal service as soon as possible.

Alain Robin, Ecole Polytechnique, C.P. 6079, Succ. A, Montreal, Quebec. H3C 3A7.

What's New in Minerals?

The Tucson Show

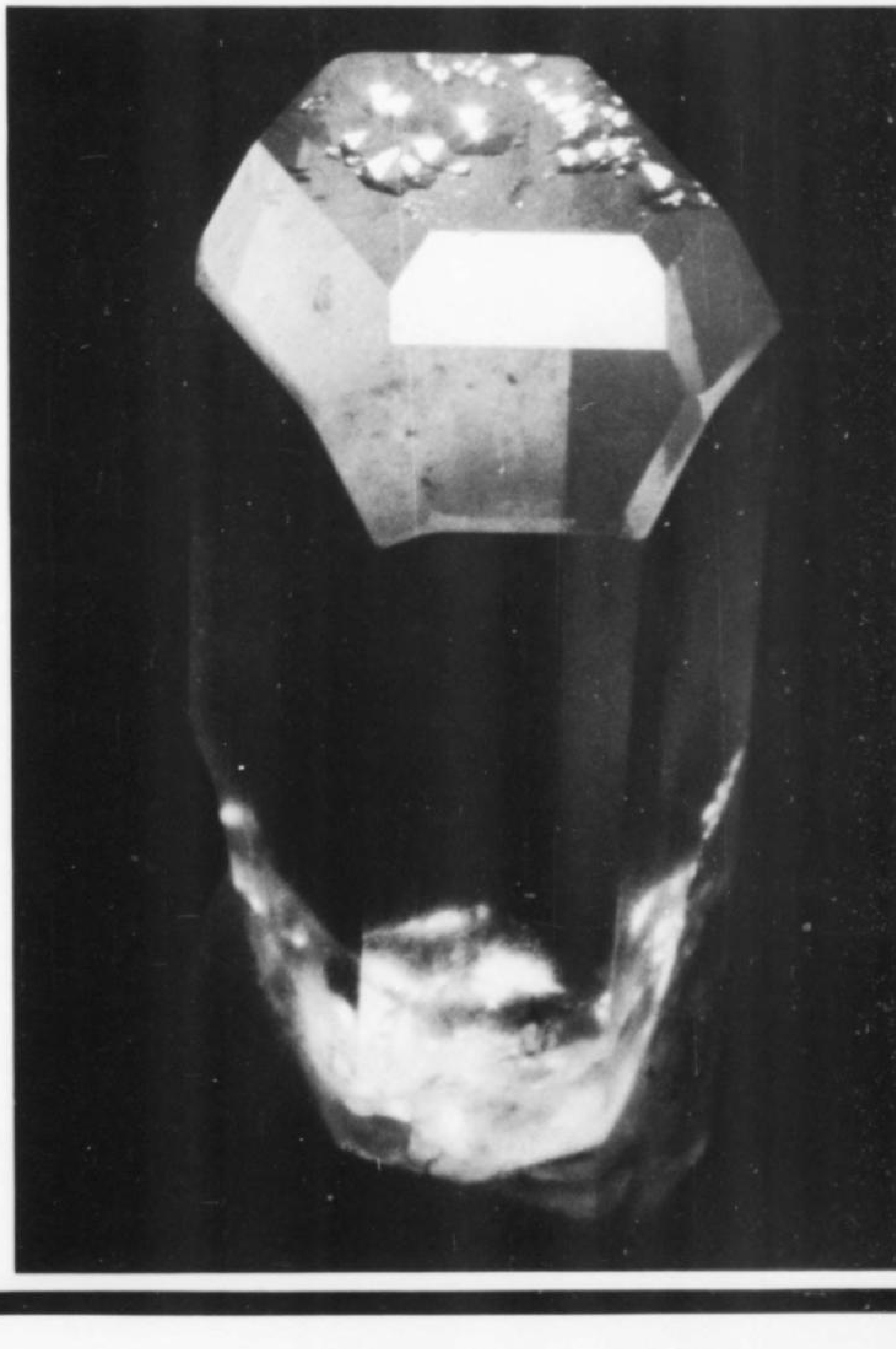
Once again the Tucson Show lived up to its reputation, and then some. If one is to gauge the quality of the show by the quality and quantity of minerals shown, and by the number of new finds that were in evidence, this year's show was a winner!

Pedra Preta mine

Possibly the most unexpected source of extraordinary new specimens at the show is a relatively unknown (up to now) locality in Brazil which has sometimes been referred to by the few who knew of it as simply "the magnesite mine". Alvaro Lucio (a past contributor to these pages) and Carlos do Prado do Barbosa, another Brazilian who deals in specimens, offered some details. The full locality name should be given as the *Pedra Preta mine, 18 km north of Brumado*, in the state of *Bahia, Brazil*. This mine has to be one of the great unsung localities of the world. Many years ago the mine produced significant quantities of pegmatite emeralds of fine quality. Extremely fine, small, aquamarine beryl crystals (Figure 1) have come out within the last few months. The (pardon the expression) "World's Finest" novacekite AND zeunerite-metazeunerite were found there by Alvaro several years ago; these consist of square tabular crystals over 3 cm on an edge and over 1 cm thick, on matrix. The novacekite crystals are a lustrous, beautiful lemon-yellow. The zeunerite is very similar in color and luster to the blocky French torbernite of many years ago, although French torbernite never reached such a size as these zeunerite crystals! The two best pieces are still held by Alvaro although he did not bring them to the show (I once saw them at his home in Belo Horizonte along with his incredible red scheelite, an octahedral crystal about 2 cm on edge, on matrix, from the Morro Velho gold mine).

The Pedra Preta mine has, in the past, also produced fine hematite crystals, pyrolusite crystals, tourmaline and xenotime. As might be expected from the mine's nickname, extremely fine, light brown, rhombohedral magnesite crystals (see Kristalle ad, inside front cover) are almost common at the locality. These can reach several centimeters in size. One of the more recent discoveries was a cache of superb Japan-law twinned quartz crystals (Figure 2) which were invariably associated with small (up to about 1 cm) peach-pink topaz crystals. The little crystals of topaz are gemmy, lustrous, and often doubly terminated, with a width of about 1 mm. Carlos brought with him a group (Figure 3) of untwinned quartz crystals on which one side of every crystal was *covered* by these small brilliant topaz crystals. Needless to say, a deposit that has produced such specimens must be the result of a fascinating geologic history. Unfortunately we do not have a detailed report on the geology and paragenesis; due to the remoteness of the mine and the disinterest of most Brazilian mine

Figure 1. **BERYL**, variety aquamarine (light greenish blue, 2.2 cm tall), Pedra Preta mine, Brumado, Bahia, Brazil. Carlos Barbosa specimen.



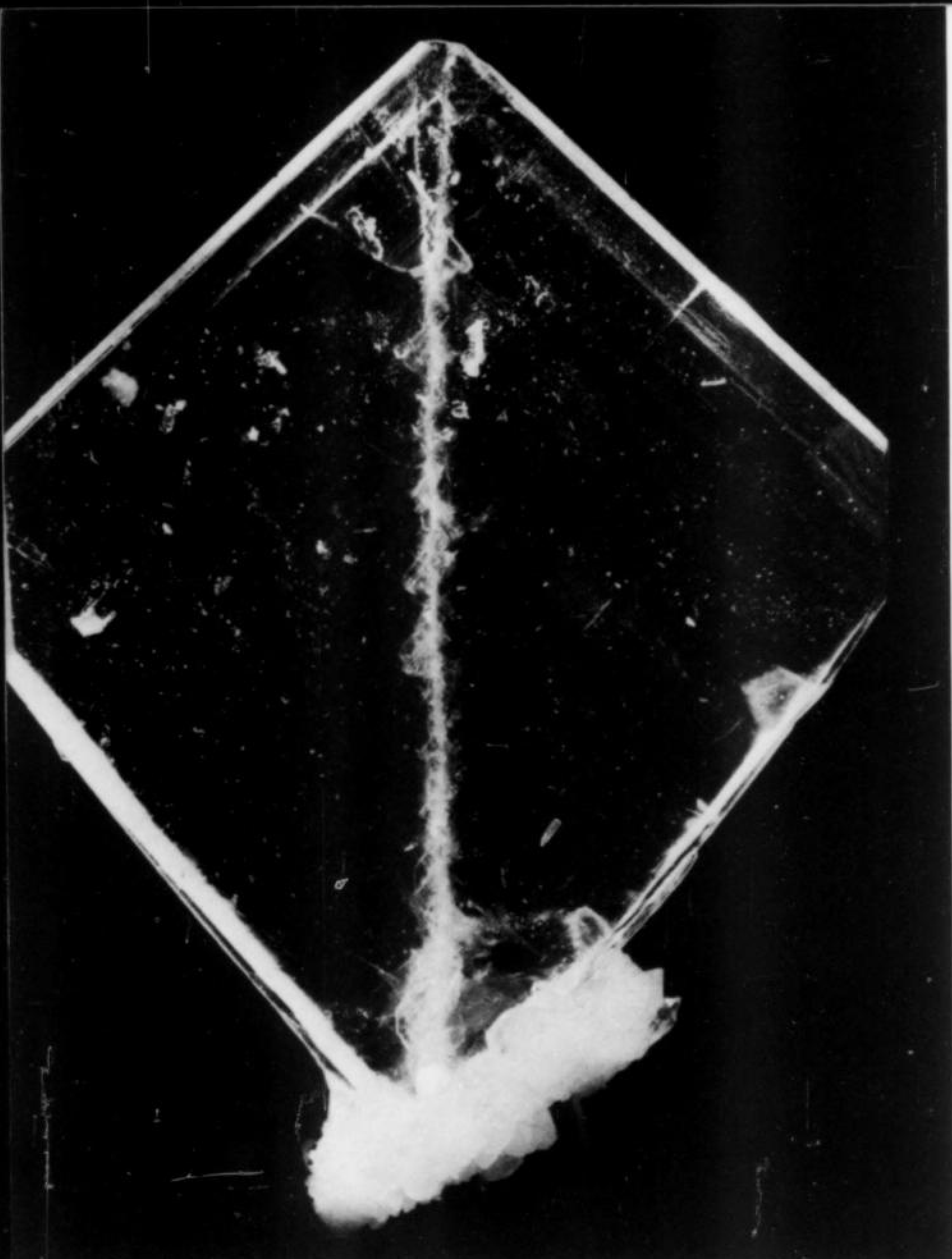


Figure 2. **QUARTZ**, left, Japan-law twin (colorless, 12.8 X 9.5 cm), Pedra Preta mine, Brumado, Bahia, Brazil. Carlos Barbosa specimen.

