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SEPTEMBER–OCTOBER 2010 • VOLUME 41 • NUMBER 5

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The Mineralogical Record

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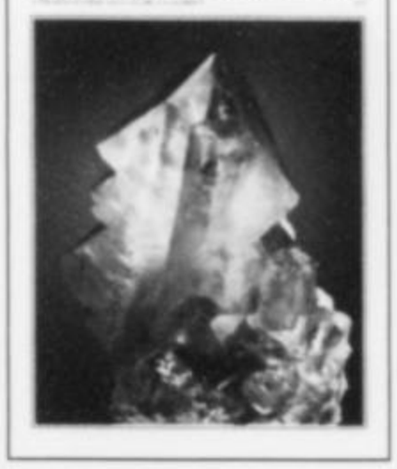
VOLUME 41 • NUMBER 5 SEPTEMBER–OCTOBER 2010

Continued on page facing inside back cover

Articles

Columns

This issue was made possible in part by contributions from Philip G. Rust and the Fellows of the Mineralogical Record



COVER: CELESTINE crystal, 9.6 cm, showing saw-tooth habit, from the Sakoany deposit, Mahajanga Province, Madagascar. (See the article in this issue, beginning on page 405.) Rob Lavinsky (The Arkenstone) specimen, now in the collection of Barry and Beth Kitt; Joe Budd photo.

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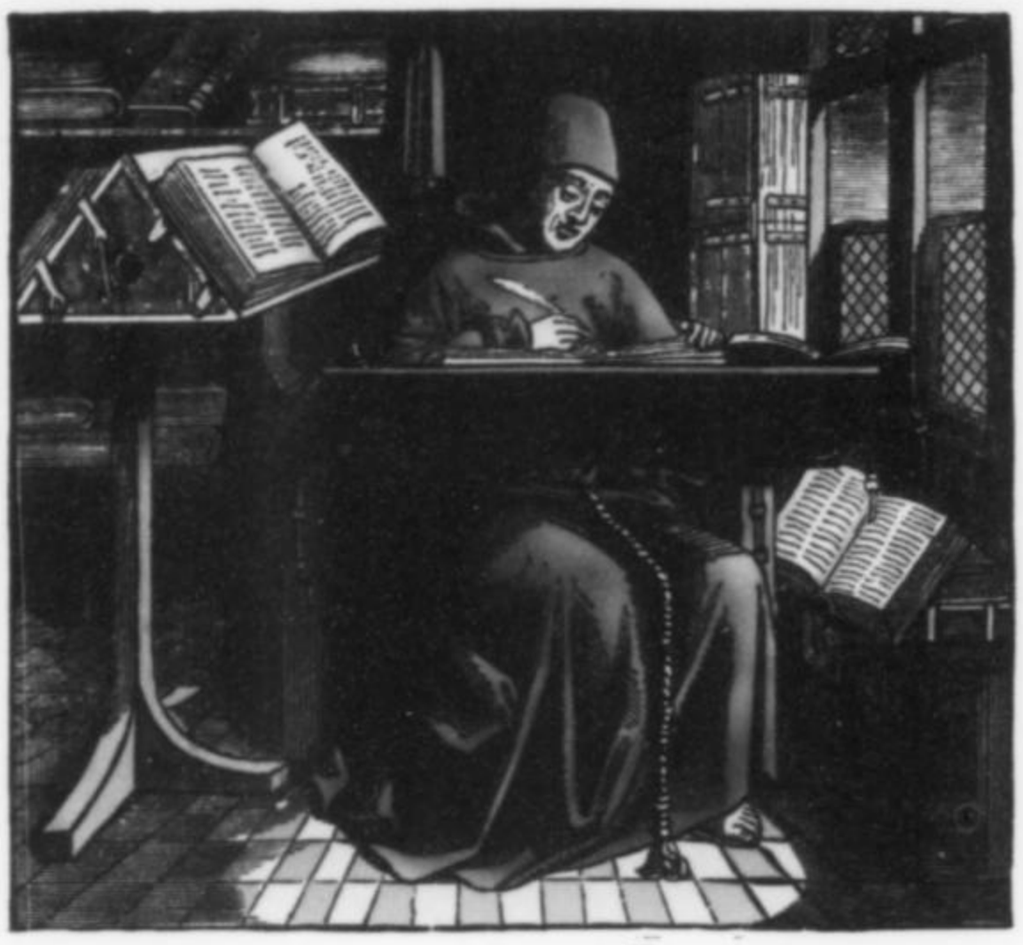


Notes from the Editors

(Above) **South African mineral stamp, with proportions restored.**

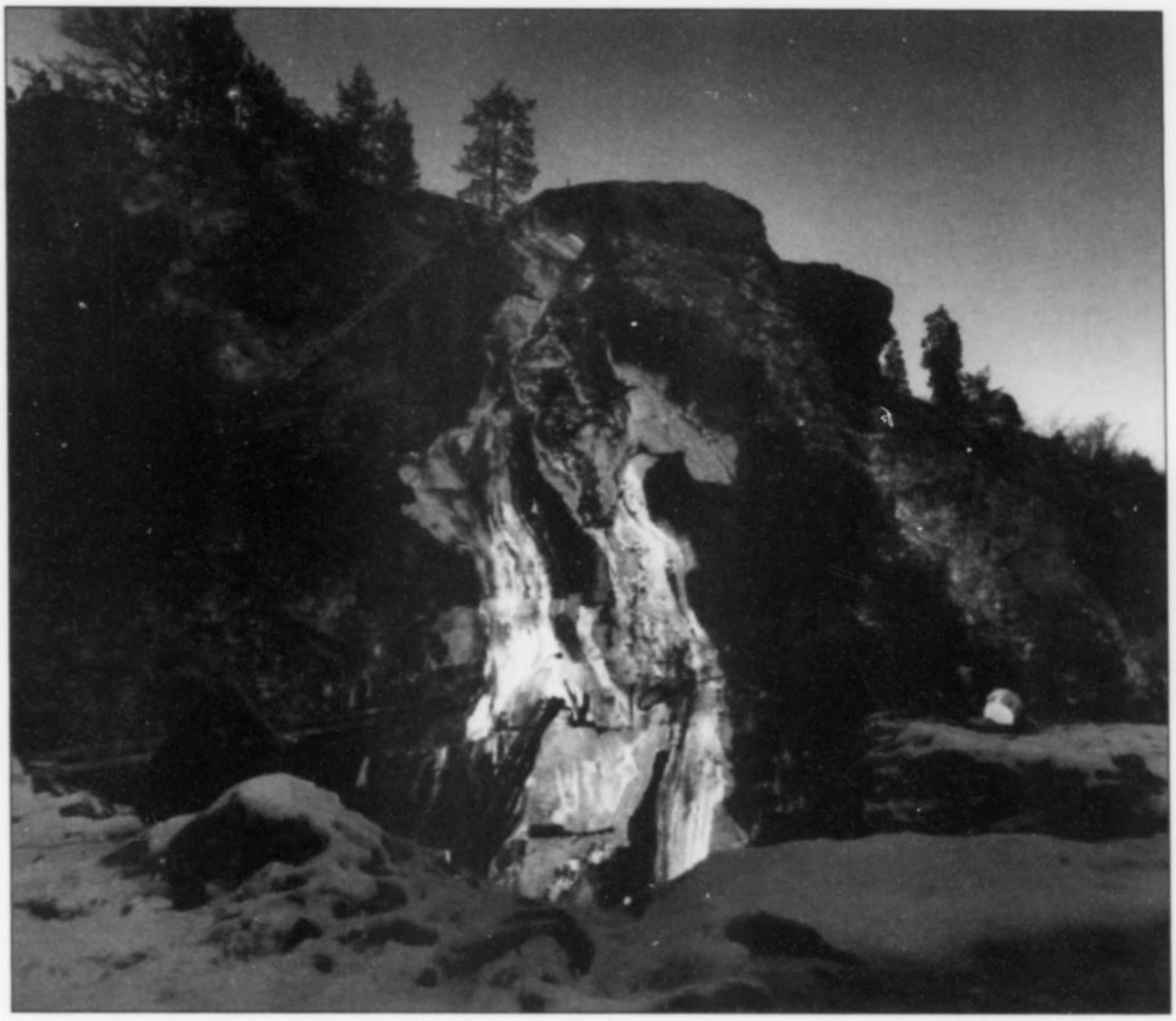
(Left) **South African mineral stamp as originally published.**

Distorted South African Minerals

The Republic of South Africa recently decided to prepare and issue a set of four mineral stamps devoted to gem minerals from South Africa. The stamps were designed and came out looking very attractive. However, it appears that the government artist or administrator in charge of the design of the stamps felt that the usual square format was not sufficiently interesting, so the stamp design was squashed into a diamond shape. Unfortunately, the angular integrity of the crystal drawings on the stamps was essentially destroyed in the process. We had an urge to see what the stamps would have looked like undistorted, and thought our readers might as well. So, through the magic of Photoshop, we have restored what must have been the original design by reversing the distortion, as shown here.

Fluorescent Hillside!

We couldn't resist sharing the incredible outdoor fluorescence photo shown here, taken by Bryan Duggan at the south side of a remnant pillar of zinc ore along the East limb of ore at Sterling Hill, New Jersey. The exposure is along the west wall of the Fill quarry, which itself is directly east of the Passaic pit. The Fill quarry is just that: it was opened as a source of "worthless" rock (just Franklin Marble) for use as backfill in worked-out stopes in the mine. The ore pillar as presently exposed thus used to be underground, and



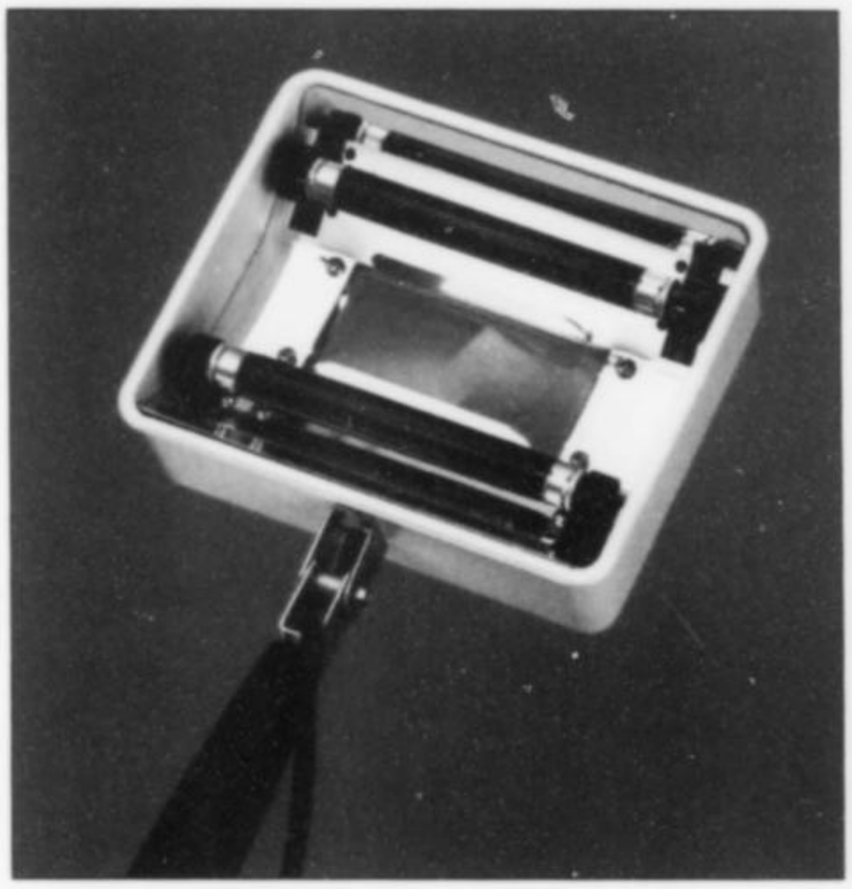
Fluorescent outcrop of zinc ore (green) and calcite (red) in the Fill quarry, Sterling Hill, New Jersey. Bryan Duggan photo

was left in place as the Fill quarry was deepened because it made no sense to quarry zinc ore to put back underground. For some reason the New Jersey Zinc Company never mined this little piece of ore, so it remains in place. The Sterling Hill Mining Museum is now in the early stages of designing a lightproof building to enclose the pillar, to allow viewing of the fluorescent zinc ore during daylight hours, thereby allowing many thousands of visiting school children to see this colorful display every year. Our thanks to Curator Earl Verbeek for providing the photo.

Ultraviolet Magnifier

Collectors need to be especially cautious these days when it comes to fraudulent repairs and restorations, as the practitioners of these age-old arts are becoming increasingly skilful. Using ultraviolet light to reveal the presence of fluorescent glue is a recognized technique. Spectroline's model Q-12NF ultraviolet magnifier lamp (priced at $356) is designed to facilitate that kind of inspection. The unit features one 4-watt longwave (365 nm) tube and one 4-watt shortwave (254 nm) tube, integrally filtered and combined with a built-in 3X magnifier lens. The lamp weighs 2.75 pounds (1.2 kg) and has a handle attached to the housing by a friction-lock swivel joint. A pedestal stand for hands-free use and a spring-balanced flexible arm with a choice of three mounting brackets (wall, bench, or table mount) are available as accessories. Visit www.spectroline.com for more details.

Spectroline model Q-12NF ultraviolet magnifier lamp.



Died, Rex Bannister, 86

Lawrence Reginald "Rex" Bannister, well-known fluorite collector, was born in Sentinel, Oklahoma on May 21, 1923, the son of Mary Louise Johnson and James Rufus Bannister, the manager of a cotton gin. Rex served in the U.S. Army Air Corps during World War II, then attended the University of Oklahoma where he earned his BS Degree in Geological Engineering. He spent most of his professional career working for the Laclede Gas Company in St. Louis, serving as First Superintendant for underground gas storage, and eventually rising to the position of vice president before retiring in 1985.

Rex was a regular at the major mineral shows, and specialized in specimens from the Illinois-Kentucky fluorite district, especially Cave-in-Rock, which were readily available on the market and relatively reasonably priced in the 1970s–1980s, before the mines closed. He would often take trips through the fluorite district, buying from local dealers who got their specimens directly from the miners. He would sometimes purchase large lots and resell the

Rex Bannister (1923–2010)

unwanted portions to help finance his purchases. His collection was thus limited in scope but high in aesthetic quality, representing the products from the various mines and the minerals that were being produced at the time.

In 1978 Rex sold 70 of his best cabinet-size specimens to the Harvard Mineralogical Museum on the condition that the group would remain intact as the "L. Rex and Julia Bannister Collection" (a stipulation that most museums, including Harvard, would no longer accept today). A year later he donated 40 more specimens to the Harvard collection, and sold his miniature-size pieces through a dealer. Since that time Harvard curator Carl Francis has acquired another 200 fluorite-district specimens from other sources and added them to the suite.

Rex and his wife retired to Lake of the Ozarks in 1985, and although he kept in occasional contact with his mineral friends and attended the Tucson Show a few times, his collecting interests in retirement shifted to antique fishing lures.

Rex married three times: his first wife, Margaret Alice Trimble, is the mother of his three daughters; his second wife, Julia Detroy, he commemorated in the naming of his collection at Harvard; and his third wife, Sharon Spicer, was with him when he died on February 27, 2010 in Iberia, Missouri.

WEW

Are You Taking Advantage?

Our Circulation Director and Associate Publisher, Tom Gressman, always enjoys spending time chatting on the phone with subscribers who call in. One thing he's noticed, however, is that a surprising number of people seem unaware of some of the very useful (and free!) features of our website. He's asked me to point out some of these again and invite readers to take advantage of them. After all, these free databases and service functions are one of the ways that we, as a non-profit organization, give back to the mineralogical community, so readers might as well get familiar with them and enjoy using them!

Biographical Archive

The Biographical Archive is unique on the internet—and that is saying something. Whenever you get a specimen that comes with the label of an earlier dealer or collector, you can look up that person in the Biographical Archive and get some background. Well over 1,400 biographies can be accessed. Just click on the drop-down menu to see the list, and then click on the name you want; that person's page will appear, along with images of labels and sometimes even a portrait photo and a photo of their shop or collection room. (Click on the image to see an enlargement.) Sometimes you can even date a specimen by comparing the label you have with dated examples posted in the Archive. We are constantly adding new entries; if you come across a label from a person we don't have, you can send us a scan of the label and we'll research it for you.

Tom Moore's Online Column

Tom Moore spends a lot of time surfing the mineral-related internet and rooting out interesting new discoveries which he talks about (and illustrates) in his online *What's new in the mineral world* column. If you can't afford to spend as much time as he does, you can read his column and get a jump start. Even I have often sat up and taken notice when reading about some of the things he has found. This column is totally different in content from his column in the magazine, which deals primarily with show reports. As I write this he has just posted his 24th installment, and earlier installments are archived as well. If you are an internet dealer, feel free to drop him a note when you post something new and interesting.

Our Online Journal, *Axis*

Yes, we are still posting new articles in our free online magazine. One of the recent ones which I found particularly interesting is about an invention developed by Eugene Cisneros (Mineralogical Research Company) for automating the taking of multi-focus photos of microcrystals. Multi-focus is that remarkable digital technique for obtaining infinite depth of field in photomicrographs. You take a series (called a "stack") of photos at a succession of focal settings, and then computer software combines the sharp-focus portions of each photo into a single image in which all parts of the specimen are sharp. It really is an amazing technique, allowing us to see microcrystals in a way never before allowed by the laws of physics. Gene's device produces the stack not by adjusting the focal knob on the microscope, but rather by raising and lowering the specimen platform. A simple computer program controls the specimen position, so with a one-touch technique you can take the entire stack of photos automatically. It really cuts down on the tedium inherent in the taking of multi-focus photo stacks.

Online Index

We no longer publish indexes to each volume (or series of volumes) as we used to; that practice has been rendered obsolete by website database technology. Now we have a *continuously updated* index to authors and title words for all articles ever published in the magazine over the last 40+ years. Every time we add the table of contents to the latest issue in the Back Issues section, those articles are automatically added to the index. You can search by author, and see a list of everything we have ever published by that author, or you can search on a particular word (e.g. "smithsonite" or "Kalahari") and get a list of every article that has ever had that word somewhere in the title. This really helps when you are trying to remember when an old article appeared, or when you are searching for past articles on a particular topic. Having identified an article of interest, you can then go to the Back Issue section of the website and see if that particular issue containing the article is still available (if it says "Add to Cart" by the issue, it's still available, and you can have it in your hands within a few days).

Antiquarian Books

Bibliophiles can access the entire *Annotated Bio-Bibliography of Mineralogy and Crystallography, 1469–1919* that constitutes the life's work of the late Curtis Schuh. This encyclopedic work lists 1,551 authors, with biographical notes on each author, and a detailed list of the books and editions they published—with scans of title pages as well. This is an essential reference for anyone wanting to collect old mineralogical books. Had it ever been published on paper it would have occupied numerous volumes and would probably cost well over $1,000. But you can access it at no charge. Curtis worked with us during the weeks before his death to get it all properly formatted for posting; he would be pleased at how well it came out, and how easy it is to use. The authors are listed in two drop-down menus, one alphabetical and one chronological (by birth year). Just click on the author you want and that author's page will appear.

The Art Museum

Don't forget to check out our online "museum" of mineral and mining art, arranged by artists. You can read biographical notes about each artist and see a selection of artworks by each person. Only eight images can be shown at a time for each artist, but if you scroll to the bottom you can select additional pages containing sets of eight images, each with a caption. Click on any image and see an enlargement. There are two drop-down menus: one for mineral artists and one for mining artists.

Don't like drop-down Menus?

Remember that you can get to our website's five-page site map by clicking on the crossed hammers symbol on the home page title screen. Then you can peruse all of the listings in all sections of the website, and click on anything you want to see.

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Over 150 different back issues are still available. You can browse through the tables of contents of every issue we've ever published, and click on the ones you want to buy that are still in print.

Advertising

Advertising Rates are posted for dealers, and likewise for collectors who are interested in sharing some images of specimens they own. The non-commercial ads by collectors amount to slow-motion articles on their personal collections; you get to see one specimen in each issue. It's a good way to support the magazine and share your treasures with the rest of the mineral world. You can even pay for ads by credit card through our secure Ad Payments page (and receive an immediate email confirmation).

Other Features

You can also give a gift subscription, or make a donation to the Mineralogical Record, or find advice for prospective authors. You can check out the "Stolen Specimen Alert" page, or the "Powerpoints and Videos" page (though we haven't posted much there yet as yet, the Powerpoint on the "Gypsum Crystal Caverns of Naica, Mexico" is absolutely fascinating.

We think our website is among the most interesting and easy-to-use mineral-oriented sites on the internet. Why not take full advantage of it?

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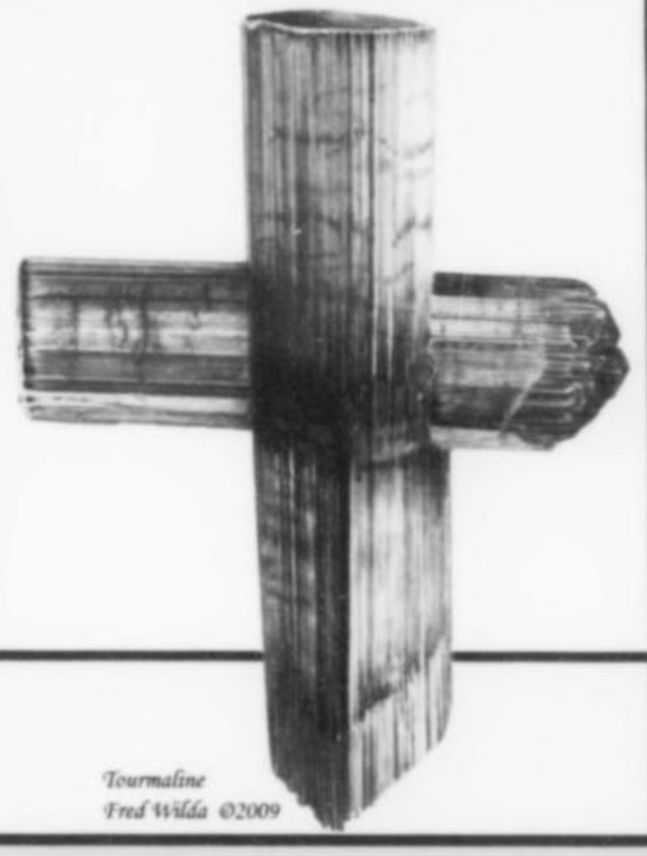

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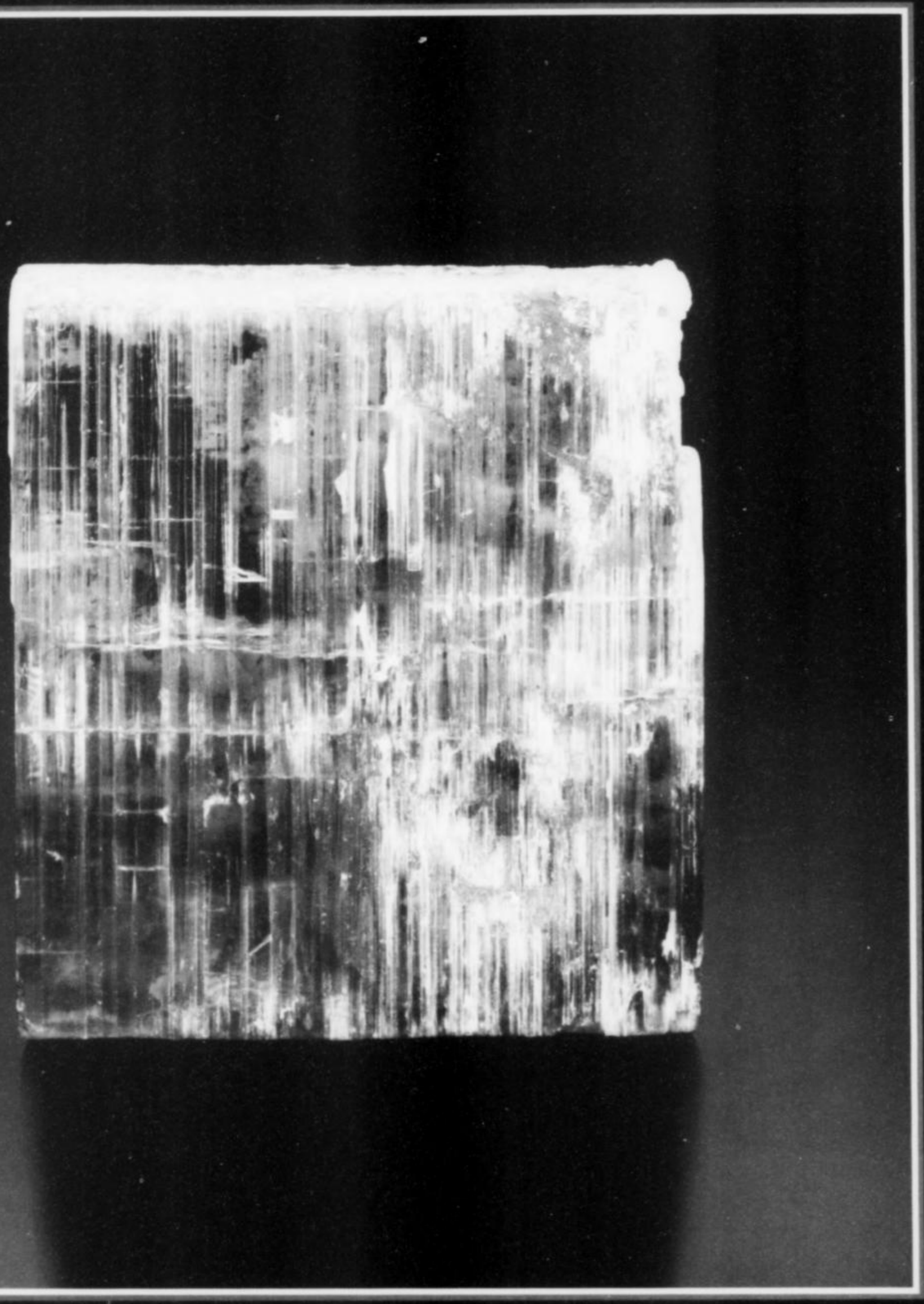
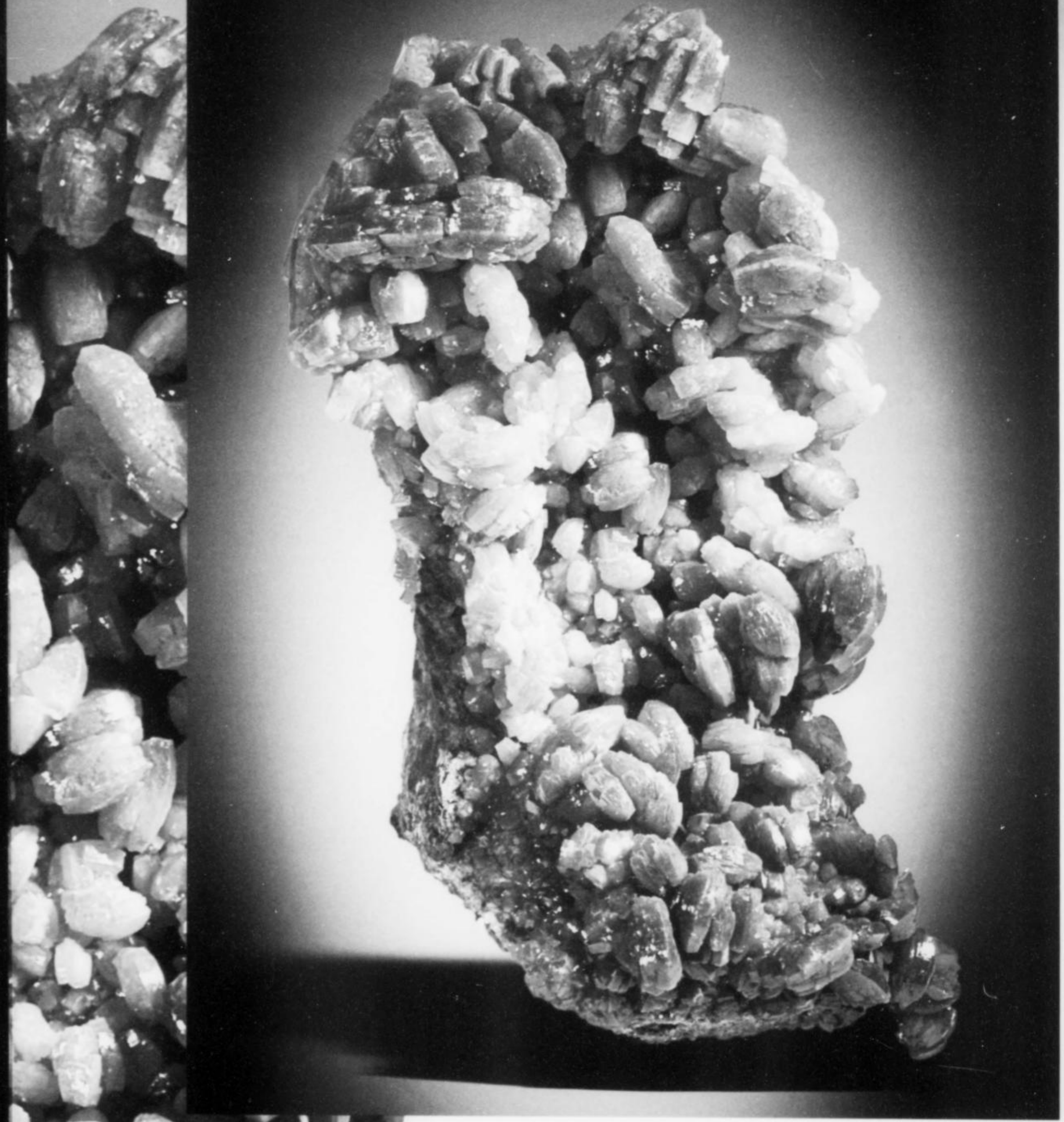
PHOTO BY JEFF SCOVIL



ANHYDRITE (REPAIRED). 5.5 CM. FROM THE SIMPLON TUNNEL, VALAIS, SWITZERLAND. OBTAINED FROM ROB LAVINSKY IN FEBRUARY 2007; EX BALLY MUSEUM (1924) TO ERIC ASSELBORN TO LAVINSKY. ILLUSTRATED IN KORBEL BOOK.

Clara & Steve Smale

COLLECTORS



Rhodochrosite, Buntzen Mine, Kellogg, Idaho. 5" tall
wilensky photo

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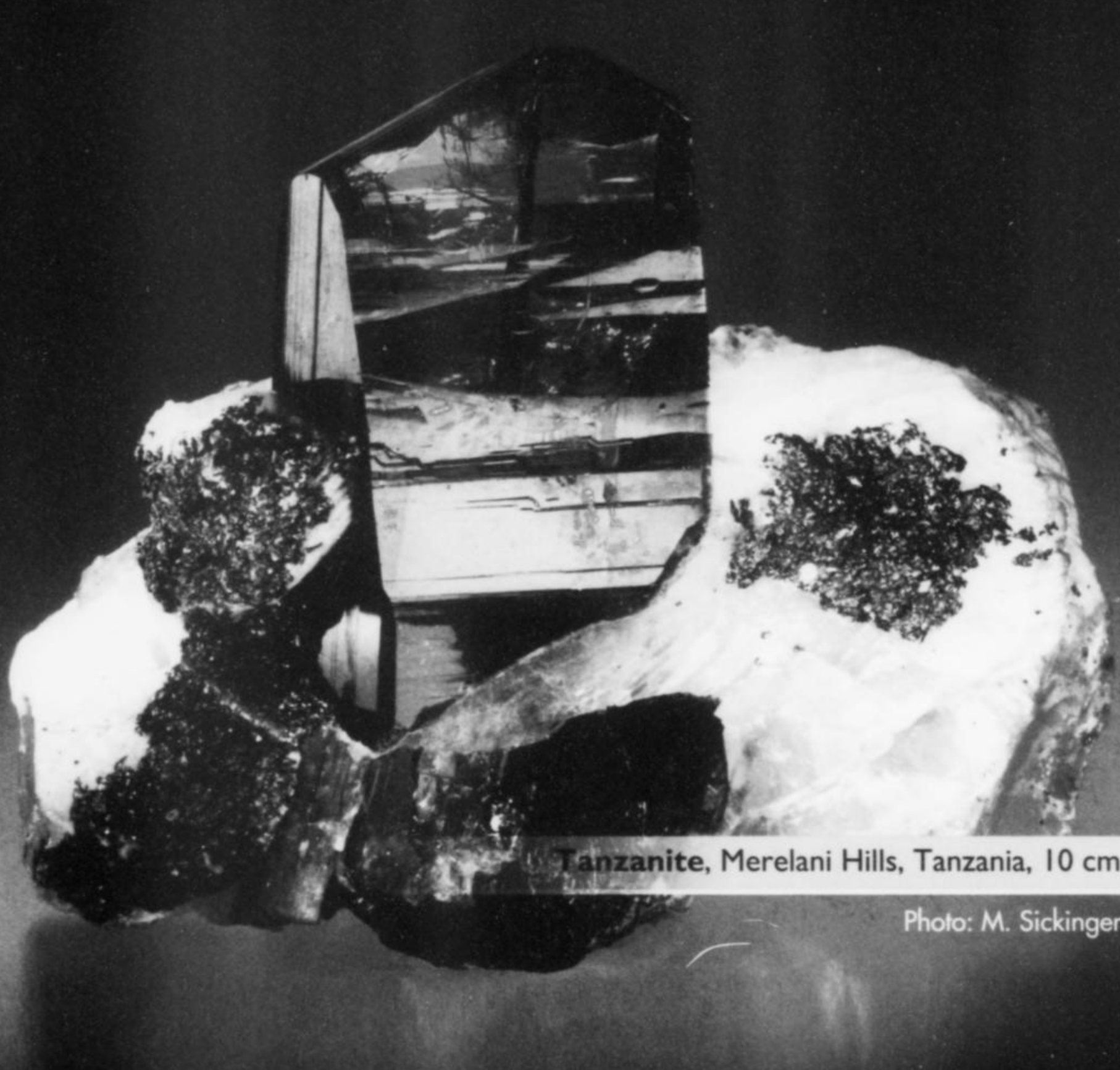


Tanzanite, Merelani Hills, Tanzania, 10 cm

Photo: M. Sickinger

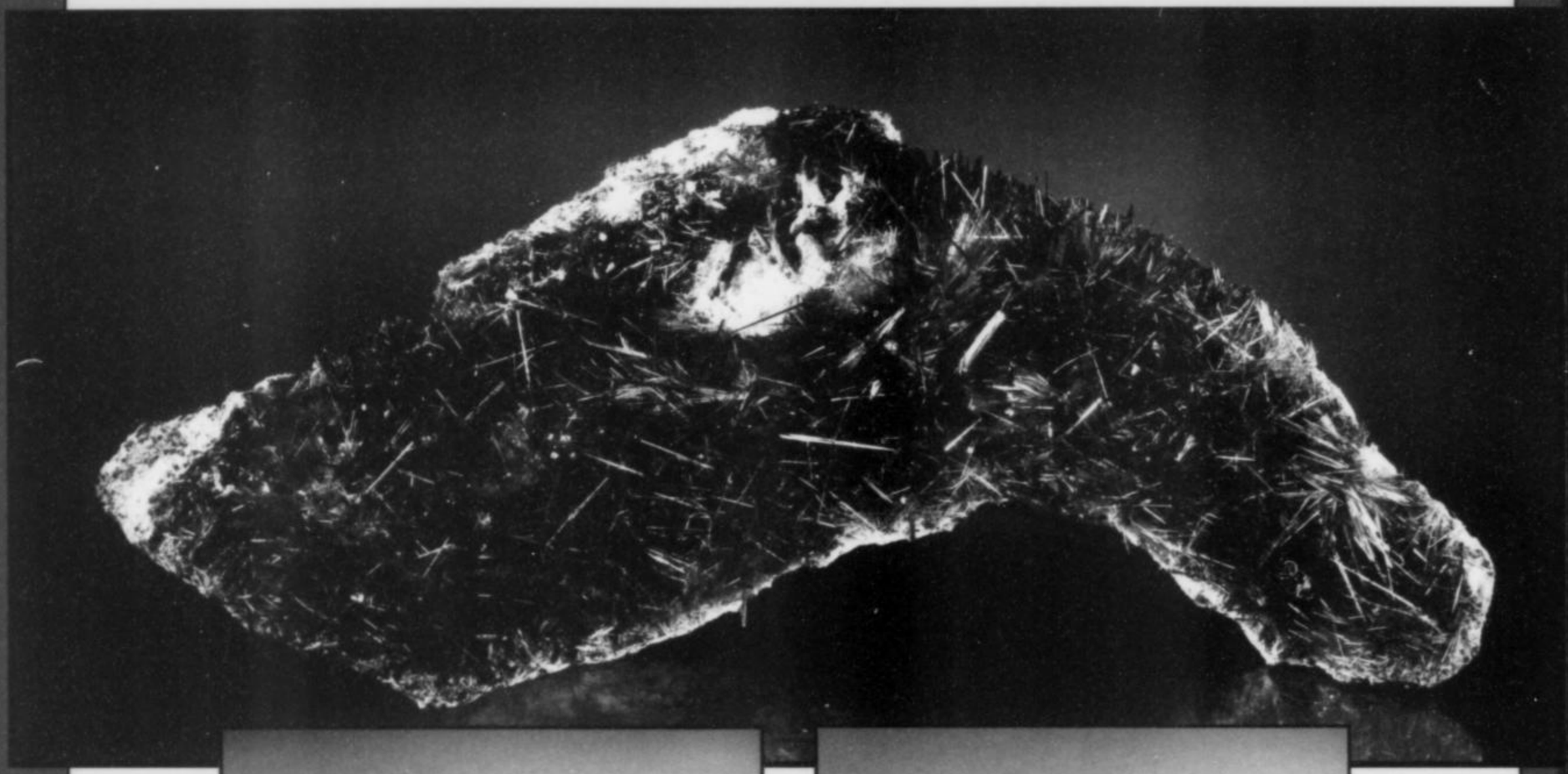
Marcus Budil

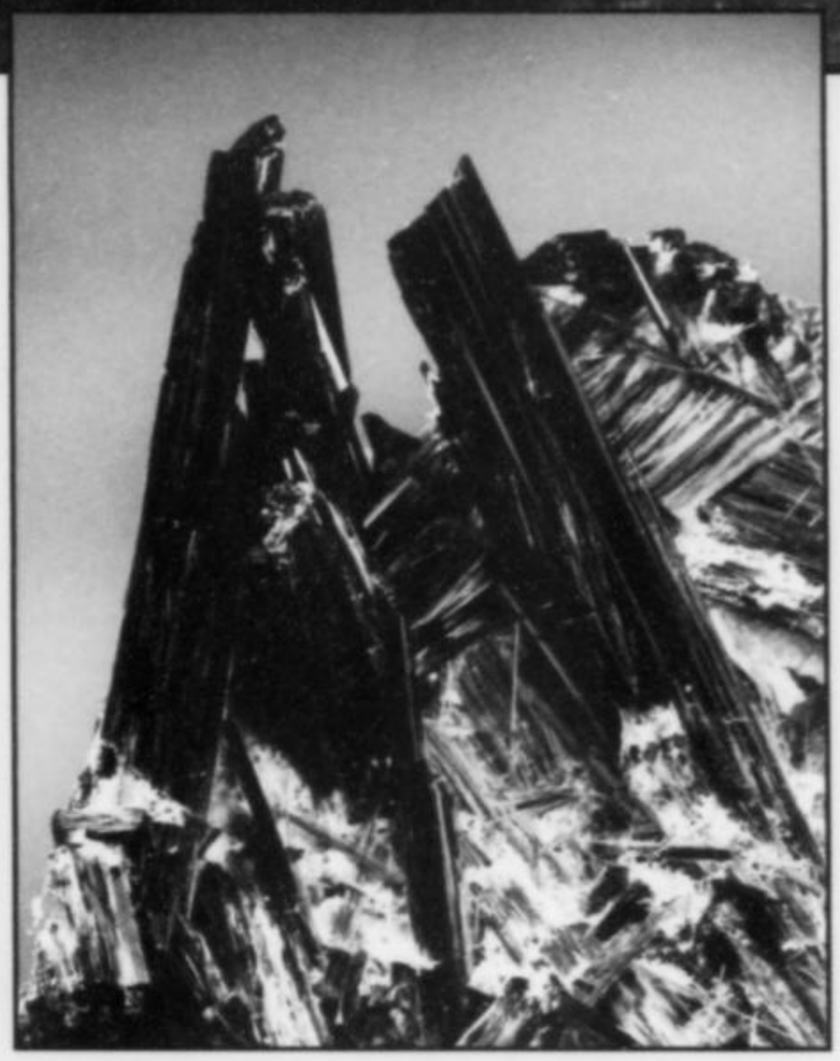
Monaco

budil@monaco.mc

World-class Brochantite

from the Milpillas mine, Mexico (collected January 14, 2009)





Photos by Joe Budd

The Sakoany Celestine Deposit

Mahajanga Province, Madagascar

Wendell E. Wilson
The Mineralogical Record
4631 Paseo Tubutama
Tucson, Arizona 85750

Since 1967 the Sakoany area on the northwestern coast of Madagascar has yielded many hundreds of tons of geodes lined with beautiful blue celestine crystals, the world's finest examples of the species. Even today it remains the one reliable source of superb celestine crystal groups, and the deposit shows no signs of being exhausted.