Figure 3. **TOPAZ**, above, crystals (peach-pink, 3 to 8 mm) on quartz crystals (colorless, longest crystal 10 cm), Pedra Preta mine, Brumado, Bahia, Brazil. Carlos Barbosa specimen.

officials we are not likely to get one in the near future either. But one cannot help wondering what other mineral species a thorough, professional mineralogical investigation would turn up.

The Continuing Saga of the Cave of the Virgin...

...or Virgem da Lapa, as this Minas Gerais pegmatite is named in Portuguese. My first thought on the translation was something like "Our Lady of the Lapidary" because I couldn't find *Lapa* in my Portuguese dictionary, but Carlos assures me it means "cave" (and explains that the only virgins left in Brazil are hiding in caves). We have reported on this locality before (V. 6, p. 250; V. 7, p. 41) and it continues to surpass itself, although it has probably peaked. The pegmatite from which most of the finest pieces were removed has now been completely worked out; other pegmatite bodies nearby which are apparently genetically related have yet to be mined, and the miners are turning to these now. There is nevertheless a significant quantity of Virgem da Lapa (pronounced "Veer-zhem duh Lah pah", incidentally) material still in the specimen "pipeline", so to speak, between the U.S. and Brazil. So even though the locality is worked out specimens may continue to be available for a short time longer. No one knows what the other pegmatite bodies nearby will produce.

Several species from Virgem da Lapa were available at the show. Green tourmaline from small (6 cm) crystals (Figure 4) to crystals nearly a meter in length could be seen. Some of the finest blue topaz ever to come from Brazil was also available; Dave Wilber probably got the largest and best piece from Jack Lowell but many fine smaller pieces could be obtained from several dealers (as in Figure 5), and nearly all were on matrix or lepidolite. Bill Larson got a superb (I'm running out of superlatives but what a way to go!) blue crystal, doubly terminated, undamaged, about 4 X 7 cm, and crowned by a halo or frame of small lepidolite crystals reaching three-fourths of the way around the crystal (up one side, across the top, and down the other side). The lepidolite crystals themselves from this locality are extraordinary, reaching well over 8 or 10 cm across and nearly as thick. Jack Lowell had another mind-expanding piece: a gemmy *blue-green* herderite crystal over 8 cm in length (Figure 6)! Fine crystals of cassiterite to several centimeters (Figure 7), as well as large yellow microlite octahedrons (Figure 8) are just two more of the great products of this locality.

Norwegian Anatase

Lest you think that Brazil is the only producing country these days, figures 9 and 10 illustrate two specimens of anatase on quartz from Tysse, Hardangervidda, So. Norway. Bob Sullivan (from Zürich) was selling some excellent pieces at the show which he obtained through Torgeir T.

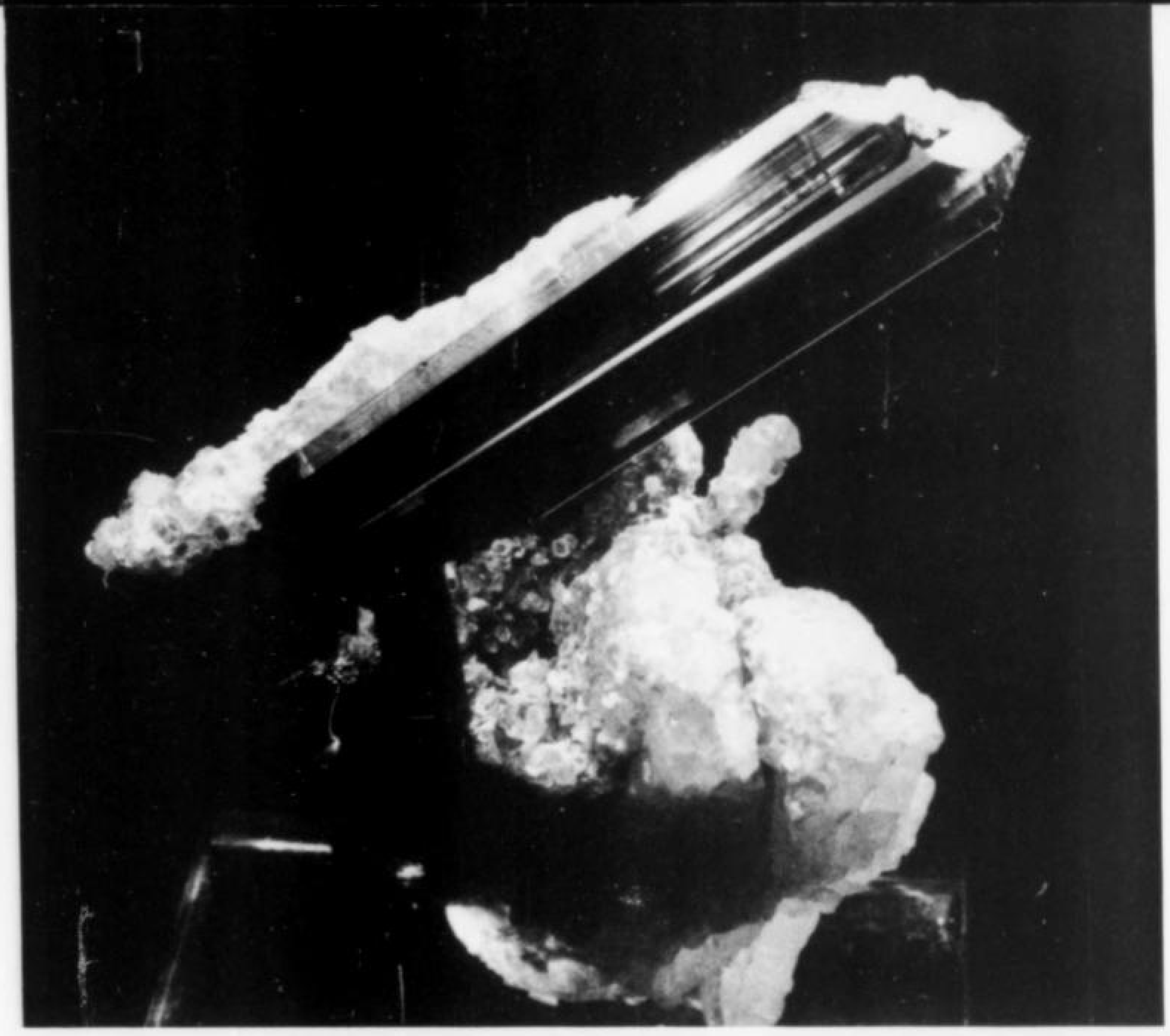


Figure 4. **TOURMALINE** crystal (gemmy green, 6.1 X 1.3 cm), with lepidolite on matrix, Virgem da Lapa pegmatite, Minas Gerais, Brazil. Jack Lowell specimen.

Figure 5. **TOPAZ** crystal (pale blue, 2.8 X 1.6 cm) on a lepidolite crystal (lilac, 2.5 X 2.5 X 1.5 cm) with dark green tourmaline, Virgem da Lapa pegmatite, Minas Gerais, Brazil. Wilson collection (from Alvaro Lucio).

Figure 6. **HERDERITE** (blue-green, 6 X 8.4 cm), Virgem da Lapa pegmatite, Minas Gerais, Brazil. Jack Lowell specimen.

Garmo in Norway. Happily, a rather large number of specimens were available in all sizes and levels of quality.

Aha! Ajo!

Arizona can usually be counted upon to provide something of interest at the Tucson Show, and this time it was a large quantity of azurite and malachite-after-azurite crystals on matrix. These were mined by Wayne Thompson, Mike New and others at the New Cornelia mine in Ajo ("Ah-ho") this year. The new material came from a single fissure which also produced specimens about three years ago until it was buried by mine officials to get the miners to go back to work. One of these older pieces (Figure 11) may well be the finest azurite Ajo has ever turned out. The luster is typically dull except in a few rare cases such as the specimen in Figure 12. The matrix is light-colored but covered by a thin layer of some black substance, possibly a manganese oxide. Wayne had a slab of rock about 1/2 meter across dotted with possibly 100 crystals of azurite in the 1 to 2 cm range. Random crystals on the plate had been altered to malachite while others were completely untouched by alternation. A large number of smaller specimens, some with very aesthetic groupings, from that same vein were available. Some specimens were entirely composed of malachite pseudomorphs (Figure 13) while others had both malachite and azurite.

Spanish Pyrite

Victor Yount, a wholesaler, arrived at Tucson with a collection of cubic pyrite crystals from either Soria or Amejun (there is some controversy here), Provincio de

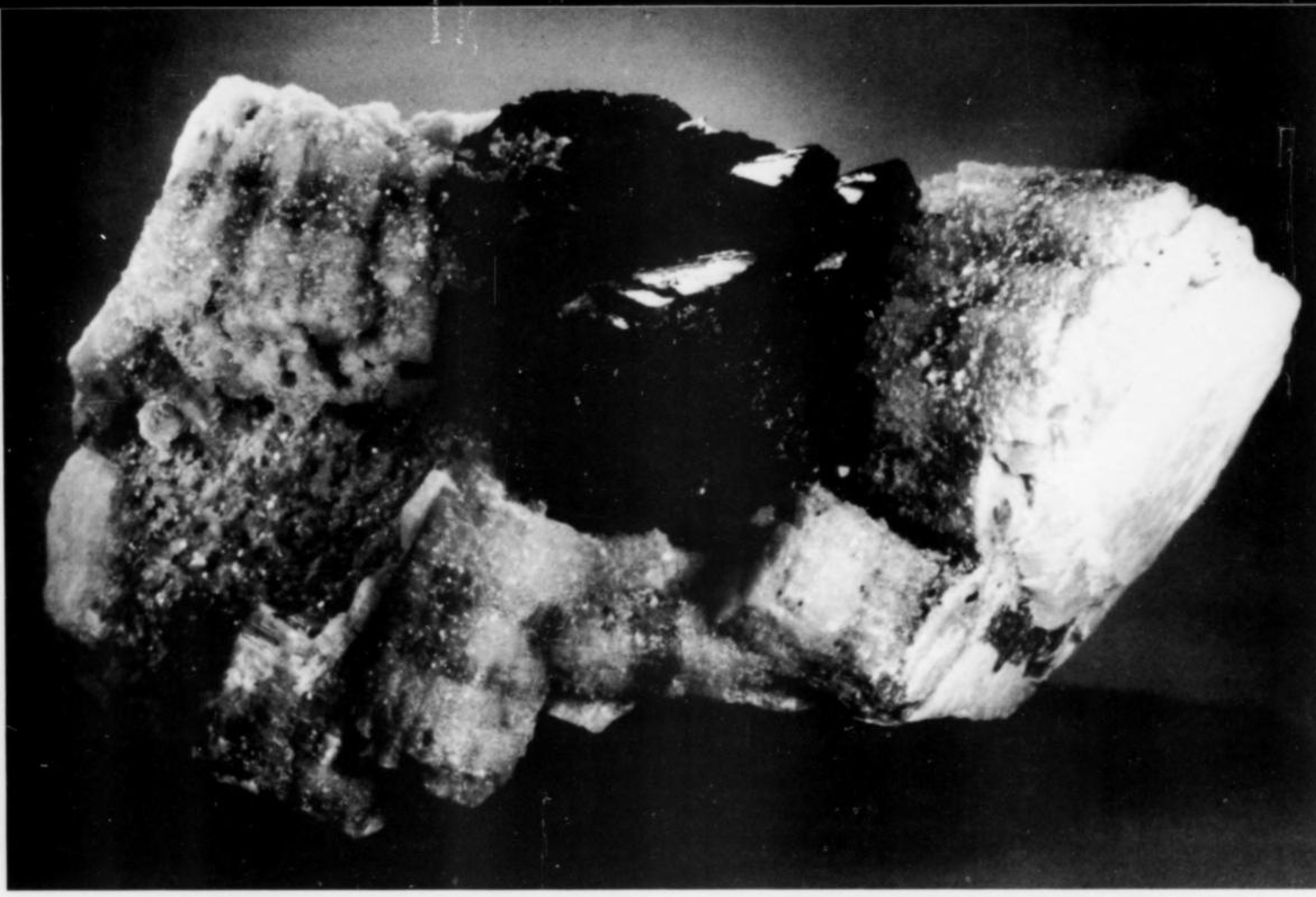


Figure 7. **CASSITERITE** (black, 12 cm across) on lepidolite, Virgem da Lapa pegmatite, Minas Gerais, Brazil. Smithsonian specimen.

Figure 8. **MICROLITE**, left, crystal (light yellow, 1.9 cm) on lepidolite, Virgem da Lapa pegmatite, Minas Gerais, Brazil. Smithsonian specimen.

Figure 9. **ANATASE**, middle, on quartz (very dark gray, specimen is 5.2 cm tall), Tysse, Hardangervidda, Norway. Smithsonain specimen.

Figure 10. **ANATASE**, right, on quartz (very dark gray, specimen is 4.2 cm tall), Tysse, Hardangervidda, Norway. Smithsonian specimen.

Logroño, Spain. These were unusual for their very smooth, lustrous faces and razor-sharp edges and corners. According to Vic there were 725 pieces in the lot, and of those only 24 were multiple crystals, mostly doubles as in Figure 14. A very few three-crystal groups were in the lot; the best is shown in figure 15. Supposedly these were

Figure 11. **AZURITE** (bluish black, 4.6 X 9 cm), New Cornelia mine, Ajo, Arizona. Wayne Thompson specimen.

pulled out of a soft talc clay, and more crystals remain except that the clay is becoming harder and it may be difficult to remove crystals undamaged. Some see a fairly good chance that more of these pyrite cubes will be forthcoming; others have heard that the source is exhausted.

Vic also had a nice batch of vanadinite from Mibladen, Morocco, although most crystals were small (less than 1 cm) aggregates and rosettes. A few were the old-style sharp hexagonal prisms, some over 2 cm across. According to Vic, mining has completely stopped in the Mibladen district, so specimens are bound to become scarce very shortly.

Random Notes

The Smithsonian acquired a remarkable malachite stalactite (stalagmite?) at the show which was found in a copper mine near Kolwezi, Zaire (Figure 16). Smaller stalactites have shown up at mineral shows over the last year or two but this one probably holds the length record.

One of the Brazilian dealers had a superb Brazilian gold specimen (Figure 17) with him. I am not at liberty to report the mine name, but it is in Minas Gerais and readers should be able to make a good guess.

Tsumeb continues to produce fine dioptase in moderately large quantities. As at the last Detroit Show, there was plenty available in all price categories; some pieces were real show-stoppers. Kahn and Kahn (from Germany) had on display the largest matrix crystal ever reported (3.5 cm). Many fine specimens of Tsumeb cerussite could be seen; some groups were as large as 30 cm across. Prosper Williams and the Zweibels in particular had many flats of fine material.

Mexico has recently yielded a *second* large strike of Batopilas silver (see last issue) and the Ojuela mine, Mapimi, Durango, produced some interesting new green adamite in thick (over 2 cm) radiating crusts and groups. The Las Vigas, Vera Cruz, amethyst locality under lease by John Whitmire produced some fine groups of exceptionally large and aesthetic crystals although the color was not as deep as some past finds.

Other items of interest include sprays of aragonite-like strontianite crystals over 3 cm long from Cave in Rock, Illinois, Utah bixbyite crystals up to 13 mm on an edge, many fine specimens of Czechoslovakian marcasite (from Vinitrov) moderately priced, and red beryl crystals to 13 mm on matrix from one of the Utah localities.

Rare minerals

Bill Pinch (Pinch Mineralogical Museum) communicated to us the *Rare Minerals Report*. He noted some interesting minerals from Katanga Province, Zaire, including serpierite (pure, bright blue crystalline mass 3.5 X 5 cm) from the Prince Leopold mine, and vandendriesscheite (up to 1 mm xls), rutherfordine, sengierite, cupro-

Figure 12. **AZURITE** (bluish black, large crystal is 3.8 cm), on matrix, New Cornelia mine, Ajo, Arizona. Kent England collection.

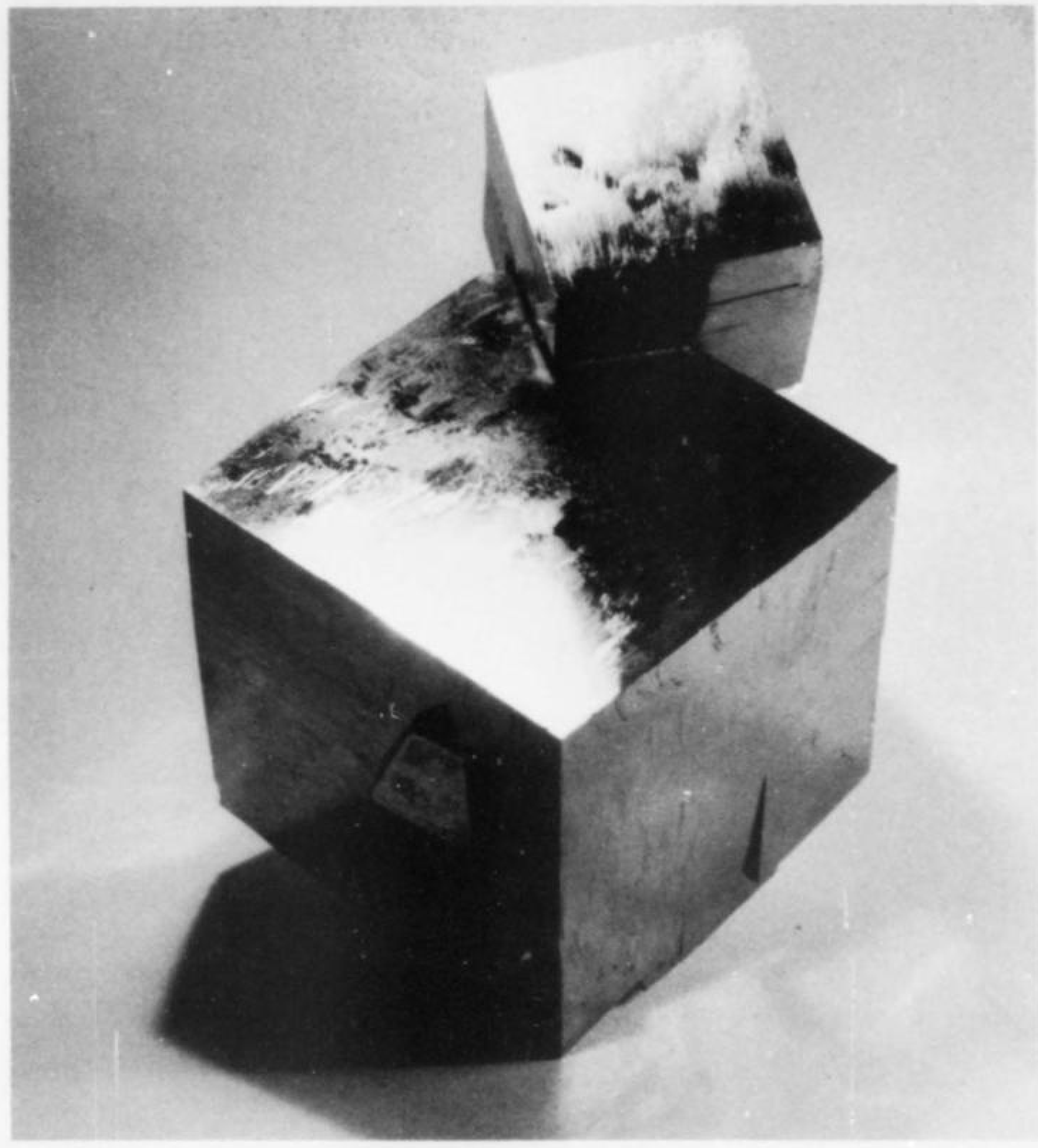


Figure 13. MALACHITE, above left, pseudomorph after azurite (green, specimen height 6.1 cm), New Cornelia mine, Ajo, Arizona. Curt VanScriver specimen.