INTRODUCTION

Celestine (originally spelled with a now-obsolete ligature: "cœlestin") was named for its typical pale sky-blue color by Abraham Gottlob Werner in 1798. The most prominent and productive locality by far in the 20th century was (and still is today) the Sakoany deposit in Madagascar. Beautiful crystal-lined geodes may be seen in museum collections around the world, and crystal clusters broken out of geodes are highly popular with mineral collectors. Strictly speaking, Sakoany is not a "mine" but rather a collection of hundreds of individual pits dug throughout a 10-square-kilometer area north and west of the village of Sakoany.

LOCATION

The village of Sakoany is located at 15° 51" 40" S by 46° 14' 6" E, on the northwestern coast of Madagascar, near the mouth of the Betsiboka River on Bombetoka Bay. The area is in the Mitsinjo District, Boeny or Sofia Region, Mahajanga (Majunga) Province. The small village of Sakoany, which is part of the Katsepy commune, is home to about 150 Muslim residents belonging to the Sakalava ethnic minority. "Majunga" is sometimes inaccurately given as the locality, but the reference is certainly to Sakoany. The Sakoany name is spelled "Sankoany" in some recent government documents.

Access is possible by ferry boat (when it is not broken down) from the town of Majunga, on the eastern shore of Bambetoka Bay, to the town of Katasepy on the western shore. From there a road leading south is passable by a 4-wheel-drive vehicle at low tide for about 12 km, and from that point one can hike the last 10 km to Sakoany village. One can also take a high-speed motorboat from Majunga to the mouth of the river, and from there a dugout or canoe can reach the village at high tide (the village is accessible by boat only during high tide). It is also possible to take an inflatable "Zodiac" boat directly to Sakoany from Majunga, but the wind rises about 11 o'clock in the morning, resulting in higher waves and plenty of sea spray on the return trip (Humbert-Labaumaz, 1982). The tropical scenery is beautiful, but malaria mosquitoes are endemic to the area so protective medication is recommended.

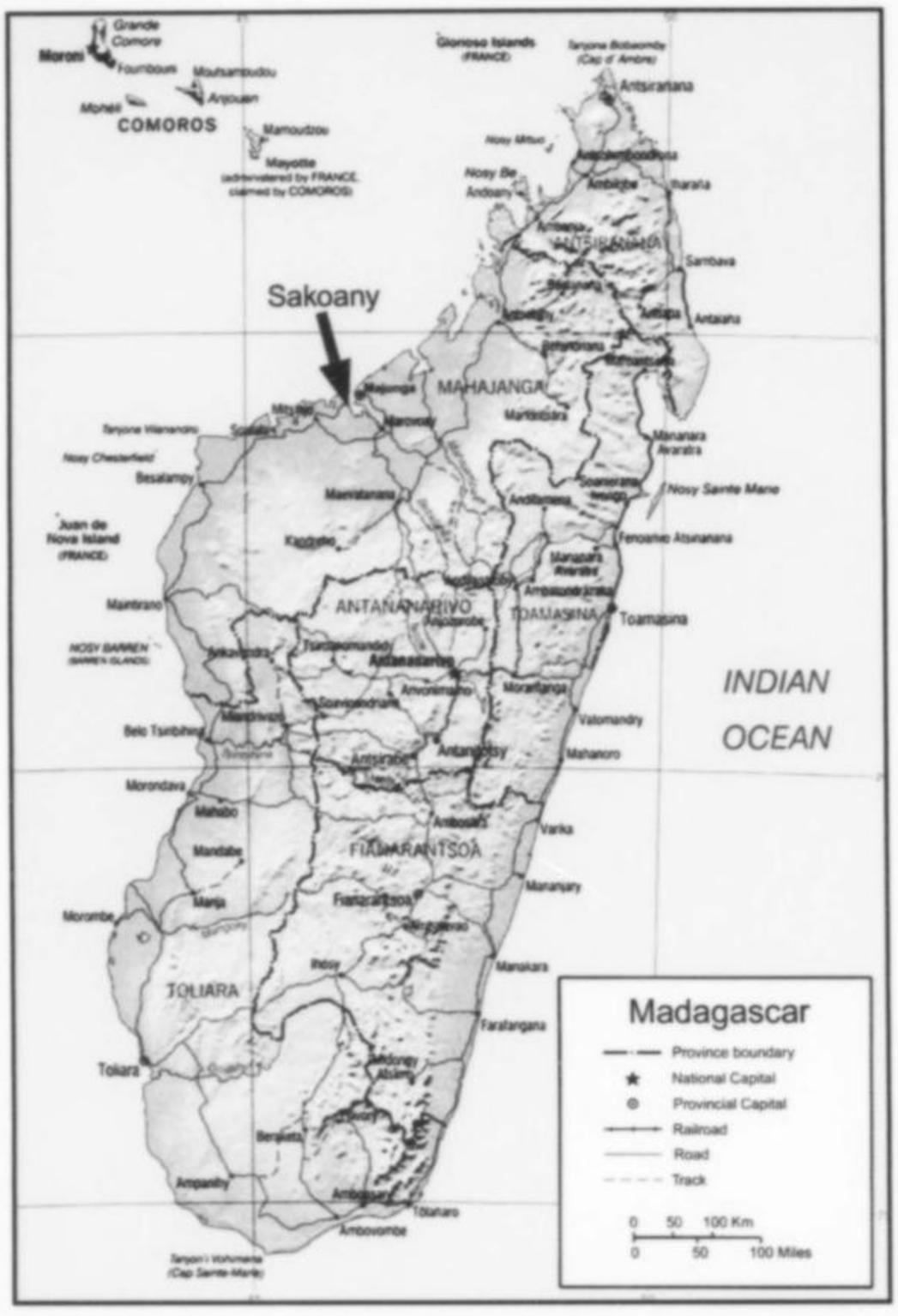


Figure 1. **Location map.**

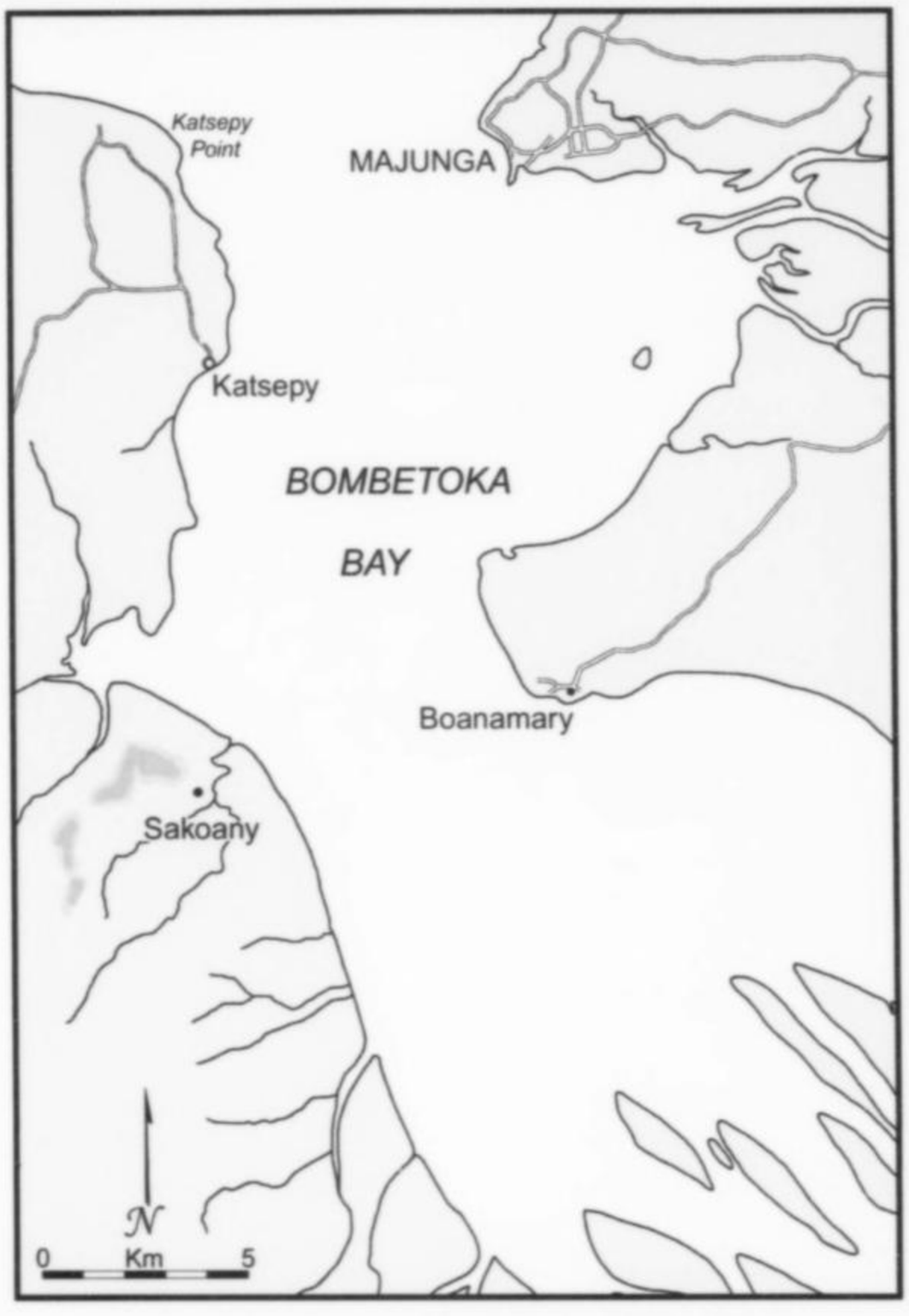


***Figure 2.* The Sakoany area on the western shore of Bombetoka Bay. The zone where pits have been dug for celestine is indicated in the blue, to the west and north of the village. (The exact location of the shoreline varies with the tides.)**

HISTORY

It is said that the first blue Sakoany celestine crystals, eroding out of the ground at the surface near the water's edge, were stumbled upon by a cattle herder. Mining of the dramatic, and often gigantic, celestine geodes began in 1967, and specimens were abundant on the mineral market through the late 1960s and into the 1970s. Then, after a lull of some 10 years, Madagascar blue celestine reappeared on the market in the early 1980s (Wilson, 1983). More emerged later in the decade (Wilson, 1987; King, 1988; Robinson and King, 1988), when French dealers Gilbert Gauthier and Paul Obeniche organized a concerted (and successful) effort to mine specimens. There has been no looking back since then—at every major U.S. show during the 1990s and into the 2000s, wholesale mineral dealers and decorator-specimen merchants have filled hotel rooms and show stands with hundreds of fine matrix specimens, most of the specimens showing at least some back-side curvature as evidence that they have come from geodes.

At the Ste.-Marie-aux-Mines show in 2006, about 20 fine specimens, miniature to small-cabinet size, of Madagascar celestine from a new pit appeared. Like the old ones, these show lustrous, gemmy blue celestine crystals (to 10 cm) lining the inner walls of geodes, but the crystals are of the elongated and tapered habit, with very steep faces almost coming to a point (Moore, 2006). And most recently at the 2010 Ste.-Marie-aux-Mines show, at least one dealer had large numbers of fine celestine geodes for sale (Daniel Trinchillo, personal communication).

GEOLOGY

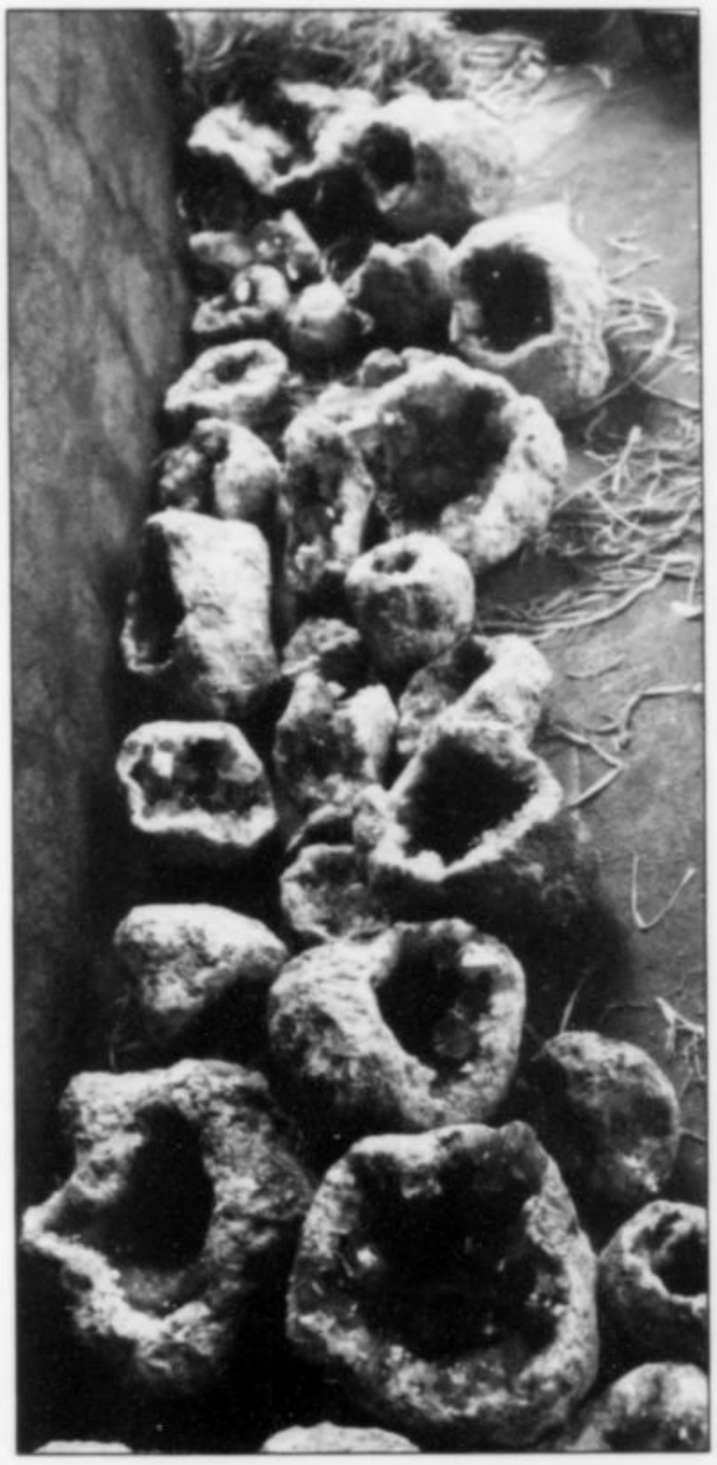
The celestine-containing geodes or concretions are found in a sedimentary deposit consisting of lenses of Lower Paleocene sandy marls up to 30 meters thick bordered by a fossiliferous limestone below and a sandy chalky conglomerate above. The sandy marl unit is gray at the base, becoming yellow higher up and reddish from iron oxides near the top. It has two zones: the uppermost zone (2 to 5 meters thick) contains small clusters to about 10 cm of bluish or brownish celestine crystals up to 2 cm. The lower zone (the thickness of which has not been accurately determined) contains the more important geodes in a range of sizes, generally 10 to 20 cm but in rare cases up to 1 meter and weighing over 100 kg. The celestine-containing unit is thought to be restricted to the area around Sakoany, as it does not appear in the geologic column 30 km away (Ratsimbazafy, 1973; Besaire, 1966, 1972; Humbert-Labaumaz, 1982).

Diagenetic (post-depositional) processes involving the circulation of low-temperature water (probably seawater, supplying the Sr) and the decomposition of organic material (yielding sulfate) resulted in strontium enrichment and the deposition of celestine (strontium sulfate) crystals as geodes, nodules and concretions.

Figure 3. **Katsepy, where the ferry arrives from Majunga across the bay. Clerico photo.**

Figure 4. **Debarking from the Majunga ferry. Cecile photo.**

Figure 5. **Celestine nodules for sale, lined up against a wall in Katsepy. Asia Gajowniczek photo.**



MINING

The people of Sakoany village support themselves by rice-growing, fishing, raising zebu (humped Indian cattle or oxen), and, since 1967, by mining celestine specimens. Ratsimbazafy (1973) reported that when he visited the diggings about 70 miners were at work in their various pits. Narrow, very neatly cut rectangular pits 10 to 15 meters deep are dug by hand in search of the celestine geodes. The pits are larger at the top, with climbing benches on the way down. Once a pit has reached the productive horizon, the miners dig horizontally in all directions until the lack of air circulation becomes intolerable or the geodes diminish. Geodes are usually removed intact and carried back to Sakoany village for opening. The geodes probably occur deeper as well, but in the absence of modern pumping equipment, mining stops at the water table, and the pits fill with water during the rainy season.

Figure 6. **Local inhabitants make their living by subsistence farming and the raising of zebu, a distinctive breed of Madagascar cattle. Eric Sibert photo.**

Figure 7. (below) **The village of Sakoany. Rock Currier photo.**

The rock is relatively stable and consequently no shoring is used. The miners' principal safety concern seems to be the fear of digging into neighboring water-filled workings that would cause sudden flooding of their pit. However, the fear of cave-ins in the water-saturated zone where the rock is softened is probably another reason why mining has not proceeded below the water table.

When the Sakoany celestine occurrence was originally discovered, the geodes were dug from areas very close to the shore of the bay, where the productive zone was only a meter or two below the surface. Probing with iron bars helped to locate the hard geodes suspended in the softer weathered rock. However, once that area was exhausted mining had to move to somewhat higher ground, about 15 meters above sea level, and the pits had to be dug correspondingly deeper to reach the productive horizon, which was still at about sea level. The majority of pits, now generally located a few hundred meters from the shore, are found scattered over an area of about 10 square kilometers. The pits are generally positioned 2 to 5 meters apart wherever the ground proves to be productive. Mining ceases during the rainy season and is forbidden by Muslim tradition on Tuesdays, Thursdays, Sundays, and during certain months.

When a new area is being prepared for mining the undergrowth is first cleared away, leaving some trees for shade. Religious offerings

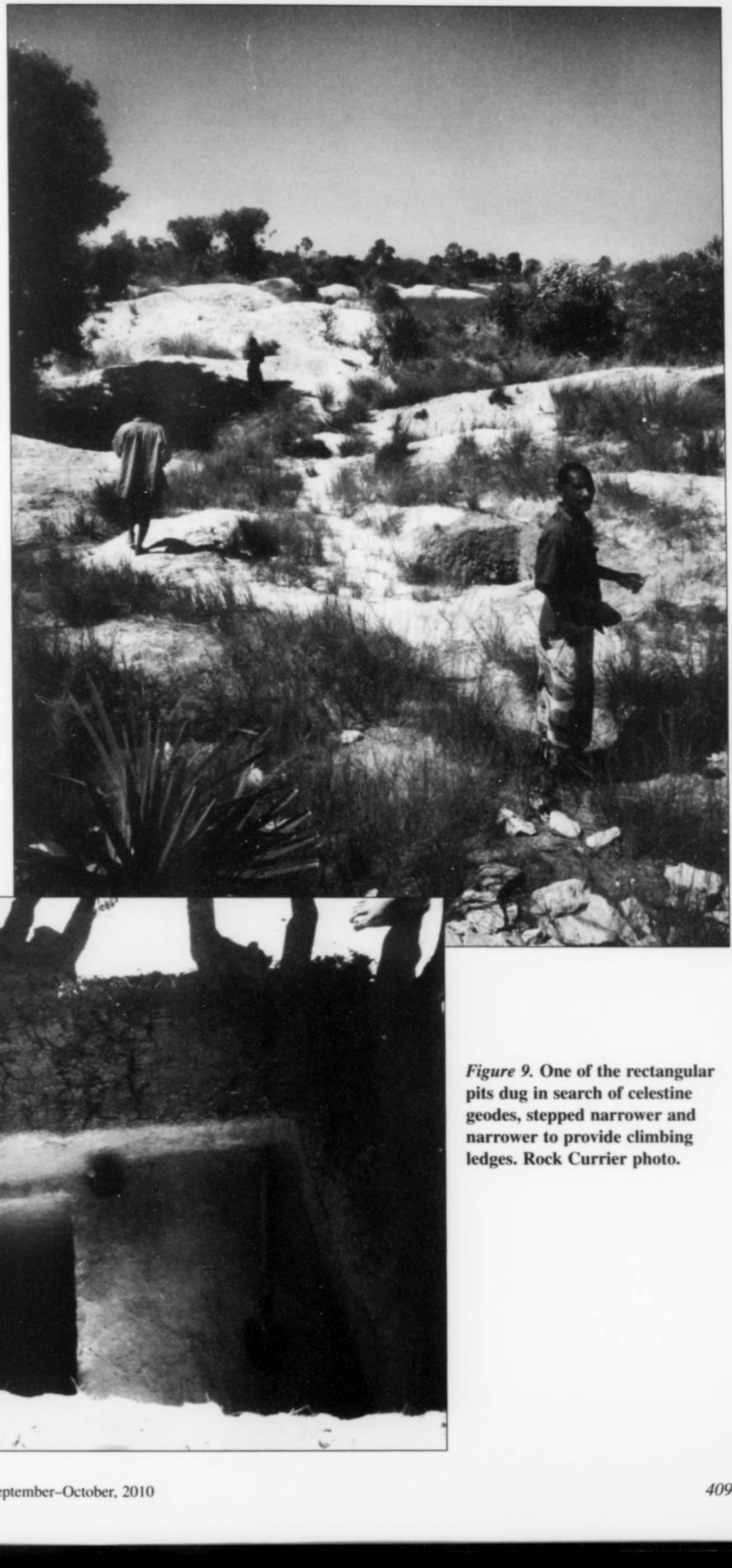


Figure 8. **White dumps surrounding countless rectangular pits that have been dug in search of celestine geodes. Rock Currier photo.**

Figure 9. **One of the rectangular pits dug in search of celestine geodes, stepped narrower and narrower to provide climbing ledges. Rock Currier photo.**

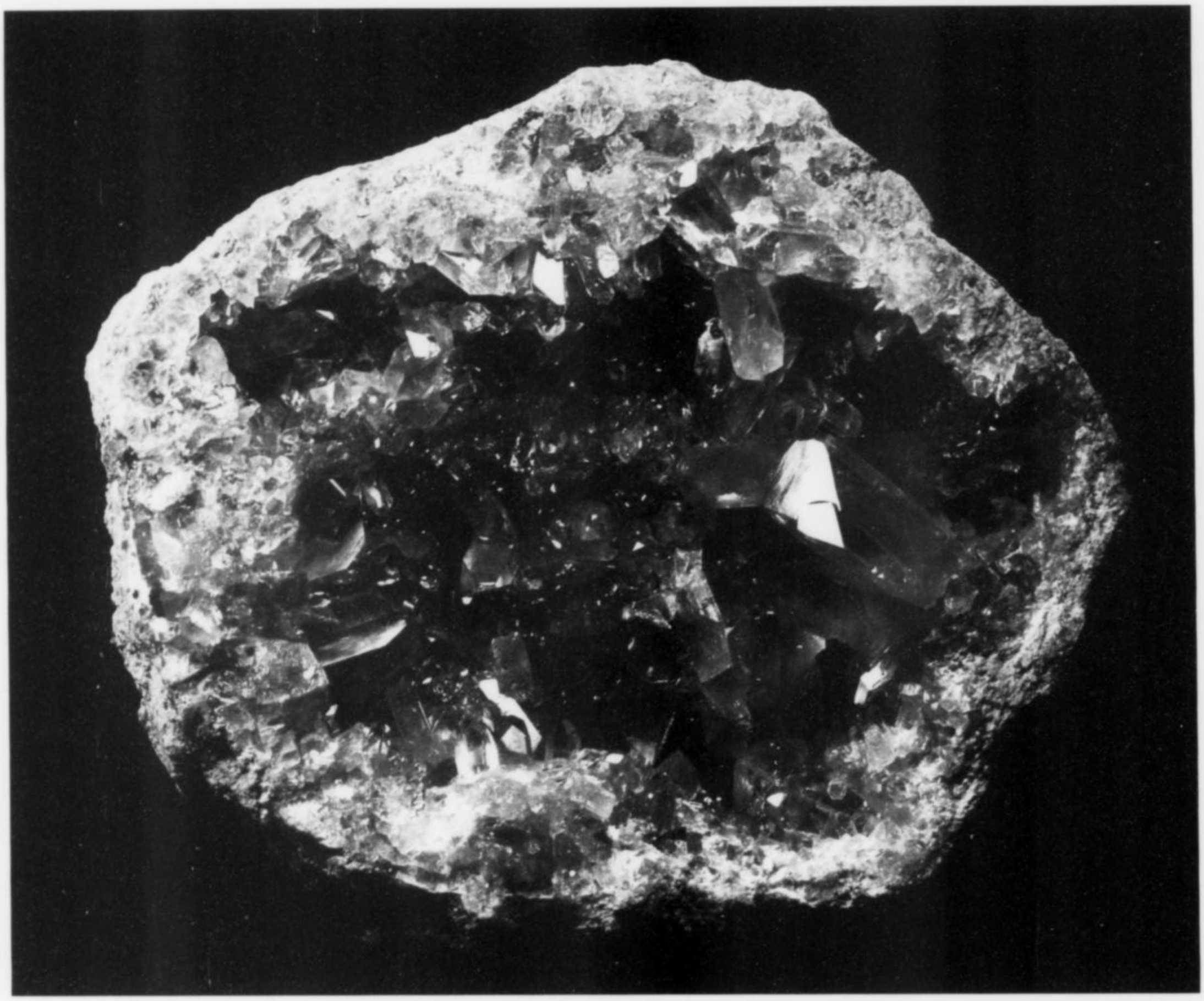


Figure 10. **Celestine geode, 25 cm, from Sakoany. Paul Obeniche specimen; Wendell Wilson photo.**

Figure 11. **Celestine geodes to about 25 cm from Sakoany, for sale in Katsepy. Asia Gajowniczek photo.**

Figure 12. **Celestine geode, 18 cm, from Sakoany. Daniel Trinchillo (Fine Minerals International) specimen, now in the Lyda Hill collection. James Elliott photo.**

are made along with a prayer for an abundant harvest of geodes. Each miner then selects his own site to begin his pit, and keeps whatever he finds. During the 1980s the deposit was worked as a socialist cooperative, and every miner was required to sell his production to state-sponsored agents at a fixed price per kilogram (Humbert-Labaumaz, 1982). Today dealer agents in Sakoany buy the geodes mined every day, and periodically the accumulated production is shipped to dealers in Antananarivo. As of 2001 Gilles Mannequin and his "Madagascar Treasures" company was among the main buyers and exporters. Yearly production by local miners was said to amount to several hundred geodes weighing a total of about 15 tons in 2001 (Pezzotta, 2001), down from the 1973 estimate of Ratsimbazafy (1973) of 24 to 48 tons per year.

Celestine $SrSO_4$

The celestine geodes are virtually monomineralic; unlike well-known celestine deposits in the U.S., France, Italy (Sicily), Germany and Poland, there is no associated hydrothermal calcite, aragonite, barite, quartz, sulfur or gypsum.

The celestine occurs as sharp, well-formed crystals to 15 cm, generally medium blue to pale blue to colorless with a bright luster. The crystals are translucent to gemmy and transparent. Habit ranges

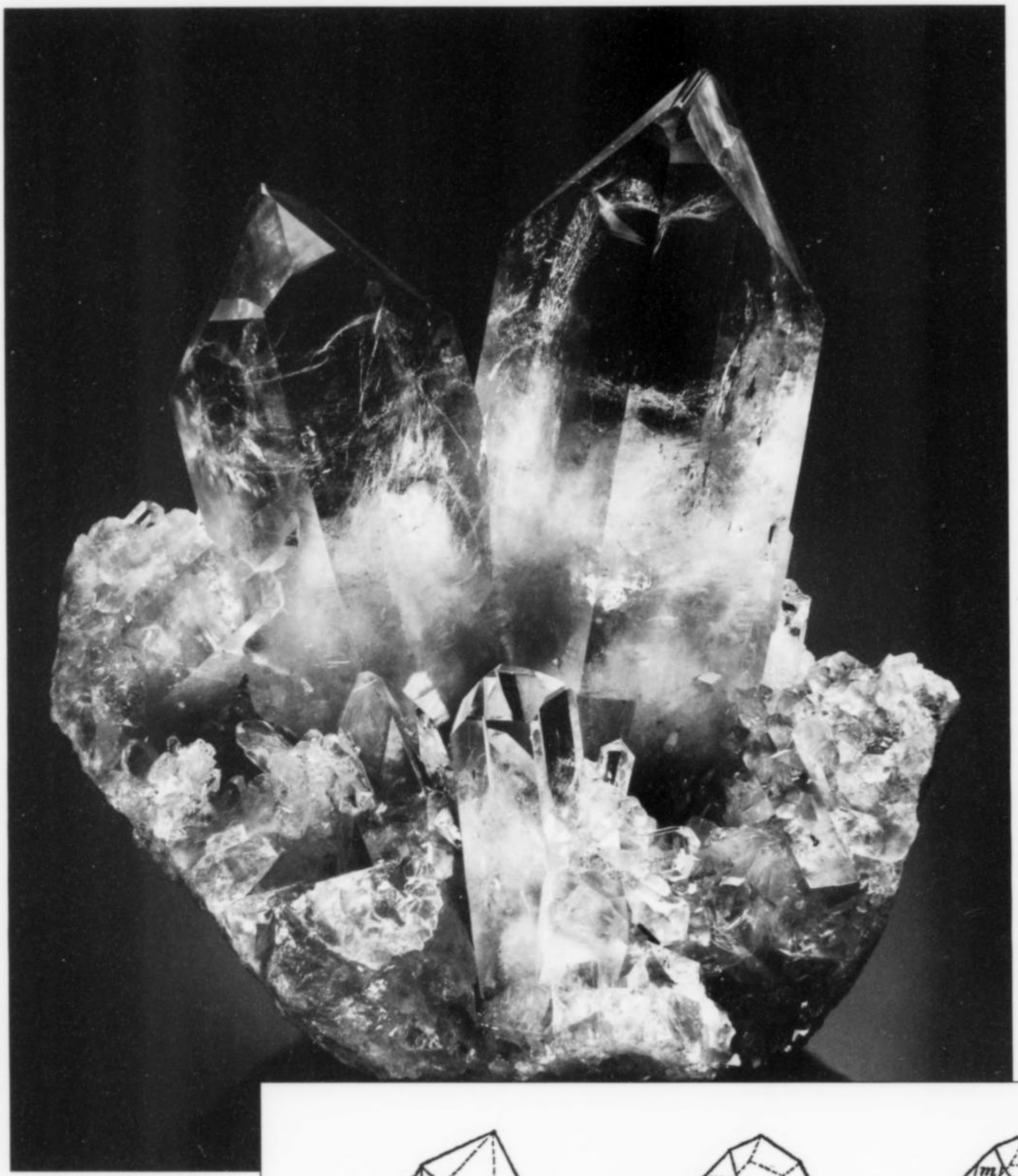


Figure 13. **Celestine crystal cluster, 7.6 cm, from Sakoany. Daniel Trinchillo (Fine Minerals International) specimen; James Elliott photo.**

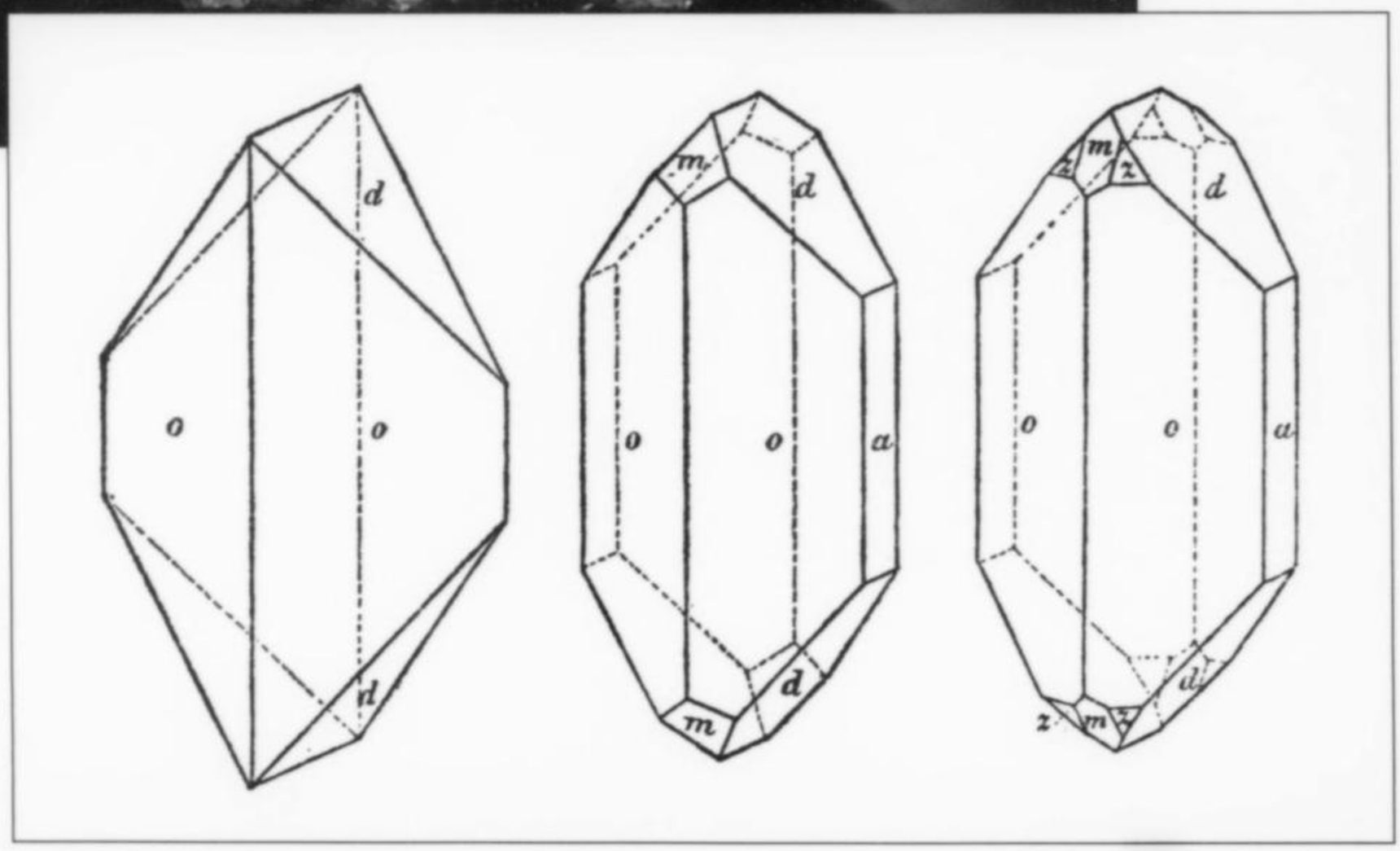


Figure 14. **Crystal drawings (from German crystals depicted in Goldschmidt, 1913) showing typical forms for Sakoany celestine.**

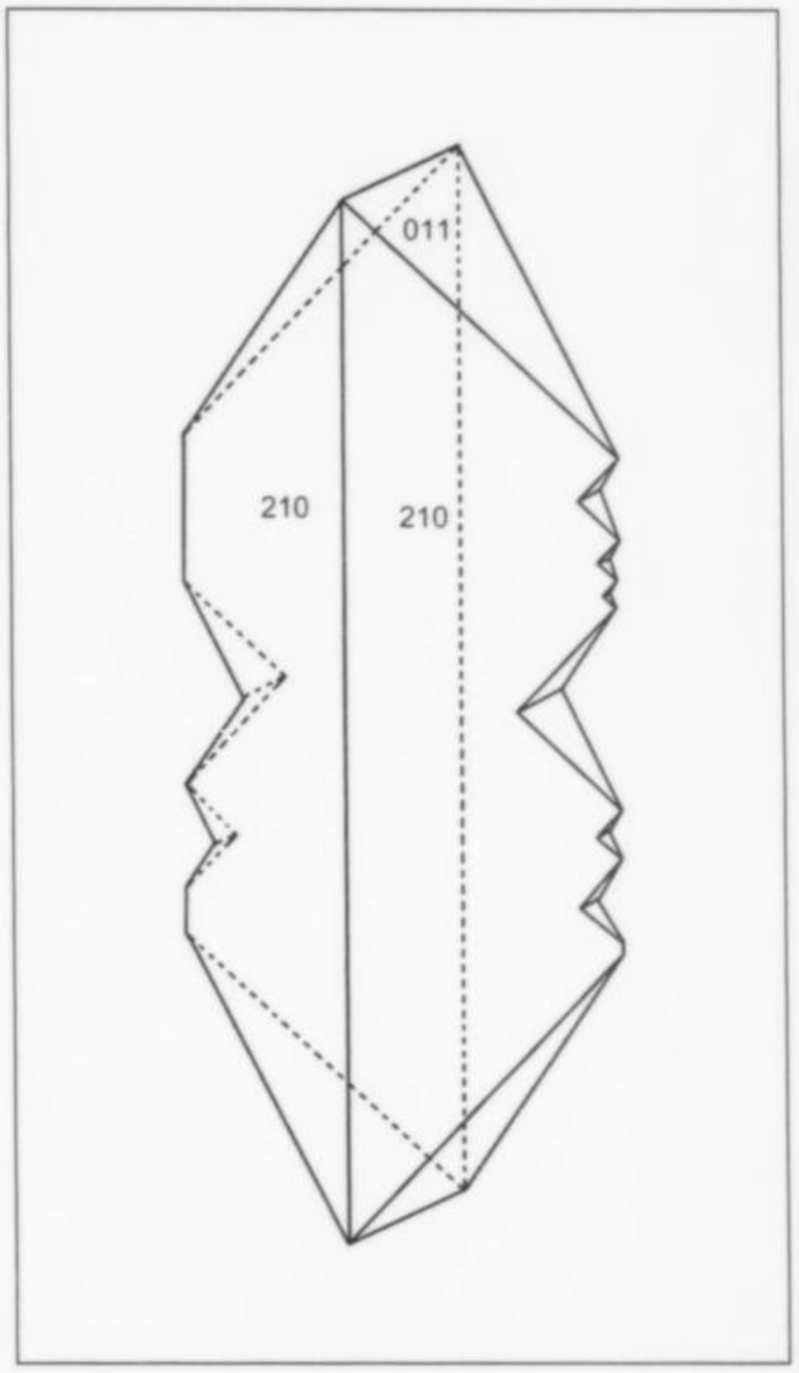


Figure 15. **Crystal sketch illustrating saw-tooth habit typical of crystals from Sakoany. (See cover Photo.)**

Figure 16. **Celestine crystal cluster, 16 cm, from Sakoany. Natural History Museum of Los Angeles County collection; Jeff Scovil photo.**

Figure 17. **Celestine crystals to 6 cm from Sakoany. Paul Obeniche specimen; Wendell Wilson photo.**