sklowdowskite, and vandenbrandeite from the Shinkolobwe mine. From the Moctezuma, Sonora, Mexico, tellurium deposit the following minerals, all relatively new species, were available: quetzalcoatlite, tlalocite, xocomecatlite, cesbronite, and carlfriesite. Tsumeb minerals available included ludlockite, and a new mineral (both named after Charles Key), tsumcorite, fleischerite, itoite, schaurteite, kegelite, gallite, schultenite, and söhngeite. Someone sold Bill a stranskiite but upon x-raying it turned out to be all linarite. Balancing this disappointment was a specimen with 7 mm crystals labeled "bornite" which yields an x-ray pattern indicative of a new mineral! Pierre Bariand brought some very rare minerals including francevilleite, chervetite, schubnelite, bariandite, vanuralite, and mounanaite (all from Franceville, Mounana, Gabon), nice crystals of parabutlerite from Yazd, Iran, and choice crystals of iranite from Anarak, Iran. Bill noted that some of the fine new jamesonite (see last issue) from Sombrerete, Zacatecas, Mexico, (which he first recognized as such) is still being sold as stibnite by some dealers. On specimens from this locality he has also identified superb valentinite crystals, zinkenite needles, and kermesite. Other rarities Bill noticed at the show included three

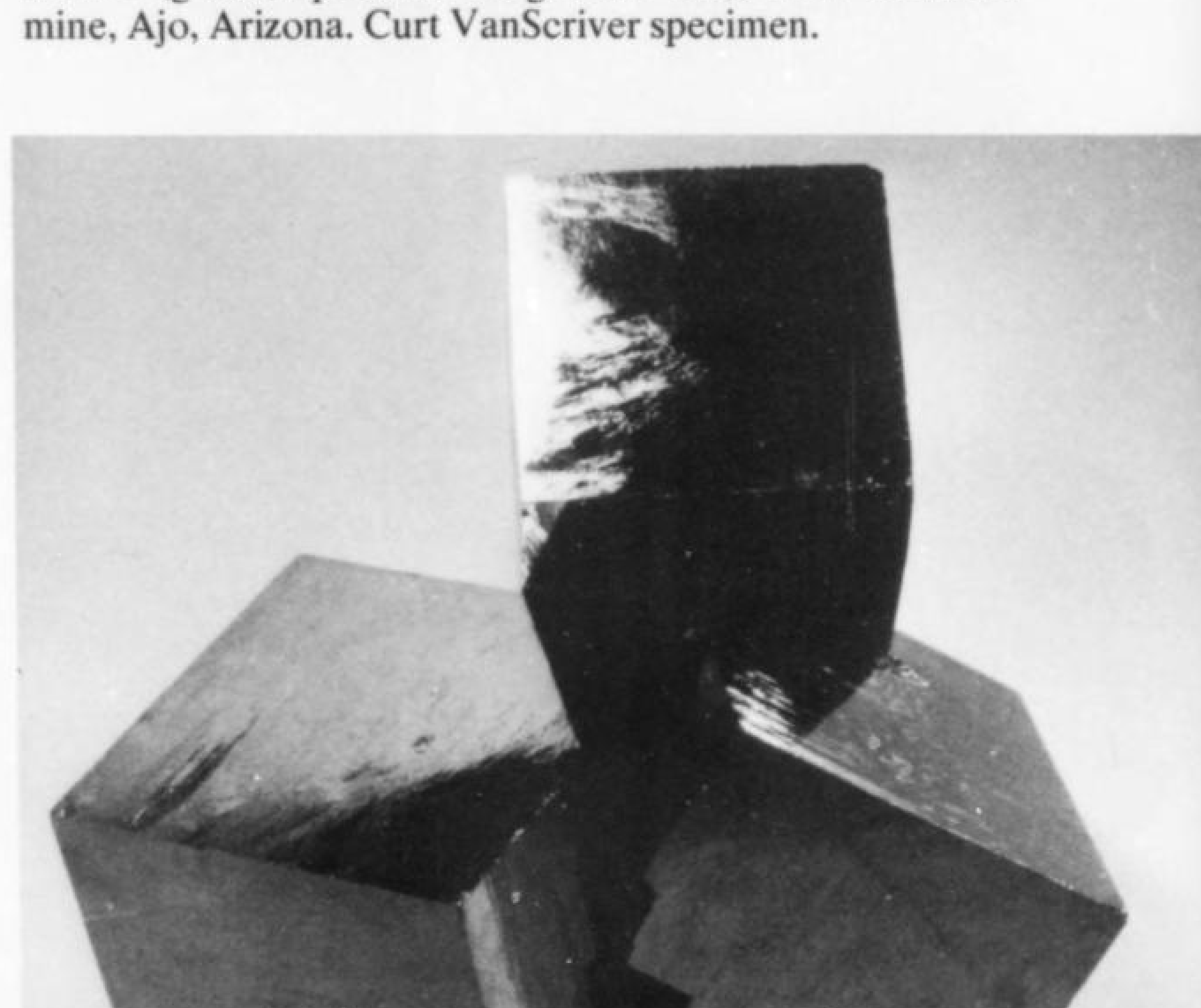


Figure 14. **PYRITE**, above right, (pale brassy yellow, 4.2 cm on edge) Soria (or Amejun), Provincio de Logroño, Spain. Brad VanScriver specimen (from Victor Yount).

Figure 15. **PYRITE**, right, (pale brassy yellow, 3.1 X 3.4 X 3.6 cm), Soria (or Amejun), Provincio de Logroño, Spain. Brad VanScriver specimen (from Victor Yount).

Figure 16. John White with the Smithsonian's new **MALACHITE** stalactite (green, 53.3 cm tall) from Kolwezi, Zaire.

pieces of graemite (Dome Rock Mountains, Arizona), vuagnatite (over 100 specimens from the Red Mountains, Mendocino County, California), cowlesite (a new mineral from Goble, Oregon), heyite (an extremely rare mineral from Ely, White Pine County, Nevada), clinobisvanite (Coolgardie, Australia), galkhaite (Getchell mine, Humbolt County, Nevada, purchased at the M.R. Auction), getchellite (same locality), good dundasite (Tasmania), creaseyite (a new species from Arizona), schoderite (Eureka, Nevada), wodginite with cassiterite in interesting, epitaxial intergrowths (Galilea mine, Minas Gerais, Brazil), agrinierite (Margnac, France), a great deal of fine kinoite (Christmas mine, Gila County, Arizona), luzonite (Taiwan), buttgenbachite with gerhardtite (x-rayed, from the Likasi mine, Katanga, Zaire), beautiful golden cryolite crystals to 1 cm with weloganite (Francon quarry, Montreal, Quebec), raspite and stolzite (from Australia), boltwoodite (Arandis, South West Africa), wermlandite (Långban, Sweden), elpidite (sprays of needles to 6 cm, from Mont St. Hilaire), mellite (Arthern, Thuringia, East Germany), melonite (doubly terminated crystal over 3 cm, Cripple Creek, Colorado), koettigite (superb crystals from the Ojuela mine, Mapimi, Durango, Mexico), canasite and fenaksite (Russia), kahnsite, segelerite and whitmoreite (South Dakota), greigite (Matra, Corsica), and ericaite (Juoharz, Germany). Obviously species collectors were well-provided-for at the Tucson Show.

Exhibits

Non-competitive exhibits this year were unusually good. Robert Gill of Santa Barbara recently acquired the Buzz Gray collection of benitoite and neptunite, and had it on display. This could easily be the finest such collection ever assembled. Almost every piece is worthy of note, and there were far too many to mention here. However, one group of neptunite crystals (Figure 18) impressed me as being the most aesthetic neptunite group I'd ever seen anywhere. Benitoite was represented both by the typically frosty crystals and also by the much rarer glossy crystals; some crystals measured over 3 cm on an edge.

Pierre Bariand, curator of the Sorbonne collection, Paris, brought along the famous Sorbonne cumengite; it was displayed by itself in a small case on a revolving platform. This crystal, for size and perfection, is probably ten times or even one hundred times better than the next closest competitor: really in a class by itself. After seeing it, one can understand why Paul Desautels likes to travel to Paris every so often "to bow down before the Great Cumengite". These six-pointed crystals were once assumed to be three-way penetration twins, but in 1974 Winchell and Rouse (*M.R.*, V. 5, p. 284) showed them to be boleite cubes with a pyramidal cumengite crystal grown epitaxially on each cube face. Specimens of both cumengite and boleite are still trickling out of the Amelia mine near Boleo (as in Figure 19), and Pala Properties had quite a few fine specimens at the show. According to Bill Larson they were all sold and he has none available at this writing. More will probably be found as Pala's mining there continues.

Bill Panczner, earth science curator at the Arizona-Sonora Desert Museum, provided a display of fine wulfenite and mimetite from the San Francisco mine, near Magdalena, Sonora, Mexico. Beautiful specimens of many colors and habits were in the museum's case including several samples from the most famous pocket. The pocket produced large (over 6 cm), thin, lustrous, brilliant yellow crystals of wulfenite with red, translucent mimetite. The ASDM is reassembling an entire wulfenite pocket in their new earth science wing now under construction. Although this wing is not yet open to the public, there are two cases of minerals elsewhere in the museum, and the exhibits of desert plants and animals in natural settings may be unique. Certainly no one who visits Tucson should miss this museum (or the mineral museum at the University of Arizona).

Saturday night

Saturday night at the show was eventful and fun as usual. Rusty Kothavala gave an excellent slide show and lecture on the minerals of the Deccan Traps in India (the locality for the green apophyllite). Then came the *Mineralogical Record* specimen auction, made particularly enjoyable this year through the help of Clarence Maier, a professional auctioneer and amateur mineralogist who volun-

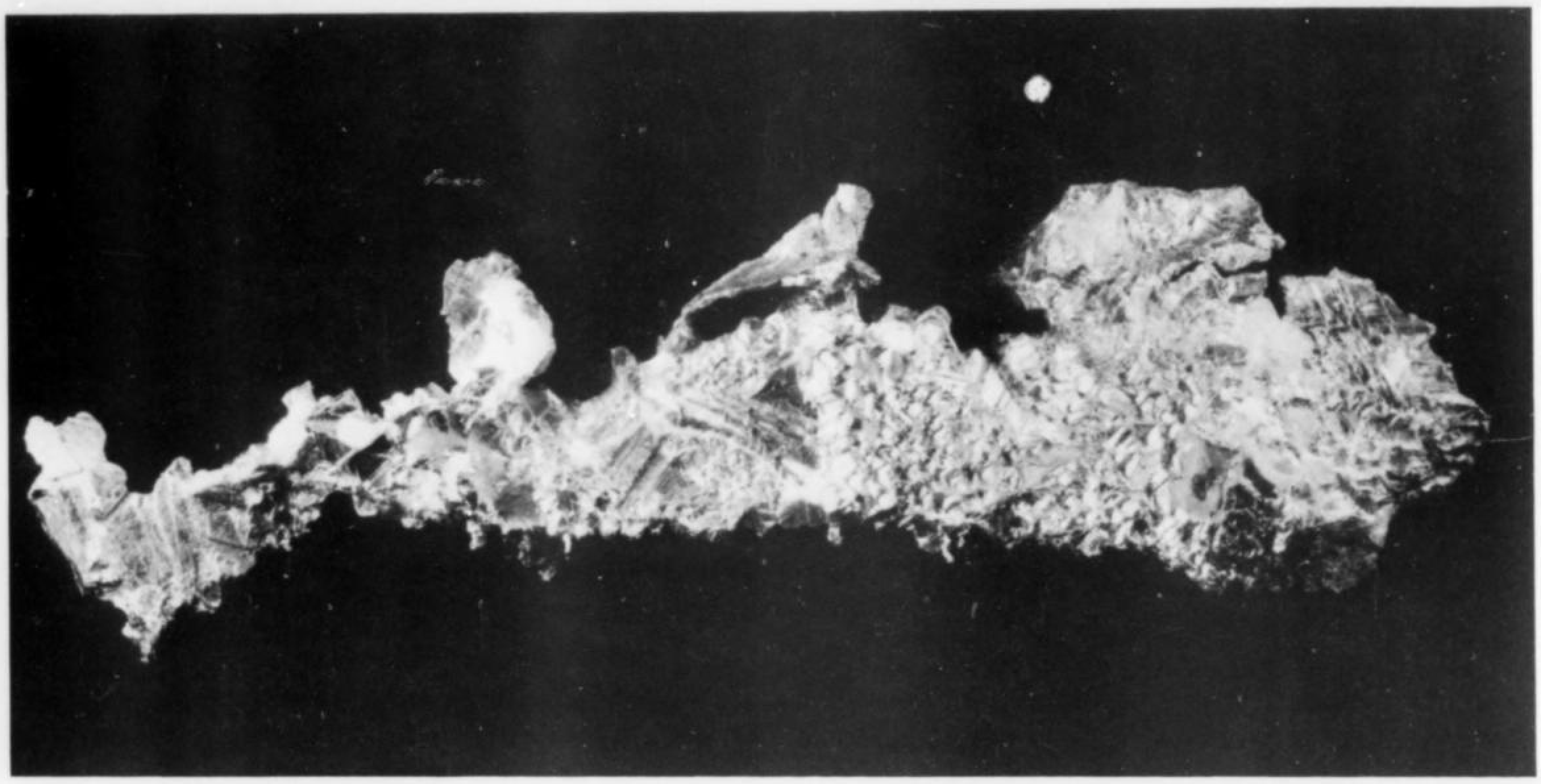


Figure 17. **GOLD** (brilliant yellow, 12 cm long, 71 grams, 2.5 ounces), Minas Gerais, Brazil.

Figure 18. **NEPTUNITE** (black, specimen about 6 cm long) on natrolite, San Benito County, California. Robert Gill collection. (The photo is a cropped flash shot taken through the showcase window during the show.)

teered his services. For readers who have never attended one of these auctions, it is a treat you shouldn't miss next year. We received many fine pieces to be auctioned off, but the donor to whom I want to offer special thanks is W.R.C. Shedenhelm, editor of *Rock & Gem* magazine (he donated a stack of cover proofs of *Rock & Gem* signed by himself and the photographer, Jeff Kurtzeman). In other circles of common interest, bitter competition usually dominates, especially in publishing (witness *Time* and *Newsweek*); it really gave us a warm feeling to see the editor of one magazine making a donation to keep *another* magazine in business! Thanks W.R.C.

The slide show competition produced quite a number of excellent candidates, and the voting was fairly close on the top five, but Eric Offermann came out the winner (readers may remember his spread in the *Photographic Record* on Swiss micromounts, V. 6, #6).

The awarding of the McDole trophy has been a standard feature on Saturday night, and this year was no different. The trophy, for those who don't know, is awarded for "Best Rocks in the Show", as McDole would have put it. Ed McDole was a beloved, rough-hewn old character, a fantastic yarn-spinner, and also a dealer in amazingly good mineral specimens. He travelled around the Rocky Mountain states in a dusty Lincoln Continental and consistently surprised people with the fine, mostly self-collected, specimens he had stashed in the back. He's dead now, but some of his friends felt he deserved to be immortalized by a trophy which is now eagerly competed for every year. There is a little ceremony the winner must

Figure 19. **BOLEITE** (dark blue, specimen 5.7 cm wide) on white clay with green brochantite, Amelia mine near Boleo, Baja California Sur, Mexico, Kent England collection.

go through Saturday night before he can receive his trophy. It seems that dark rum (black, actually) was McDole's favorite drink, and years ago when the first such trophy was awarded a bottle of rum that had been Ed's was brought out from which the winner was poured a good-sized slug. The requirement has been continued to this day; only after downing this initiatory drink is the winner officially declared "an Old Bounder" (and also probably a fire hazard) and given his trophy. This year John Barlow, who won last year but was called out of town before the ceremony, was first to take his overdue drink. In an impressive display of a cast-iron esophagus, John waved away water for dilution, drained the rum in one gulp, and jumped off the stage to a wild ovation from the audience! This year's winner, Steven Smale, (a professor of mathematics at the University of California, Berkeley) took a little longer but finally got his down. Anyone who plans on winning next year had better start practicing this feat! Incidentally, after every show the hallowed bottle of rum if filled back up to the top with more rum so that "there will always be some of Ed's original rum in this bottle". Ah, the wonderful traditions we have!

W.E.W.

Photo by Kent England

Figure 20. Clarence Maier and John White auctioned off two photo portraits of Bolivian minerals at the M.R. Auction Saturday night...

Photo by Kent England

Figure 21. ...and John Barlow became an Old Bounder.

THE ZÜRICH SHOW - 1975

by Alexander Kipfer
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The 15th International Gem and Mineral Show in Zürich was held on the 22nd and 23rd of November of last year. The Zürich Show is one of the oldest expositions of its kind in Europe and is considered today to be the most important event in the European "Mineral World". The *Mineralogical Record* (May-June, 1975) confirmed that "It is the 'Tucson' of Europe and by far the largest mineral show on the continent."

Some facts: more than 320 collectors and dealers from 16 countries in five continents displayed their treasures on more than half a mile of tables! The first day it snowed and occasionally even stormed; on the second day the temperature fell far below freezing. So it was good weather to spend indoors viewing mineralogical treasures from our own mountains and the rest of the world. Twelve thousand visitors were registered.

The first Mineral Fair in Zürich was held in 1959, and it was very small; the second, in 1961, was a bit bigger: 30 exhibitors and 250 visitors appeared for that event. From this modest beginning grew the now large and famous Zürich Mineral Show (Mineralbourse). Such growth, of course, brings with it many problems. Because of the rapid growth, it became difficult for the promoters to maintain the show within the limits set by the Collector's Association. In order to remain within the limits set for exhibitors and table space (currently 1075 square yards) the requirements have become increasingly selective, and the specimen quality level has been set ever higher. Experts walk through the hall checking the quality of the specimens offered, and the accuracy of their label information. Falsified pieces must be withdrawn at once. Each complaint by a visitor is carefully checked.

There is a thematic display every year; this year there were two. Hansjakob Siber, Jr., displayed American fossil fish from his private collection; such beauty and perfection have never before been seen in Europe. In another display he showed, also from his private collection, a fossil bird from Wyoming, complete with the slab with the negative impression. There was a second specimen, head only, but also accompanied by the negative impression.

Still another attraction of Siber & Siber (of Aathal, Zürich) was the display of magnificent gold and silver specimens, some of which had been flown in from the U.S. the preceding day just for this show. Both wires and crystals of silver were on display, along with crystallized gold specimens. Two pieces from an old collection of Kongsberg minerals were shown. A wire-silver specimen 6 inches tall, with the wires intergrown and as thick as your finger, was topped with sphalerite. The other piece, 5 inches tall, looked like a small bonsai tree. Most of the gold and silver pieces were supplied by David P. Wilber, of the U.S. Localities for the gold pieces included Russia, the United States, Canada, Australia, and Romania. They lay protected behind thick security glass, surrounded by guards. The value of these specimens is said to be about 60,000 Swiss francs ($22,900).

The Arkansas quartz was the "black sheep again; the specimens had been turned a smoky color by exposure to x-rays. A wholesale dealer had to be convinced last year that such specimens do not belong in a Swiss show, and yet there were several dealers again offering them this year. Every year this type of cheating must be dealt with more often. Some dealers try to improve their profits by other tricks. For instance, certain pieces such as rhodochrosite and amethyst can be made to appear exceptionally well-colored by the use of colored spotlights. Copper minerals show more intense colors when augmented by ultraviolet light. At home, however, the buyer realizes that the pieces have lost much of their beauty.

"The Arkansas quartz was the 'black sheep' again."

This year, as every year, Alpine minerals were in great demand. The supply of smoky quartz crystals has been dwindling. Poor sales of the larger pieces may be a result of the world-wide recession. However the dealers with reasonable prices could not complain about sales. The number of micromounts for sale increases every year, and the Swiss Alps are prolific suppliers. Even the wholesalers now offer micromounts, and also the supplementary micromounting equipment. The Zürich Show now seems to have the widest and richest offering of rare specimens for species collectors. Rare minerals no longer easily available could be had as micromounts, thumbnails or miniatures. The rare minerals available included the highly sought-after gold-tellurium minerals from Nagy-Banja and Verespatek. Also interesting were the very rare uranium minerals from Zäire (formerly the Belgian Congo).

Thanks to lucky circumstances this author himself was able to offer some extremely rare specimens of fülöppite. Because very few collectors are aware of the facts surrounding this species, a summary is given here which has been abstracted from a certificate of guarantee issued with each specimen.