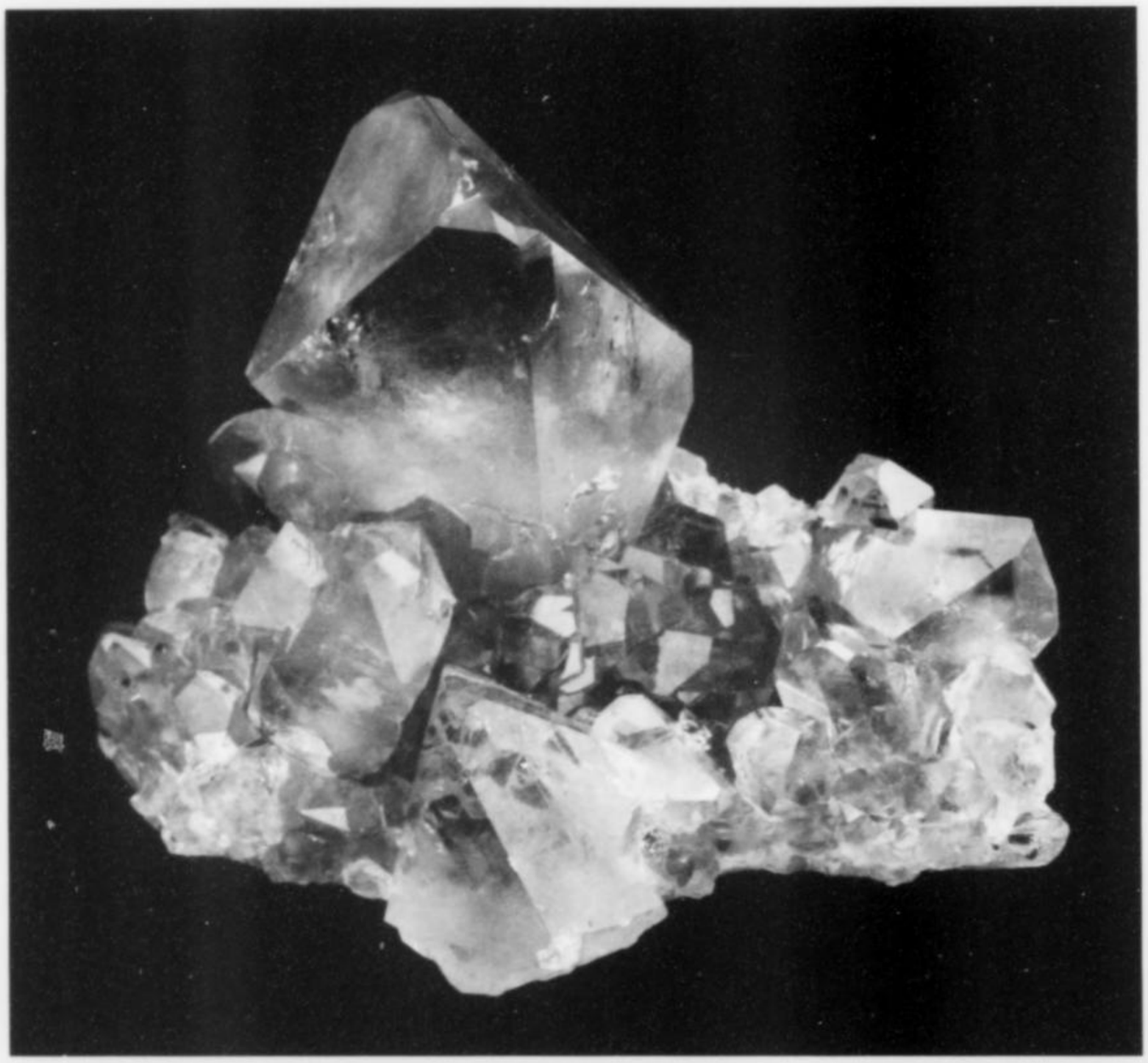


Figure 18. **Celestine crystal group, 7.9 cm, from Sakoany. Steve Smale collection; Jeff Scovil photo.**

Figure 20. **Celestine crystal, 3.3 cm, from Sakoany. Cal Graeber specimen; Jeff Scovil photo.**

Figure 19. **Celestine crystal group, 7.7 cm, from Sakoany. Rob Lavinsky (The Arkenstone) specimen; Joe Budd photo.**

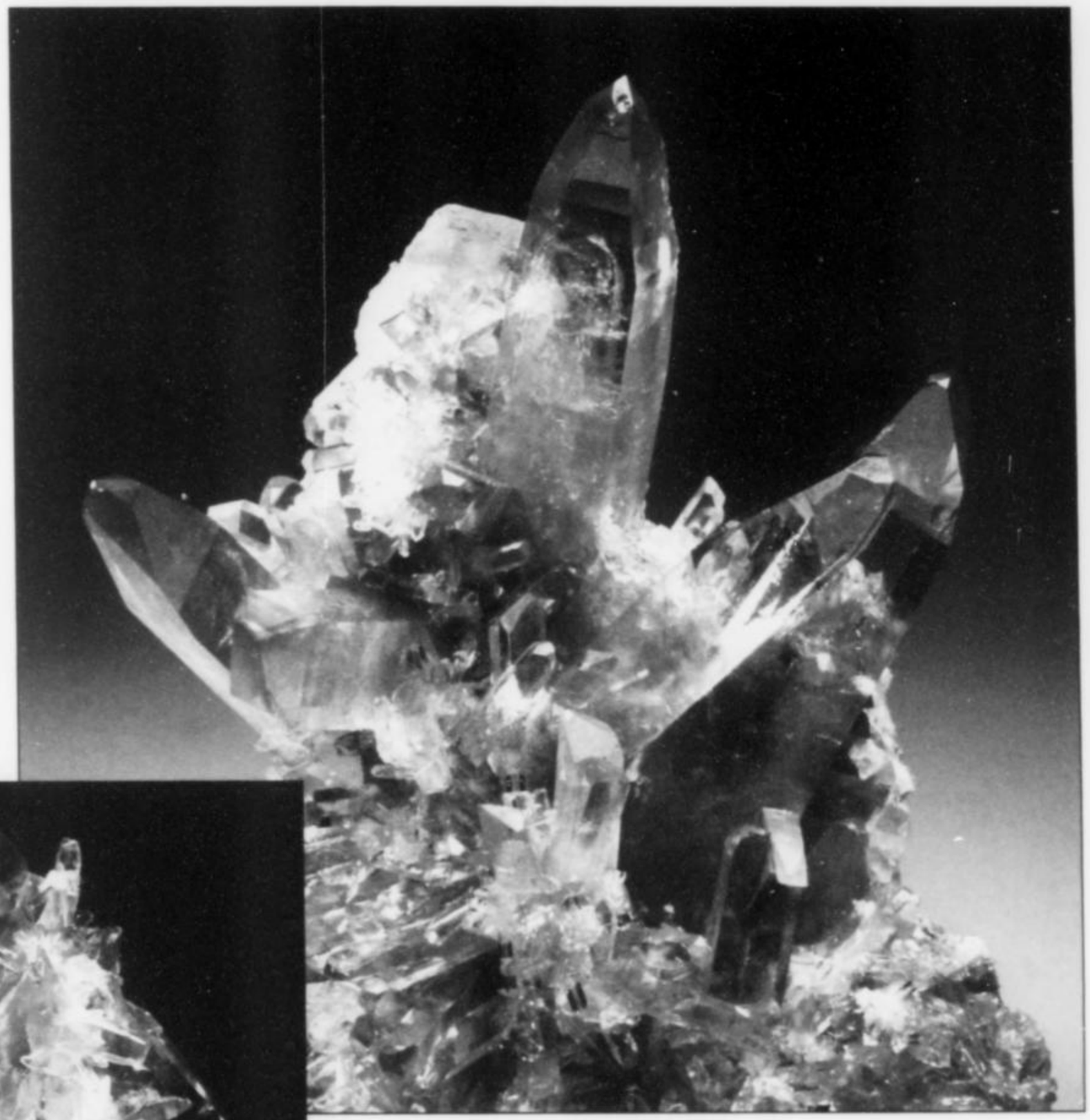


Figure 21. **Celestine crystal group, 15 cm, showing spear-point habit. Paul Obeniche specimen; Wendell Wilson photo.**

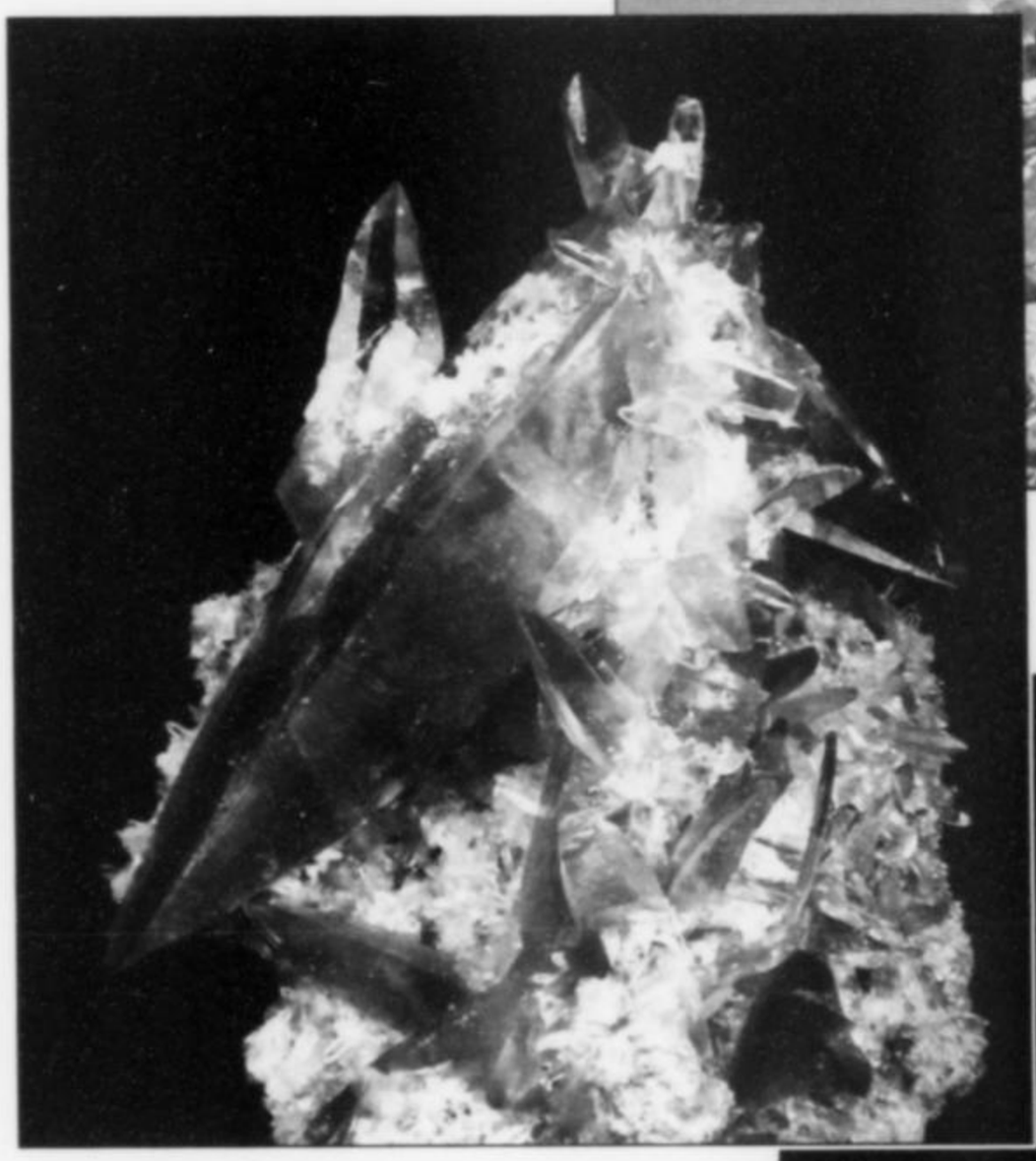


Figure 22. **Celestine crystal group, 15.2 cm, showing spear-point habit. Jeremy Sinkus specimen and photo.**

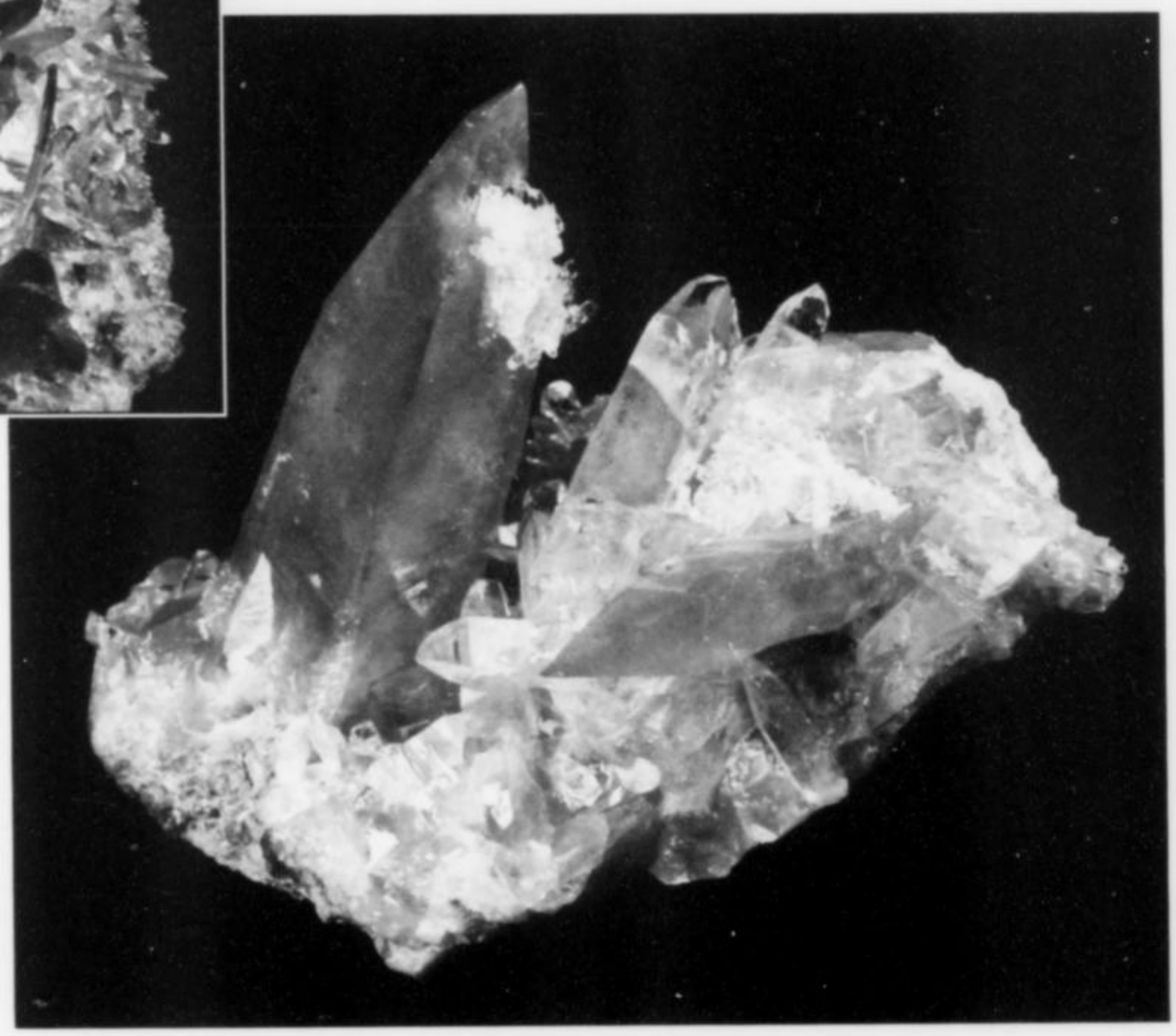


Figure 23. **Celestine crystal group, 8 cm, showing spear-point habit. Rob Lavinsky (The Arkenstone) specimen; Joe Budd photo.**

rather widely, from blocky to elongated, tapering and pointed. Dominant forms include the prism {210}, modified by {101} and {011}, plus several other minor forms including {100}, {001}, {111}, {110}, and what appear to be {122}, {133} and {166}. Prismatic elongation may be present along *c* or *a*. Some of the tapered crystals have slightly curved faces indicating a smoothed transition between two nearly equal forms.

CONCLUSIONS

Noting the primitive approach to the exploitation of the deposit, Ratsimbazafy (1973) pointed out that many celestine geodes are probably missed in the productive zone by the rather random and restricted nature of the underground workings. He recommended that the overburden simply be stripped away by mechanized equipment so that the productive horizon could be mined thoroughly and safely in the sunshine. Needless to say, his recommendation was never implemented, and is probably economically impractical. Consequently one can safely assume that a great deal of celestine remains in the ground, in the unexplored area between the pits, in the portion of the productive zone that lies below the water table, and in as-yet unmined extensions of the productive horizon that have not yet been investigated.

ACKNOWLEDGMENTS

My thanks to the late Gilbert Gauthier (1924–2006) for his encouragement and help with this article. Thanks also to Thomas P. Moore for his assistance with references and proofreading; and to Daniel Trinchillo, James Elliott, Dr. Robert Lavinsky, Rock Currier, Tomasz Praszkier, Asia Gajowniczek and Jeff Scovil for photography. Dr. George W. Robinson and Dr. Anthony R. Kampf kindly read the manuscript and provided helpful suggestions.

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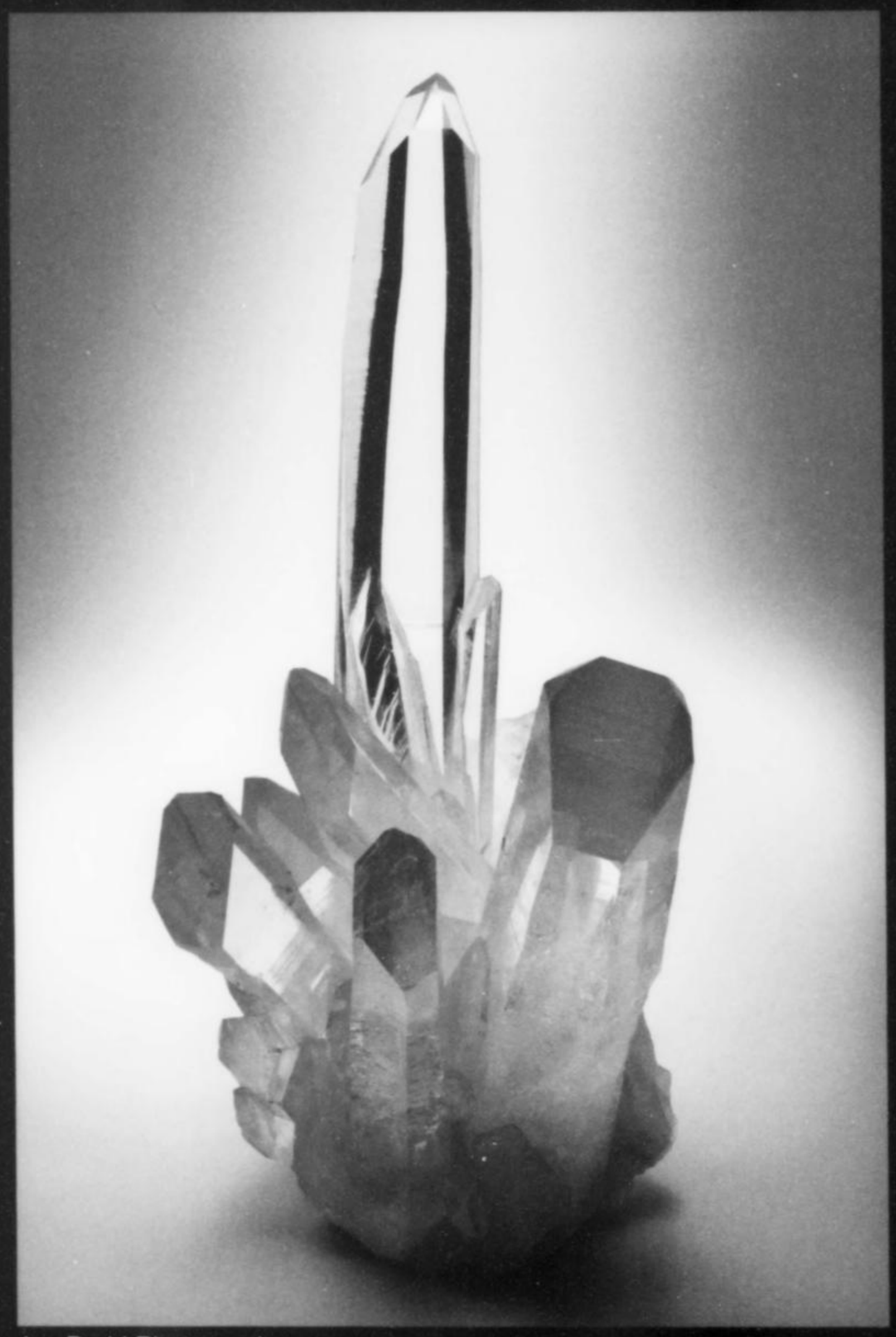

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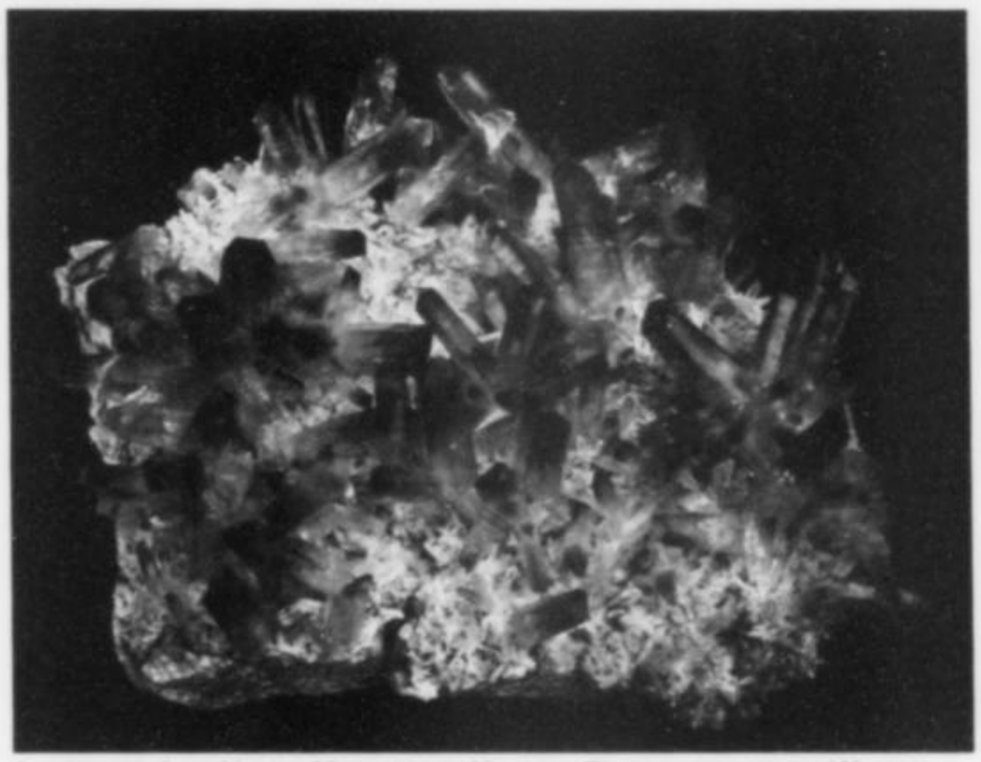

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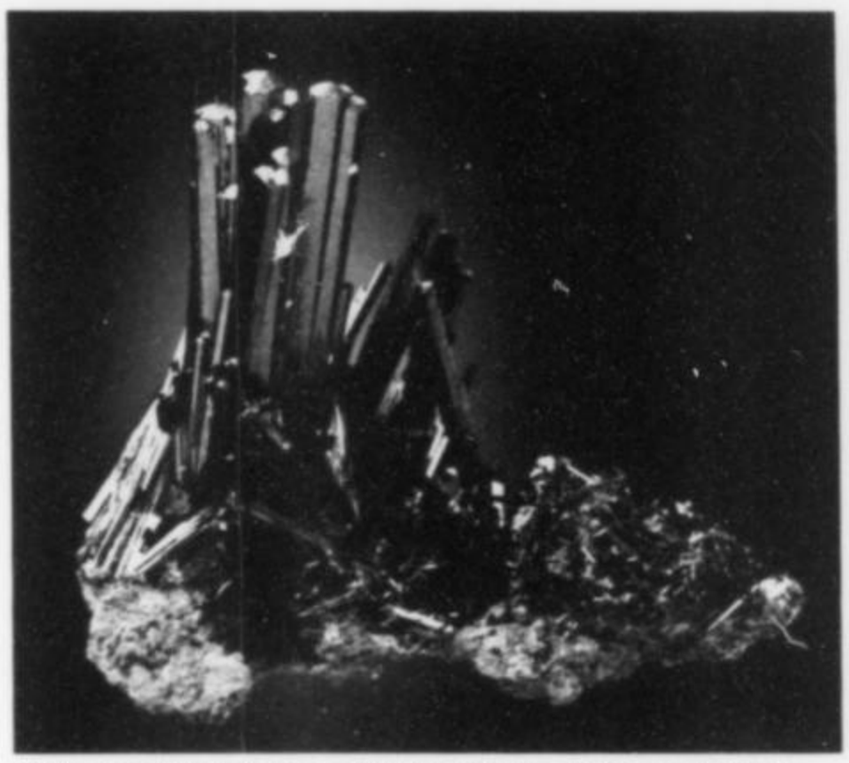

GAUDEFROYITE, WESSELS II MINE, KURUMAN, SOUTH AFRICA. PURCHASED IN SOUTH AFRICA (2001). PHOTO BY JEFF SCOVIL.

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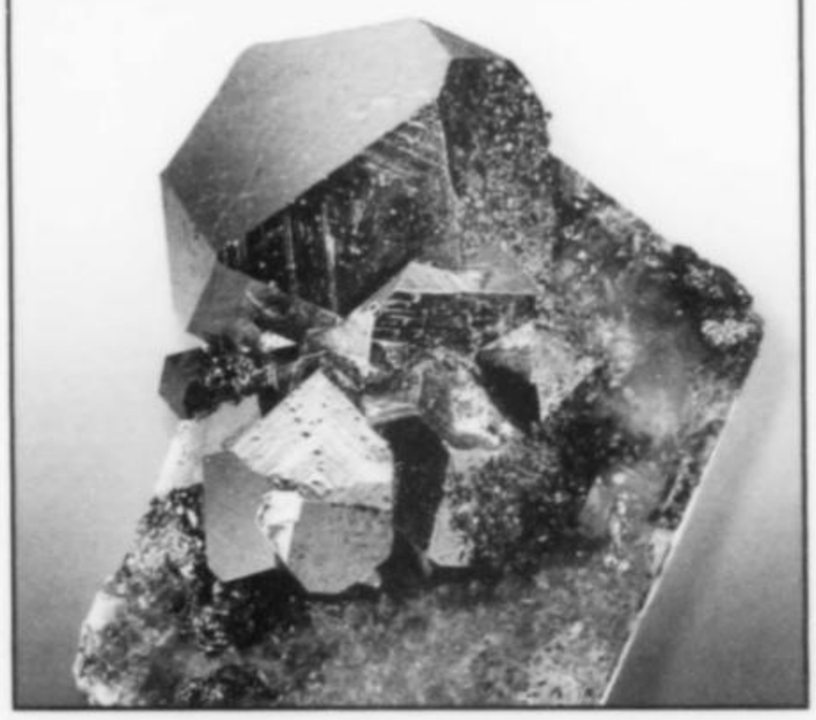

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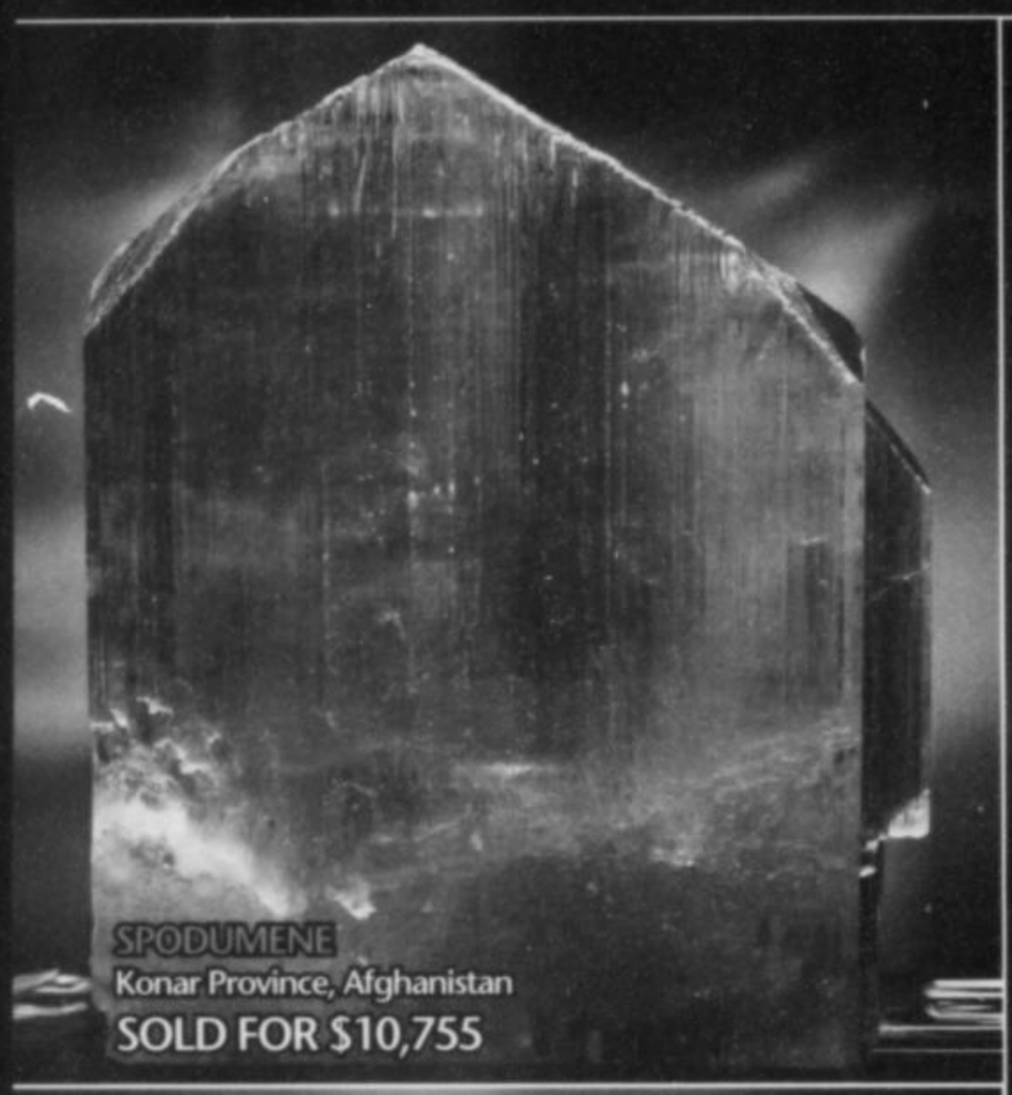

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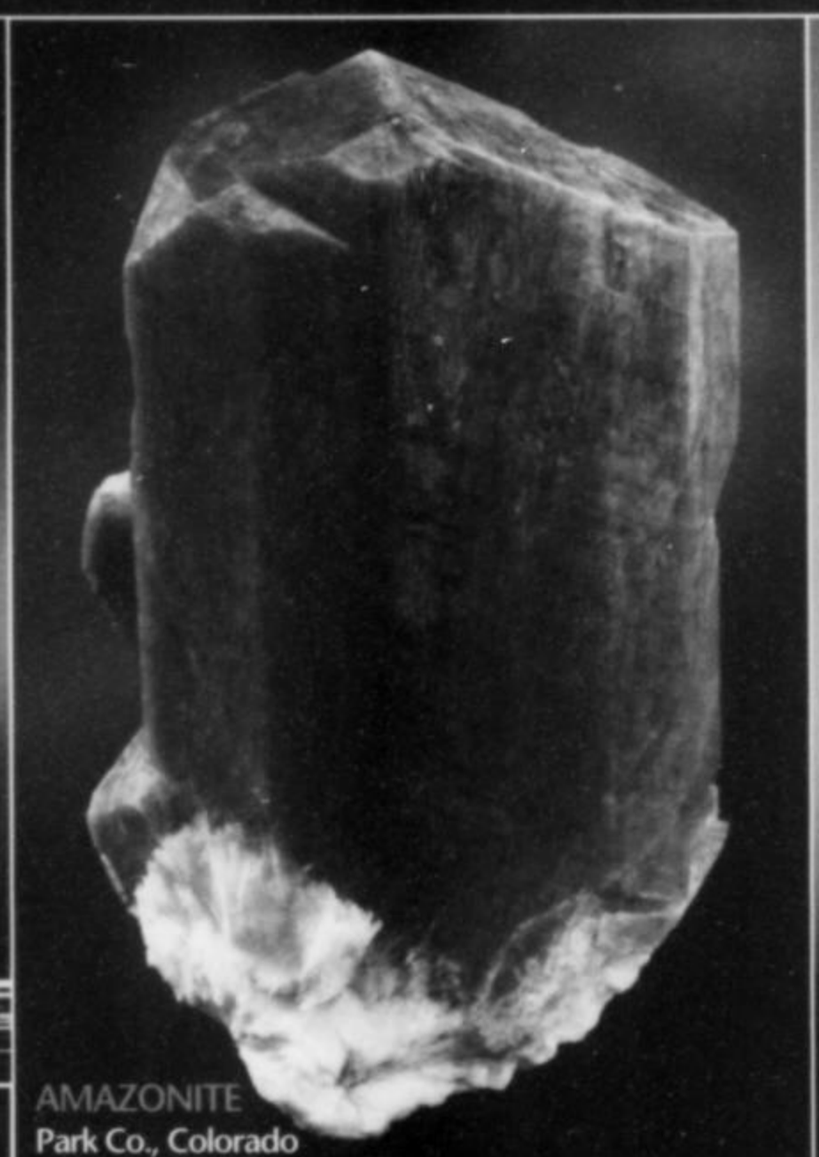

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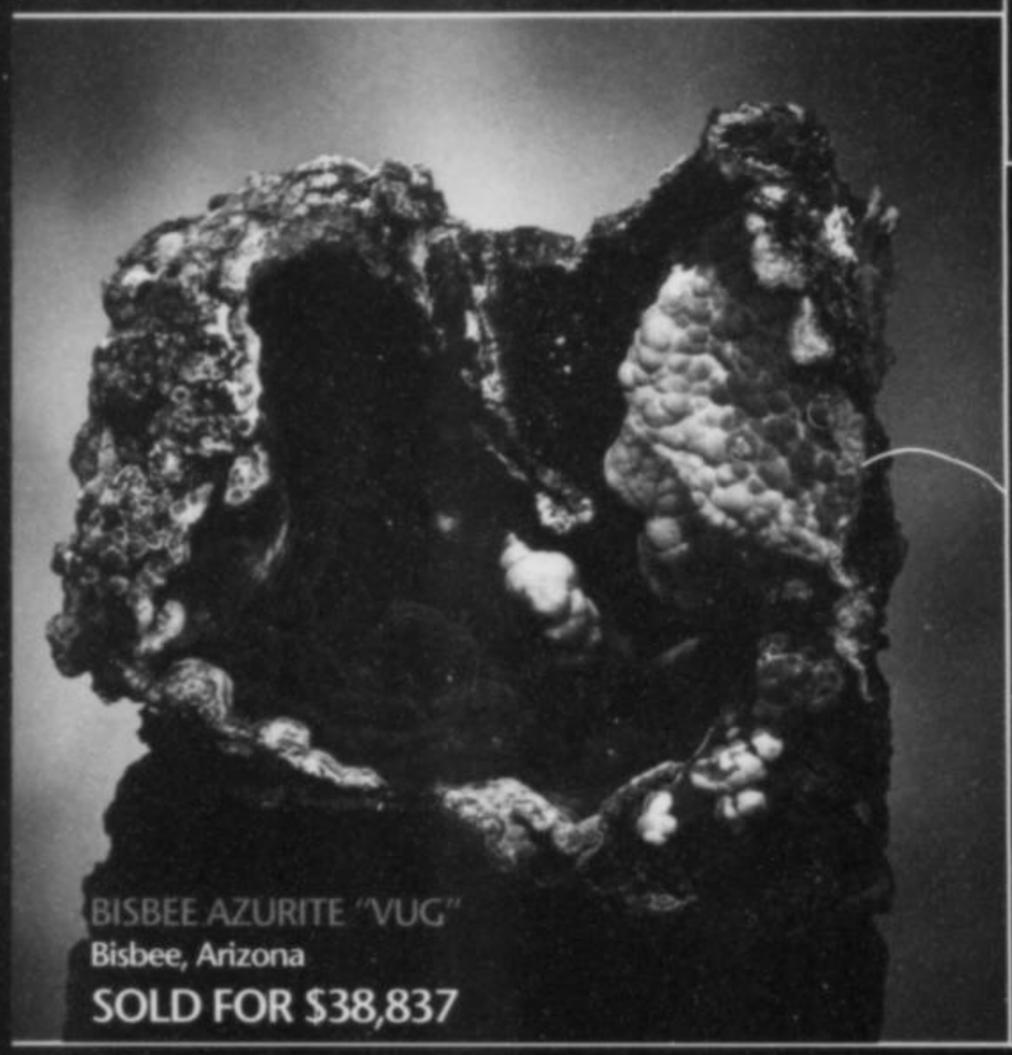

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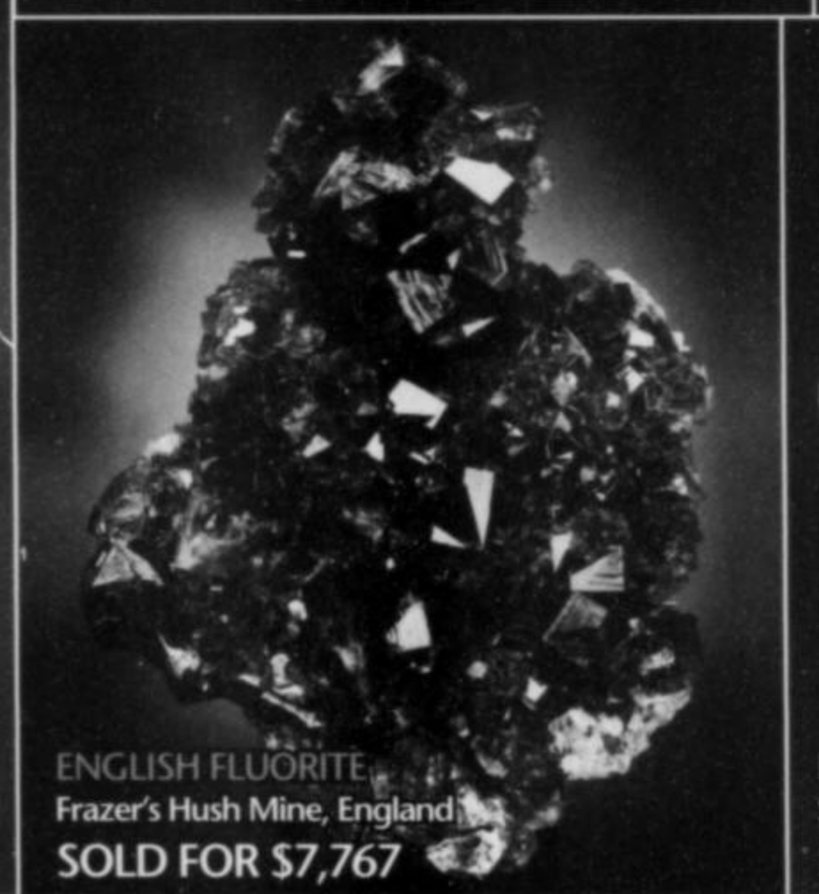

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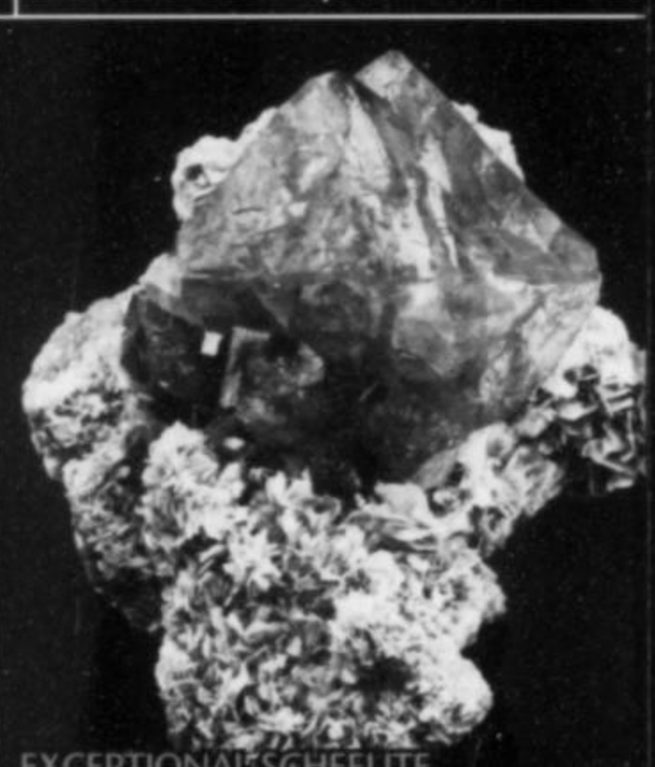

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Memoirs of a Mineral Collector—Part 4

A Final Visit to MINAS GERAIS: 2009

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In which Guido Steger of Wiener Neustadt, Austria, veteran of more than 60 trips to Minas Gerais since 1968, concludes his Brazilian adventures by making a tour in 2009, his Brazilian friends providing trusty guidance during his stops at the Taquaral, Pau Alto, Morro Redondo, Teixeirinha, and Resplendor mines.

INTRODUCTION

Minas Gerais is a Brazilian state with an area of 588,000 square kilometers—a little larger than France—and a name which means "general mines." Its capital city, Belo Horizonte, is the third largest Brazilian city after São Paulo and Rio de Janeiro, and the center of the largest iron ore mining region in the world.

Among mineral collectors, Minas Gerais is known for its very important occurrences of minerals, including gemstones. In the course of my many study and collecting trips there, my goals included not only expanding my personal collection but also acquiring mineralogically interesting information which I could then pass on in lectures, films and written publications. My latest intelligence-gathering trip to this South American "crystal paradise" took place in 2009, and what follows is my report on it.