FÜLÖPPITE, (Finaly and Koch, 1929) is the rarest of the complex sulfides ($Pb_3Sb_8S_{15}$).

In the book by the author, *Der Mikromounter*, (Otteditor, Thun/Munich, 1972) this rare mineral is mentioned on page 23, but the find described turned out to be fizelyite.

Fülöppite has only one known occurrence: Delaul de Crucii (previously Kreuzberglstollen) at Baia Mare (previously Nagy-Banya, Romania). This locality is mentioned in Radulescu, D., and Dimitrgscu, R., (1966), *Mineralogy of Romania*, but the statements in Klockmann and Dana regarding the locality are incorrect. The find consisted of approximately 120 small pieces measuring 3-4 by 5-7 mm, according to the information from the Heidelberg University dated 1970. The date of the actual find was March, 1928. The associations included semseyite, fizelyite, andorite, zinkenite, freieslebenite, boulangerite, jamesonite, and robertsite (?), as well as more common minerals.

The original (1928) discoverer of these specimens kept most of them for himself, and apparently never offered any for sale. They have been handed down through trades of rare minerals, and in 1970 the belongings of the discoverer were put up for sale in West Germany, at which time the specimens he had retained became momentarily available. The crystals offered here are from the specimens owned by the original discoverer. They were associated with zinkenite, and were tightly covered by boulangerite, which was removed with a soft brush, to make the fülöppite visible.

Fülöppite is missing in almost all museum collections, even the very old ones.

For reference, my personal locality-type collection contains the following specimens:

Specimen B 107/1	3X4cm	25 xls on sphalerite xls, on a matrix of pyrite-chalcopyrite.
Specimen B 107/2	5X8cm	About 100 xls with zinkenite and sphalerite xls on matrix.
Specimen B 107/3	1-1/2X3cm	About 10 xls with boulangerite etc., on matrix as above.

We met the following dealers from the United States: Fraziers Wholesale Mineral Company (Berkely), La Jolla Gems and Minerals (La Jolla), Keith Proctor (Colorado Springs), Herbert Obodda (Short Hills, N.Y.), Pala Properties (Fallbrook, CA), and Robert Sullivan. The presence of so many visitors from overseas is an indication of the great popularity of the Zürich Mineral Show.

QA column

Q. In the interim between Hey, Appendices to Hey, and the *American Mineralogist*, v. 51, #8 on one hand and Fleischer's *Glossary* on the other, what happened to kertschenite (kerchenite)? Has it been relegated to a pseudomorph status? If so, *what* after vivianite?

William Hunt
Sun City, Arizona

A. The following response has been prepared by Paul B. Moore, University of Chicago:

"Vivianite is a member of the homologous ("same general formula") series $Fe_3^{2+}(H_2O)_n(PO_4)_2$. For n = 8 it is vivianite; n = 4 is ludlamite, n = 3 is phosphoferrite, n = 1 is a synthetic phase, and n = 0 is sarcopside and graftonite. If two conditions can be met, the iron can be oxidized to the ferric end-member, $Fe_3^{3+}(OH)_3(H_2O)_{n-3}(PO_4)_2$ without destruction of the structure. The conditions are: (1) three waters in the formula must each be bonded to two Fg^{2+} cations and, (2) the remaining (n-3) water molecules must be bonded to only one Fe^{2+} cation. The only structure which fulfills this criterion is for n = 3. Thus, there exists a complete solid solution series $Fe_3^{2}(H_2O)_3(PO_4)_2$ (phosphoferrite)—$Fe_3^{3+}(OH)_3(PO_4)_2$ (kryzhanovskite). See P. B. Moore (1974): *Nature (Physical Sciences)* **251**, 305-306 for a detailed account.

Since vivianite and ludlamite decompose after extensive oxidation of the iron, the products are amorphous and unstable. Kertschenite is a generic term for the glassy products of oxidation of triphylite which are not true mineral entities but glasses or gels.

This brings up nomenclatural problems. If we define as species (1) end-member composition, and, (2) structure type, then any amorphous material is not a mineral species since (2) is not fulfilled as a unique space group cannot be found. Some gels, however, can have rather fixed compositions as, for example, evansite. Since the structure is not accessible, evansite is at best a *weak* species.

Another problem involves oxidized end-members which are in fact crystalline. Consider, for example, beraunite, $Fe^{2+}Fe_5^{3+}(OH)_5(H_2O)_4(PO_4)_4{\cdot}2H_2O$. It is deep blue in color. The oxidized form, eleonorite, is $Fe_6^{3+}(OH)_6(H_2O)_3(PO_4)_4{\cdot}2H_2O$. Or is it $Fe_6^{3+}O(OH)_4(H_2O)_4(PO_4)_4{\cdot}2H_2O$? Only further structure study can settle this issue. By the way, eleonorite is brilliant orange in color, so some major electronic changes have taken place.

I personally favor new specific terms *only if* good structural evidence is at hand to warrant this. As for beraunite and eleonorite, further study is definitely needed. What about the series $Fe^{2+}Fe_4^{3+}(OH)_5(PO_4)_3$ (rockbridgeite)—$Mn^2\ Fe_4^{3+}(OH)_5(PO_4)_3$ (frondelite)? What if a manganese analogue exists for beraunite, that is, $Mn^{2+}Fe_5^{3+}(OH)_5(H_2O)_4(PO_4)_4{\cdot}2H_2O$. Should it, too, be named?

So you see, more detailed studies, including new chemical analyses, may lead to a rapid growth in trivial names for the same structure type because of end-member composition. Providing the compounds are crystalline, a name is warranted for each end-member composition, including oxidized end-members.

I am of the opinion that *all* mineral names are tentative so long as a chemical analysis and a structure analysis are not available for each and every specimen."

Q. What is the difference between alpha and beta duftite?

John Tetrick
Minneapolis, Minnesota

A. Duftite, $PbCu(AsO_4)(OH)$, was split into two species by Claude Guillemin in a 1956 article in *Bulletin de la Societe Francaise de Mineralogie et de Cristallographie* (p. 70), duftite-α and duftite-β. These are certainly polymorphs of essentially the same chemical composition, but it is unfortunate that the suggestion made by Michael Fleischer at that time was not adopted; namely, call duftite-α simply duftite and generate a new name for duftite-β. Some of the localities given in the article are: duftite-α : Avozel, Vosges and Cap Garonne, Var (France), Tsumeb (South West Africa), duftite-β: Ojuela mine, Mapimi, Durango (Mexico), Brandy Gill, Caldbeck Fells, Cumberland (England), St. Nicholas, Ter-de-Belfort and Avozel, Vosges (France), Tsumeb (Southwest Africa). Duftite-α is isomorphous with mottramite and duftite-β is isomorphous with conichalcite.

yedlin on micromounting

The big news in micromounting was the session held at Tucson, Arizona a day after the regular show closed. Friends of Mineralogy and the Mineral Society of America held a joint affair, lasting two days, and in addition to regular papers and discussions, some twenty-six of them, an evening devoted to micromounting was on the schedule. Arthur Roe and Neal Yedlin were chairmen, and the speakers were Paul E. Desautels of the Smithsonian (History and Development of the Art); Violet Anderson of Toronto (Photographs of Canadian Minerals Through the Microscope); Paul Seel of Bala Cynwyd, Pennsylvania (Morphology and Rare Crystal Forms Seen with the Microscope); and Louis Perloff of Tryon, North Carolina (Minerals Appreciated Only with the Microscope).

With the Tucson show ended there were doubts about the number of collectors attending this session, but these were allayed when the proceedings began, for there were over a hundred people in the meeting room at the start.

Desautels opened with the first reference to micromounting in the literature. Robert Hooke, in 1667, included in his book *Micrographia of Minute Bodies made by Magnifying Glasses*, a sketch and description of quartz crystals in a seam in chalk-covered flint from Dover, England. Some two hundred years elapsed before the next step occurred in this phase of mineral collecting. Rakestraw, Fiss and a host of followers, all in the Philadelphia area, began micromount collecting, and the activity spread to all parts of the world. Paul discussed some of his personal relationships with Keely, an eminent collector of the period, whose micromount assemblage now is the property of the Philadelphia Academy of Sciences. His first acquisition was the collection of Morrell Baldwin, one of the latter-day saints (circa the mid 1930s) of micromounting.

Violet Anderson, who began photographing minerals through the microscope but recently, and who is doing the pictorial work on micromounts for a forthcoming tome on the minerals of Saint Hilaire, Quebec, by Mandarino and Perrault, exhibited slides of some Canadian minerals, demonstrating the fact that anyone can learn to use a camera and color film providing she knows minerals, has good taste and judgment, has developed great patience, and is satisfied with nothing but perfection.

After a brief recess, Paul Seel showed some unusual diamond crystals. Rare habits, inclusions and twinning structures were shown in the projected photographs. These were evident only to those who studied minerals under low-power magnification, to observe details not usually visible in large crystals.

Louis Perloff, with his uncanny ability to present the rare and unusual in the form of kodachromes, showed new and rare phosphates, arsenates and others, some on view for the first time ever. Most of the new discoveries are of minute or grain-sized specimens, and the only way they may be observed by collectors generally is by means of color photography. Roberts' *Encyclopedia of Minerals*, with over nine hundred photographs of some five hundred species, done, for the most part, by J. Weber, is indicative of this.

The day following the Friends of Mineralogy - Mineral Society of America conference, there was a field trip to the Mammoth mine, at Tiger, Arizona. Two busloads of ardent collectors attended, and the bulldozed dumps provided many specimens of wulfenite, fluorite, dioptase malachite and other copper bearing and associated minerals.

The concept of a joint meeting of the amateur and professional mineralogists is a fine one. This affair at Tucson was sponsored by Friends of Mineralogy, the Mineral Society of America, the Mineral Museums Advisory Council and the Tucson Gem and Mineral Society. Its continuation promises great things for the mineral arts and earth science. And much credit for its success is due to Paul Moore, technical chairman, and William Panczner, program chairman, whose work at the Arizona-Sonora Desert Museum has been so outstanding.

The Tucson show itself? What remains to be said? Collectors and dealers from all the continents attended (including some from Brooklyn, New York). World-wide specimens abounded, with a number of rare and new species available - from Iran, Gabon, Madagascar, Tsumeb and Baja California. New minerals from the phosphate localities in South Dakota were in evidence, and the promise of new species associated with known ones was discussed everywhere.

Kinoite, a one-dealer mineral in 1975, was being sold by many of them, at a fraction of last year's prices. The bright blue micro crystals, usually embedded in clear apophyllite, graced many boards, and diligent search afforded individual needles and clusters of such quite suitable for micromounting. Iranite, bariandite, francevillite, chervetite and others were obtainable. Pala Properties, which had gone into Baja California to explore and mine the minerals of the boleite series, did, indeed, offer superb specimens of boleite, pseudeboleite and cumengite, together with their associates, as loose individuals and as matrix specimens.

Tailgating was rampant. This included the trucks and automobiles loaded with specimens for sale, and the wide-open motel rooms at the Desert Inn, the Sands, Holiday Inn South and most others, where all flat surfaces, including the beds and floors, were completely covered with enticing minerals. You just could not come home empty-handed!

A week prior to the Tucson affair, as has been the custom for many years, the Southern California Micro-Mineralogists held a conference, this the eleventh such meeting. The topic for study was sulfides, and the programs of the speakers were directed to this subject. This was a two day (and night) affair and featured, in addition to the discussion subjects, workshops, exchanges of material, give-aways, new tools, and new ideas; a micromounter's paradise. Joel Arem, on Saturday evening, explained his methods of photographing minerals for use in books, magazines, and as posters. Instead of shooting through a microscope, which limits depth of field and operating controls, he uses a bellows attachment, lens reversal, and obtains some of the finest pictures extant. A special beginners' work session was conducted by Juanita Curtis, who, with guest participants, outlined basic methods and techniques of the micromounting art, getting newcomers started properly, and preventing them from falling into habits of carelessness and poor workmanship. Every micromount meeting should have such a session. Too often is it presumed that those attending are all old hands at the subject, need no preliminaries, and are expected immediately to enter the flow of expertise. The hobby needs well-grounded beginners.

Jan deHass, 2734 Midvale Avenue, Los Angeles, 90065, manufacturer of fine lights for reflected viewing under the microscope, showed what could be done to rehabilitate old stereo-binocular 'scopes. He had a couple with him, old Spencer Lens Company jobs (predecessor to American Optical Company) which in appearance and operation seemed new instruments. We have one of them; Kay Robertson has the other. He occasionally has such instruments available.

Some time in the past we'd told of milarite finds at Conway, New Hampshire, indicating that the two largest crystals found were acquired by the Smithsonian. Well, a fine matrix specimen, ideal for viewing under the microscope, arrived recently, unheralded, unannounced, and, says John Oliver, from whom it came, "With my good wishes. Thought you'd like it".

We surely do, and we ascertained that there were a very few more available. Write him at Old Intervale School Mineral Shop, Intervale, New Hampshire 03845. These specimens are good, and rare. We don't know what else Oliver has available but a self-addressed, stamped envelope should suffice for an answer.

Just got a catalog in the mail from Hatfield Goudey, 1145 West 31st Avenue, San Mateo, California 94403. "Hat" was with us at the Southern California meeting, stayed overnight at Yuma where we did, and was everywhere possible at Tucson, acquiring unusual things for micros for himself and his clients. One thing about his lists: Not only do they contain prices of specimens, both mounted and unmounted (almost 400 entries in the latest catalog), but there are basic directions for the art, and lists of supplies available. Goudey, a retired mining engineer, does this as a favor to the hobby practitioner, and to educational institutions in need of specialized miniature collections of minerals. A couple of stamps will deliver this catalog to you.

A couple of years ago Laura (Peg) Marble produced for the Worcester, Massachusetts Mineral Society a compilation of the then known minerals of the De Mix quarry, at St. Hilaire, Quebec. This was a most popular work, affording the amateur identifications of the myriad species to be obtained at this locality. Peg has moved to South Carolina, 62 Dorset Way, Lyman 29365. Her mineral work and micromounting have been temporarily curtailed, but she has refused to remain still and has decided that an alphabetical compilation of the minerals of the Foote mine, at Kings Mountain, North Carolina, was in order. So she did it. Six sheets, 98 entries, giving name, hardness, class and crystal system, tenacity and fracture, cleavage, form, luster and color of each of the species listed, and where the mineral had been described in the *Mineralogical Record* she included this reference, too.

We do not know the cost of producing and duplicating the work. Mrs. Marble isn't aware that we are promoting it to assist collectors interested in the locality. If you collect seriously you will indeed have specimens from this famous quarry and would want a tabulated record of the finds there. A dollar? Two dollars, for duplicating, postage, envelopes, time? Hey, why not send Peg a fine micromount specimen for a copy of the list? She'd like that.

Let's see. Before this column goes to press the Capital District Micro Mineralogists will have had their annual to-do, (April 3 and 4, 1976) at the Center of Adult Education, University of Maryland, College Park 20742. This is a great meeting, devoted to micromount mineralogy, with fine facilities, speakers and exhibitions. Sales, too, of fine material, gleaned from collectors and dealers, the proceeds from which defray lecture costs and meeting facilities. Everything is under one roof - lodging, dining, lectures and all. We'll have been there.

Meanwhile, buy and use a good mineral book, R. V. Dietrich's *Mineral Tables, Hand Specimen Properties of 1500 Minerals*, a Virginia Polytechnic Institute bulletin, Volume 59, Number 3, March, 1966. The price is about $2.50, and the address - Blacksburg, Virginia, 24060.

Neal Yedlin
129 Englewood Drive
New Haven, Connecticut 06515

Letters

TUCSON SHOW; FAN MAIL:

Dear Sir:

Ever since the Mineralogical Record was first published, I have been reading about how great the Tucson Show is. The letters and articles of praise have always made me anxious to attend the next one. This year I was able to afford a plane ticket and all of the other expenses and make the trip to Tucson.

Everyone was right. It is the greatest mineral event.

I am an avid and very devoted mineral collector, but due to a shortage of cash for many years I have not been able to do much collecting or purchasing. My collection is small and I know very few collectors. The last four years my wife and I have operated a small mail order mineral business, Northwest Mineral Studies. We make money, but few people know us.

I have gone to many gem and mineral shows and have always found them to be hurry-up affairs where the dealers really don't care about the customers, where old friends meet but new ones are rarely made. I expected this at the Tucson Show because the big names were there. Fortunately it was not true.

Everywhere I went I felt welcome. It did not matter whether I was talking to one of the best known dealers, authors, professors or the curator of the Smithsonian himself, I was always made to feel welcome and important.

During the show, I made several new friends and aquaintances. Some of them will be an asset to my business and I expect to be an asset to theirs. They have already proven to be a big help to my personal collecting trips.

Hoping for some trades, I brought along several specimens. After looking at many of the exhibits and dealer's stocks, I felt very humble and thought of the small mediocre specimens that I had brought along. Almost decided to put them on the bottom of my flight bag and cover them with the specimens I was purchasing. Fortunately

I did not. When I mentioned trade to any of the dealers in the motels, they always asked to see what I had, and generally traded with my interests in heart. During the two days I was there, I was able to make several rewarding trades and a few sales.

To me the show was a good example of the scientists and knowledgeable collectors helping each other, novice collectors and the hobby and science as a whole.

It was rockhounding as a young person that got me into mineral collecting. It was mineral collecting that got me into and out of college as a geologist. It was geology that got me back into mineral collecting. Now it is events like the Tucson Show, magazines like The Mineralogical Record and the overall spirit of the hobby that makes me glad that I am part of it.

All of those collectors who have had second thoughts about the Tucson Show because it is *The* mineral event must make the trip to Tucson at least once. They will all see the hobby for what it really is.

Lanny R. Ream
P.O. Box 1336
Cedar City, Utah 84720

JOESMITHITE, ETC.

Dear Sir:

Amateur mineralogists are having an increasing number of new minerals named after them. Although I am very definitely in favor of their names being used in this manner, it seems somewhat inappropriate while many discredited names of famous mineralogists are not being given a second chance.

Afwillite may have been the first successful attempt to bypass an earlier name in order to honor A. F. Williams, who contributed much to our knowledge of diamond occurrences. Years later the existence of Smithite presented a similar problem. As any metropolitan phone book will indicate there are many Smiths. It was practically a certainty that eventually another Smith would appear worthy of recognition. This time Joesmithite was selected honoring an outstanding present-day mineralogist, Professor Joseph V. Smith.

The first name honoring a person was torbernite appearing in 1793. It produced a storm of protest, so much so that it was withdrawn and "chalcolith" substituted. It was "torbernite", however, that managed to survive. After this departure from conventional procedure, fewer names derived from early Greek made their appearance. Many continued to resent this departure from the Greek source that produced such names as eosphorite, "bringer of the morn", an allusion to the dawn-like rose-pink color.

As might be expected, earlier methods of identification being what they were, minerals named after many distinguished persons became discredited. Now that a means of bypassing earlier usage has appeared they should be deserving of further consideration.

The writer for one hopes that more joesmithite-type names appear even though at the expense of worthy amateurs, names of states or other localities or early Greek allusions. The following are a few of the names that could be revived:

Waldemar C. Brogger, Broggerite = thorian uraninite; Charles Hyde Warren, Warrenite = cobaltoan smithsonite; Johann Peter von Monheim, Monheimite = ferroan-ferrian smithsonite; John Walker, Walkerite = magnesian pectolite; Carlo Viola, Violaite (violan) = manganoan-manganian diopside; Gerard Troost, Troostite = manganoan willemite; Francis Chamberlain Partridge, Partridgeite = bixbyite; Chester Dewey, Dewelite = a mixture; Alfred C. Lane, Laneite = a variety of hornblende.

Ernest E. Fairbanks
Old Orchard Beach, Maine

CLUB DISCOUNTS:

Dear sir,

I am wondering if you have a policy of giving a portion of your subscription price to a rock club. I am a member of the Earth Science Club of Northern Illinois. We use funds raised in this manner for purchase of books by our librarian for placement in the Downer's Grove Library.

Chet Williamson
Wheaton, Illinois

We do now. Have your club treasurer collect subscriptions (new ones or renewals) from at least five different people in your club. Then keep $1 out of every year's-worth of subscriptions, and return the remainder to us along with a careful list of the subscribers and their addresses. While your club is ordering you might point out to them that there is also a $1 discount on the new Glossary of Mineral Species if bought in lots of 10 copies or more.