My way led from Wiener Neustadt and Vienna to São Paulo, then, by way of Belo Horizonte, into the interior of Minas Gerais. The route included stops in Governador Valadares, Teofilo Otoni, Taquaral, Araçuaí, Virgem de Lapa, Coronel Murta, and back again to São Paolo. The goal of the trip was to gather publishable information concerning the present productivity of the old mines in pegmatites, and to learn of new mines and their methods of operation. To anticipate a bit: what I found was that quartz crystals, including very large ones, were on hand in quantity, but not generally in remarkable quality; that gem minerals were very scarce; and that when specimens with gem crystals were offered it was for crazy prices such as I had never encountered before. Nevertheless I was able to take some special specimens home with me. We may hope that the *produtores das pedras*, as the locals call those who operate the mines, will continue to produce more wonderful gems and crystal specimens for many decades to come.

MINING REGULATIONS AND OPERATIONS

To protect the water, forests, and all other elements of the natural environment, a controlling authority exists for all of Brazil: IBAMA, as it is abbreviated. To obtain IBAMA authorization to begin a mine, the following steps are necessary. (1) One must obtain a general authorization from DNPM (*Departemento National Producao Mineral*)—there is always a long waiting time for this authorization! (2) The landowner must agree. (3) The Army and civil police must agree. Before beginning to work the mine, one needs also (1) a claim to the area; (2) a claim verification, attesting to the appropriateness of the claim, obtained from an official of the DNPM; (3) an authorization from the local prefect (area administrator or mayor). It can take up to ten years to go through all the processes just named. And once mining has begun, yearly checks by the proper authorities will take place, and an extension of authorization must be granted periodically by the DNPM.

The *garimpeiros* (mine workers), with their compressed-air hammers, do the main work of advancing the tunnels. As they have the most practical experience, they are critical to any successes in making finds; the ultimate justification of the mining costs

Figure 1. **Minas Gerais location map.**

depends mainly on them. The *garimpeiros* decide which techniques and which tools are employed, and in which directions to follow the pegmatite veins, and they are responsible for recognizing the signs suggesting which pegmatites should be explored. Since the various working groups are paid according to their functions and receive proportional shares of profits, competitions naturally arise, and the mine owner makes use of them. Sometimes the members of a working group may choose not to go home for a weekend but rather to stay at the mine and keep seeking gems; if they find them, the workers in other groups may grow envious, and serious frictions may result.

By the customary procedure, the owner stores valuable finds in his safe, but the *garimpeiro* gets the key to the safe. Any transaction must therefore be by mutual agreement, when one or the other wishes to sell the finds. In this way it is guaranteed that the mine worker really receives from the sale whatever share of profits he is entitled to by prior agreement. The system is practical and at the same time provides a basis for trust and co-operation between mine owners and workers.

It is enormously hard to find suitable *garimpeiros*; any mine owner who has a good working team available to him can consider himself fortunate. On this year's visit I formed especially clear pictures, both of the hugely strenuous and dangerous work involved in developing a mine, and of the great riskiness of the mine owner's financial investment. Miscalculations of finances or faulty assessments of mining prospects can lead to bankruptcy or to accumulations of debt in the millions. Suicides have been known to occur. For these reasons it is quite understandable that gemstones (*pedras preçiosas*) are never cheap: they represent massive investments of men, materials and financial assets.

Two anecdotes from earlier times at the Nova Era emerald mines may illustrate some of the physical, social and financial hazards of gem-mining in Minas Gerais.

Since the first emerald discoveries at Nova Era, the area has become known for criminal activities and unsettling incidents. A "wild west" atmosphere—like that in the old gold rush areas of North America—has prevailed. Once a good friend of mine, owner of a claim in the general area of the Capoeirana emerald mine, complained that some *garimpeiros* who worked for him there had secretly "disappeared" a large part of the finds. When I asked him why he had not taken harder measures with them, he said laconically, "If I did they would kill me."

Figure 2. **Regional Map:**

1 Morro Redondo
2 Lavra Fazenda
3 Pau Alto
4 Limoeiro and Xanda
5 Jenipapo
6 Ilha da Taquaral
7 Teixeirinha
8 Chia
9 Santa Rosa
10 Capelinha
11 Malacacheta
12 Cruzeiro-Aricanga
13 Pederneira
14 Morrao
15 Escondido
16 Golconda
17 Tres Barras Marambaia
18 Urucum
19 Mendes Pimentel
20 Sapucaia
21 Arqueana
22 Sapo
23 Resplendor
24 Telirio, Corrego Frio
25 Macaco-Ferruginha
26 Itatiaia
27 Morganita
28 Navigador

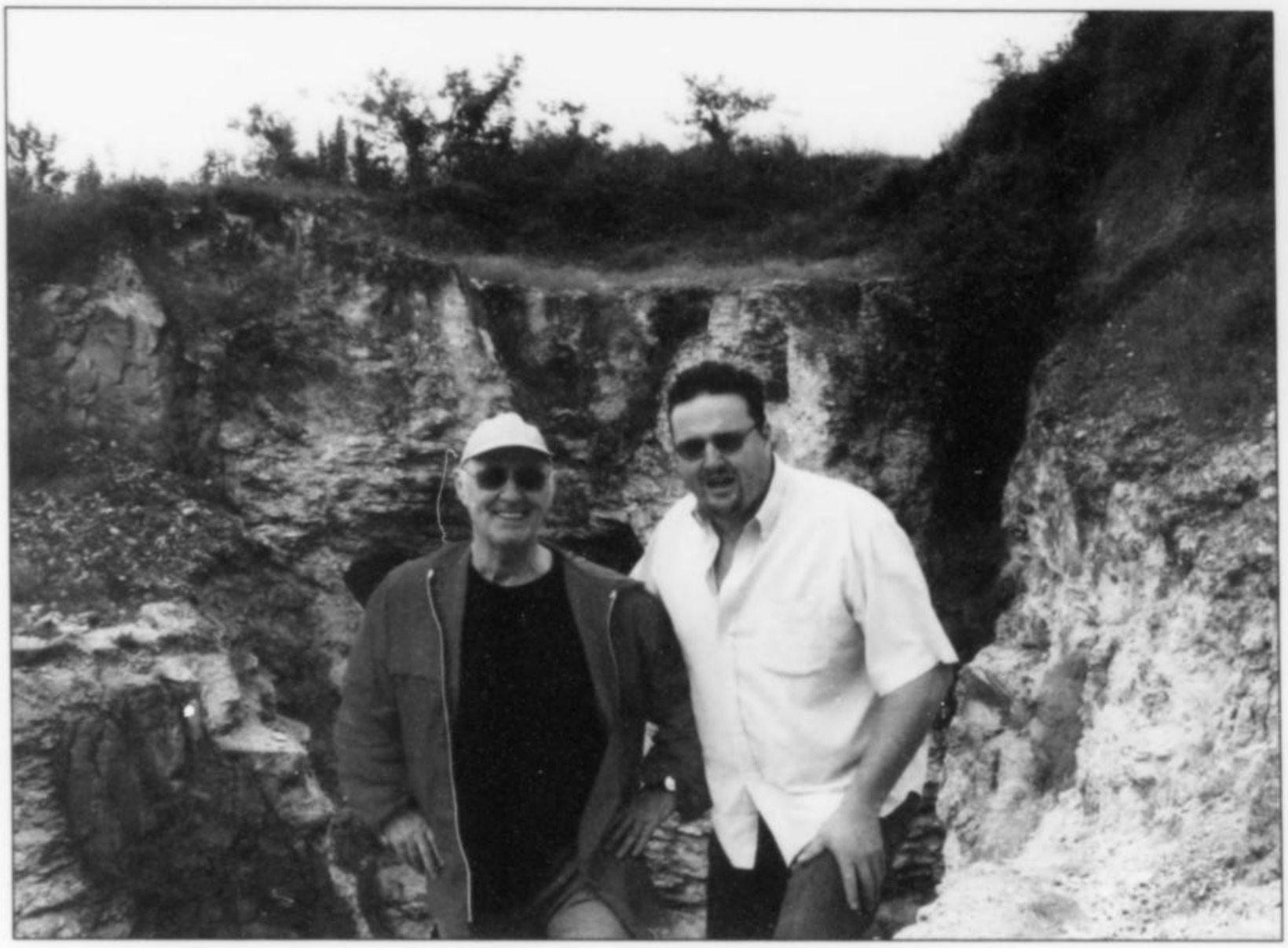


Figure 3. **The author with Jean-Claude Nydegger, owner of the New Santa Rosa and Resplendor mines, in an open cut of the Lavra Fazenda, Pau Alto.**

At the Rocha emerald mine near Nova Era, chaotic events took place just a few weeks before my visit in 2006. The mine had been closed for a year as a result of wrangling within the owner's family, and the intention had been to sell it off. In order to make the sale profitable a trick was employed: a respectable number of emeralds were planted in a plausible rock layer. The wife of one of the *garimpeiros* heard of this and spread the news around . . . and consequently more than 3,000 people, including women and children, descended on the mine. For three days they snatched up everything they could find. Word reached the Brazilian press, and daily newspapers published the story. Since then there has been no further work of any kind in the mine.

The Nova Era area has been, and is, very valuable economically. Most of the finds were not publicized and were exploited by insiders: for several reasons it is troubling that hardly any information about them has reached the outside world. Emerald crystals to 12 cm which are suitable for cabochons have come to light; top-quality alexandrite also has been found. In 2006, on the occasion of my trip to the Belmont emerald mine, I had the chance to acquire from a *garimpeiro* whom I met in the city of Nova Era a very fine, sharp, elongated alexandrite crystal about 7 cm long and 1.5 cm wide, which displayed a beautiful red-violet color by candlelight. He wanted $3,000 for the crystal. For a single specimen for my collection this was too much to ask of my wallet, and so I passed—what a shame! It is seldom that one has a chance to acquire such an exquisite piece, and already today the price would be very much higher.

2009: GOVERNADOR VALADARES TO TEOFILO OTONI

A wonderful April 2009 in Europe, sunny and warm, prepared me nicely for the weather I found when I went to Minas Gerais for what will probably be the last time. Would it still be a dreamland for mineral collectors? What awaited me there? The portents were not encouraging: I spent two hours searching for my bags in the São Paolo airport, then experienced a three hour delay (while debris from a traffic accident near Nova Era was being cleared away) added to what is normally a six-hour bus ride to Governador Valadares.

Stressed by these events, tired of carrying my heavy bags full of photographic equipment, and rattled by an expensive and hectic transfer to the bus depot (Rodoviaria) in Belo Horizonte, I was happy finally to be sitting in an overland bus to Valadares, even though, because of the traffic accident, a stop in Nova Era had proved impossible.

Arrived at my hotel in Governador Valadares, I resumed my contacts with mine owners and dealers I knew. It was a weekend, and most of these people were at their homes or else out of town procuring fresh material. I reached only one of my old friends of many years, Nezio, who was in his office. Quantities of dull, cloudy quartz crystals were piled up in his warehouse. Still standing guard in front of the building was a huge geode I remembered, weighing many tons and as tall as a man, with inner walls lined by large, deep black smoky quartz crystals. In two other rooms lay stone chandeliers to enormous sizes, festooned everywhere with malachite and crystals of azurite. Gold-brown rutile "stars" centered on brilliant hematite crystals, with diameters to 15 cm, reposed in groups on a big work table. A remarkable sight, as if artistically arranged by a benevolent spirit!

On the following Sunday my further journey commenced. In two and a half hours the bus brought me to the "world capital of gemstones," Teofilo Otoni. My friend Jean-Claude Nydegger, mine owner and dealer, who during my last trip had shown me around his Santa Rosa mine, was waiting for me at the bus depot. The hospitality in his house—like a prince's palace—was a restorative for my body (which is no longer young: worn down by the stresses of many decades of living). I was wonderfully refreshed by the solicitous care I received from Jean-Claude's family.

TAQUARAL AND ARAÇUAÍ

The trip to the mines at last could begin: Jean-Claude turned his beat-up vehicle with the very high wheelbase northwards, and, in beautiful weather, we drove at a fairly fast pace along a curving asphalt road, past clumps of trees and tall stands of bamboo. The drive was not dangerous except that, occasionally, drunken motorcyclists would swerve in front of us. Brownish violet banks of

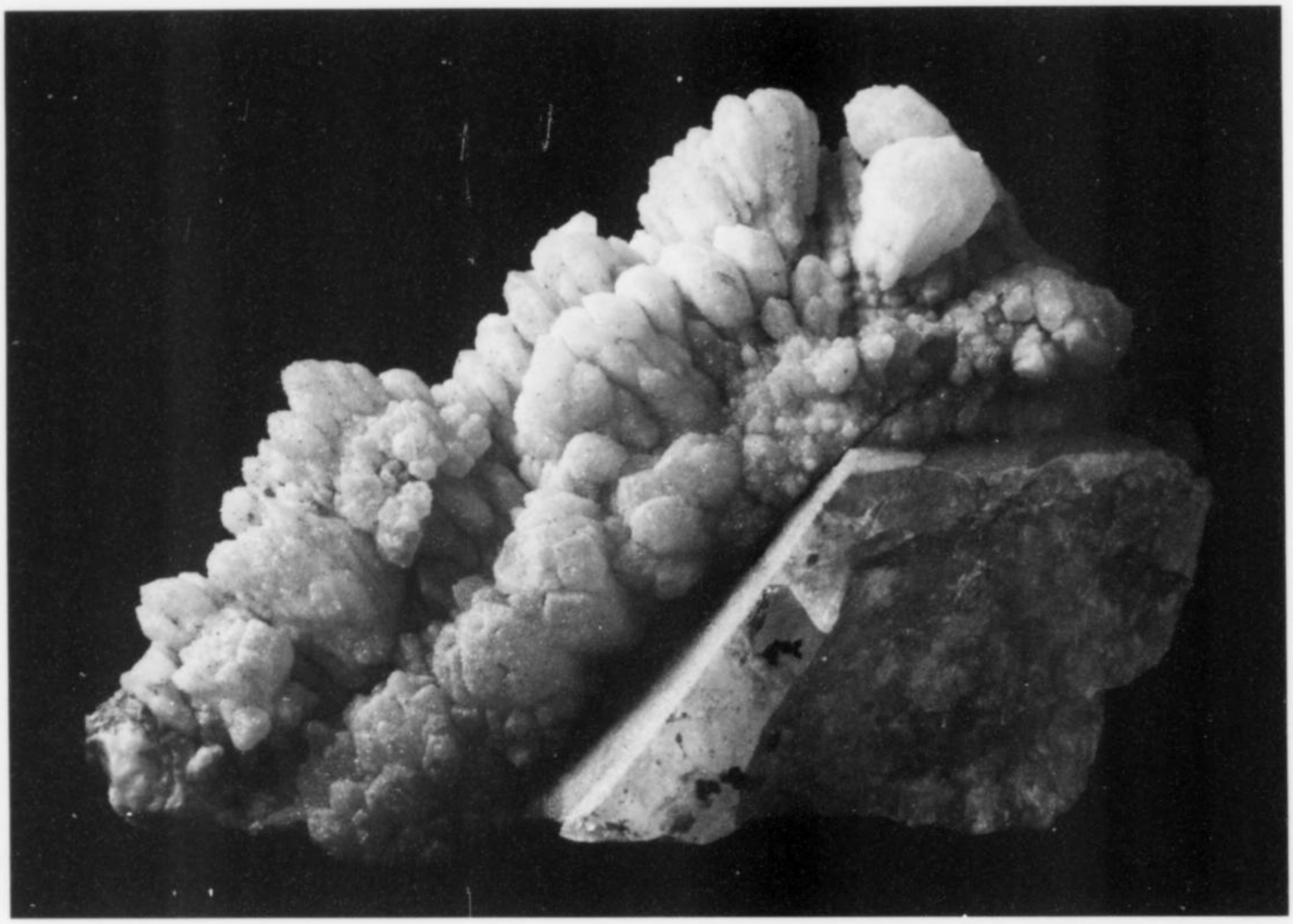


Figure 4. **Rose quartz, 14 cm, from Lavra da Ilha, Taquaral. Guido Steger specimen and photo.**

eroded laterite interrupted the sparse greens of the hilly landscape. After Padre Paraiso, cone-shaped rock formations, shot through with vertical black bands in which bromeliads had established themselves, towered around us. Suddenly we left the main road and branched off to the west, along the Jequitinhonha River Valley. Half an hour later we reached Taquaral: a scattered settlement of very small, simple dwellings. Many *garimpeiros* live here, earning their meager subsistence by working in nearby mines. Of course, this tiny town is famous among mineral collectors, as it lies very near the so-called "rose quartz island" in the river. We stopped in Taquaral and sought out mine workers who also dealt in specimens. Thus we were able to acquire crystallized rose quartz, as well as some fine specimens of unusual composition: doubly terminated amethyst crystals to 2 cm, including some sceptered crystals, resting on white quartz. Jean-Claude later brought these to the show in Ste.-Marie-aux-Mines, France.

Soon thereafter we made a stop in Araçuaí, near which is the Genipapo mine. This locality once produced crystals of blue quartz, some doubly terminated. I was aware that these highly coveted specimens are being found no longer; activity at the mine has greatly diminished, and only granite is being exploited at present. However, I was lucky! With another old friend of mine among the dealers, Ze Crente, I found a few remaining specimens of the "blue miracle" quartz, and for considerable monies but with much joy I was able to take a few of the best specimens away with me.

One longtime friend of mine, José Estrada, a former *garimpeiro* but now a well established mineral dealer, had several finds from the area on hand. There were no high-value pieces, but from José's son Marco (who lives with him in Araçuaí) I procured a few attractive

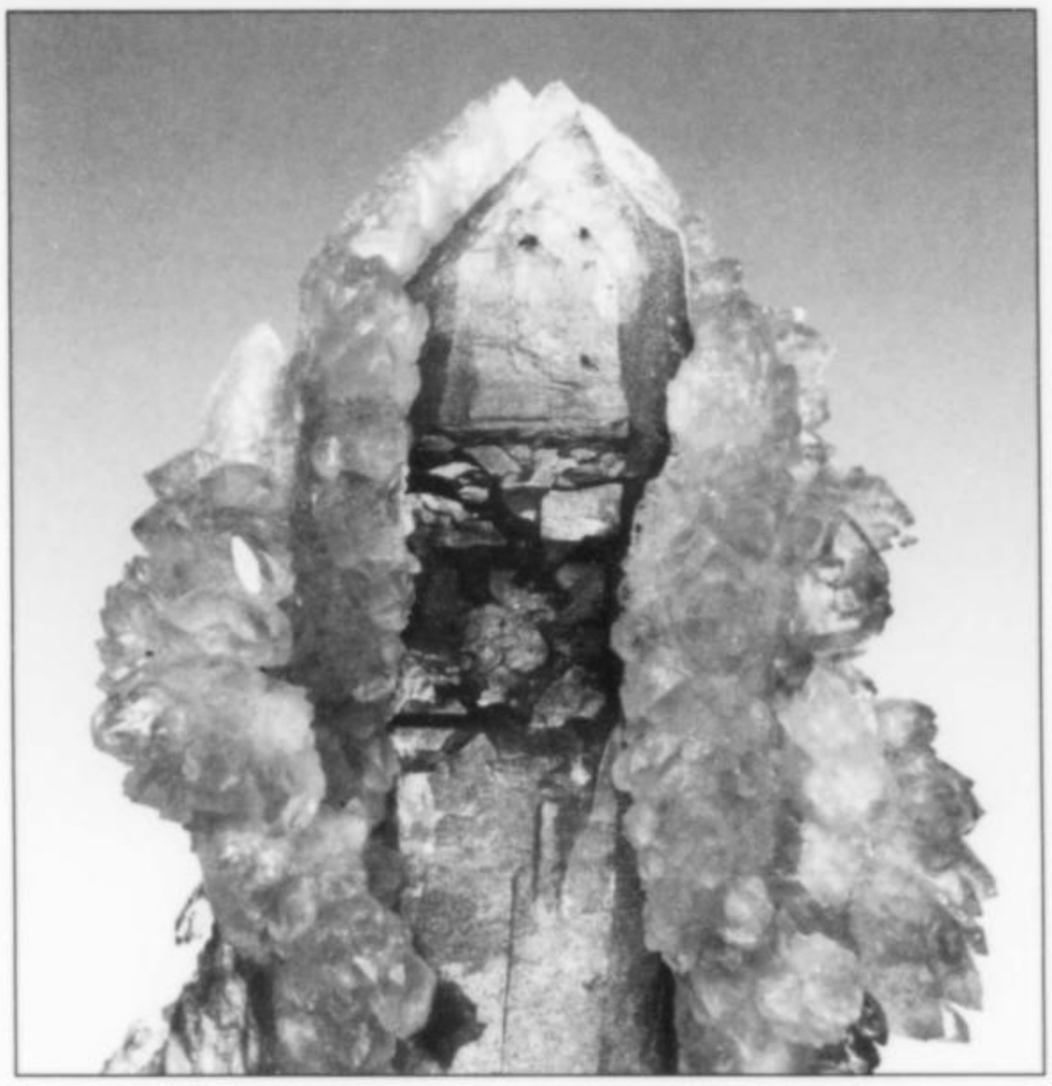


Figure 5. **Rose quartz crystals encircling a white quartz crystal, 14 cm, from Lavra da Ilha, Taquaral. The rose crystal belt is "open" on the side shown, "closed" on the other side. Guido Steger specimen and photo.**

lepidolite specimens which had recently come from a mine near Pau Alto. I had never seen specimens like this before: some are floater groups of sharp, purple lepidolite crystals, while others show the lepidolite crystals resting on tabular white albite crystals.

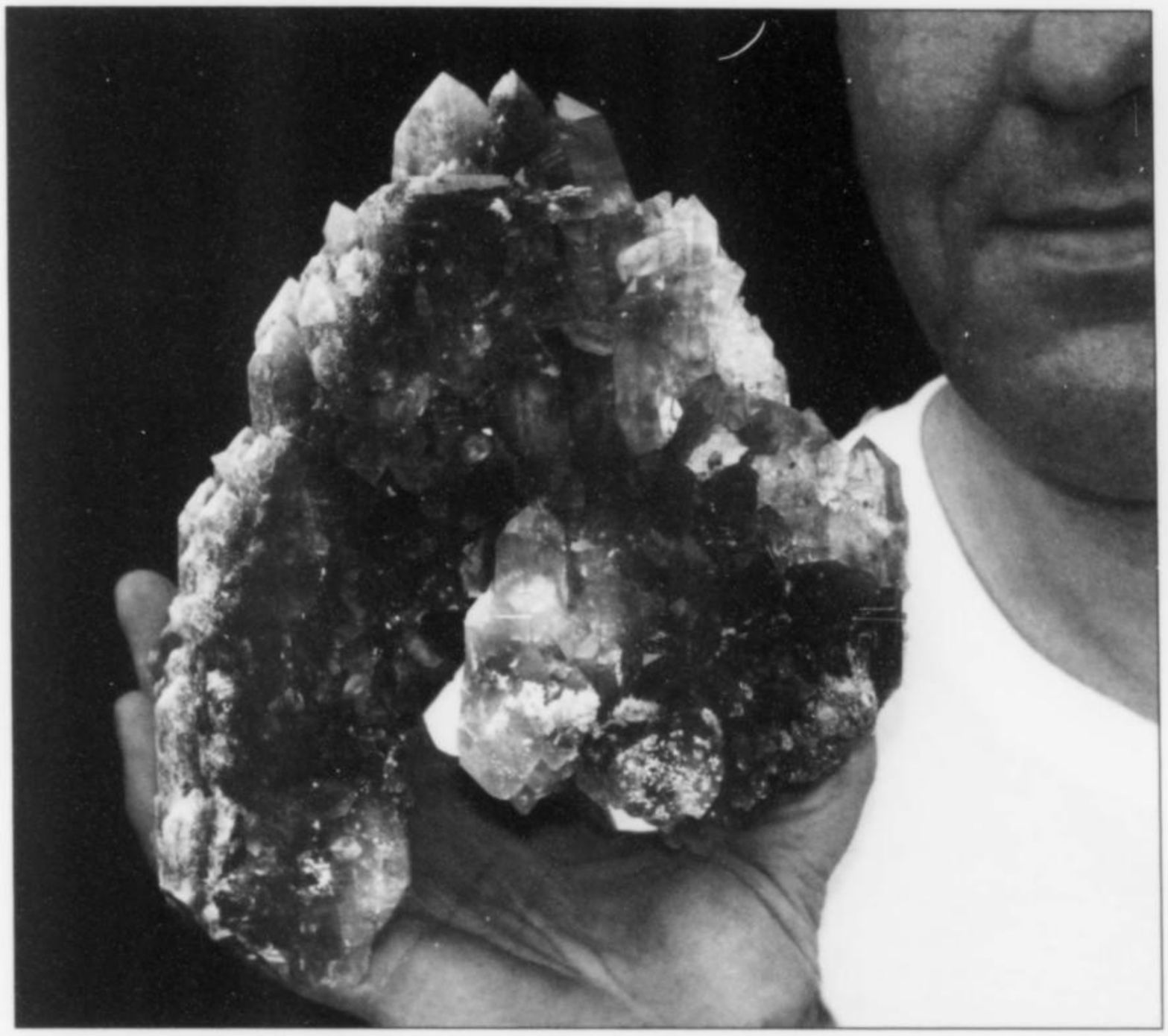


Figure 6. **Blue quartz, 14 cm, from the Genipapo mine, found in 2006. Eric Cantayre (holding the specimen) collection; Guido Steger photo.**

Figure 7. **Phenakite crystals, 4 cm and 8 cm, from a mine near Araçuaí. Guido Steger collection and photo.**

Figure 8. **Lepidolite crystal group, 8 cm, from the Pau Alto mine, collected in May 2009 by Marcelo Estrada (son of José Estrada). Guido Steger collection and photo.**

THE PAU ALTO MINE

Next we set our sights on the Pau Alto mine. After first whizzing over a good asphalt road, we turned onto the road leading into the mining area. This road is made of rust-red lateritic soil, with deep furrows, wide potholes, and standing rocks; our bodies shook and vibrated at every turn. Soon we came to a stop on a rim of rock whose sides dropped away and downward from us. Standing on the rim, besieged by the clatter of compressed-air hammers and the deafening din of compressors, we watched the *garimpeiros*, twenty meters below, with their heavy equipment, laboring in the sweat of their brows. Tracked "caterpillar" vehicles lifted waste rock to the sides. Standing on the sharp-edged lip of this excavation, resembling an amphitheater, we could see into its depths. One false step forward from the precipice, and the fall would give us no hope of survival! The miners kept working busily: boring, shoveling, and preparing explosives. Dust swirled through the air, and very near us a powerful compressor roared so that we could hardly hear our own words. The mine owner, José, signaled a worker to come to him and gave the man some instructions. Having closely observed the work in the valley below me, I recorded it in pictures and film—one doesn't often witness a working day dedicated to retrieving gemstones!

After a while we descended, and in the valley we stopped at a point in the middle of the "battle of production" to gather details

Figure 9. **Schist layers with pegmatite veins in the Lavra Fazenda—as the first mine in the Pau Alto chain of hills is called. Guido Steger photo.**

about the procedure. The *garimpeiros* were glad of the chance to take a short break. And now, as the temperature climbed, a few men headed for some tunnels already in place in the gemstone-bearing pegmatite, to continue working there. Much money and much work must be expended before a "calderon" (pocket) with *pedras preçiosas* can be found and opened, and until this happens the mine owner must exploit mica and feldspar in order to keep his operation viable.

Next we traveled into the hilly area surrounding Pau Alto—a complex of many tunnels and holes dug into the hills, recognizable by the thick vegetation which covers their overhangs. Pau Alto can be translated "high wood" or "forested heights." We had to climb higher, over a road full of potholes and protruding rocks. Finally the road leveled out, and we approached the isolated and primitive huts of the local workers, visible behind clusters of bushes. At last we had reached our goal: the center of José's mining domain. The *garimpeiros* who were on hand greeted us in a friendly way, and once more I took out my camera to record the scene: the hearths (which we called kitchens), sleeping areas, livingrooms, warehouse, and outside the huts a furnace with hand-made bellows . . . an odd collection of mining imagery in a remote and forested place.

Now we learned the details concerning the mines and the many irregular hills riddled with gem-bearing pegmatites, with their possibilities for further mining. The existing main tunnel, more than a kilometer long, extends into this hilly region, and there is an almost countless number of smaller tunnels. Pau Alto is not a single, precisely laid out mine; rather, its excavations cover the whole wide area, and different owners have worked different parts of it. "Pau Alto" is only a handy collectors' term for numerous, widely varied collecting sites.

A kilometer-long path, not clearly marked out, led us, through stands of shrubs and past prospect holes, to the apex of the mining

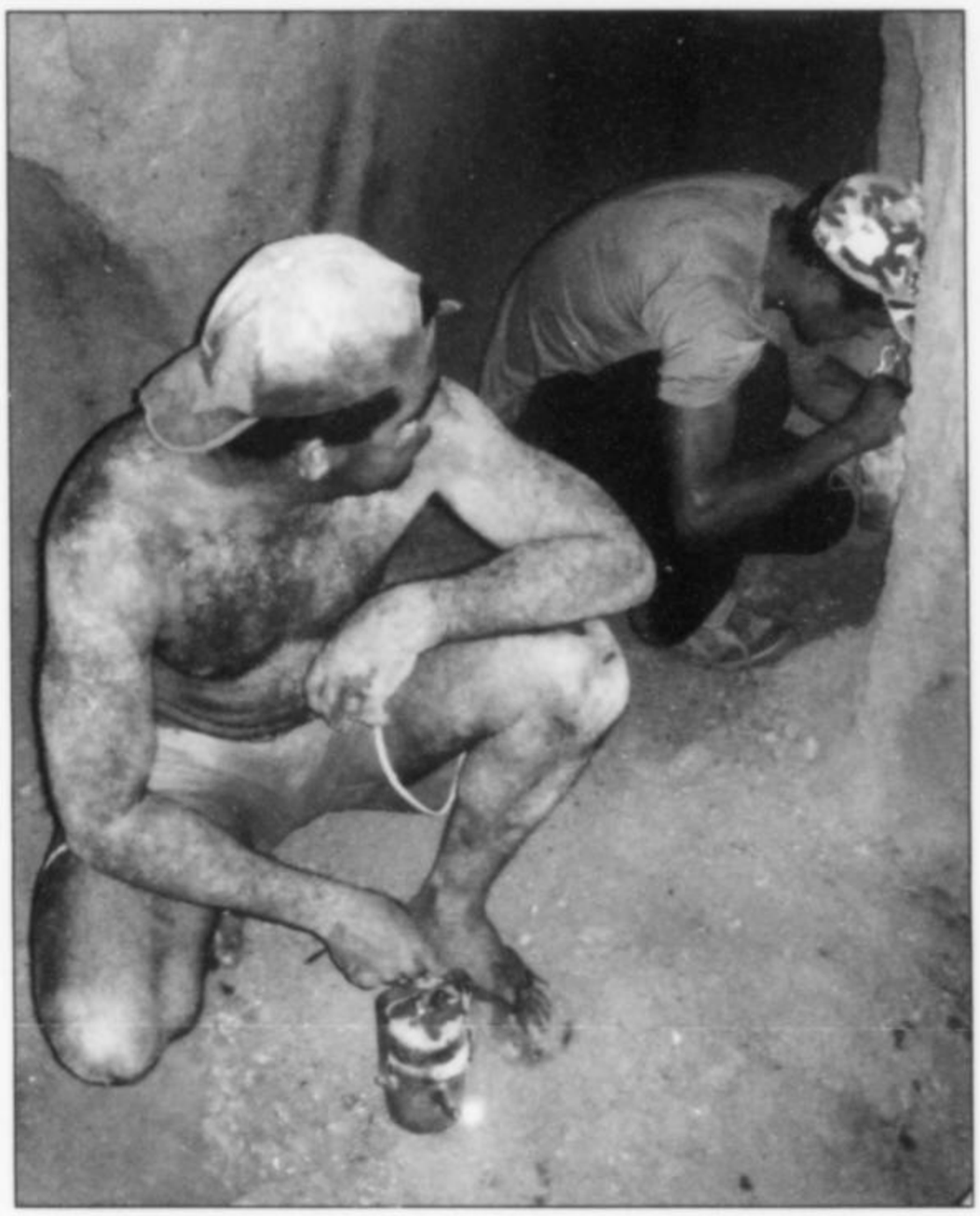


Figure 10. **Miners investigating the course of the pegmatite zone in one of the many tunnels in the Pau Alto mining area. Guido Steger photo.**

region, and actual working tunnels. In a very narrow tunnel crossed by a watercourse, we groped our way into the mine by the light of a carbide lamp, following our guide. Sometimes, at an interesting place in the exposures of country rock, we crouched together and

Figure 11. **Miners at their work with jack drills on a steep slope of the Lavra Fazenda open cut. Guido Steger photo.**

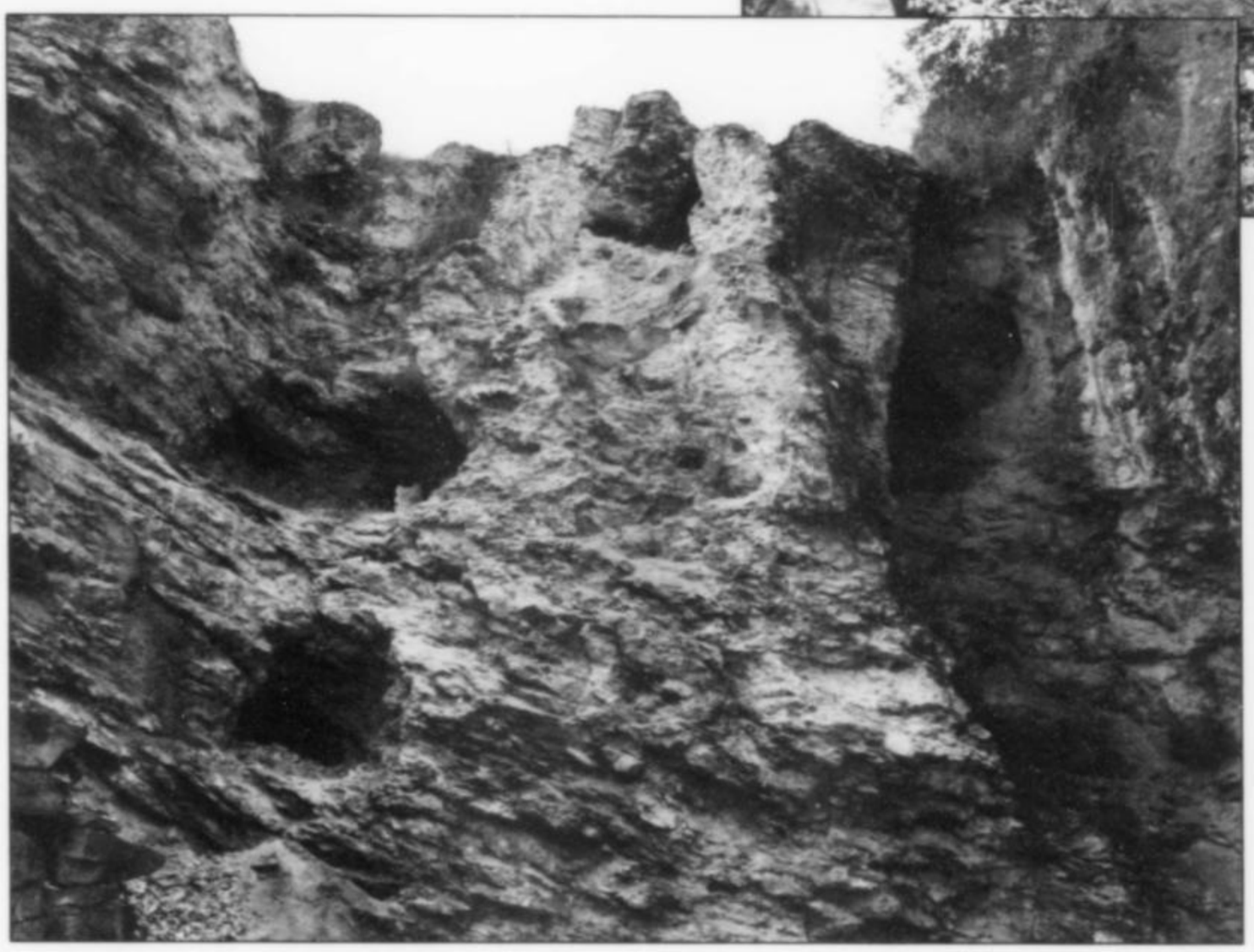


Figure 12. **Exploratory adits in the steep walls of the Lavra Fazenda open cut. Guido Steger photo.**

investigated collecting possibilities. Recognizable in the tunnel walls were xenoliths of black tourmaline, as are typical of pegmatites. Carefully we hammered on the walls in some places to ascertain the rock's toughness. In time we had had enough. On our way back out of the dark "dungeon" we had to be awfully careful not to hit our heads on overhangs . . . our scalps would not have handled that very well. The miners are reluctant to wear the available helmets and the face masks which are designed to protect them from gases and from dust particles: they feel constricted by these, and are willing to risk injury—just as, with us, some drivers choose not to buckle themselves into seat belts.

MORRO REDONDO, VIRGEM DA LAPA

To make use of the rest of the day we drove in half an hour to the Morro Redondo mine—not altogether unknown in collectors' circles. Years before, this mine had yielded considerable numbers of distinctive rust-red and yellow-brown tourmaline specimens. It was oppressively hot, and after a thorough survey of the workings in this mining area we adjourned into the shadowy tunnels. Tunnels? They were gigantic throats such as we'd never seen before, reminding us of entrances to Hades, the underworld of the classical Greeks. Through the several superimposed galleries of the workings we could look up through a 40 meter-high cleft to see daylight above. This steep, towering expanse of rock, spotted with prospect holes, showed vividly just how hard, dangerous and expensive a struggle the miners had to wrest precious gemstones out of the earth at this place!

At the base of the excavation the galleries blasted out of the rock were so wide that the tracked "caterpillar" vehicles could transport waste rock out directly. What we were seeing here was sheer mania for giant things! It was explained to us that in the surrounding tropical forest, too, pegmatites were now being intensively worked—but at sites not visible from where we stood, and not reachable during the short time we had for our visit.

I wanted to form a picture of the living conditions here, and to enter the simple abodes of the *garimpeiros*. A stuck-together awning of corrugated iron offered shelter from heat and precipitation. Men were even now taking rests on sleeping surfaces of diverse kinds,

Figure 13. **Exploration and working tunnels in the Morro Redondo mine. Guido Steger photo.**

Figure 14. **One of the many tunnel entrances in the laterite country rock of the Morro Redondo mine. Guido Steger photo.**

simple tools were lying around, and a storage space for the essentials of daily life and for mining tools was suspended directly under the roof: this was life on a bare-minimal level.

I fell into conversation with the miners, and they answered my questions willingly. These strong, friendly, brown-skinned men were in the prime of life. Just now they were rejuvenating themselves after very hard work, and I didn't feel right about claiming too much of their time.

Finally we took the steep road down from the hills and headed for Virgem da Lapa. When the 14 downhill kilometers were behind us, our vehicle took its refreshment at a gas station.

The town of Virgem da Lapa is a center of mineral dealing; experienced collectors think of it particularly in connection with earlier finds of blue topaz in the Limoeiro and Xanda mines, not far from the town. Violet and blue herderite crystals, as well as many other pegmatite species, are also well known from this place. Now we sought out some established "stone producers." High on the hill above the center of town we met up with the dealer Ciquino, in whose house precious things such as tourmalines and morganites waited for buyers—although there were many fewer specimens, and less attractive ones, than there had been when I was here two years earlier. Peculiar little amethyst groups and other finds from the region, all rather meager, reposed in boxes. Arranged in interesting combinations in the courtyard outside there were, above all, many quartz specimens, some of considerable size, including quartz crystal clusters with platy crystals displaying feathery inclusions.

Figure 15. **Jean-Claude Nydegger with an unusual quartz specimen, 65 cm, from Virgem da Lapa—one of the most interesting quartz specimens the author has ever seen in Brazil. The transparent and colorless crystal sections resemble smoky quartz because of inclusions of dark minerals. Guido Steger photo.**

Jean-Claude could not resist buying the whole lot, in anticipation of the Ste.-Marie-aux-Mines Show, where he wanted to show up with new offerings (he would also be taking his small, sceptered crystals of green tourmaline from the Cruzeiro mine to that show).

What interested Jean-Claude particularly were specimens of black tourmaline (schorl) of a type rarely seen—compact within, and with very few broken surfaces. To obtain these he could drive to the source and happily load the bed of his small truck to capacity.

By evening it was time to leave, bringing our reunion to a close. Jean-Claude returned to his family in Teofilo Otoni. He had been a circumspect traveling companion and guide, making mines I had not been aware of before accessible to me. On the next day I sought out a few more dealers I knew, but unfortunately they were not all available.