Ed.

THE EXCHANGE COLUMN

In his letter to the editor (Jan-Feb 1976 issue), Mr. Bob Stewart asked that subscribers let you know their feelings regarding the listing of traders. I see nothing wrong with the listing of people interested in trading. This is but one more way *MR* has served its subscribers (and I know of only two individuals who asked for the listing).

I enjoy trading, and estimate that my collection has increased about 30% over the past few years by this activity. It has been an excellent way to dispose of duplicate material (other than by giving them to museums). I do not know what Mr. Stewart means by "run of the mill material", nor can I imagine how one could determine which materials fall in this category. As long as a book such as *The World's Finest Minerals & Crystals* sees fit to picture minerals as common as calcite or quartz, I cannot determine from name alone what the "run of the mill" category would be. Perhaps Mr. Stewart sets too high a value on his items and too low a value on other people's? I have seen this effect potential exchanges. I do not know why he is against listing traders, except that he seems to feel that it is not proper.

Henry Fisher
4636 Dundee Avenue
Columbus, Ohio 43227

Dear Sir:

In answer to the letter of Bob Stewart in Vol. 7 #1, RE: Exchanges. Might I add my viewpoint, that if M.R. had only scientific or high level collectors to subscribe to it, then it might not survive. A lot of us so called "Amateur" or "Run of the Mill" collectors subscribe to it too.

I have an open mind on an exchange column in M.R., but his trend of thought is wrong about the level of collectors, or their material. WHO IS TO JUDGE!

He might try to exchange with a few of us, and find out how good our material can be. I know that you, Mr. Editor, are much too busy to "SCRUTINIZE" letters addressed to an exchange column. If persons want to exchange, they describe their material, and wants, in detail in letters to each other, and no one forces them to complete an exchange.

My congratulations to you and your staff for a very fine periodical.

Raymond J. Marlotte
10201 Pickwick Drive
St. Louis, Missouri 63123

We will try an exchange column on an experimental, irregular basis. Extreme conciseness of wording will be required, and of course mention of lapidary material would be inappropriate. Let's keep it to rare, or high quality, or unusually interesting minerals.

Ed.

I have read a few letters to the editor from people defending their role as "species collector". I would like to throw in my specific support; and add that I am anxious to trade with any of them.

Looking forward to hearing from your specialized readers.

Irwin Kennedy
160 Eskine Avenue
Toronoto, Ontario M4P 1Z3
Canada

Advanced collector wishes to swap quartz crystals and associations with other collectors around the world. All sizes, all localities wanted. Have very large number of duplicates of other specimens, chiefly crystallized, to offer. Welcome inquiries from museums and colleges with duplicates of quartz and who wish a large selection of world-wide crystals to choose from.

Paul F. Patchick, Geologist
414 Bishop Avenue, Pacific Grove, California 93950

ELEGANT NEW EXHIBITION HALL

A 563-carat star sapphire, twelve chunks of iron from extraterrestrial regions, a large garnet crystal unearthed from a New York City subway excavation, quartz crystals from the Catskill Mountains, a 596-pound topaz from Brazil, an 87.64-carat engraved emerald believed to have been worn 300 years ago by a Hindu prince, and more than 5000 other fascinating specimens are now being transferred to a sumptuous new Hall of Minerals and Gems at The American Museum of Natural History. Covering one-third of an acre, the hall will be the largest and one of the most important exhibition areas in the Museum. It will open to the public on Friday, May 21, 1976.

The huge hall is curvilinear, a bold departure from traditional box-like exhibition areas. It also has multiple levels—with ramps and steps leading to individual displays—which are expected to generate a heightened sense of involvement on the part of visitors. The earth-toned floor and wall carpeting provide a color scheme that suggests earth and its treasures.

Two major objectives influenced the hall's design: to display the richness, variety and dramatic beauty of earth materials and to explain the properties of these materials, the profound subterranean forces that produced them, and their significance to human societies throughout history.

FINE MINERALS

VANADINITE, Old Yuma mine, Tucson, Arizona. Well xld. covering rock. Old Hugh Ford label. 3-1/2x1-3/4x1-1/2 .... $25.00
SCHEELITE, North Chungchong, Korea. Brill. xl., 3/4x5/8, w. attached Mico on term. Quartz xl. Choice. 2-3/4x1-1/4x1 .... 200.00
KINOITE, Christmas, Arizona. Micro. xld. on rock. 2-1/2x2x1 .... 15.00
TENNANTITE, Tsumeb, S.W.A. Group of huge xls., no matrix, coated w. minutely xld. Smithsonite. Choice. 3-1/4x1-3/4x1-1/2 .... 75.00
MILARITE, Valencia Mine, Guanajuato, Mexico. Well minutely xld. on xld. Adularia. 3x2x1-1/4 .... 50.00
BOLEITE, Boleo, Baja Calif., Mexico. Superb 1/4" xl. on Atacamite on matrix. with Anglesite 2x1-1/2x1-1/4 .... 200.00
ALBITE, near Amsteg, Switzerland. Brightly xld. w. minor xld. Quartz on rock. 4x2-1/4x1-1/4 .... 35.00
SMITHSONITE, Tsumeb, S.W.A. Very fine group of "butterscotch" xld. Largest xl. 1-1/4. 2-3/4x1-1/2x1-1/4 .... 110.00
ROSE QUARTZ, Sapucaia, M.G., Brazil. Superb xld. area, 2-3/4x1, on matrix. 4x2x2 .... 475.00
ZINCITE, Franklin, N.J. Fine old-time mass w. Tephroite & Franklinite. 4x3-1/2x2-1/2 .... 25.00
CHALCOPYRITE & QUARTZ, Ellenville, N.Y. 1x1" Chalcopyrite xl. and others on very well xld. Quartz. 5x4x3 .... 90.00
GROSSULAR & VESUVIANITE, Lake Jaco, Chihuahua, Mexico. Two Grossular xls., 5/8 & 3/8, perched on corner of Vesuvianite xl. 1-1/2x1-1/4x1 .... 18.50
SAPPHIRE, Sparta Junction, Sussex Co., N.J. Two small purplish xls. on matrix. Old Peter Zodac label. 2x2x1-1/4 .... 17.50
SMITHSONITE, Tsumeb, S.W.A. Minutely xld. green covering matrix. 3-1/2x2x1-1/2 .... 45.00
TETRAHEDRITE, Highland Boy Mine, Bingham Canyon, Utah. Well xld. with xld. Quartz on matrix. 4x4x2 .... 75.00
DANBURITE, Charcas, Mexico. Group of large term. xls. No matrix. 5x3x2-1/2 .... 45.00
DIOPTASE, Tsumeb, S.W.A. Brilliant gemmy xls. on xld. Calcite on matrix. 2-1/4x1-1/2x1-1/2 .... 75.00
AZURITE, Chessy, France. Good group of xls. 3-1/2x3x1-1/4 .... 95.00
CALCITE, Schulenberg, Harz Mts., Germany. Good group of hexagonal xls. No matrix. 2-1/4x2x3/4 .... 20.00
TARNOWITZITE, Tsumeb, S.W.A. Very well xld. on matrix. 3-1/2x2x1-1/2 .... 45.00
CLINOZOISITE, Baja California, Mexico. Very fine loose xl. 2x1-1/4x1 .... 45.00
BOURNONITE, Herodsfoot Mine, Cornwall, England. Well xld. on matrix. 3x2x1-1/4 .... 75.00
CHALCOCITE, Bristol, Connecticut, Xld. w. Calcite. 3x2-1/4x1-1/2 .... 50.00
WOLFRAMITE, Zinnwald. Bohemia. Good loose xl. 2-1/2x1-3/4x1 .... 30.00
CREEDITE, Santa Eulalia, Mexico. Good group of xls. No matrix. 1-1/4x1x1 .... 35.00
AUTUNITE, Near Autun, France. (Type locality) Micro. xld. on rock. Old Hugh A. Ford label. 3x2-1/2x1 .... 25.00
BIRNESSITE, Mt. St. Hilaire, Canada. Extremely fine bright term. xl. pseudo. after Serandite with Leucophanite xls. 2-1/2x5/8x1/2 .... 100.00
BERYL, Minas Gerais, Brazil. Very fine pale green term. gem xl. 3-1/4x1/2x1/2 .... 110.00
HERDERITE, Golconda District, Brazil. Extremely fine doubly-term. twinned xl. 1-1/4x1-1/8x3/4 .... 100.00
MORGANITE, Governador Valadares, Brazil. Large loose tabular xl. 2-1/2x2x1-1/4 .... 45.00
CUPRITE, Tsumeb, S.W.A. Unusual red xld. mass with some matrix. 2-1/2x1-1/2x1-1/2 .... 45.00
DIOPTASE, Altyn-tube, Kirghese Steppes, U.S.S.R. Well xld. on matrix. Old Buckelew label. 3x2x1 .... 145.00
AXINITE, Vittoria do Conquista, Bahia, Brazil. Good translucent xl. 1-1/2x1x3/8 .... 55.00
DIOPSIDE, Pitcairn, N.Y. Good well term. dark green xl. 1-1/4x1/2x3/8 .... 17.50
CUPRITE, Onganja, S.W.A. Good group of small cubic xls. coated with Malachite. 1-1/2x1x3/4 .... 20.00
LEPIDOLITE, Virgem da Lapa, Brazil. Fine large xls. on xld. Feldspar. Choice. 3-1/2x2-1/2x2 .... 90.00
CASSITERITE, St. Agnes, Cornwall, England. Brilliantly xld. with xls. up to 1/2" on matrix. British Museum label. 4x3x1-3/4 .... 150.00
HYALOPHANE, Bosnia, Serbia, Yugoslavia. Superb loose gemmy xl. 1-3/4x1-3/4x1-1/2 .... 150.00
AMBLYGONITE, Taquaral, Brazil. Fine colorless xl. 1-1/2x1-1/2x3/4 .... 45.00
SENARMONTITE, Constantine, Algeria. Well xld. on matrix. Rare on matrix. 2x1-1/2x3/4 .... 125.00
PYROMORPHITE, Dry Gill, Cumberland, England. Very well xld. on matrix. This important specimen is illustrated, in color, on page 289 of Field Book of Common Rocks & Minerals by Frederic Brewster Loomis. 3-1/4x3x2 .... 350.00

* * *

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