THE TEIXEIRINHA MINE

I was eager to find out what new adventures, information and minerals awaited me the next day in Itinga. As previously arranged, the brother-in-law of Clezinho Gonçalves Oliveira took me—as if in a Formula One racing car—on the 40-kilometer trip to the home of Clezinho, owner of the Teixeirinha mine (see the *Mineralogical Record*, January–February 2009). I was welcomed heartily there, and found in Clezinho's warehouse some highly interesting gem materials, as well as ornamentally painted quartz crystals. Goodly numbers of blue topaz crystals (to 4 kg!) from his recent production stood in orderly rows on the tables. Specimens with garlands of purple lepidolite crystals on feldspar crystals were smiling at me! Huge, heavy specimens with quartz crystals, cleavelandite, lepidolite and blue topaz squatted ponderously on the floor. Clezinho agreed to show me his mine: no sooner said than done!

Clezinho wanted to tell me about the mine's layout, geology, and present condition, and about the ongoing progress of the tunnel workings. He also explained what procedures are followed when signs of a crystal pocket appear. In such a case the work proceeds solely with hand tools, in order to protect the crystals; explosives which might destroy them are not used. Another possible option is to extract the greater part of the crystallized pocket wall. Since the boss is interested in crystal specimens above all else, it is natural that he himself goes to supervise this careful work. He assured me that I too would be able to see an open crystal pocket.

Clezinho prepared his jeep for the trip to the mine. Normally he uses a motorcycle to get there, so as to be sure of having vehicles free to carry tools and supplies. About twice a week he visits the mine, where work is supervised by his brother. Full of excited anticipation, I prepared my camera and film equipment—and off we went. For the first two kilometers we had an asphalt road, but then the trip became extremely turbulent: deep potholes, rocky protrusions, gulleys, streams of water, muddy slopes running downhill and uphill, and a screaming motor, made for a hellish approach to the mine. I had wanted to make a film of the approach, but these conditions made filming impossible: I was frantically concerned just to hold on, and I clutched my equipment close to me. To keep this road useable, Clezinho has to have new work done on it after every rainstorm.

Finally, after 14 convulsive kilometers, we were standing in front of a tunnel entrance. Glancing behind me, I could still see Itinga, our starting point, in the distance. Everywhere on the forested hill, tropic green surrounded the sheds in which powerful pieces of equipment were stored: generators, compressors, machines to bring air into the tunnels, pumps to take water out from the rocky throats. Crazy heat afflicted us; thus, after a minimum of informative talk, we entered the maw of Mother Earth, itself not much cooler than outside. Watch out for the overhangs; don't walk too erect! Although this tunnel was unusually wide, we had to be very careful with every step.

The two brothers led me to the end of the tunnel. Here there was space—the beginning of a flat, damp, gravel-covered, sloping surface on which rested used mining tools and around which rose heaps of rock waste. And here, to my delight, were specimens with perfect smoky quartz crystals to 30 cm long on matrix! When the beam of the strong lamps fell on them they came up into sight, throwing pointed shadows behind them. There were echoes in this

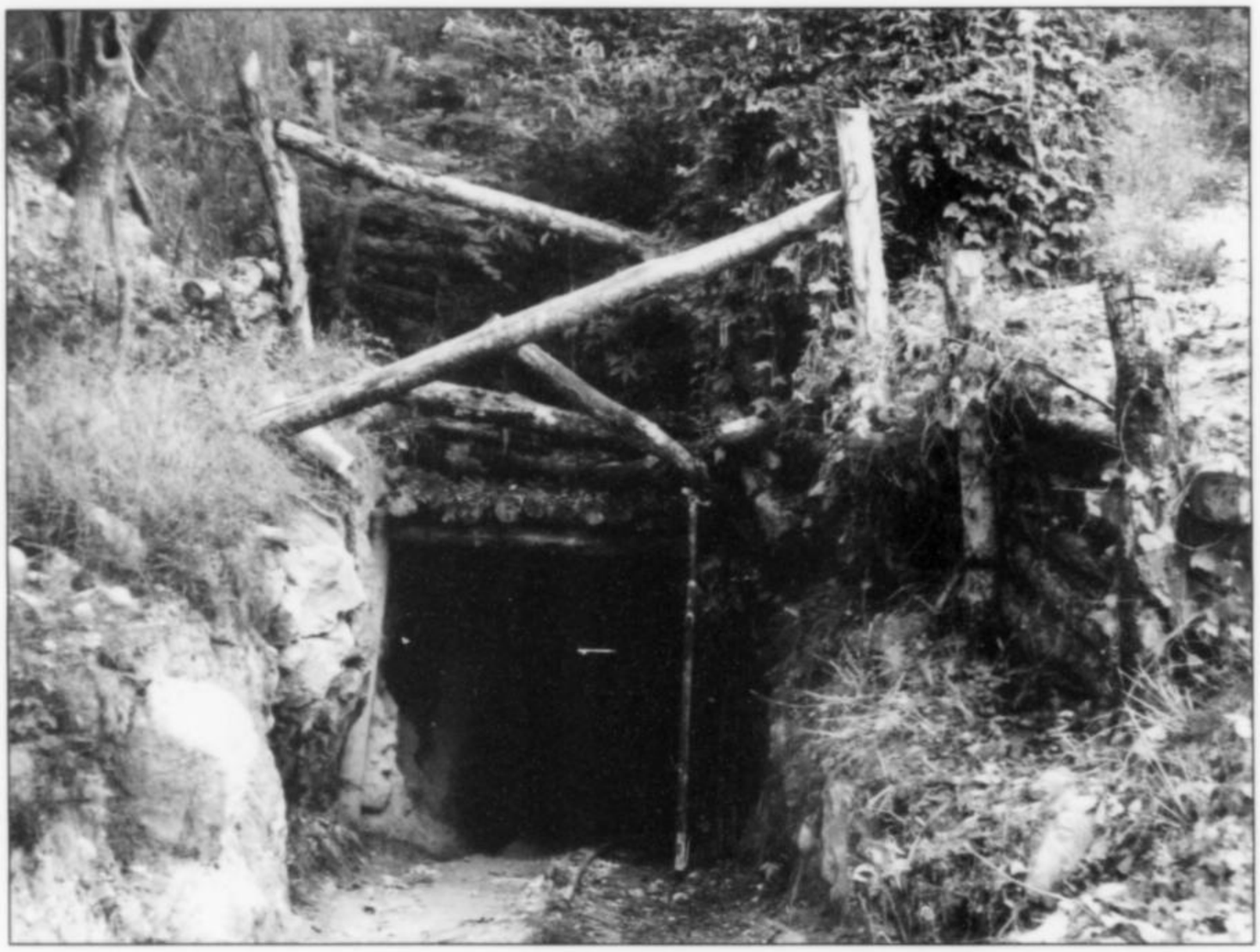
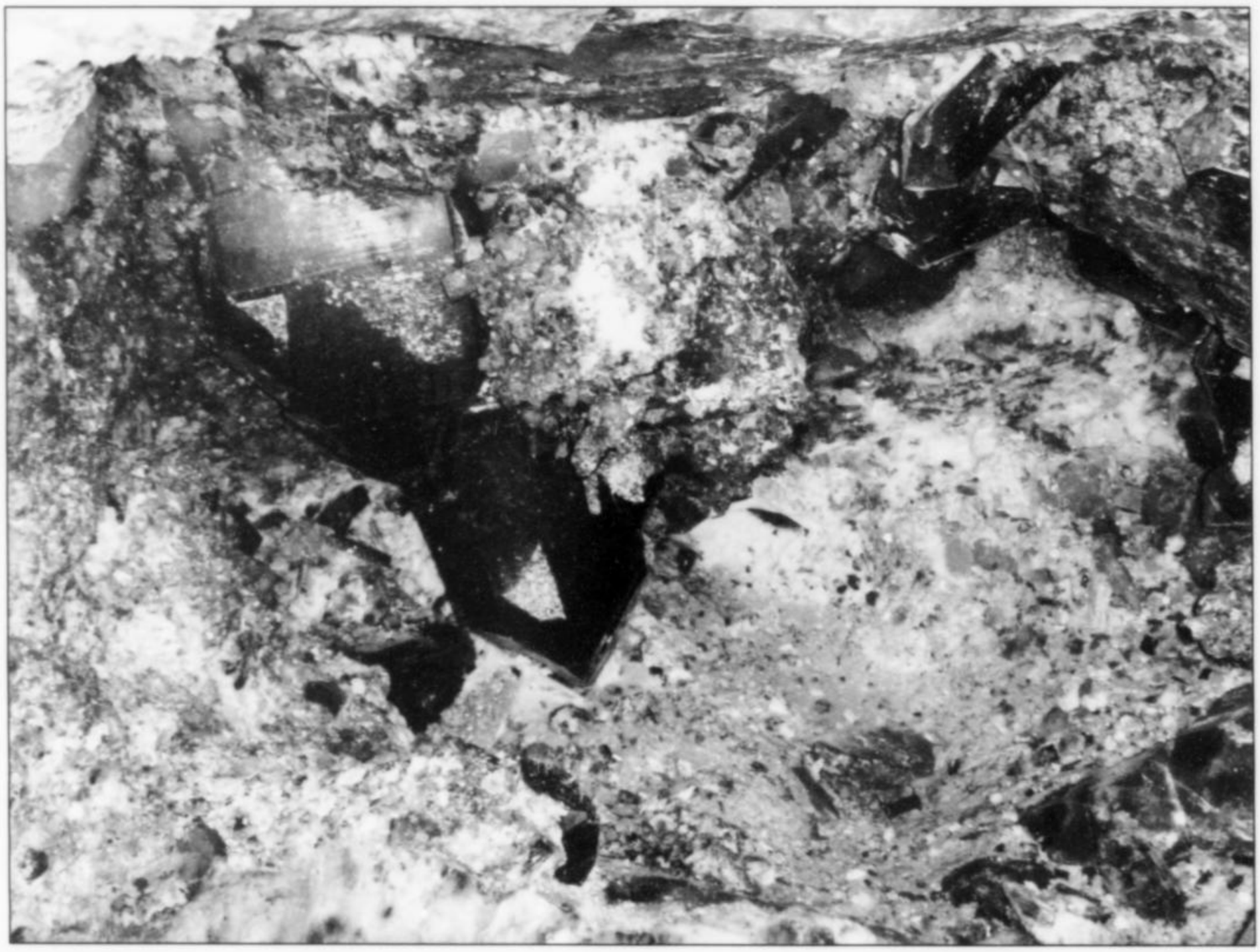


Figure 16. **Tunnel entrance at the Teixeirinha mine. Looking downhill from here, one can see the city of Itinga in the distance. Guido Steger photo.**

Figure 17. **A just-opened, 1.2-meter-wide pocket in the Teixeirinha mine. The smoky quartz crystal measures 30 cm. Associations include lepidolite and blue topaz crystals (hidden behind the quartz crystal). Guido Steger photo.**



domed chamber inside the mountain. Dangerous, slippery planes of rock sloping downwards called for exceptional caution. Sometimes it was possible to hold on to iron feeding chutes or on to ledges of rock on the side or over one's head. Now and then my two friends gripped my arms to lead me further on—a most welcome support, as I'd recently had a hip operation. And then, as promised: an open pocket! Our lamps illuminated it to a width of 70 cm, and showed its glistening inner walls. Still attached to the roof of the pocket and pointing down was a dark smoky quartz crystal 30 cm long, its smooth faces gleaming. Feldspar crystals, more quartz crystals, and blue topaz crystals rested like swallows' nests in the pocket. It was a sight that did not simply fascinate me, but downright intoxicated

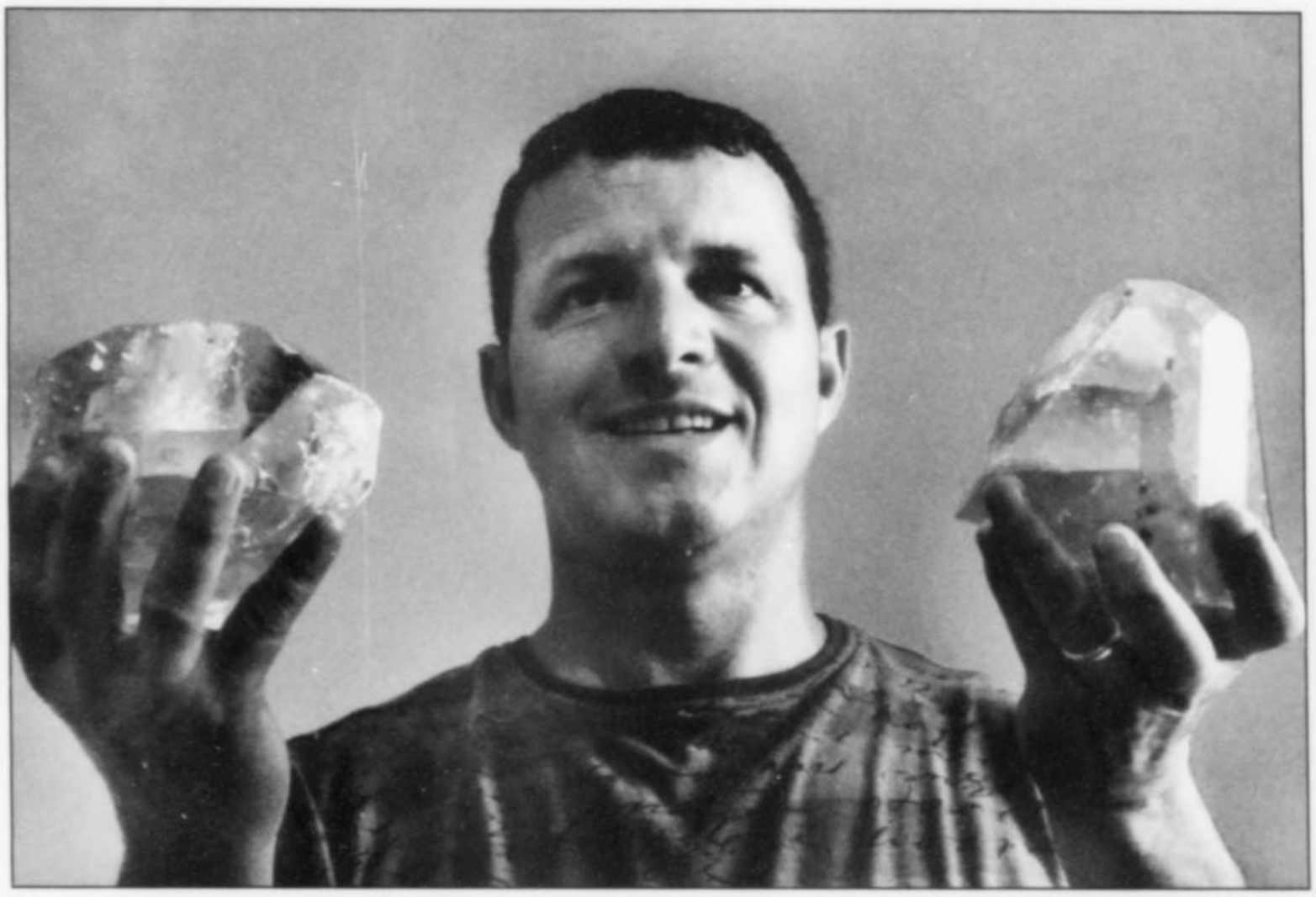


Figure 18. **Clezinho Gonçalves Oliveira, owner of the Teixeirinha mine, with blue topaz crystals from the mine. Guido Steger photo.**

me. I had almost never seen anything like it—not in the conically terminating shafts at Panasqueira, not in the clefts of the mountain's interior at the Sweet Home mine, only perhaps in some quartz clefts in the Alps. The crystals before us could be grasped in the hands, in the state in which Nature had made them.

Of course I tried to preserve the image of this waking dream. I had "trimmed" my camera and tripod rig in anticipation of setting them up in a difficult and narrow place, and the effort was worth it: without having to jostle the camera I took photos, and later brought the documentation home with me. Much less pleasant for me was the fact that, in the "heat of battle" (stabilizing the tripod, mounting the camera, etc.), I failed to notice an overhang and put my scalp at risk . . . the result was a small concussion which tormented me for the next few days.

Teixeirinha is currently the only productive mine which yields blue topaz. Tiny brown crystals of zanazziite are commonly seen resting on the faces of the topaz crystals. The mine, owned by Clezinho Gonçalves Oliviera of Itinga, lies 12 km from that town, and the road to it is best negotiated by jeeps. The first production came in 2001, soon after work had begun. The main entrance is at an altitude of 750 meters. The width of the tunnels varies between two and three meters; the distance to the working face averages 180 meters. The camp of the *garimpeiros* lies at 800–900 meters. A single pegmatite is present. The mining crew presently stands at 10 miners. Drinking water is on hand, a deep drilling having tapped into a water-bearing layer. Once in a while it happens that a schararaka, a very poisonous snake of the region (called "schaka" for short), strays into the pipes and rods of the machines . . .

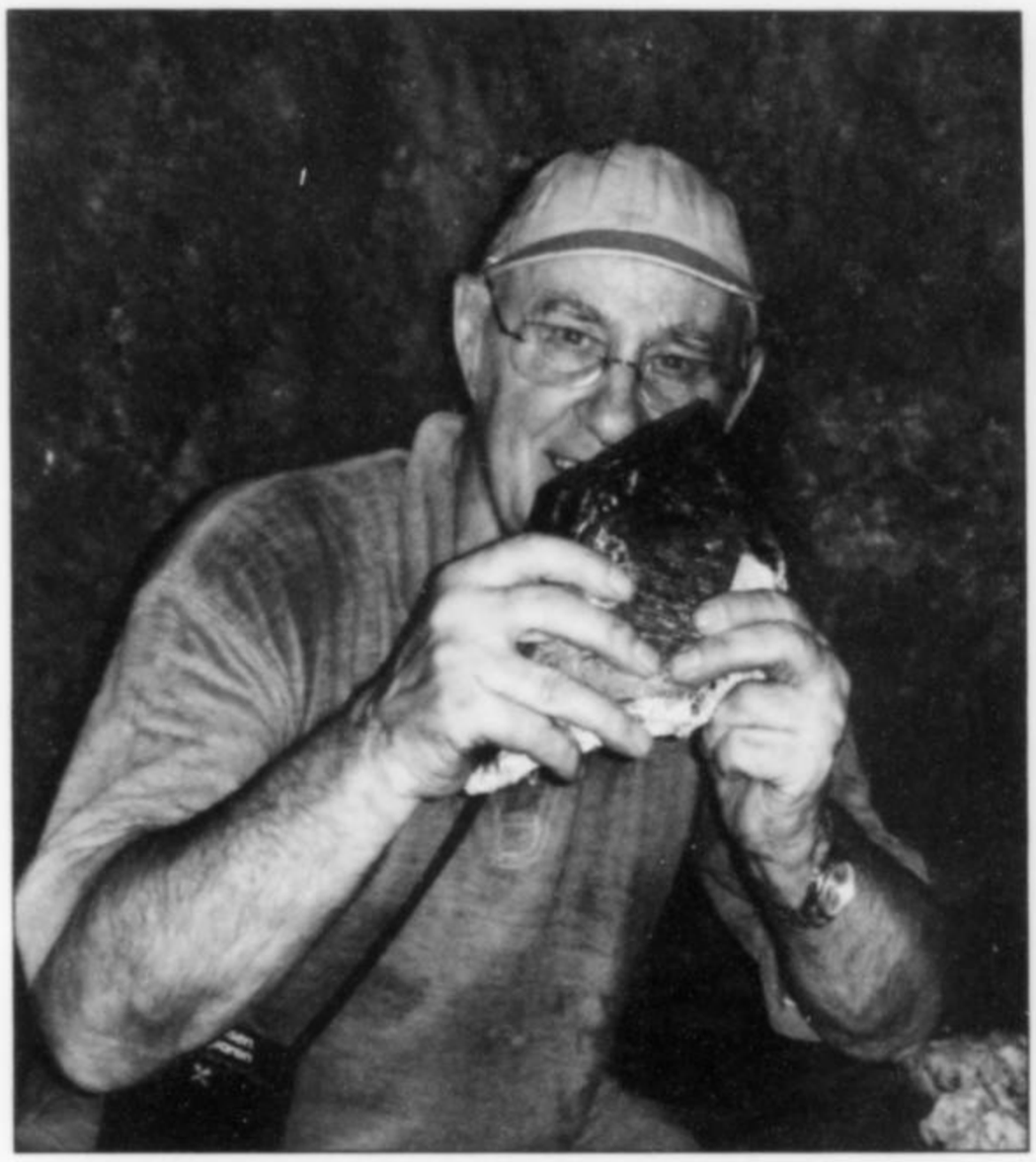


Figure 19. **The author holding a quartz crystal he has collected from the just-opened pocket in the Teixeirinha mine.**

GALILÉIA AND THE RESPLENDOR MINE

That afternoon, a four-hour bus ride brought me from Itinga to Teofilo Otoni, where Jean-Claude Nydegger greeted me in his wonderfully laid-out home with many amenities, including a swimming pool. It was Saturday, and the "stone producers" whom I wanted to seek out had closed their gates. However, I did succeed in finding one dealer of my acquaintance and in buying from him a phenakite specimen of remarkable size: the crystal weighs 721 grams and measures 8 × 8 × 9 centimeters!

For Sunday, which was Mother's Day, a drive to the farm of Jean-Claude's wife's parents was planned. In fine weather the entire family (plus me) climbed into their car, and we drove many kilometers over asphalt roads, amid abundant green vegetation, before turning onto a dirt entrance to the bucolic rural estate. The newcomers were greeted with a friendly hello. The farmhouse, furnished in old-fashioned style, is now a showplace for family activities. I made myself comfortable on the veranda and took delight in the sight of whirring hummingbirds which drank nectar in mid-flight from a hanging basket that had been provided for them. In a little birdhouse a colorful finch (called a "canary"), much more brightly colored than its European cousin, raised its beautiful voice. Big birds with black and white plumage circled around the herd of

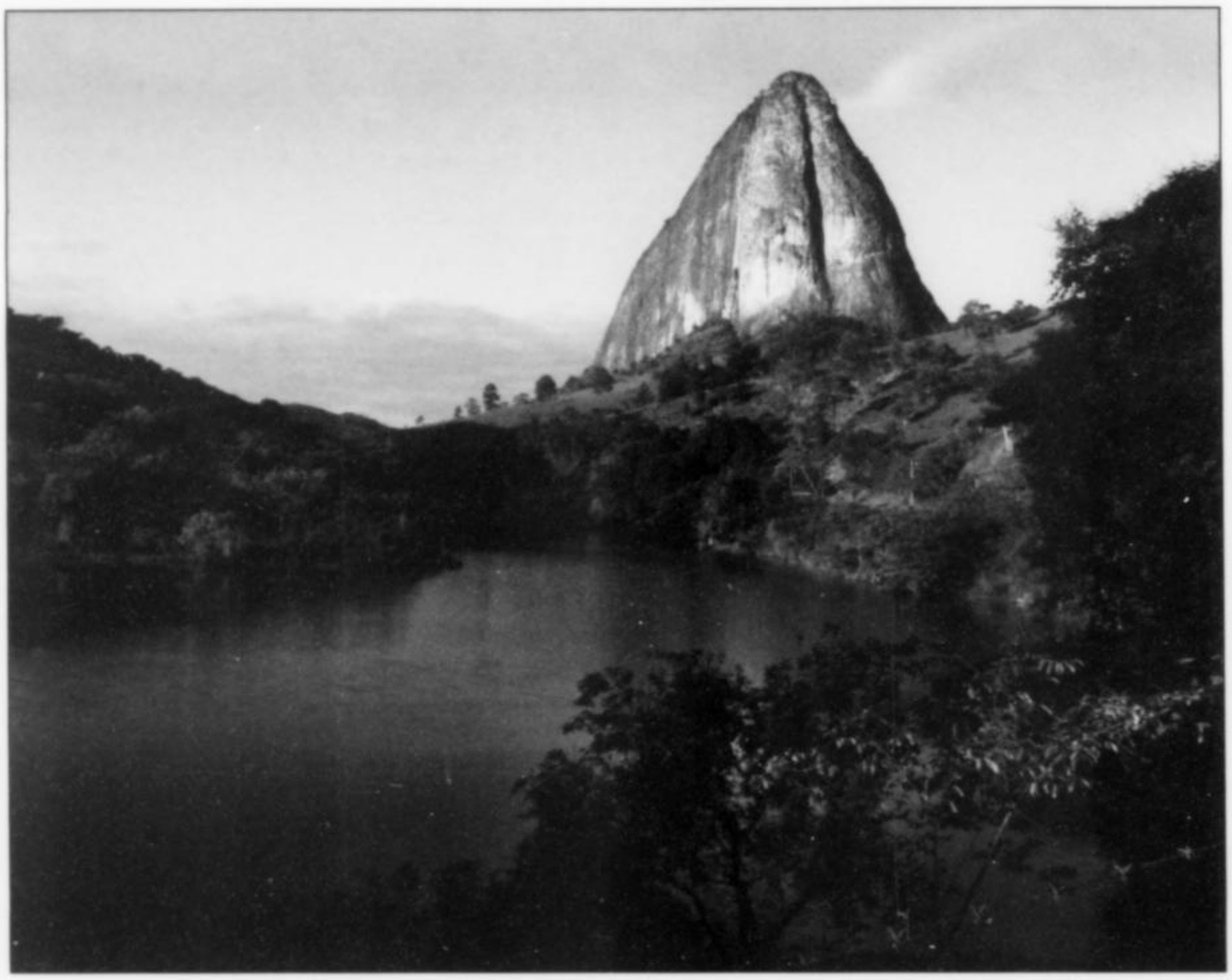


Figure 20. **Landscape near the resort town of Ladainha: a quiet lake surrounded by wooded hills and overlooked by a sugarloaf-shaped rock formation. Guido Steger photo.**

cows and the grazing horses. Monkeys played in the crowns of the trees around the house. In this house, where I enjoyed conversation both serious and jocular, I was a welcome guest, and I was invited to come soon again.

In the afternoon, with my companions, I went on a 40-kilometer side trip to one of my favorite little cities: Ladainha, a convalescent center and recreational paradise. The gorgeous region around it is dominated by a spire of rock with a sugar loaf-like peak on high, its silhouette reflected on the surface of a lake popular with bathers. The hours of recreation in and around Teofilo Otoni helped to restore my energy for visits to mines in the area. I knew these mines only from maps, from hearsay accounts, and of course as names on mineral labels: Galiléia, Resplendor.

On the way out, Jean-Claude and I saw a wholly different landscape. The weather was beautiful again, and our vehicle was weighed down by its load of provisions and of new equipment for the assault on the mines. In Galiléia the owner of the Navigador mine was stopping by. Minerals were hardly at all to be seen, although everywhere there were chaotic confusions of metal objects awaiting employment. Only a small lot of bizarre, though good-quality, little spessartine crystals was available for sale. On a forlorn table inside a house were some larger mineral specimens which might have been tradeable, but certainly these would have been too heavy for transport in airline hold baggage; besides, the miner preferred to hold onto them himself.

The sun was sinking and cloud banks were moving in as we neared our goal—the mine owned by my prudent friend Jean-Claude. Just before reaching the little city of Resplendor we left the asphalt road to begin our approach to the mine. As usual the entrance road was rocky and rough, and as usual we were vigorously shaken about. Our panting vehicle pressed uphill, past fertile fields and prosperous plantations, until we reached the communal abode of the *garimpeiros*. This contained all the basics: sleeping accommodations, a livingroom with TV, a kitchen, a storage room, a clothes-washing area outside on the veranda, a room where one could simply sit and relax. A short distance downhill, pigs wallowed, and foul-looking dogs lay yawning in the shadows. A bicycle hung head-high on a tree branch. At present most of the mining crew were still at work in the tunnels, but one group here was preparing timber to secure a tunnel entrance, while another, just back from the mine, sat relaxing on the porch of the building.

We kept climbing uphill, finally reaching the mine entrance. A short distance into the dark world inside, there was a narrow track on which stood a mine car for hauling waste out of the mine. Crouching, straining, we made our way to the end of the 120 meter-long tunnel. There we saw the only wooden support structure, which took the form of a gate or portal; cables and pipes went into the mine from this point, and incandescent bulbs placed at intervals brought light to the weird underground world. To the right and left along the walls there were pits and short drifts where prospecting work had been done, and these warned us to be alert and cautious.

At the end of the entrance tunnel loomed great vertical throats almost 30 meters high. The ghostly prospect, as lit by our headlamps, showed a strange world of crevices running along layers of pale-colored amblygonite. Non gemstone-bearing schist and more promising pegmatite alternated in narrow layers, both now being excavated. Then we had to evacuate the tunnel: a blast had been prepared, and soon, from outside, we could hear explosions closely following each other. After the dust had settled we waited to learn whether the blast had gotten through barren rock and penetrated the pegmatite—unfortunately it had not; more blasting would be necessary.

We spent the night in a good, clean hotel in the nearby town of Resplendor. Supplies and provisions for the support of the mine had again to be purchased, filling the upper deck of the supply room. And once more our gasoline steed fought its way uphill to the mine

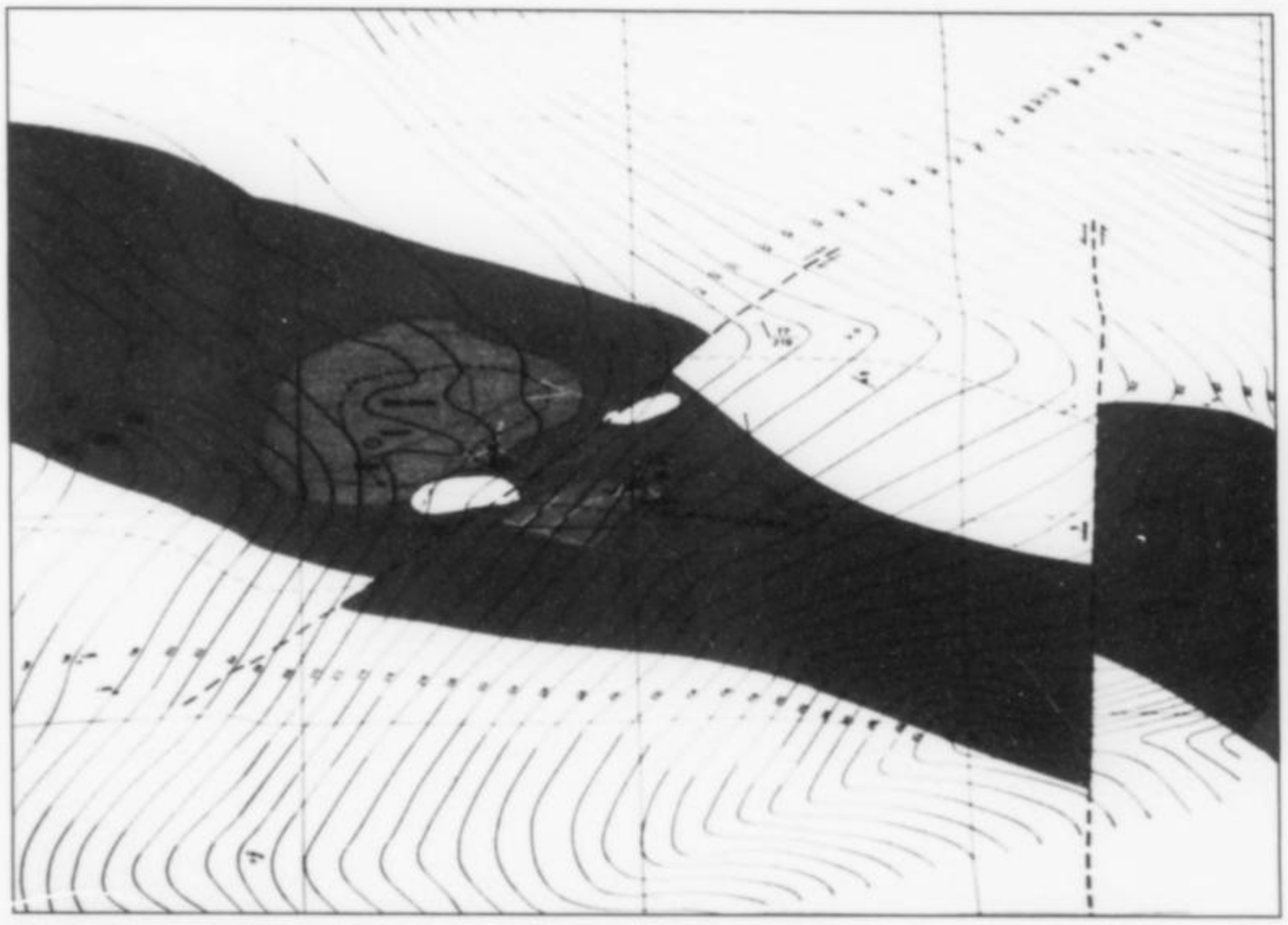


Figure 21. **Geologic map of the pegmatite body at the Resplendor mine (red-violet), showing faulted off-sets.**

Figure 22. **A cleft system cut by a tunnel in the Resplendor mine. Guido Steger photo.**

area. The next blast was being prepared. Little plastic bags were being filled, not with dynamite, but with ammonium nitrate, and being equipped with fuses; then 12 of these were emplaced close to each other and electrically detonated. This blasting took place twice that day, with, each time, the successive detonations of the twelve charges, one after the other, resounding dully as heard from outside. After the dust and rock particles had settled it was necessary to make sure that there were no charges which had failed to ignite: such "duds" can have dangerous consequences. Only when this precaution has been taken can the search for gemstones begin.

The mine owner has plenty of onerous chores to do: he must obtain legal permits to work on the property, and find suitable *garimpeiros*; he must furnish the mining camp with all necessities (food supplies, housing, tools, transport, explosives, etc.); he must build an entrance road; he must pay the miners and cover all working expenses; he is responsible for the sale of all products of the mine. Problems of all kinds can arise: for example, if the entrance road (even a small part of it) runs over someone's property, that person invariably is antagonized, and it is common that extortion money must be paid to the neighbor to keep him from bringing criminal charges. Another kind of problem also arises: because the good asphalt road to Resplendor is easily reached from the mine, it is fairly easy for dishonest *garimpeiros* on the crew to smuggle out gemstones and later to sell them. It is estimated that 10% of the gemstones produced by the mine disappear in this way.

The owner of the Resplendor mine, Jean-Claude Nydegger, is a native of the Fribourg region of Switzerland. He has been a gemcutter for decades, lives in Teofilo Otoni, and speaks perfect English, French and Portuguese. The mine lies 5 km west of the town of Resplendor in Minas Gerais, near the border with Espirito

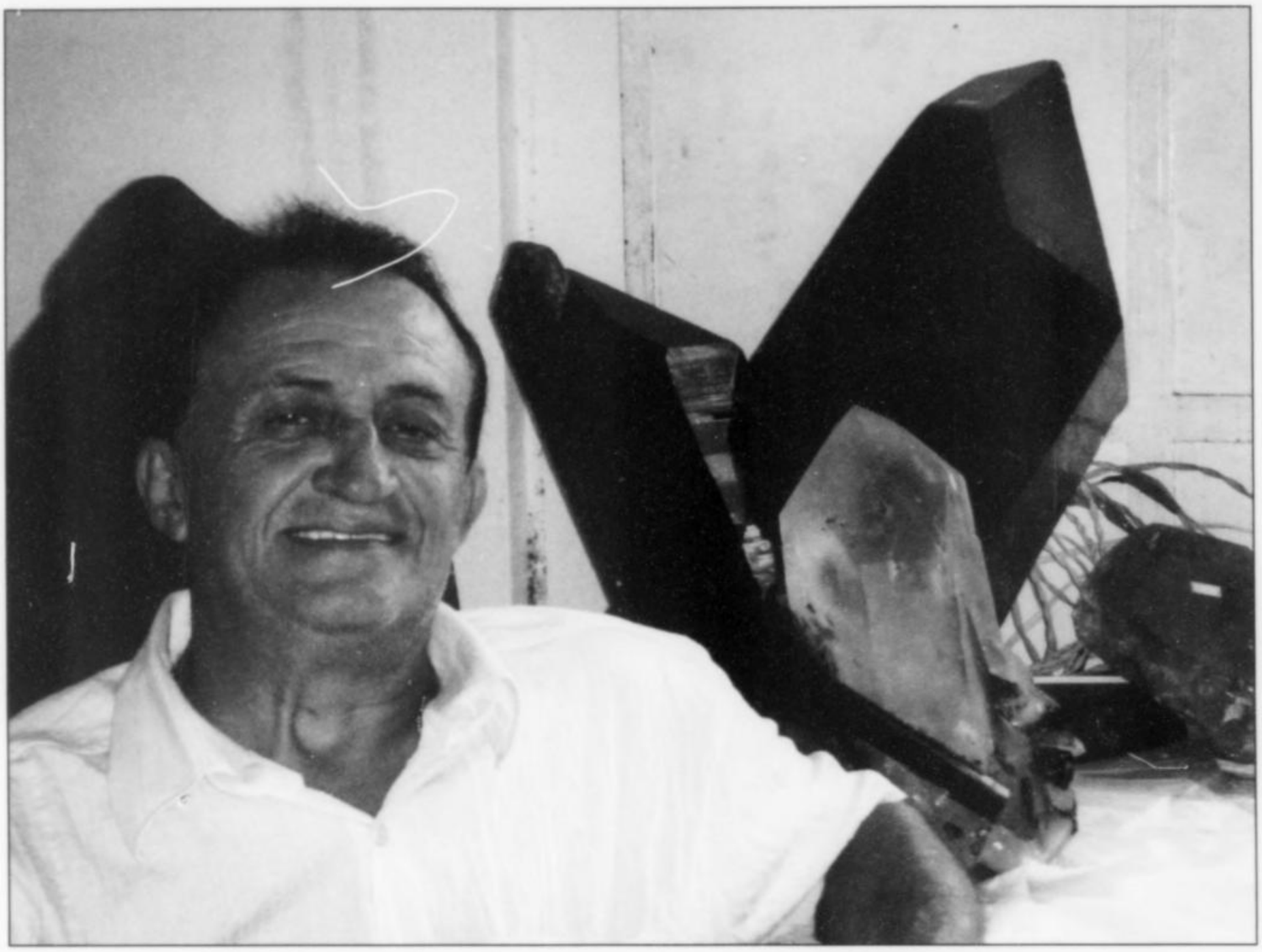


Figure 23. **Martins Clovis Coelho ("Baiano") in Governador Valadares with two huge specimens: a smoky quartz crystal group and (in front of it) a quartz crystal with a partly embedded crystal of green elbaite. Guido Steger photo.**

Santo. Fifteen years ago Jean-Claude acquired the mine from the *garimpeiro* and dealer Jair Medeiros (nickname: "Linguiça"), during whose time the mine produced 1200 kg of gem-quality kunzite, the largest complete crystal weighing 50 kg. The dealer Joao das Moças, of Governador Valadares, bought the largest part of that production.

Among the minerals also produced by the mine are collector-quality colorless beryl; pink and blue beryl in significant quantity; tourmaline in many colors, especially blue and green; large crystals of citrine quartz; and small quantities of orange spessartine. Gem materials for cutting are the chief product, but collector specimens too are avidly sought.

The mine is worked with drills, compressors and compressed-air hammers; ammonium nitrate is the explosive of choice. The work crew consists of ten *garimpeiros*.

A present goal is to improve the mine's infrastructure. At any given time, three miners work busily in each gallery. One of these, the most experienced, who handles the drill and guides the work in the proper direction, is called the *Frentista*; the other two, who clean out the waste rock, are called the *Carreiros*. Of course the intention always is to maximize efficiency, i.e. to get more production from less work expended. For this, certainly, experienced and competent miners are needed—but these are obtained with great difficulty.

"A miner is a dreamer": the miners, many with small, illegal claims of their own, are always dreaming of making one great discovery which will enable them to live better lives. Jean-Claude Nydegger's own dream is to amalgamate many small mines into a single great one, and thus to establish for himself in this place a home, a stronghold—a fortified castle.

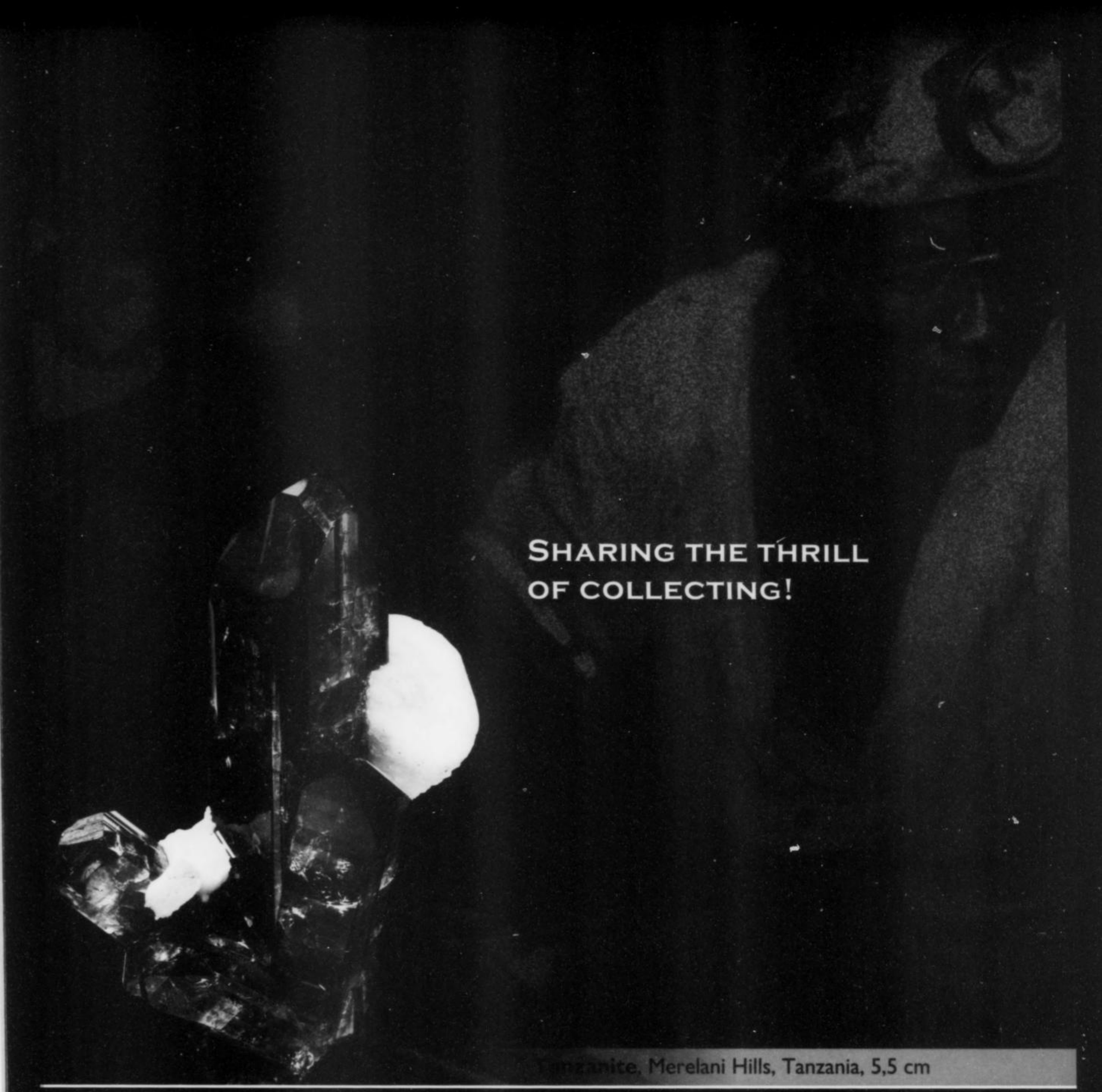
THE END OF THE ODYSSEY

After a six-hour bus ride from Governador Valadares I reached the *Rodoviaria* in Belo Horizonte, and from there a taxi brought me to the international airport at Confins/Tancredo. My heavy traveling bag had made the bus transfers quite arduous. Near Confins I succeeded in finding a beautifully situated hotel, the Hotel Fazenda, where I spent the night in a comfortable room in a separate "chalet," amid palm trees beside a lake. It was a worthy conclusion of what would almost surely be my last journey to Brazil.

1968–2009: more than four decades under the spell of the Crystal World of Brazil. Was all this a dream, or was it reality?

ACKNOWLEDGMENTS

For providing information and offering general support I am grateful to Ronaldo Rodrigues Barbosa, Dilermando Rodrigues de Melo Filho, Martins Clovis Coelho, Joel Djajah, Fernando Cesar Onofri, Eric Cantayre, and Geraldo Rodrigues Pereira. I owe a special thanks to Clezinho Goncalves Oliveira for guiding me so helpfully to the Teixeirinha mine. My friend Jean-Claude Nydegger of Teofilo Otoni deserves my unending gratitude for sharing his knowledge of Brazilian mines and for guiding me to his own mines, and in general for aiding me in my adventures in Minas Gerais. I am also grateful to Tom Moore for his fine job of translating this article from German.



Tanzanite, Merelani Hills, Tanzania, 5,5 cm

Photo: M. Sickinger

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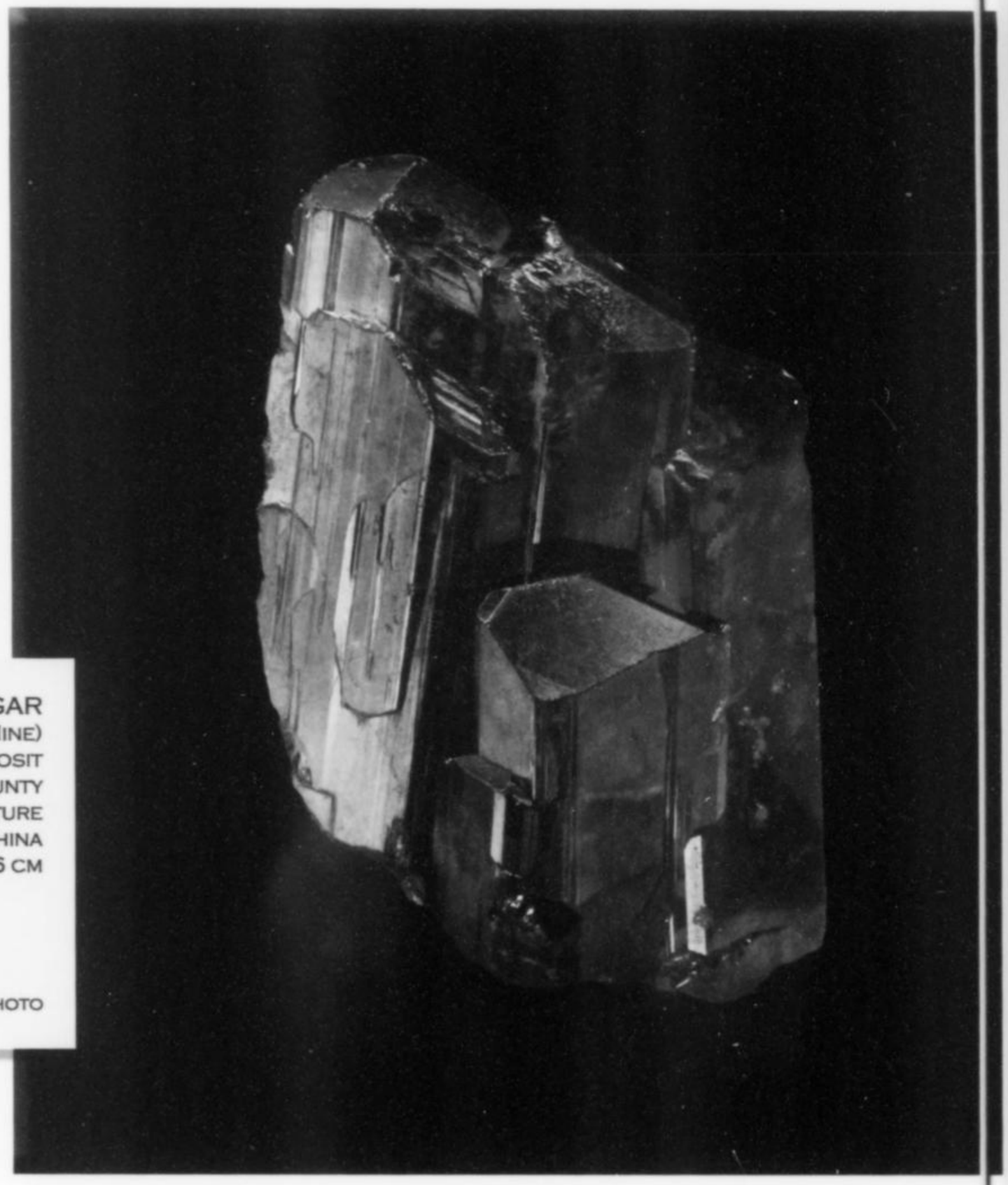
STONETRUST



REALGAR
JIEPAIYU MINE (SHIMEN MINE)
SHIMEN AS-(AU) DEPOSIT
SHIMEN COUNTY
CHANGDE PREFECTURE
HUNAN PROVINCE, CHINA
6 CM

JOAQUIM CALLÉN PHOTO

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The Heart of the Munich Show:

Johannes Keilmann

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For over 37 years the show known as the Münchner Mineralientage ("Munich Mineral Days") has been guided by the energy, creativity and inspiration of one man: full-time manager and Show Chairman Johannes Keilmann. With the help of his wife Hermi, his son Christoph (who has gradually been taking over the management reins), other family members, and an army of volunteers and paid staff, he has developed the Munich Show into Europe's greatest mineral extravaganza.

INTRODUCTION

Among the many great benefits I enjoyed as a curator at the Smithsonian Institution was the opportunity to meet extraordinary people. In 1978 I was invited to take an exhibit from the Smithsonian to the Munich Show—the first time that the museum had exhibited at that show. It was there that I first met the man responsible for producing the Munich Shows, Johannes Keilmann, and we have been very good friends ever since. It was Keilmann who first introduced the idea of having an annual mineral show in Munich, and it was he who has nurtured this germ of an idea throughout its development into its present form: the biggest and by far the best mineral show in Europe.

BACKGROUND

Johannes Keilmann (known as "Hannes" to his family and German friends, "John" to his American friends, and simply "Keilmann" to thousands of others) was born on September 20, 1940, near Staffelsee, a small lake in Bavaria, just south of Munich. His parents were both musicians, his father a composer of classical music. Today all three of his children can play musical instruments. During his childhood and early teenage years he lived in Bad Kohlgrub (near Oberammergau) and was a student at a public school in Schondorf am Ammersee. Beginning in 1958 he was a student in Garmisch-Partenkirchen, where he graduated from the Werdenfels Gymnasium (secondary school) in 1961. It was during this period that he and his friend Ingomar Jäger (the school director's son) became interested in mineral collecting.

The central Alps were only about two hours by car from where he lived, and on many weekend treks into the mountains he and his friend found nice garnet crystals from the Ötztal and fluorites from South Tyrol. But he recalls that his first actual exposure to natural mineral crystals took place when he was 16: while waiting for the daily train, he noticed some "gold" crystals in the crushed rock below the rail track. He asked his teacher if that was really gold and was told that it was not gold, but pyrite. While still in high school he wanted to study mineralogy, but he found that the only course available focused exclusively on mineral chemistry instead of crystallography, and this he found frustrating.

Following graduation from high school he served two years as an officer in the German Army (military service then was compulsory for all West German men between the ages of 18 and 21). His duties sometimes took him to Idar-Oberstein, which at that time was the world's leading lapidary center. There he came in contact with American soldiers and also with local mineral collectors. Both encounters served his interests well. He was able to improve his

The Munich Show hall, 1974.

English while speaking with the Americans, and he learned about the quarries where he could collect the wonderful geodes for which the Idar-Oberstein area is famous.

After leaving the Army, Keilmann studied geology at the Technical University in Munich, but in 1963 he changed his major to construction engineering, although he retained an interest in geology. At that time his family was struggling financially because there was very little opportunity for musicians to earn a livelihood so soon after the war. So Keilmann helped pay for his education by selling some of the specimens he had collected in Idar. His early interest in minerals was greatly influenced by Dr. Werner Lieber's book *Der Mineraliensammler* ("The Mineral Collector") (1963). That same year he, along with his school friend Ingomar Jäger and Christain Weise (later to become the publisher of *Lapis)*, acquired the legal right to extract emeralds from the famous old Habachtal mine, at the foot of Grossvenediger, Austria's second highest mountain. This venture also helped finance his university studies, and in the process he made many useful contacts with other European mineral collectors.

THE FIRST "STONE MEETINGS"

While still a student, Keilmann participated in "stone meetings" at a small restaurant near the Geological Institute. In 1964 these regular monthly gatherings of about 15 people resulted in the first "Mineral and Fossil Market" held in Bavaria. There were only about a dozen collectors and a few hundred visitors. The focus of the "stone meetings" in their earlier days was almost exclusively on the minerals of the nearby Alps; the members had little exposure to or knowledge of minerals from the rest of the world. The nearest they came to seeing anything more exotic was when Fritz Krantz, owner of the famous and historic Krantz mineral dealership in Bonn, would bring some of his inventory to the early club shows. Word of the beauty of mineral crystals spread quickly, and soon it was clear that a larger room would be needed. In the following years these meetings of enthusiastic mineral and fossil collectors were held in such places as the Löwenbräu and Hackerkeller restaurants, and in the city museum.

Keilmann's first contact with what was then referred to as the *Münchener Messe Gesellschaft* ("Munich Exhibition Association") dates from the time when he met Walter Gehringer, the MMG's project manager for BAUMA, the world's leading international Trade Fair for construction and mining machinery. Keilmann's knowledge of surveying proved useful in helping with exhibition stand construction for the fair. He was greatly influenced at this time by Dr. Werner Lieber, with whom he had long discussions about organizing a mineral club and related activities. Dr. Lieber and Dr. Joseph Clemente (president of the Munich mineral club) were also helpful in spreading the word around Germany about these early "shows" through ads in *Der Aufschluss* (Dr. Lieber was editor of this periodical) and by word of mouth.

After he completed his studies in 1970 he was employed as a structural engineer with Bauunion, a daughter company of the Siemens Corporation which, in 1973 after the Olympics construction boom had ended, merged into the Dyckerhoff and Wittmann Company. During his eight years of employment with these companies his mineral hobby became increasingly important to him. He became eager to create something far more substantial for his fellow collectors than just meetings in restaurants and museums. In 1971 he and 18 friends founded the non-profit *Münchener Mineralienfreunde* ("Munich Friends of Minerals"). After seven years as the unofficial leader of this group he became the chairman, a position he has held ever since, some 32 years as of this writing. He was also the group's representative in the German umbrella organization for mineral societies, the *Vereinigung der Freunde der Mineralogie und Geologie* (VFMG, based in Heidelberg), and a member of that group's advisory board. Years later, in 1986, he and a group of dealers founded the German Dealers Association (DMF), for dealers in gems and minerals.

THE FIRST MÜNCHNER MINERALIENTAGE, 1972

The number of exhibitors and visitors at the early Munich shows was growing rapidly, so Keilmann began to think about moving the show to the much larger *Münchener Messegelände* ("Munich Fairgrounds"). He expressed these thoughts to Heinz P. W. Seifert,

who not only was the general manager of the Messegelände, but also had been a miner and mineral collector when he was young. As a result, in September of 1972 the *Münchner Mineralientage* ("Munich Mineral Days") show was held in the exhibition halls at the Messegelände for the first time.

The timing of that show was no accident. It was the year the Olympics were held in Munich, and Keilmann thought that, with so many international visitors in the city, he could get many of them to attend the show if it were adequately promoted. But unfortunately the strategy failed. Although the show was sandwiched in between the Olympics and the Oktoberfest, the Olympics were over long before the show started, and virtually all of the visitors who had come to the city for the games had gone home, while those coming for Oktoberfest had not yet arrived. Nevertheless, he hosted 152 national and international mineral dealers, and some 6,000 people attended the event in Hall 2 of the exhibition center in the Theresienhöhe district, near the *Theresienwiese* ("Theresa's Meadow"), where the annual Munich Oktoberfest is held each year.

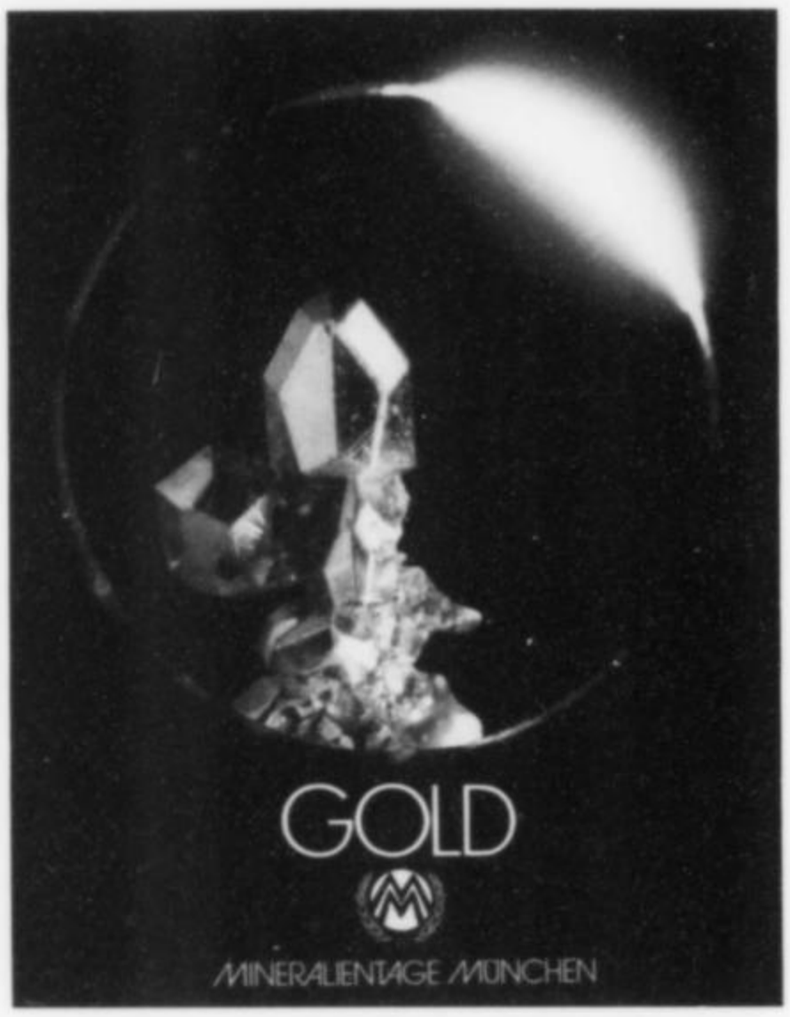
That first big show in 1972 was a bold venture on Keilmann's part because leasing the hall was expensive and the mineral club refused to finance it, although they were willing to see the event promoted as a club function. Determined to go ahead with the plan, Keilmann, Dr. Joseph Clemente and Christian Weise formed a company on June 12, 1972, and each put up 3,000 Deutschmarks in order to finance the show. They made no profit, but they didn't lose money either. The local media, faced with slow news days following the departure of the Olympics, were eager for something to report, so the mineral show was a blessing for them and they gave it extensive coverage. Most of the visitors at the first show in the Messegelände were West Germans, Austrians or Swiss; there were no French visitors and certainly no East German collectors in attendance.

GOING FULL-TIME

In the following two years the show barely broke even; Dr. Clemente resigned from the company after the first year, and Weise left after the second year. But the show grew rapidly in its new location, and eventually the demands of the job exceeded what Keilmann could accomplish on a part-time basis. In 1977, with a wife (nee Hermi Klüh, married Jan. 18, 1969) and three children (Andrea and twins Robert and Christoph) to support, he quit his job with Dyckerhoff and Wittmann so that he could devote full time to managing the Munich Show. This would not have been possible without the remarkable support of close friends, dealers, customers, family members, and the members of the Münchener Mineralienfreunde club. In the beginning the all-volunteer workforce had consisted of Keilmann and his wife, the club members, and a number of personal friends of the family, all unpaid (including the Keilmanns). But once the show had been moved to the Messegelände it became necessary to hire professional workers. Keilmann decided that the dealers and visitors participating in the show deserved professional-level service. The increasing size of the operation also required that students and other temporary help be hired just to set up and dismantle the show. Over the course of 16 years at the Messegelände, the number of hired "helpers" increased from 20 to 80; that number has grown to something like 150 at the present location. The extra help is needed especially during what Keilmann refers to as the "hot phases" of the show: set-up and tear-down. Today the club members who help with the show (including the Keilmanns, of course) are paid, except for those club members who are responsible for club-related projects such as collector showcases, the poster shop, the club promotion booth, and demonstrations. He points out that, when it comes to injury insurance and reimbursement of personal expenses for gas, food, phone use, and so on, all club volunteers enjoy the same benefits as those who are paid.

Johannes and Hermi Keilmann, in traditional Bavarian costumes for the opening of the 1976 Munich Show. John S. White photo.

One has to wonder whether anyone other than Johannes Keilmann could possibly have made the Munich Show the great success which it has become since moving to the Messegelände. His personal skills and talents have made him ideally suited to this task. His ability to *persuade* people to his way of doing things and to push for what he wants is remarkable. He is entirely indefatigable; his energy level is quite unbelievable. Beyond that, his ability to conceive creative special exhibit ideas, and to extend those ideas to their limits, has always been astounding. Whenever he thinks of a new idea, his first reaction is: how can I expand on that, how can I make it even more dramatic, bigger and better? And he is always thinking years ahead, not just about the particular show that is imminent. The special exhibits at the Munich Show have always been more than "special." They have been feasts for the eyes of the mineral and fossil crowd. They have been brilliantly educational and, usually, intellectually challenging. The temporary exhibits at the Munich Show typically surpass in quality what one might see in a major museum where the creation of exhibits took years and the cost was far higher. Part of his motivation is his strong belief that the only way to help the mineral business to continue to prosper is by educating collectors, a primary function of the special exhibits.



1983 Show Catalog: "Gold—Ore of the Sun."

GOING INTERNATIONAL

When Keilmann decided that he wanted to increase the international participation at his shows, he traveled to shows in the U.S., including those in Tucson and Denver, to make new contacts. Through partners and friends such as Ulrich (Uli) Burchard and Herb and Moni Obodda, he met with museum people and collectors who were eager to be part of the Munich experience. Curators he approached included myself while I was at the Smithsonian, Joel Bartsch (Houston Museum of Natural Science), Boris Igdalov (Amber Room, St. Petersburg, Russia) and Gerhard Niedermayr (Naturhistorisches Museum, Vienna, Austria). American dealers who were particularly helpful at the beginning of this globalization effort included Wayne and Dona Leicht, Keith Proctor, Bill Larson and, of course, the Oboddas.

We all have fond memories of the Munich Shows that we have been able to attend. Space does not permit a reminiscence about *every* show that has taken place since 1972, but I will comment on a few that stand out in my mind.

1984 Show Catalog: "Alpine Minerals."

1984 SHOW

I remember especially the 1984 Alpine minerals exhibit (*Schätze der Alpen,* "Treasures of the Alps")—a really brilliant effort. This exhibit represented a special challenge because of all of the different languages, currencies (German mark, Austrian schilling, Italian lira, Swiss and French franc), and border restrictions. It took a lot of time and effort to travel to each of the five Alpine countries to locate potential lenders, negotiate the loans, and arrange the transportation of the borrowed objects. There were also specimens from the Smithsonian Institution and from Herb Obodda. Special problems arose with some of the Swiss *Strahlers*, who had to be persuaded to lend exceptional specimens even though they could not come to the show because they lacked official export papers. Somehow it all came together to create a wonderful exhibit of Alpine minerals. The expenses involved in this special exhibit, as in all subsequent special exhibits, were similar to those for the 1985 show.

1985 Show Catalog: "Tourmaline—Gemstone of the Rainbow."

1985 SHOW

Another of my favorite exhibits from the past was the 1985 celebration of tourmaline. The poster for that show is, in my view, the best that the show has ever produced, and a mounted copy of it graces my office to this day. Much of the credit for the excellence of the tourmaline special exhibit must go to Keilmann's longtime friend, the artist and mineral enthusiast Max Glas (1948–2005). Glas, who began working for Keilmann in 1978, jumped into the effort when tourmaline was proposed as the featured mineral for the 1985 show because tourmaline was his favorite mineral. He

1986 Show Catalog: "Petrified Forests."

1987 Show Catalog: "Agates."

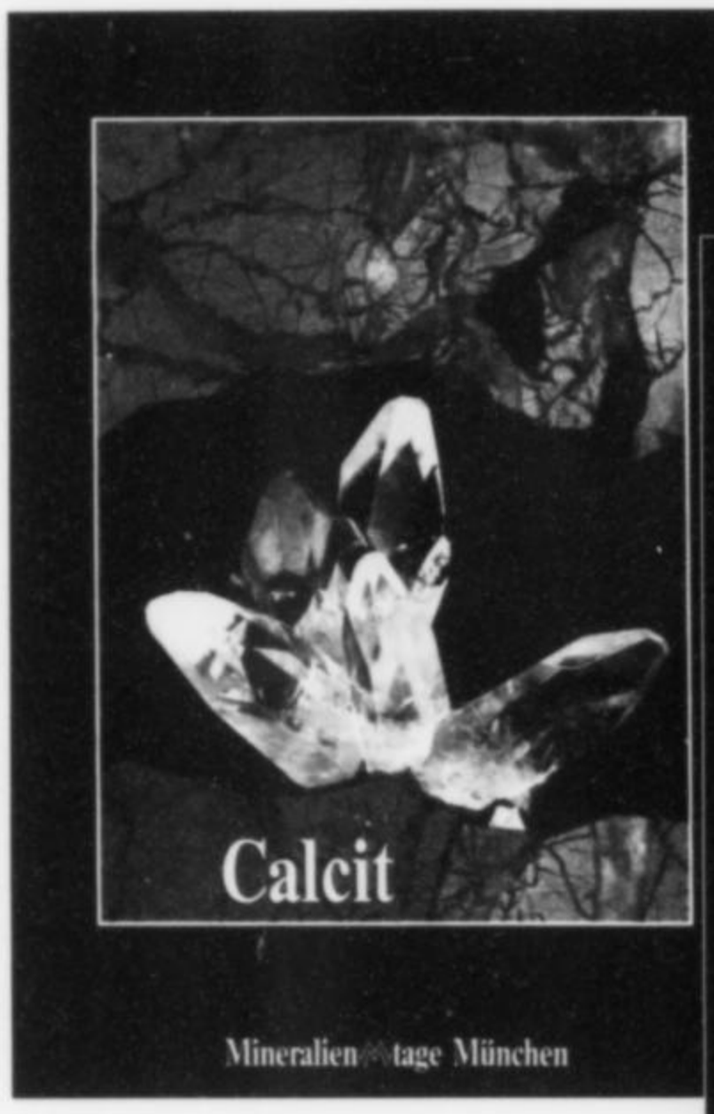
1988 Show Catalog: "Collectors Make History."

discovered a rich collection of large slices of liddicoatite tourmaline from Madagascar privately owned by a Stuttgart physician, Dr. Bernard Wöhrmann. As part of the main exhibit these slices were mounted by chief designer Herbert Kraft in black frames, creating an effect reminiscent of the stained glass windows seen in churches. Keilmann was also able to borrow tourmalines from ten international museums, including the Smithsonian, Harvard University, Florence, Vienna, Idar-Oberstein, Berlin and Munich; from 18 major dealers, mostly Americans or German dealers from Idar-Oberstein; and an amazing 22 private collectors worldwide, including Stan Korfmacher (Redlands, California) and Keith Proctor (Colorado Springs, Colorado), who provided his famous "Rose of Itatiaia" from Minas Gerais, Brazil. For this extraordinary gathering of tourmaline the show had to insure exhibits for a total value of 3.85 million German marks (ca. $1,375,000) covering 675 objects. Another 62,000 marks (ca. $22,000) went into such things as exhibit design, gifts, and travel and accommodation expenses for those who provided specimens.

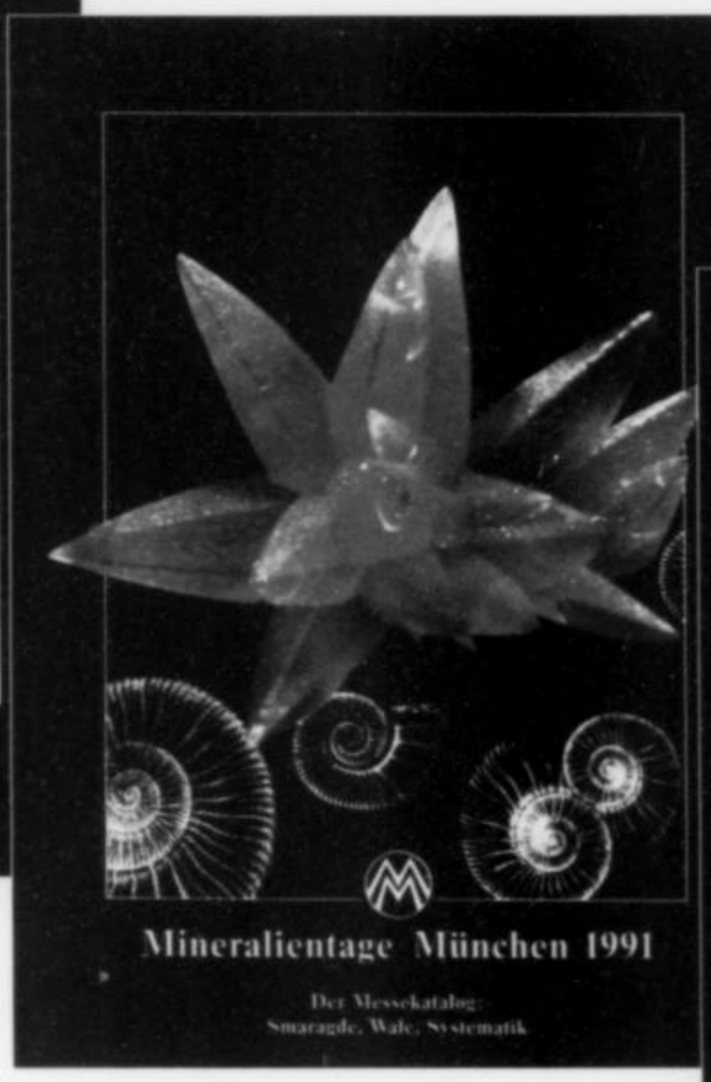
1987 SHOW

I well remember the show in 1987 as well, when agates and the lapidary work of Idar-Oberstein were featured, and an entire antique water-powered lapidary workshop from Idar-Oberstein was recreated on the show floor. How that feat was accomplished is a testament to the determination and resourcefulness of Johannes Keilmann. It all began with Keilmann's regular springtime visit to Idar-Oberstein to collect agates before the ground was covered by new vegetation. While there he heard rumors that the old Bechtel *Schleiferei* ("lapidary workshop") was going to close and that the owners were willing to sell two mounted sandstone wheels that had been used for grinding agates. These items are extremely rare and expensive, and they weigh about 350 kg (770 lbs) each. He bought them immediately and then began to "think/dream" (as he says) about what he might do with them at the Munich Show. It took three more trips to Idar-Oberstein (500 km from Munich) before he could acquire from surrounding villages all that he needed in order to reconstruct a replica of an old lapidary workshop similar to those that were once quite common in the Idar-Oberstein area. Today there is but one *Schleiferei* that is preserved and still functioning as a tourist attraction. He acquired all of the pulleys and belts used to turn the giant grinding wheels, the small square windows typical of these buildings, and even the "lying chairs" that the artisans of old would recline on while holding the agate against the turning wheels.

Additionally Keilmann was fortunate in being able to hire Albert Leyser as a specialist to direct the construction of the mill for the show. Leyser was the owner of the only such workshop using sandstone wheels still operating in the area, and he knew everything about the history and the operation of such mills, so he was up to the job of supervising the assembly of the replica for the show. Keilmann's longtime friend and show decorator Herbert Kraft was the one who sorted out the puzzle of the approximately 500 parts, bringing them all together in the form of an "original Idar-Oberstein workshop from the last century" which was called the Bechtel-Schleiferei. In telling this story Keilmann attributes the successful outcome to a series of "lucky chances," but luck only played a small part. His ability to make an impossible dream a reality through extraordinary personal effort is really what enabled the Bechtel-Schlieferei to be seen by thousands of show visitors. In addition to all of this, the show borrowed some 268 agates from six museums and 16 dealers and private collectors, valued at some 340,000 German marks (ca. $121,550) for insurance purposes. Other expenses including design, accommodations for special exhibitors, gifts, etc. came to nearly 30,000 German marks (ca. $10,700).



1990 Show Catalog: "Calcite—Stone of Life."



1991 Show Catalog: "Emerald of the Upper Tauern."

1993 Show Catalog: "Beautiful Alpine Crystals."

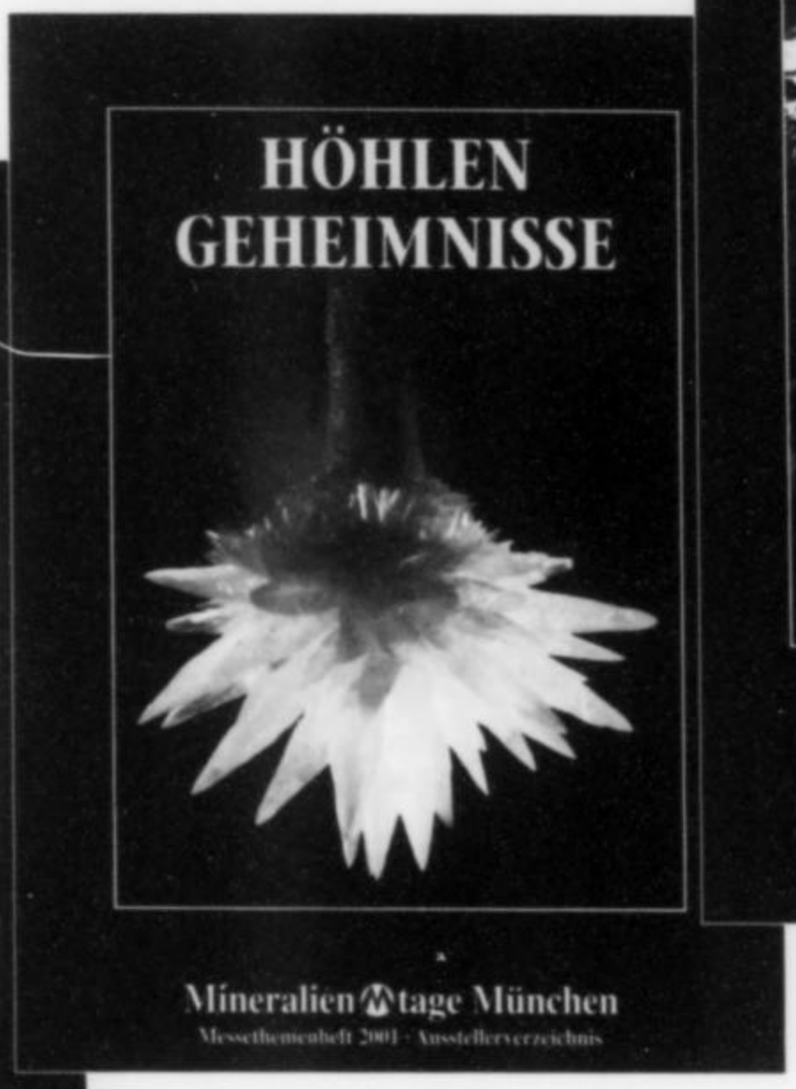
1998 SHOW

It is worth noting that some of Keilmann's special exhibits have been devised purely for fun, without any particular profit motive in mind. This was especially true for his "crazy" idea of memorializing Tucson's now-gone Desert Inn at the 1998 Munich Show by recreating, as best he could, a portion of the motel on the show floor. The Munich Show had just moved from its old location in the Messegelände, where it had been for 25 years, so this exhibit was to be all about bringing something from the past to a new location. He had first-hand experience of the many years when the Desert Inn was the center of all the action before, and sometimes even during, the main show at the Tucson Convention Center: it was the only gathering place in town where dealers and collectors could buy, sell and socialize throughout that period. All of the top mineral dealers stayed there, even though they could not sell from their rooms because the Tucson club forbade pre-show selling by their show dealers. But many of the "second tier" dealers, those who did not have booths at the club's show, had selling rooms at the Desert Inn. Collectors hung out there, wandering the corridors until the last rooms closed very late in the evenings. There were famous all-night poker games, and marguerita-fueled parties. For many years the Desert Inn was the place to go to see minerals and meet with friends until it became rather run-down from neglect and lost its appeal; eventually it was abandoned and finally it was torn down. So, at the Munich Show, Keilmann's great fun would be to try to present a replica of the Desert Inn. In true Keilmann fashion he pursued the idea with remarkable energy. He was able to locate and acquire the original Desert Inn neon sign. He and friends in Tucson went on what they like to call a "dumpster diving" excursion, buying up whatever they could find from the old hotel and, failing that, objects that resembled items from the hotel, including some of the actual chairs, bedspreads and telephones used there. On set-up day he created his own Desert Inn at the Munich Show, with a recreated set of bedrooms, an American-style bar with a jukebox which continually played American music similar to what one would have heard at the bar in the Desert Inn, some typical furniture, a large wall upon which were mounted many images of people from the Desert Inn days, and more. All of this, of course, meant absolutely nothing to most of the Germans who attended the Munich Show, but it was a great bit of nostalgia for those of us who remembered those days, and it represented an amazing effort on the part of Johannes Keilmann, just for a bit of fun.

THE SHOW CATALOG

Since the mid-1980s the show each year has published a superb catalog, really a first-class softcover book. The 88-page "show guide" for 1983 had grown to 304 pages by 2009. The production of this book is also something for which Keilmann has been largely responsible. It is a full-color collection of authoritative articles relating to the special exhibits of the show, written by renowned experts, plus some 40 pages (in 2009) of listings of show dealers and maps of the various exhibit halls. It is produced on high-quality paper, perfect bound and measuring 26 × 20 cm; the 2009 edition weighs two pounds. Just producing this catalog would be more than most of us could accomplish in a year without any other distractions. Fortunately, again, Keilmann was able to find two highly qualified specialists in succession for the immense effort. Max Glas was the editor beginning in 1983, when the special exhibit was GOLD. In 1992 Rainer Bode, publisher and owner of the other major mineral magazine in Germany, *Mineralien Welt*, took over full responsibility for the layout and printing of the catalog—a pressure-packed

1996 Show Catalog: "Gems of Emperors and Kings."



2001 Show Catalog: "Cave Secrets."

2002 Show Catalog: "Crystal Treasures of the Upper Tauern."

responsibility indeed because the deadline was absolute; the catalog *had* to be ready by show time.

GROWTH OF THE SHOW

When the show first moved to the Messegelände in 1972 it occupied Hall 2, one of the smaller halls. Attendance was about 6,000, not including the 152 dealers. In 1983 the show was moved to the larger Hall 16 because of the increasing number of dealers and the inclusion of special exhibits which required far more space than was available in Hall 2. On the occasion of the 25th anniversary of the show in 1988, the last year it was in Hall 16, the mayor of Munich, Georg Kronawitter, spoke at the opening and made it clear how impressed he was with what he saw. The mayor's presence was particularly important in that it greatly enhanced the reputation of the show and resulted in more publicity in the Munich newspapers and on local radio and TV. The show was then moved to Halls 1, 2 and 3. The additional space and the "star stones" special exhibit, which attracted particular interest among the public, brought attendance up to 20,000. By the time of its 30th anniversary in 1993 the show had grown to the point where it occupied five different halls at the Messegelände. Attendance in 2009 totaled 34,700—down 4% from 2008, but far exceeding the attendance of about 20,000 at the 2009 Tucson Gem and Mineral Show. (The combined attendance at all of the various show venues in Tucson in 2009 was around 50,000; the Munich Show has no satellite shows.)

Of course Keilmann could not have produced such shows year after year were it not for his ability to single-mindedly focus on the task. As each show approaches, his level of intensity actually becomes somewhat frightening—his usual warm and friendly manner disappears, his eyes become steely, and his complexion takes on a red color, making one fear that he is on the verge of a heart attack. I must

Munich Show Themes (1983–2010)

1983: Gold—Ore of the Sun
1984: Alpine Minerals (Alpine I)
1985: Tourmaline—Gemstone of the Rainbow
1986: The Petrified Forest
1987: Agates, and the historical Idar-Oberstein workshop
1988: Collectors—Architects of History (25th anniversary show)
1989: Stars in Stones—Stones from Stars
1990: Calcite—Stone of Life
1991: Emerald—Green Treasure of the Upper Tauern (Alpine II)
1992: Rich Ore along the Saxony Silver Route
1993: Beautiful Alpine Crystals (Alpine III)
1994: Opal—Fiery Harlequin
1995: Fluorite—The Collectors' Favorite
1996: Gems of Emperors and Kings
1997: Copper and its Minerals (last show at the Messegelände)
1998: Red and Vivid—The Red Minerals (& Tucson's Desert Inn)
1999: Ammonites and Twins
2000: Diamonds—the Millennium Theme
2001: Cave Secrets
2002: Crystal Treasures of the Upper Tauern (Alpine IV)
2003: Tourmaline & Trilobites
2004: China—Crystals from the Far East
2005: Agate-Dreams—The Hooded Owl
2006: Worldwide Masterpieces
2007: Himalaya—Treasures from the Roof of the World
2008: Australia—Specialities from Down Under, & Excellent Alpine Gold (Alpine V)
2009: India—Hidden Treasures, Archaeopteryx Fossil Park, & Alpine Giants (Alpine VI)
2010: Brazilian Beauties & The *Cristalliers* of Mont Blanc (Alpine VII)

2003 Show Catalog:
"Tourmaline & Trilobites."

2005 Show Catalog:
"Agate Dreams."

2006 Show Catalog:
"Mineral Masterpieces."

2007 Show Catalog:
"Himalayan Treasures."

2009 Show Catalog:
"Hidden Treasures of India."

emphasize that all of this makes perfect sense: the show is huge and it is all Keilmann's responsibility. He attends to virtually every detail even though he has a solid support group of very experienced family members, friends and employees. He is seen everywhere during set-up. He must monitor the installation of the special exhibits, as well as deal with hundreds or even thousands of problems or questions from the hundreds of dealers exhibiting at the show.

The special exhibits always cover far more than just minerals. In another hall there is always a major fossil exhibit, mounted by important museums like the Bavarian State Museum in Munich and the Dinosaur Museum of Kirby Siber in Aathal, Switzerland. Major dinosaur skeletons and/or displays of fossils related to some particular theme are always included. For example, in 1987, in addition to the mineral theme (agates of the world) for which the lapidary workshop from Idar-Oberstein was constructed, there was an ambitious special exhibit about the last Ice Age entitled *Der Eiszeit auf der Spur* ("On the Trail of the Ice Age"), which included original plant and animal fossils from 12,000 years ago, displays showing how the ice reconfigured the topography of the Alpine region, and an exhibit featuring the mammoth fossils of northern

The Keilmann family in 2007 (son Christoph on the left and daughter Andrea and son Robert on the right), at the celebration held to mark the transition in leadership of the show.

Europe. At this past Munich Show (2009) visitors were given a real treat; they were able to see seven of the ten known fossils of the famous archaeopteryx, the "first bird," plus many wonderful dinosaur skeletons, all originals—no casts!

And there are almost always crowd-pleasers such as exhibits featuring mineral-related paintings and artwork, demonstrations of fossil preparation, gold panning, flint-knapping, gemstone cutting, geode splitting (where visitors can buy geodes and have them cracked open on the spot), demonstrations of micromounting, and even wine-tastings. All of these various displays and interactive workshops add to the huge number of details that the planners of the show have to attend to. No object is so large that Keilmann would not consider trying to borrow it for the show. When others would say "impossible," Keilmann would say "why not?" For the 2008 show, which featured Australian minerals, there was an immense rectangular block of tiger-iron from Australia outside of the main entrance to the show. It measured 3 meters tall by 1.5 meters wide, and weighed an impressive 14.5 tons (29,000 lbs). A giant group of quartz crystals from Arkansas weighing 7.5 tons (15,000 lbs) was a prominent feature of the 1982 show.

There are even more details which make this show so special. As the show is preparing to open, all over the city of Munich, Keilmann's organization puts up posters with arrows that help to guide visitors to the show's location. There are celebration dinners near the close of the show. There are awards to be given to exhibitors, and acknowledgements to be made in formal ceremonies.

That it always comes off perfectly is a tribute to the dedication of the Keilmann family, beginning, of course, with the show's founder and major-domo, Johannes Keilmann. We are now witnessing the "passing of the baton" from father to son. One of the twins, Christoph, has been assuming more and more of the responsibility each year and is now the show's manager; he has the advantage of a contemporary education, having majored in Aviation and Space Technology and also Business Administration at Stuttgart University. This makes him well-qualified to bring the show into the computer age. He has developed programs for simplifying dealer registration, making bookkeeping more efficient and transparent, and networking among the various computers within the company. In 2008 he officially replaced his father as chief executive officer (CEO) and he shouldered the responsibility for the fossils portion of the 2009 special exhibits. For the 2010 show (October 29–31), in addition to the fossil exhibits, he will be the planner and organizer for the mineral displays under the theme "Brazilian Beauties."

Johannes Keilmann claims that he is retiring this year at the age of 70. We will see. Long-range planning is always essential in order to pull off these highly complex extravaganzas; show themes are sometimes chosen up to five years in advance, to allow the necessary development time. I have a feeling that Keilmann will at least want to have a hand in the conceptual phase of future shows for some time to come. One way or another, though, you can be certain that this energetic man will keep busy in his "retirement." Like the rest of us, he is a born collector and has enjoyed not only minerals as a hobby but also stamps, coins, books and all kinds of mining-related artwork. Perhaps these will occupy more of his attention, in addition to his other favorite leisure-time activities, such as hiking, mountain biking, downhill skiing and golf—which he began learning in Tucson in 1999 (he says Victor Yount was his pro).

Since its inception the Munich Show has been very much a family affair. If you look at the title page of the latest show catalog you will see that Keilmanns are involved in everything. Management is Christoph, Hermi and Johannes Keilmann. Robert Keilmann is part of the show committee, and Johannes is shown as the editor

Johannes and Hermi Keilmann receiving the gold medal award in 2008 from Manfred Wutzelhofer, CEO of the Munich Fairgrounds complex.

of the show catalog. Additionally, their daughter Andrea and her husband Ingo Schäfer come back to Munich from their home in Cologne every year to help out in the show office. One cannot help wondering how soon Christoph's son Julius (age 3) and Andrea and Ingo's new daughter Emmy (age 1 ½) will be recruited. The hobby of mineral collecting has turned into a lifelong enterprise for the Keilmanns, and those of us who have been fortunate enough to enjoy the Mineralientage München all these years should be profoundly grateful. *Danke schön, Familie Keilmann!*

ACKNOWLEDGMENTS

The text of this article was greatly improved through the editorial skills of Wendell Wilson and Thomas Moore, and I am very grateful for their input.

Bologna Show 2010

by Renato Pagano

[March 26–28, 2010]

A Little History

The Bologna Mineral Show, one of the leading events of this type in Europe, has been held for 39 years (from 1980 to 2008) at the Palazzo dei Congressi, a complex structure on the Bologna fairgrounds, and also in an adjacent pavilion (see July–August 2006, p. 331–335). Although this physical arrangement was less than ideal, the show gained a sound reputation for the quality of its offerings and the efficient hospitality of the organizers. And certainly the attractions of Bologna itself, a city of culture, art and good food, were part of the equation that made this show a preferred early Spring destination for dealers and collectors from Italy and many other countries.

The Palazzo dei Congressi as a show venue had certain inherent shortcomings: difficult access to vehicles, difficult parking, distribution of dealers on various levels of the building (and in an annex), excessive heat build-up in the lower levels where the better dealers were located (with their many high-wattage lamps), and, of course, different rates for the various locations—not to mention a difficult relationship with the owners of the building, who posed restrictions and frequently raised their rates.

The promoters decided to celebrate the 40th edition of the Show by moving it to a new, more convenient location outside the downtown Bologna area, at the Castenaso Nasicae Event Park. Parking is easier there and the dealer booths could all be on the same level. This rather rural location had most of the necessary features, but some problems nevertheless emerged: there were power failures caused by the high use of lamps by many dealers, exceeding the facility's electrical capacity, and unpaved parking lots became muddy in the rain (and rain it did in March 2009!). Also, restrooms were not conveniently located.

The Show still proved successful for most of the dealers, as visitors had no problem finding the new location, but the show promoters decided to move to yet another location in 2010.

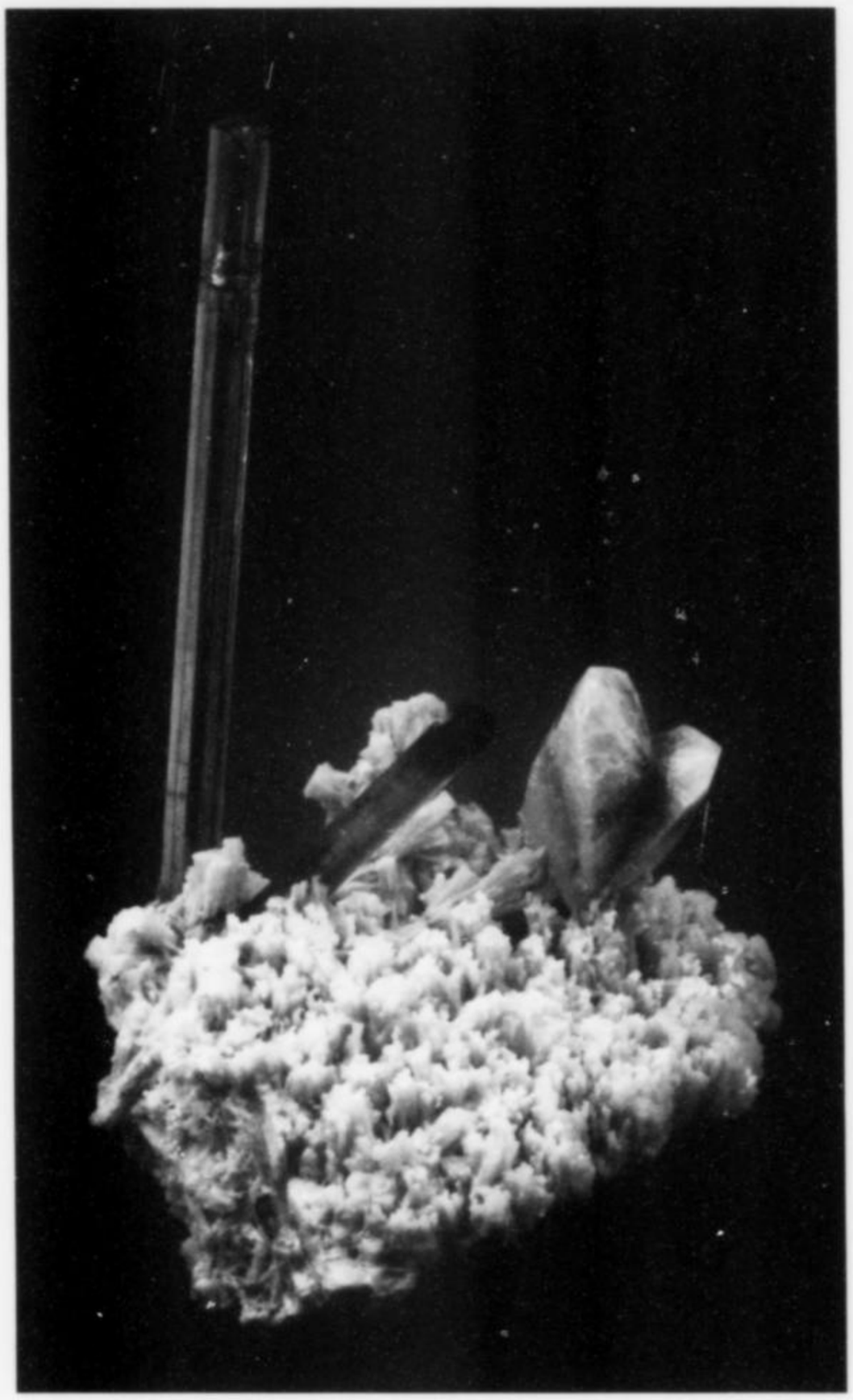
The New Location

The 41st Bologna Mineral Show was held at the *Futurshow Complex* in Casalecchio, about 16 km (10 miles) from the original location. This is a multi-purpose building designed to accommodate various types of events: it can host basketball and volleyball games, with about 12,500 seats for spectators. Or the seating area can be expanded to a capacity of about 18,000 for concerts. When the seats are retracted, the large and impressive arena, about 30 meters high, can be used for exhibitions. The facility is well equipped with coffee shops, restrooms etc.

The Futurshow location is connected to downtown Bologna by convenient public transportation, has parking space for 3000 vehicles, and is very close to shopping malls, restaurants and lodging that ranges from deluxe hotels to nice countryside inns. Visitors can sample the typical homemade tortellini and wash down the famous Bologna cold cuts with pleasant local wines.

Figure 1. **Bologna Show floor at the Futurshow Complex in Casalecchio. Matteo Chinellato photo.**

Figure 2. **Elbaite crystals to 6 cm, with hydroxylherderite on lepidolite. Pederneira mine, Minas Gerais, Brazil. Emanuele Marini specimen, ex Clara and Steve Smale collection. Roberto Appiani photo.**



The Mineral Show was neatly arranged in rational rows in the arena. In an adjacent area a smaller show, the 7th Bijoux Expo (jewelry, lapidary equipment etc.), which in the past was held elsewhere and at different dates, was open to the public at no extra cost.

Special Exhibits

Various initiatives and special exhibits complemented the Mineral Show. Among the most interesting was the exhibition dedicated to the minerals of the Carrara marble. Several cases presented a generous selection of specimens from the collections of the Milano Natural History Museum, collector Armando Del Taglia, and the show's principal organizer, Maurizio Varoli. This was easily the most impressive assembly of Carrara specimens ever exhibited in one place. Most of the Carrara minerals are in the form of small crystals, which can be difficult for showgoers to fully appreciate; so in order to help show the beauty of the delicate crystals of wurtzite, sphalerite, colusite, sulvanite, rutile, quartz, tetrahedrite and many other species, excellent photos by Roberto Appiani and Matteo Chinellato were shown in sequence on the large overhead screens above the exhibition area.

Two display cases devoted to fluorescence were organized by Guido Mazzoleni, a professional geologist and an avid collector of fluorescent minerals. Mazzoleni also debuted his new book *Luminescenza nel mondo minerale* ("Luminescence in the Mineral World"), lavishly illustrated with photos by Roberto Appiani. This is the first book in Italian on the subject of fluorescence (and one of very few in any language); an English edition is planned for the near future (for information: guido.mazzoleni@unimi.it).

Quite appropriately, another case next to the Mazzoleni display dealt with the Bolognian stones: nodules of barite that used to be found, and still can be found sparingly, in the hills around the city. In 1602 a local cobbler, Vincenzo Casciarolo, who practiced alchemy in his spare time, collected some nodules, with the idea that, being very heavy, they could be turned into gold. He ground some of them and calcined them with charcoal. Of course no gold was obtained, but the resulting cakes had the property of absorbing the sunlight and becoming phosphorescent in the dark. Now we know that he was producing barium sulfide, certainly the first phos-

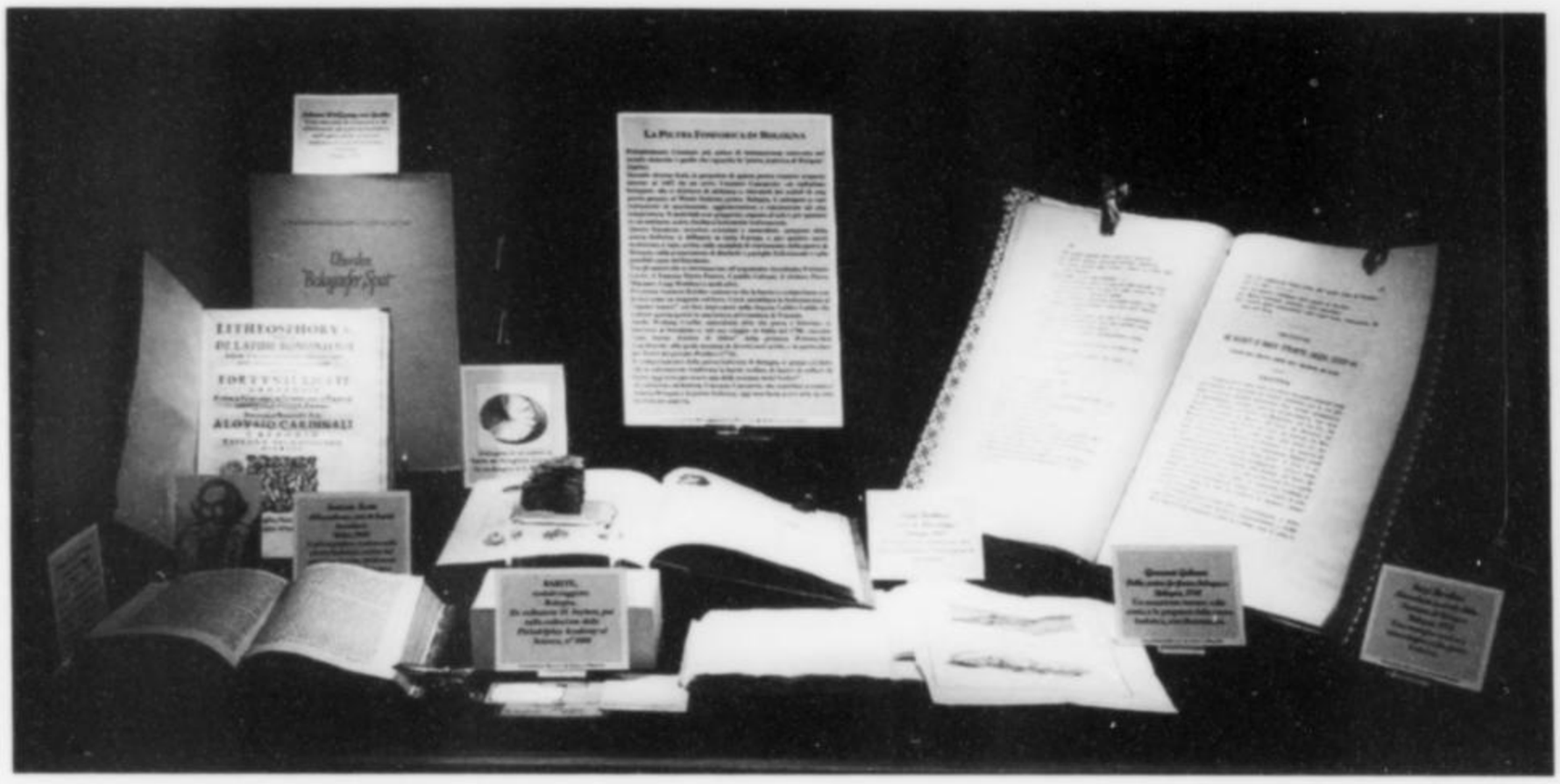


Figure 3. **Historical-theme exhibit case devoted to "Bologna stones" (barite) from the Bologna area. A barite specimen from the Henry Seybert collection (formerly in the collection of the Academy of Natural Sciences in Philadelphia) is included. Renato Pagano collection; Matteo Chinellato photo.**

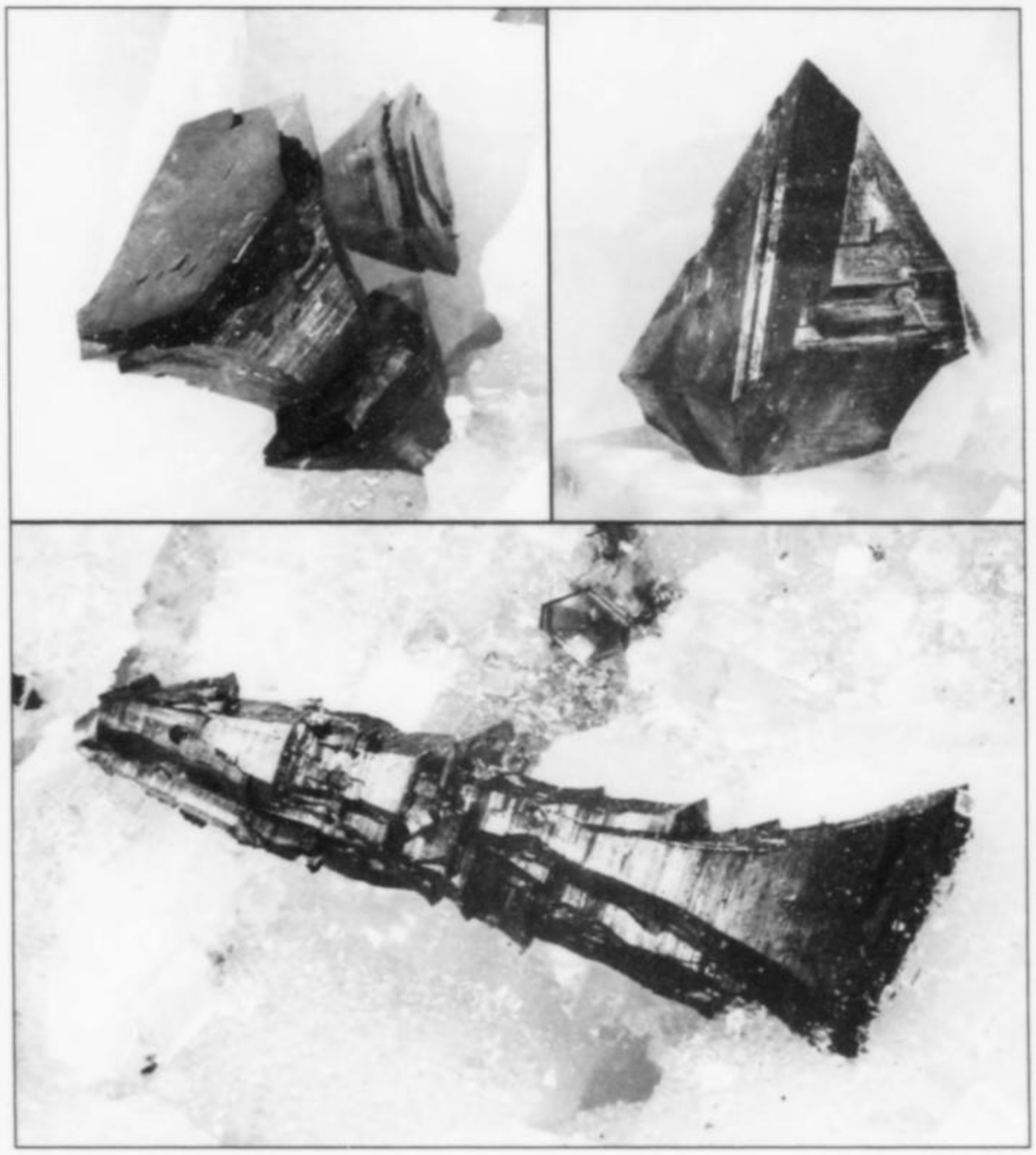


Figure 4. **Crystals of wurtzite (upper left, 6.8 mm, and below, 7.3 mm) and sphalerite (3.2 mm) from the Carrara marble quarry. Maurizio Varoli collection; Matteo Chinellato photos.**

Figure 5. **Orthoclase crystal cluster, 3.9 cm, from Cuasso al Monte, Varese, Italy. Emanuele Marini collection; Roberto Appiani photo.**

phorescent mineral known to man. Casciarolo's discovery triggered four centuries of discussion and publications on this phenomenon. Interested readers may contact the writer, at renpagan@gmail.com for more information on this fascinating and little-known chapter in the history of mineralogy.

A national competition for mineral and fossil drawing, limited to elementary and junior high school entrants, produced some nice and at times surprising works. The winning entries were exhibited at the Show, along with the prize winners of a mineral and fossil photo contest.

Finally, a focal point of the Show was an intriguing sculpture by artist Antonio Canova (1757–1822), said to have been presented to professor Teodoro Monticelli, and on loan from the University of Naples: the head of a satyr, carved out of an 11-cm block of Carrara marble, with a quartz crystal left in place and appearing as a fang protruding from his (its?) mouth.

Dealers

The most prominent dealers were located in booths along one side of the area. Riccardo Prato (*Pregi Gemme Srl*) had a row of several cases of outstanding aquamarine crystals from the Erongo Mountains in Namibia, along with his regular offerings of wonderful Pakistani and Afghani pegmatite minerals. German dealer Jürgen Margraaf also had a nice selection of Erongo minerals for sale.

Marco Tironi exhibited a few large, exceptional specimens, one of which kept me hypnotized for several minutes. Gwindel quartz crystals from the Alps are always a desirable catch for most collectors, especially if they are on matrix. But how about a 24 × 30-cm

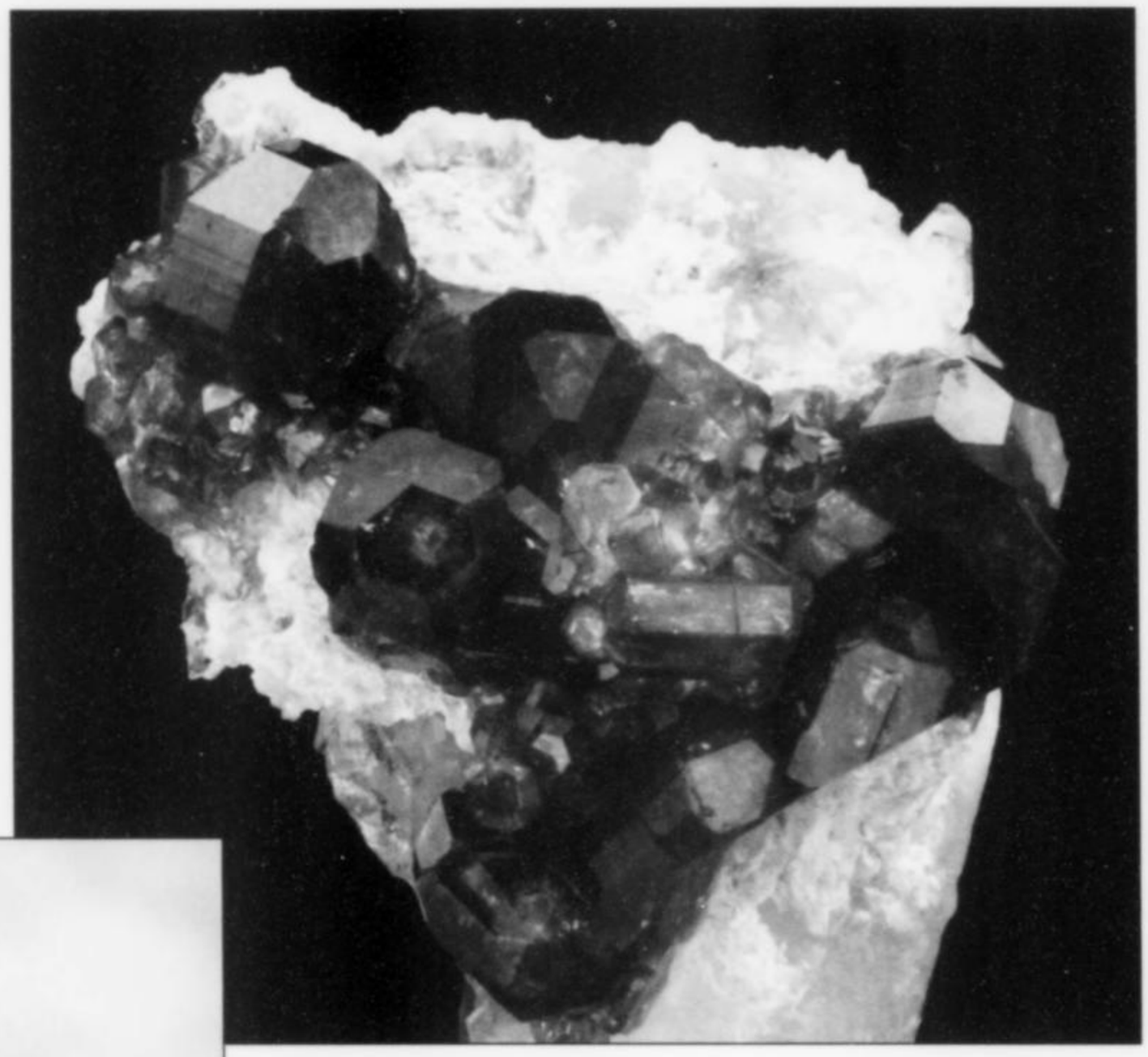
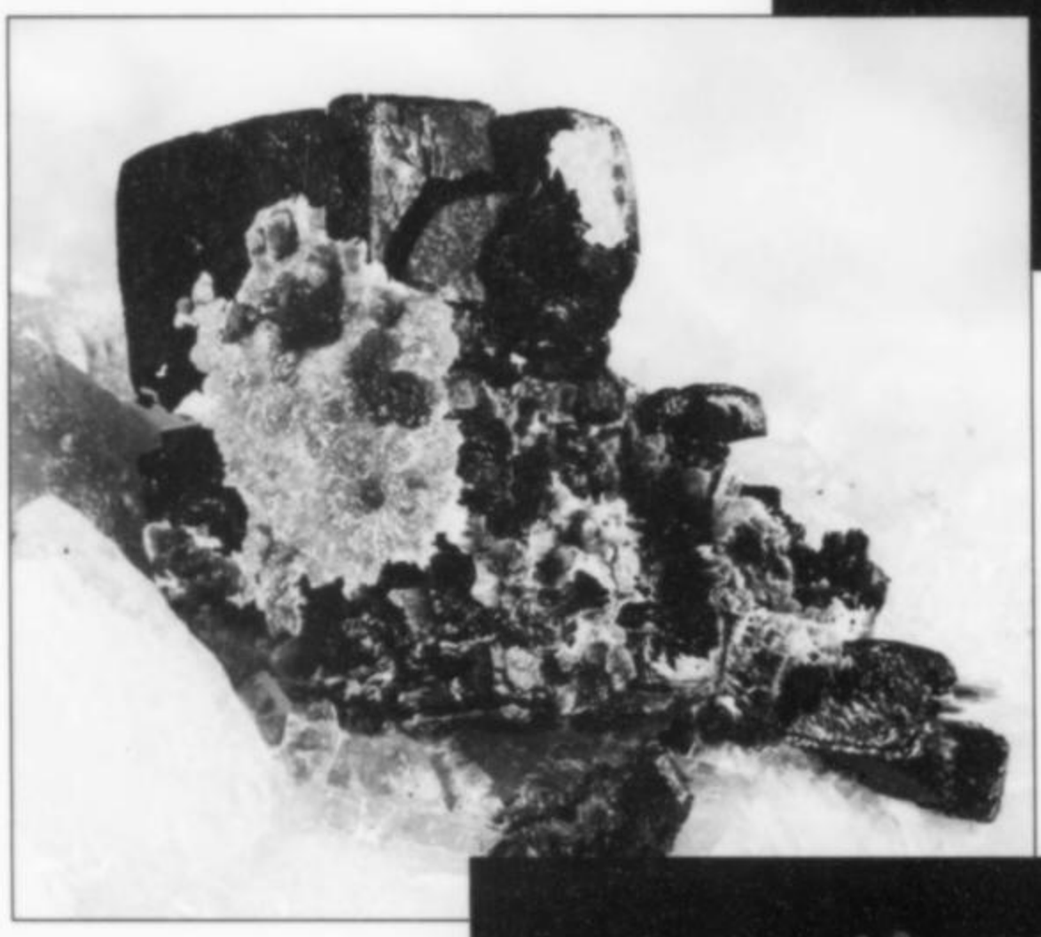


Figure 6. **Blue fluorapatite crystals to 1.4 cm on quartz, from the Paraiba mine, Peixoto de Ajevedo, Mato Grosso, Brazil. Emanuele Marini collection; Roberto Appiani photo.**

Figure 7. **Sulvanite crystal cluster, 1 cm, with volborthite, from the Val Bona marble quarry, Carrara. Maurizio Varoli collection; Matteo Chinellato photo.**



matrix specimen with six major gwindels, all of large size, up to 7 × 7 cm? The locality is the Zinggenstock, Grimsel, Switzerland. Another impressive specimen was a 130-kg block of albite on which rested a 24 × 60-cm crystal of smoky quartz from the Navegadora mine, Conselheiro Pena, Minas Gerais, Brazil—a locality well known for its fine spessartine crystals.

French dealers Claudette and Michel Cabrol (*Merveilles de la Terre* in Grenoble), frequent exhibitors at the main Italian shows, are well known for their tasteful displays of colorful minerals. They

Figure 8. **The booth of Claudette and Michel Cabral's Merveilles de la Terre company. Renato Pagano photo.**

are also very nice people to talk to—but, during the conversation they keep an eye on their closed-circuit TV surveillance equipment monitoring their stand. Shoplifters beware!

Lugi Piasco, a dealer from Milan, had a fine selection of the new Madagascar andradites (demantoids and topazolites) described by Federico Pezzotta in the May–June 2010 issue, and attractive pink and green tourmalines from Paprok.

Mateen Zafar, an Afghani now living in Holland, had some very attractive crystals of tourmaline from the Laghman area, Afghanistan: about 10 to 15 cm long, with unusual pale pink and blue colors.

Some surprising green quartz ("prase") specimens recently collected at Rio Marina on the Island of Elba were offered by Maurizio Prati, one of the most active Italian field collectors. Prati is generally known by the nickname "Scheggia," a term for a chip that flies away at high speed when a rock is struck with a hammer. This nickname well reflects Maurizio's modus operandi when he can get his hands on a good outcrop, like that of the Elba prase.

The Future

After 40 years the Bologna Show has made a successful transition from its traditional location to new and better quarters at the Futurshow complex where there is plenty of room for future growth. So we can look forward to the continuing success of the Bologna Show and to its positive future as one of the major European mineral events.

Figure 9. **The impressive façade of the Geological Museum of China in Beijing, where the first-ever "Mineral Treasures of the World" exhibition was held. Tom Gressman photo.**

Beijing Exhibition 2010

by Tom Gressman

[May 28–July 18]

The "Mineral Treasures of the World" exhibition, the first of its kind for China, was held in Beijing at the Geological Museum of China. The event, sponsored jointly by the Museum and Collector's Edge Minerals dealership in Golden, Colorado, was timed to coincide with the 2010 World's Fair in Shanghai. Collector's Edge displayed over 100 "world-class" mineral specimens valued at over $10 million, and an estimated 10,000 visitors toured the exhibition during its 51-day run.

The opening ceremonies on May 28 included Bryan Lees' presentation of a Sweet Home mine rhodochrosite specimen as a gift to the Geological Museum of China. Government and museum officials, along with Chinese television media, were present. Dr. Jia Yueming, Director of the Geological Museum of China, stated:

> This event is a first for the Museum, introducing an international exhibition aimed at presenting advanced Western concepts and methods to the general public. It was conceived in the spirit of international relations and to foster the business, avocation and academic study of mineral collecting. The exhibition demonstrates both the popularity of minerals and of the study of mineralogy, providing visitors with an understanding of the economic value of mineral resources while also giving proper attention to their aesthetic, cultural, social, and historical value, and the promotion of the rational development of mineral resources and their effective use. The exhibition will be for the domestic [Chinese] collectors, earth sciences enthusiasts and professionals, and promises to provide a sumptuous visual and cultural feast.

Visitors to the exhibition were greeted, just inside the entrance, by four aesthetic cabinet specimens in individual glass cases: a rhodochrosite from the Sweet Home mine, Colorado; a green fluorite from Riemvasmaak, South Africa; a native gold from the Eagle's Nest mine, California; and an amethyst crystal group from the Anahi mine, Bolivia. From there the sequence of showcases was set out in a horseshoe-shaped layout, leading visitors through a series of instructional displays. Each showcase was highlighted by extremely fine specimens meant to epitomize connoisseurship in the Western style. Adjacent to each case was a wall-mounted poster listing the criteria by which mineral specimens are evaluated in the West. This unfolding set of criteria was designed to bring the Chinese visitor and collector into the culture of Western collecting.

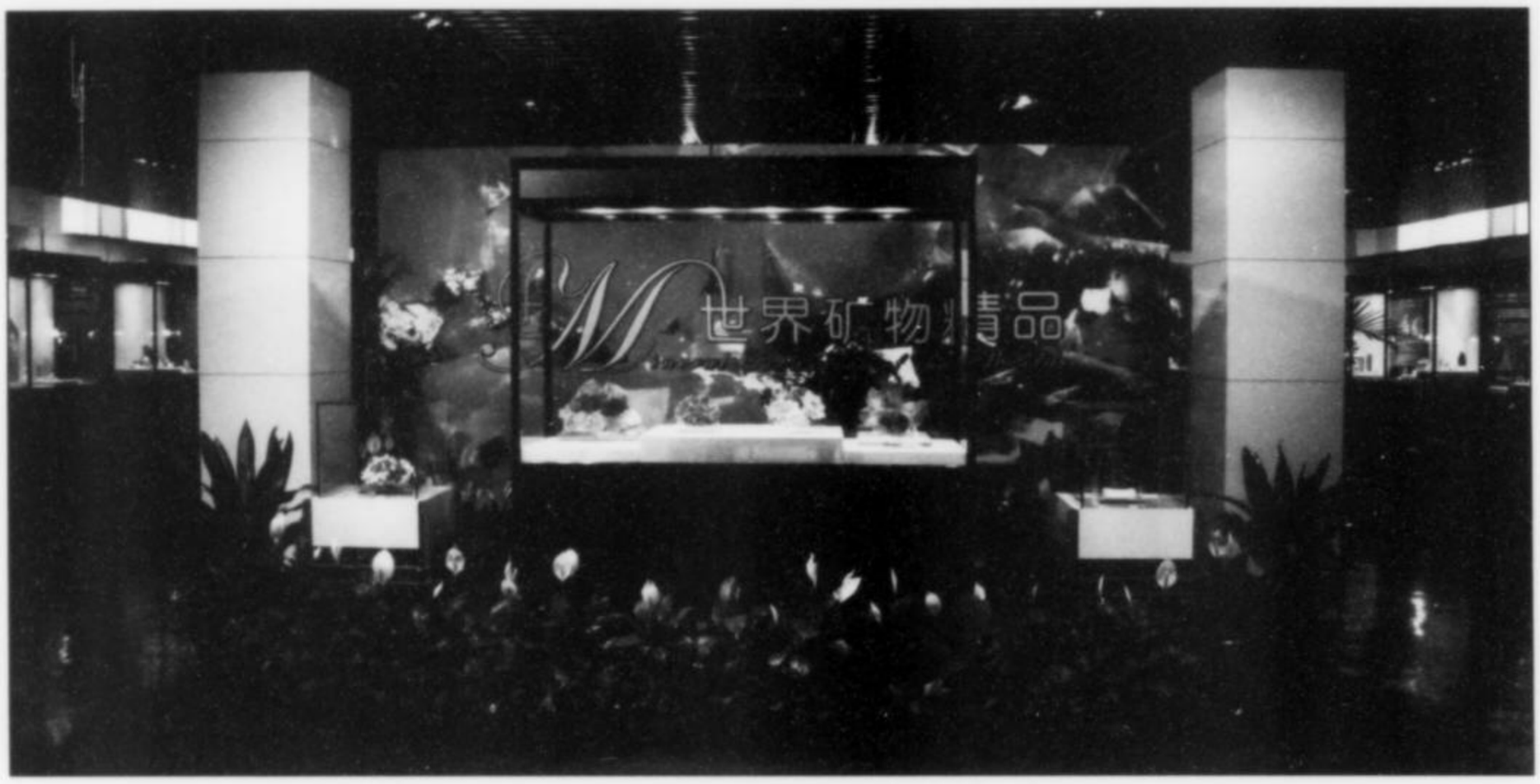


Figure 10. **Main-entrance showcases in the Beijing exhibition. Tom Gressman photo.**

Figure 11. **Visitors to the Beijing exhibition examining crystals of spodumene and beryl. Tom Gressman photo.**

A panel of five Chinese experts carefully translated into Chinese the English-language specimen labels and instructional texts, to make sure that no information was lost or distorted.

Nine basic criteria were presented, with text conceived and written by Steve Behling of Collector's Edge:

(1) Aesthetic appeal
(2) Color
(3) High luster and freedom from damage
(4) Transparency or translucency
(5) Sharp crystal form
(6) Large crystal size
(7) Rarity
(8) Durability
(9) Provenance

Each criterion was defined and explained. For example, the "aesthetics" criterion included explanations of the importance of a "focal point"—large isolated crystals that are positioned near the center of the specimen. It also included the idea that crystals and crystal groups should have "drama," that is, the crystal(s) should be standing up rather than lying flat on the matrix. A distinct color contrast between the primary crystals and the rock matrix also adds to the aesthetic appeal of a specimen. Specimens should have pleasing sculptural shapes, and ideally should have a length-to-width relationship approximating the "golden ratio" (1 to 1.618). This ratio, also know as the "golden mean" and the "golden section," has been known since ancient times to carry a strong appeal to the human mind, and it was interesting to see it publicly acknowledged as a factor in the evaluation of mineral specimens.

Each of the nine criteria was explained in a similar way, with photos of well-known world-class specimens as examples, both on the posters and inside each display case. There was also a video documentary playing continuously on a monitor (with the audio portion in Mandarin Chinese) showing how mining specifically for mineral specimens has proven successful at localities like the Sweet Home mine. Wall posters and video segments also showed

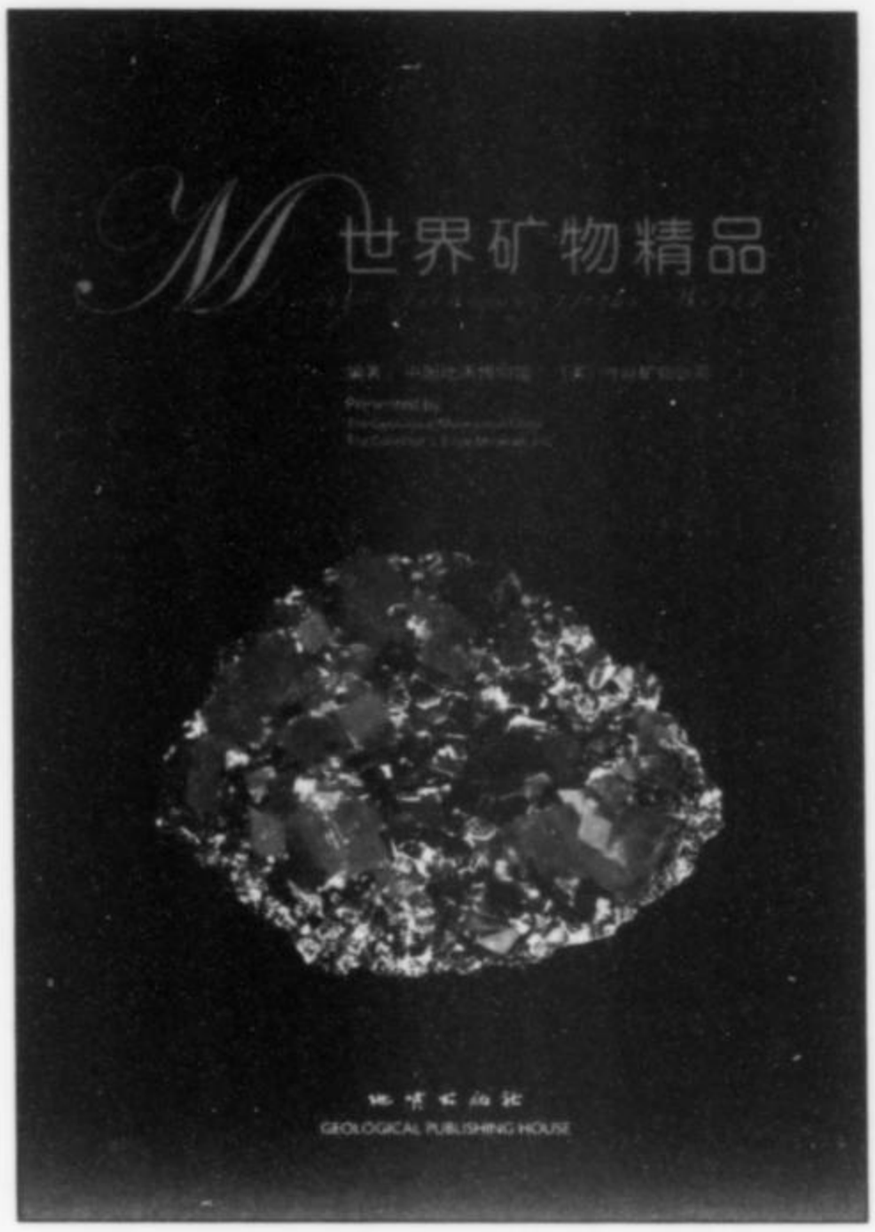


Figure 12. **Cover of the 125-page hardbound exhibition catalog, with 90 color photos of specimens on exhibit, plus other specimens, localities, etc., accompanied by parallel text in Chinese and English.**

the mineral preparation laboratory at Collector's Edge, illustrating the complex processes of careful cleaning and trimming.

Among the most important educational aspects of this exposition was showing the Chinese public that mineral crystal specimens are naturally occurring, not man-made, objects. Like many well-educated people in the U.S., many of the Chinese visitors had not realized that such immensely beautiful natural objects exist. (Actually, come to think of it, this exhibition would be of value and interest in the U.S. and Europe as well, perhaps in the venue of an art museum where it would reach a broader segment of the population.)

One major purpose of the exhibition was to encourage private collecting of minerals in China, and thus to create a market for fine specimens there. The approach was clearly having an effect, as a number of visitors expressed interest in purchasing specimens from the displays. All specimens on display were available for purchase, and some were indeed sold before the close of the exhibition.

Collector's Edge surveyed approximately 150 visitors at the exposition every day, of whom about 10% turned out already to be mineral collectors—a surprising figure until you remember that the Chinese have long collected "scholar's stones," natural free-form rock specimens with sculptural shapes. Many other Chinese people collect what we would call "decorator" specimens, not only for aesthetic reasons but for the purpose of protecting their homes from "bad spirits." Such collectors, it is hoped, will see the beauty and order of fine *crystallized* mineral specimens as a natural extension of the "scholar's stones" concept, and will become equally interested in Western-style aesthetic mineral collecting. This event introducing Western collecting concepts is probably a first in China. Already at least four other museums in China have expressed interest in hosting a similar exhibition.

Complementing the exhibition is a 125-page hardcover book with parallel text in English and Chinese, created jointly by the Geological Museum of China and Collector's Edge Minerals. The book mirrors the exhibits, with photos of each of the specimens displayed as well as text about specimen mining, laboratory trimming and cleaning, criteria for judging fine minerals, worldwide market trends, and how to get started as a mineral collector. In the "getting started" chapter there is discussion of the concept of building a collection of fine minerals as a method of storing wealth. The book is a primer on how to identify and purchase world-class minerals for pleasure and for wealth preservation.

Why was Beijing chosen for this historic exhibition? Besides being the seat of China's central government, this city of over 17 million people is highly prosperous, reflecting the remarkable growth in China's gross national product in recent years. Beijing is home to over 100 universities, and has an affluent and well-educated middle class. The Geological Museum of China is connected to a bureaucracy analogous to the Bureau of Land Management in the U.S.; consequently the "Mineral Treasures of the World" exhibit in Beijing may help to inspire the preservation of specimens in the extensive working mines of China.

With China's total population pushing 1.3 billion people, combined with a rapidly rising standard of living and a pre-existing cultural appreciation of natural beauty, China has the potential to become a leading market for collector-quality mineral specimens. So be forewarned: if even a tiny percentage of the Chinese citizenry turns into avid mineral collectors, fine mineral specimens will become even scarcer and more expensive on the Western market in years to come. If that happens, it may be said that it all began with the Beijing mineral exposition of 2010.

San Francisco Show 2010

by Thomas Moore

[July 9–11]

The second edition of Dave Waisman's San Francisco Fine Mineral Show, like the first edition last year, was held in an Embassy Suites hotel not, actually, in San Francisco but in San Rafael, in Marin County—over the Golden Gate Bridge and north of town a few miles on Route 101. Since this was your faithful reporter's first visit to San Francisco, I found it a bit hard to leave that splendid city behind even for two short days, *even* to make it to a mineral show. But it turned out to be a fine idea—hereby strongly recommended—to combine a mineral show experience with a few aching-feet days spent snooping about in the city's cool, livable, distinctive spaces. The sensory joys of San Francisco include blocks of rowhouses all given over to soft California pastels; roller-coaster-like streets with harlequin streetcars dipping and rising; old Spanish churches, *faux*-countercultural smoke shops, sleek outdoor cafes, ruthless skyscrapers; the huge farmers' market hard by the Embarcadero, with shellfish and garlic and ginger smells, and strawberries the size of tennis balls reposing in prickly heaps; long, lazy parklands with curving drives and war monuments and

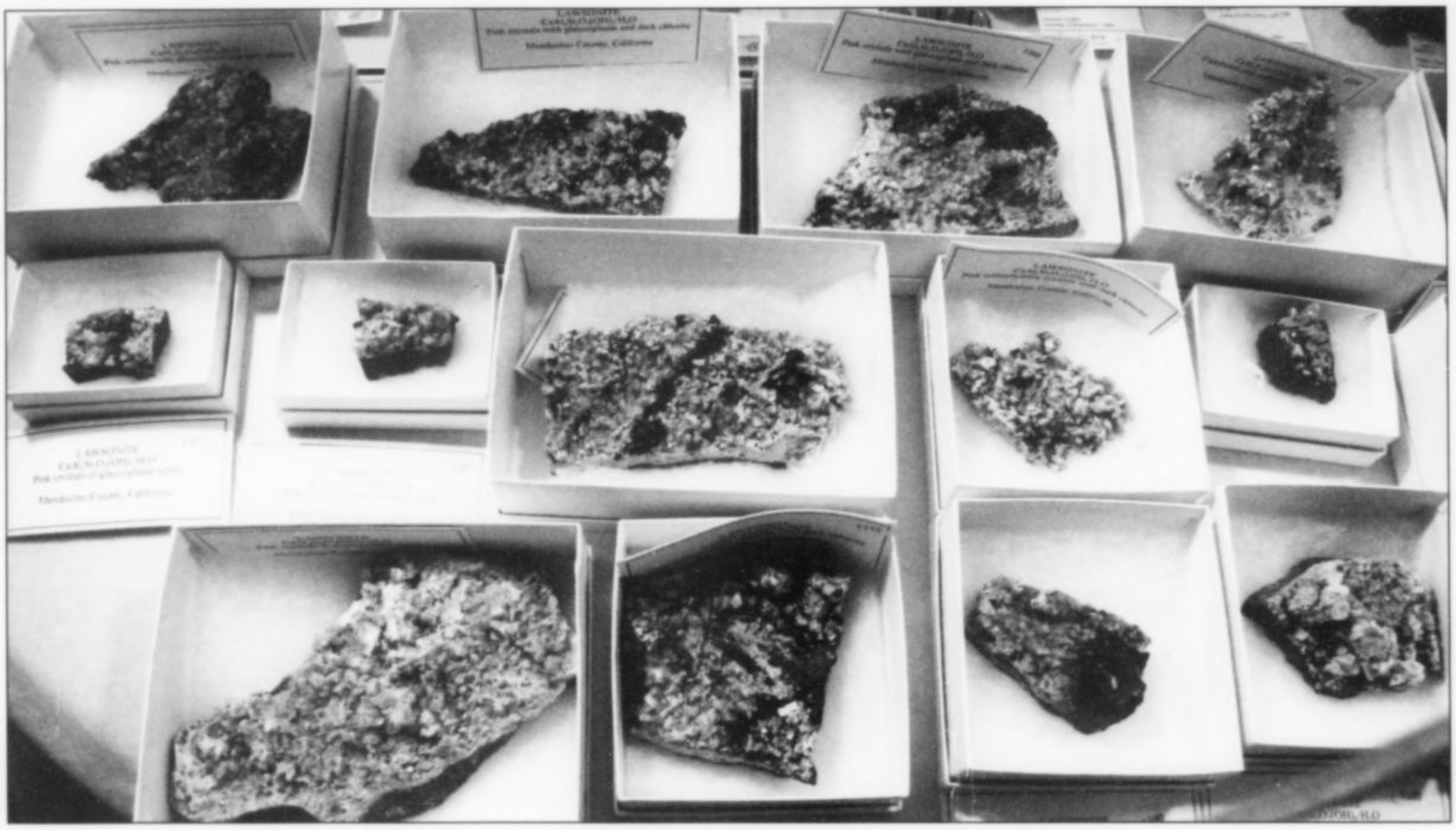


Figure 13. **Lawsonite specimens from "Mendocino County, California" for sale by Clive Matson (*Cascade Scepters*). Tom Moore photo.**

museums; wind-bent pines on cliffs looking out on the Bay, and the great orange towers of the Golden Gate Bridge topped by clouds of mist until well past noon; and everywhere People Of Many Lands—all this graceful cosmopolitanism awash in breezes just in off the boundless unfathomable Pacific.

Oh yes, about that mineral show . . .

Dave Waisman these days runs three small annual shows which are mainly for "serious" mineral collectors, with 30 or 40 mostly high-end dealers in elegant hotel settings. The general public, though, is welcomed, indeed is admitted free. Dave's Westward Look Show in Tucson each February is well-known, but there is also his spring show in Houston (see the report on Houston 2009 in our July–August 2009 issue), and finally there is San Francisco (=San Rafael), the smallest and newest of the trio. Like Houston, and like its forerunner in Dallas (see our July–August 2008 issue), the San Francisco Show takes place in an Embassy Suites hotel, with rising tiers of rooms all opening on a central, amphitheatric space, with a ground-floor courtyard featuring ponds for swans and giant goldfish, a restaurant, a bar (Happy Hour at 5:30 for dealers!), a swimming pool, a gym, and sprawling lounge areas. The most striking difference between Houston and San Rafael is that the Embassy Suites in the latter is about three times larger. This meant that the 32 open dealers' rooms seemed somewhat lost amid all the unmineralized spaces but, on the positive side, there is almost unlimited room for expansion in the future.

There seems every reason to anticipate such expansion. Dave says, as did the dealers I talked to, that this year's turnout of visitors was *much* higher than last year's, with people, including whole families, coming from all over California and from parts of two or three adjacent states. There were plenty of eager children and teenagers, many expectantly bearing shopping bags and backpacks. And guests overnighting for other reasons in the hotel wandered into and out of the rooms as well; these innocent wayfarers sometimes inquired of dealers, "Now, did you quarry all of these rocks *yourself*?" (as I overheard one say). Some of them indeed left with lustrous new acquisitions. Meanwhile the likes of Cal Graeber, Bill Larson, Dave Bunk, Evan Jones, etc., and many of their usual customers, went on about their business, just as at Tucson or Denver. We should hope that this fledgling show thrives—for why shouldn't mega-civilized San Francisco (not to speak of mega-affluent Marin County) become a minor Mecca for mineral collectors each year?

That sentiment stated, it's nice to begin the what's-new survey with a description of something from a place in Mendocino County—not too many miles north of San Rafael. For some years now, at an as-yet unspecified digging site in high-grade metamorphic rocks, Clive Matson has been taking out specimens showing very good crystals of **lawsonite**, and he and his eager 10-year-old son brought about 20 miniature to small cabinet-size pieces to the Embassy Suites room of *Cascade Scepters*. The rare Ca-Al silicate species is totally California; described in 1895 from its type locality on the Tiburon Peninsula, Marin County, lawsonite has not since been found in noteworthy crystal specimens anywhere else in the world. An old hoard of lawsonite specimens was released to the market in 2004, and appeared at that year's Tucson Show (see my Tucson report in May–June 2004)—but whereas the "old" Marin County lawsonite is blue-white to medium blue, the "new" Mendocino County lawsonite is brownish pink with hints of lilac, occurring as sharp, blocky crystals to 1.5 cm, resembling orthoclase or microcline. Moreover the crystals show a nice vitreous luster, and a few even have tiny gemmy areas. The crystals line seams in a hard, dark glaucophane schist from which the original calcite seam-fillings have been dissolved away. Most of the Matsons' lawsonite specimens were unpriced when I saw them, but you can make inquiries through the *Cascade Scepters* dealership (www.cascadescepters.com).

In the same room, Joe George of *Cascade Scepters* was offering hundreds of attractive, mostly loose crystals of **chlorite-included quartz** from a find in May 2010 in the Majuba Mountains, Persh-

ing County, Nevada. Most of the lustrous, colorless, transparent, prismatic crystals, from around 5 cm to more than 35 cm long, have just one termination, but a few have two; some bristling cabinet-size crystal clusters were also on hand. Most distinctively, the quartz crystals show multiple phantoms *en echelon*, sharply outlined by fine-grained, ghost-green inclusions of chlorite—recalling quartz specimens found most abundantly during the early 1970s at Shingle Springs, El Dorado County, California.

Evan Jones (evanabbottjones@gmail.com) has a new lot of **azurite** specimens from the Milpillas mine, Cuitaca, Sonora, Mexico, which probably are the best found to date at this red-hot (in more ways than one) locality just south of the Arizona line—see the article in our Mexico IV (November–December 2008) issue. Found in the spring of 2010, the specimens show blocky azurite crystals to 4 cm in stacks and subparallel "crests," some on splotchy gray and red, altered andesite matrix; the crystal groups, with and without matrix, reach 15 cm across. The crystals are azure-blue to almost black, and as vividly lustrous as any yet from the Milpillas mine: the exuberant color and flash come actually from very thin skins of a second generation of azurite covering malachite pseudomorphs after earlier crystals (again, check this out in the article in Mexico IV). Also, since February 2010 the Milpillas mine has turned out what may be the world's finest **brochantite** specimens, with lustrous, lushly deep green, thin-prismatic crystals to 5 cm in masses and matted aggregates to 30 cm across. Evan Jones had just one specimen of the brochantite in San Rafael; the best pieces from the find are now with Wayne Thompson, and they are strikingly attractive.

In the late 1980s, outstanding single and V-twinned crystals of gemmy pale brown **diaspore** began to reach the international market; various localities have appeared on labels, but generally the specimens come from an emery-mining region between the towns of Aydin and Muğla in southwestern Turkey, inland from the ruins of ancient Ionian Greek cities (e.g. Ephesus). Turkish diaspore specimens have never quite stopped trickling out during the past 20 years—the Turks, who call the material "zultanite," hoard the crystals to sell as gemstock—and Leonard Himes (LeonardHimes@aol.com) of the *Graeber & Himes* dealership now has about 25 superb specimens which were mined at intervals over the last four years. The loose V-twins seen in the *Graeber & Himes* room at San Rafael are highly lustrous and mostly gemmy, pale brown to yellow-brown with some purplish highlights, in sizes ranging from 3 cm to an amazing 13.75 cm from wingtip to wingtip. One crystal "wing" of one twin shows complex terminal faces, but the other crystals all end, typically, in splinters and feathers.

Just one shelf down from the diaspores at *Graeber & Himes* was a handful of truly magnificent **fluorite** specimens collected between June and August 2009 and in the spring of 2010 in the "rat tail" pocket—which is to say, Jesse Fisher explained, the "tail end" of the earlier "rat hole" pocket—in the Rogerley mine, Weardale, Durham, England. The fluorite cubes, to 3 cm on edge, in the crystal groups are untwinned, which sets them apart from earlier Rogerley mine specimens nearly all of which show penetration-twinned cubes. The new "rat tail" clusters, as gorgeously gemmy green and daylight-fluorescent purplish as you could wish, reach 17 cm. For more on the Rogerley mine, see our recent supplement *Classic Minerals of Northern England*; you may chase after specimens by contacting *UK Mining Ventures* (www.ukminingventures.com).

A fellow named Jaimeen in the Embassy Suites room of Steve Ulatowski's *New Era Gems* (www.neweragems.com) was showing off hundreds of little, loose, blue and green, quite splendidly gemmy crystals from the famed Merelani mines, Arusha, Tanzania. Of course, the blues (and purple-blues, and some yellows) are tanzanite zoisite, and the greens are "tsavorite" grossular and chromium-rich diopside. But, fine as these are, they're familiar enough (thanks in part to our recent "Merelani" issue: September–October 2009); I was drawn instead to eight loose, gemmy crystals of **axinite-Mg** which Jaimeen said had came from a pocket opened in April 2010. The thin, striated, axe-blade-shaped crystals range from 2 to 4.5 cm; four are pale blue but two are bright brownish orange, and two more are dramatically color-zoned in blue and orange. They are the best crystals—and the most in one place—I've yet seen of this rare species from Merelani, and unsurprisingly they sported low-four-figure prices.

A dealership new to me, *Gemega Collections*, run by a friendly, young, smart, petite and (best of all) English-fluent Chinese woman named Cicy Zheng (zhengcicy@hotmail.com), had some pretty **hematoid quartz/pyrite** specimens from a May 2010 find somewhere in the Daye mining district, Hubei Province, China. Cicy was being helped out by her mother, and both swore that the locality for the new specimens is the "Daye mine." However, the books on Chinese minerals by Liu (2006) and Ottens (2008) agree that there is no

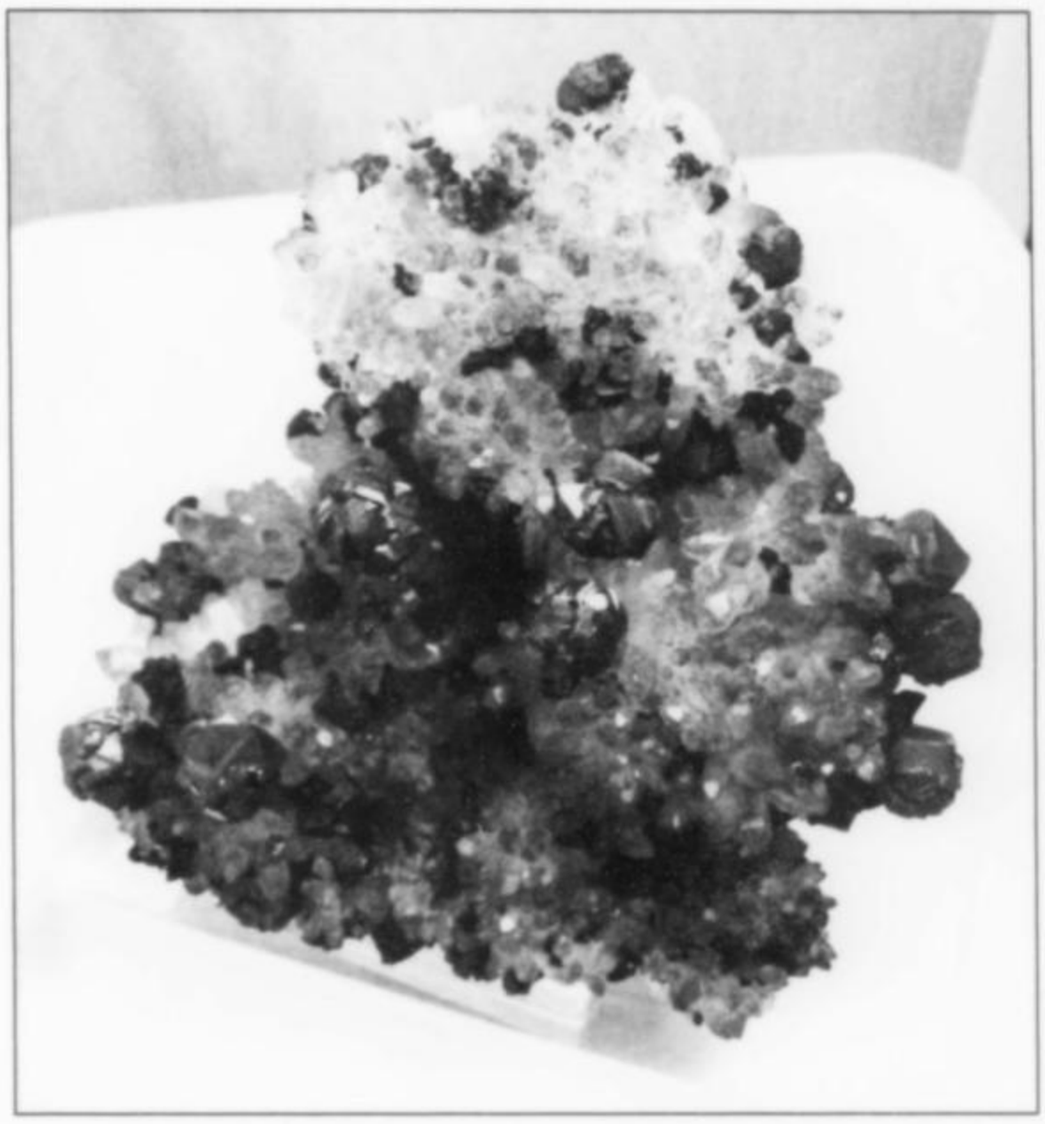


Figure 14. **Hematite-included quartz crystals with pyrite, about 7 cm, from the Daye mining district, Hubei Province, China. Cicy Zheng (*Gemega Collections*) specimen; Tom Moore photo.**

"Daye mine" *per se*; the Daye mining *district*, surrounding the city of Daye, encompasses several mines, of which the most important for specimens are the Tonglushan (copper) mine, the Tieshan (iron) mine, and the Fengjiashan (wollastonite) mine. The hard fact is that there is no telling from which of these mines, if any of them, the new quartz/pyrite specimens come—ditto, by the way, for the lovely new specimens showing transparent, golden yellow lenticular **calcite** crystals on dark matrix, also said to be from the "Daye mine" (Cicy and her mother had some of these; and see the specimen pictured with my 2009 Munich Show report, January–February 2010). Well, anyway . . . in San Rafael, Cicy Zheng and her mother had about 20 specimens, ranging in size from 5 to 12 cm, which are rounded groups of lustrous quartz "points" with brilliant red sprinklings of fine-grained hematite, just dense enough for best aesthetic effect; the pyrite chimes in as spherical groups, to 1.25 cm in diameter, of tightly intergrown crystals, perched delicately at random spots on the quartz; there are also small drapings of lustrous, cream-white

dolomite crystals, and, here and there, very sharp, black-tarnished sphenoids of chalcopyrite to 3 or 4 mm.

Speaking of goodies from China, John Cornish (cornish@tfon.com) had examples of yet *another* new kind of **fluorite** from the great Yaogangxian mine near Chenzhou, Hunan Province. John's five small-cabinet-size specimens are loose, rounded, stepped, compound fluorite crystals with beautiful color-zoning, being transparent and almost colorless in outer parts and delicate pale green (with a hint of blue) in their cores. John said that other fluorite specimens from the same find are like these, but have sharp, discrete, purple cubic fluorite crystals perched on them. Reportedly the specimens were taken out sometime in May or June 2010, and it's probably reasonable to expect to see more in due course.

Although its aspirations are wider, the San Francisco Show retains in some measure the feel of a "local" show, and I enjoyed the opportunity to meet California dealerships not often seen—if at all seen—elsewhere. One room was shared between southern California collector Carl Acosta's new *Mineral Maniacs* dealership (www.mineralmaniacs.com), and another enterprise, run by Carl's friend Len Pisciotta, called *Haiku Minerals* (www.haikuminerals.com). Carl specializes in Tsumeb minerals and had plenty of fine ones to offer, and Len . . . well, Len not only has nice things, but, if you want, he might write you a haiku appropriate to some specimen that you fancy. For instance, one page of his website shows a fine pyrite specimen from the Carson Hill mine, California, with two crystals, just touching, perched on a bit of matrix, with a haiku reading

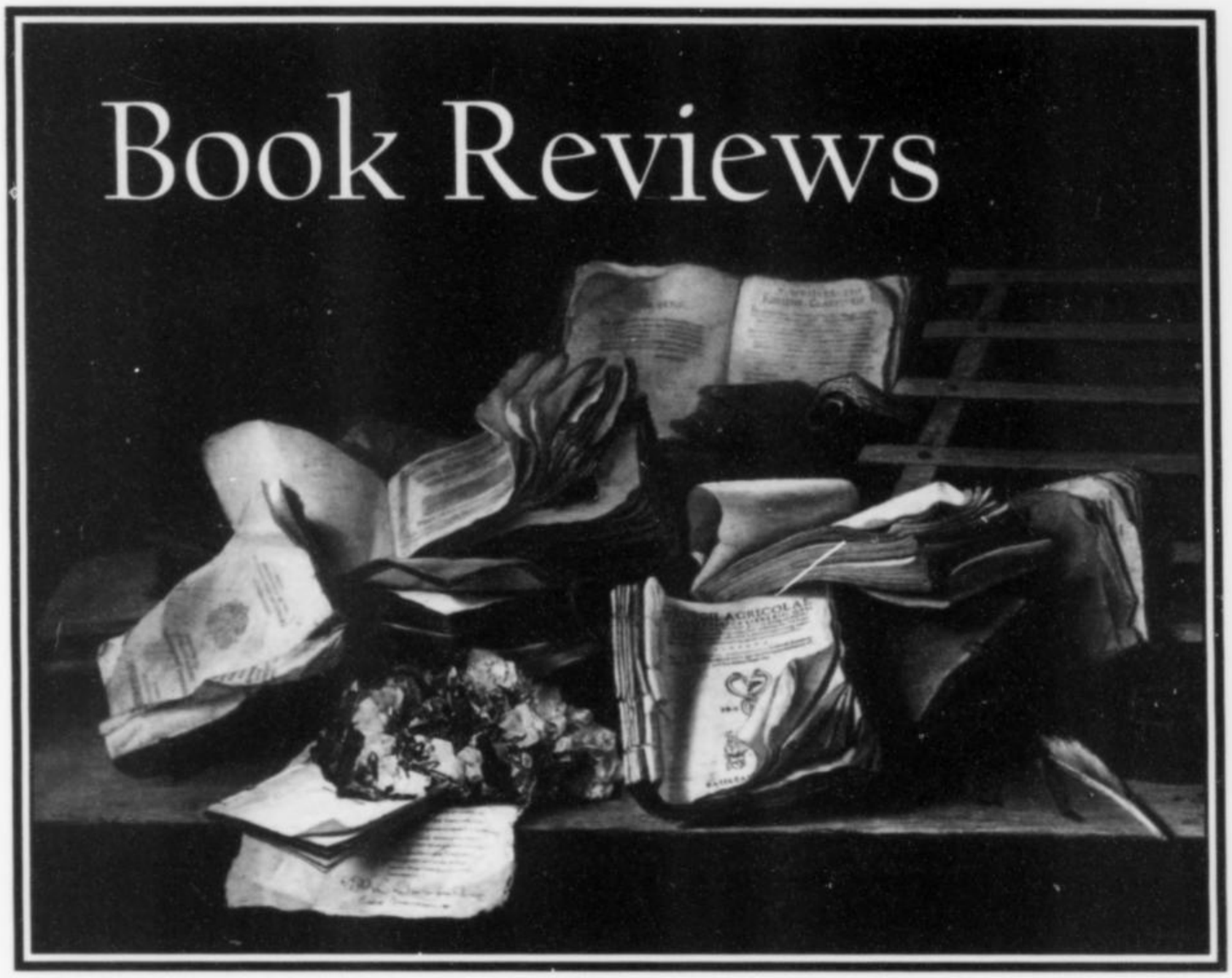
> Pyrite stands so tall
> Yet it leans on someone close
> Who is suffering?

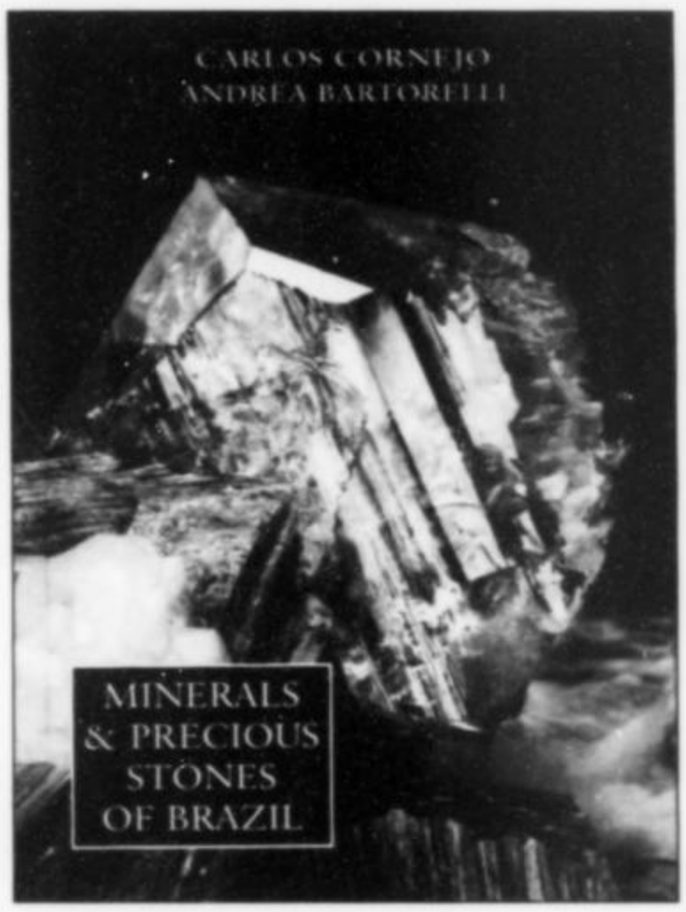
There's a substantial selection of more such specimen/haiku pairings elsewhere on the site.

Also in San Rafael I met Mike Keim for the first time. Mike's *Marin Minerals* website (www.marinmineral.com) is a rich and important one which I've often pored over, but until now he has been *only* a web dealer, so it was good to see him at last in bodily manifestation, sharing a room with Scott Werschky's *Miner's Lunchbox* and offering, at that, some nice new thumbnails of jeremejevite from the Ameib Farm, Namibia. I have already mentioned young Cicy Zheng and her mother, whose *Gemega Collections* dealership operates (so far without a website) from somewhere in California. And finally it was a pleasure to find Californians Si and Ann Frazier (siannfraz@aol.com) holding court in a room full of miscellaneous specimens (no, *not* all quartz), plus books and periodicals. Si and Ann set up for business in Tucson for many years but lately have not been doing so; on this home turf, however, they seemed to be having a fine, laid-back time.

That's a wrap, then, from San Francisco—except that I want to thank Jack Halpern again for hosting me and my wife for a terrific afternoon in his home on Forest Side Avenue. We greatly enjoyed inspecting the roses, orchids, cacti, succulents and I-forget-what-other exotic biota that he cultivates; even better, we got to see his extraordinary mineral collection, and had an excellent French dinner with him and with his good friend Carolyn Manchester, then visiting from Ohio. Ninety-year-old Jack is as exceptional a gentleman as his great tanzanite (see the cover of September–October 2009) is a mineral specimen. When next you see Jack, ask him about the new video on his collections and on his philosophy, aptly called "Addicted to Beauty"; or write to eric@worldloveproductions.com.

Book Reviews





Minerals & Precious Stones of Brazil

by Carlos Cornejo and Andrea Bartorelli. Published (2010) by Solaris Cultural Publications, São Paulo, Brazil; price $140. Hardcover, 7 × 9.5 inches, 704 pages; order from Hawthorneden at shows, or from Rocks & Minerals or Lithographie, LLC, or from lmenezesminerals@uol.com.br.

All serious mineral collectors know that Brazil is rich in major mineral occurrences, many of them fairly well represented on the specimen market today. Especially since World War II, the pegmatites of the state of Minas Gerais have yielded some of the world's finest specimens of topaz, chrysoberyl, euclase, elbaite, and beryl (in all of its colored varieties); phosphate-rich pegmatites of the same state have furnished the world's finest specimens of brazilianite, beryllonite, eosphorite, hydroxylherderite, amblygonite and more; complex pegmatites of other kinds have provided cassiterite, xenotime, monazite and several rare-earth species; Brazilian specimens of titanite, phenakite, fluorapatite, kyanite, scheelite, spessartine and bertrandite are among the world's very best. Brazilian quartz and microcline crystals can be as tall as the person who owns them, as can the calcite-bearing amethyst geodes of Rio Grande do Sul. There are major Brazilian localities for hematite, rutile and microlite; the pegmatites of northeastern Brazil yield amazing specimens of the columbite-euxenite group; even gold and diamonds have come in the past—and some still come—from remote places in the interior of the country. Given these realities, it would seem that a book on collector-quality Brazilian minerals should long since have been written, but that has not been the case. So the advent of Cornejo's and Bartorelli's new book, *Minerals & Precious Stones of Brazil*, is truly a headlining event, as this is precisely the reference work on Brazilian minerals that we have sorely needed.

Carlos Cornejo is a Chilean/Brazilian journalist, photographer, graphic artist and cultural historian, and one of the founders of Solaris Cultural Publications of São Paulo, the publisher of this book. Andrea Bartorelli is a geologist, environmentalist and mining engineer. Both are passionate and long-experienced mineral collectors. At the end of the book, ten Brazilian "collaborators" are also credited, with thumbnail biographies (plus photos) which altogether fill five fine-print pages. The collaborators include noted mineralogists and collectors such as Daniel Atencio, Julio Landmann, Marcelo Lerner, and Pércio de Moraes Branco, as well as two well-known Brazilian collector-*dealers* who have been attending major mineral shows for many years: Álvaro Lúcio and Luiz Menezes. In the same final section, 23 snapshots of *more* smiling people, mostly in groups, are shown, by way of crediting still other helpers and "friends" of the project. The overall feeling is that the book is a labor of love on the part of the whole Brazilian mineralogical community. Historically thorough and technically rigorous where it needs to be, the book conveys a feeling of warm openness, as if we are being hosted by about 40 people all vying to show us their minerals, and then to enjoy our responses and answer our questions. Photos of specimens

from the private collections of Álvaro Lúcio and Luiz Menezes are scattered throughout the volume, and some of these specimens are jaw-dropping. Indeed, there are *many* impressive specimens pictured among the 675 top-quality color specimen photos. And then there are the 345 images of other sorts (mining scenes, old-time prospectors venturing out into hilly landscapes, thatched-roof villages, century-old postcards, the frontispieces of old books, photo-portraits of important people, crystal drawings, rough alluvial gemstones being proffered in open palms, big faceted gems . . .). There is plenty of credit to go around among the "friends," researchers and expert photographers who are responsible for the book's consistent, page-by-page visual impact.

The work is exceedingly rich in presentations of the historical backgrounds of Brazilian mineralogy. Twenty-three pages at the beginning go all the way back to human beginnings, presenting objects of Brazilian "lithic art," from Paleolithic flint spear points to idols and statuettes smoothed out of gabbro to amazonite and nephrite animal carvings to haunting anthropomorphic figures with globose, stylized faces. Then come 60 pages on the development of mineralogy in Brazil, from the initial Portuguese landings in 1500 through the establishment and growth of major Departments of Mineralogy and institutional mineral collections. There are detailed accounts of the lives and achievements of scientists who came from abroad, including prominently the Englishman John Mawe (1766–1829), whose *Travels in the Interior of Brazil, Particularly in the Gold and Diamond Districts* (1812) describes Mawe's adventures while seeking out Brazilian diamonds and other gems to sell from his shop in London. Chief among the native Brazilians who made major contributions was José Bonifácio de Andrada e Silva (1726–1789), who, after graduating from the Freiberg Mining Academy, went on to write prolifically of Brazil's "natural history." Andrada was the first to describe petalite, scapolite and cryolite; the mineral species andradite was named for him. Members of the Portuguese Royal Court had been collecting minerals when, around 1800, they sought refuge in Brazil from Napoleon's armies, and after Brazil gained independence in 1822 the Brazilian Emperors Dom Pedro I and Dom Pedro II kept up the tradition, building important "royal" collections. Meanwhile, in the interior, gold and diamonds were being won, and in the cities extensive institutional collections were being built, among these the collections of the Royal Museum (today the National Museum) in Rio de Janeiro; the Museum of Earth Sciences, also in Rio; the School of Mines in Ouro Preto (hard by the "Imperial topaz" fields); and the Museum of the Institute of Geosciences of the University of São Paolo. The book's early chapters describe all this history minutely, even lovingly, before getting down to the first chapters on systematic mineralogy.

Twenty-nine pages cover (1) type minerals and (2) discredited species from Brazilian localities, and then all of the book's remaining 540 pages are given over to species/locality descriptions. In one way the organization here is conventional, the chapters moving in Dana order from native elements through tectosilicates, to end at last with opal, a non-crystalline "mineraloid." But there is much more history along the way. For example, the "Native Elements" section, which takes up fully 100 pages, includes chapters with titles like "The gold of Minas Gerais," "The gold rush in Piancó," "The gold rushes of the decade of 1980," "The mysterious origin of platinum in Brazil," "Lençóis, the queen of [diamond] claims," "Present and future of diamond exploration in Brazil," and "Famous Brazilian diamonds." When we get to "The Nesosilicate Subclass" we find, within it, about 20 pages on Imperial topaz and the history of its extraction at Ouro Preto; when we come to "The Cyclosilicate Subclass" we find 12 pages (3 short chapters) on emeralds, 30 pages (two chapters) on other colored beryls, and an extraordinary 100 pages on tourmalines, including individual chapters on, for example, the Cruzeiro mine, the Pederneira mine, the Santa Rosa mine, the Jonas mine, the Golconda district, northeastern Brazilian tourmaline-bearing pegmatites, and miscellaneous occurrences of uvite, dravite and schorl. Quartz in all its forms is accorded more than 70 pages. At the end of the book—just after the credits to friends—is a Bibliography with 259 titles, a listing of 65 pertinent websites and, finally, a half-page of biographical information regarding each of the two main authors.

Humor me here, but I must rave again about the specimens shown in the photos. You'll be understanding if, when you obtain a copy of the book, you turn to the Santa Tereza chrysoberyl (page 106: Keith Proctor collection), Morro Velho gold (page 150: Álvaro Lúcio collection), Lavra Caba Saco rutile (page 288: Luiz Menezes collection), Brumado dolomite (page 317: Julio Landmann collection), Ouro Preto *crocoite* (page 331: Álvaro Lúcio collection), Sapo mine fluorapatite (page 347: Jim and Gail Spann collection), Malacacheta autunite (page 357: Luiz Menezes collection), or nearly any one of the stunning specimens of topaz, elbaite, beryl, euclase, etc. which keep coming at us in the book's second half. And how about the gorgeous item shown on the cover: a gemlike 2.5-cm brazilianite crystal resting on "star" muscovite, from Linópolis, Minas Gerais (Julio Landmann collection and photo)?

Carping at all about such a beautiful and important book probably seems ungrateful—but here goes. The translation of the text, attributed to "Business Translation Services," is at times very awkward, and suffers often from malaprops which, on the other hand, can be amusing ("Scheelite is a mineral that is widely divulged in the world . . ."). The Table of Contents, wherein just one page is crammed with the titles of about 200 chapters and subchapters, is very hard on the eyes and, thanks to the digressive organizational scheme of the book as a whole, can be somewhat confusing at first.

The book suffers from a general shortage of maps: there is only one (crude) geological map and no map at all which simply shows the *states* of Brazil. Of course, a Brazilian reader will be unlikely to need such a simple political map, but the book after all is in English and thus is necessarily addressed to "foreign" readers. I vaguely know, or can infer, that Paraíba state is in the northeastern bulge of the country, but I would like to be *shown* this fact at a glance. (For detailed maps of Brazilian beryl-producing districts one might consult Sinkankas's *Emerald and Other Beryls*).

The introductions to individual species and to chemical classes seem often to waste too much space in repeating general mineralogical knowledge. Some of this space might better have been used for describing some localities mentioned in the picture captions; for example, we would very much like to know something of the place called "Ariquemes, Rondônia," given for a magnificent blue topaz crystal figured almost full-page. And although the geologies and histories of many localities are indeed described in great detail, with extensive quotation from authoritative sources old and new, others, even when flagged as important, are too often simply *listed*, leaving us with an unsatisfied hunger to be told something about them.

Finally, a minor quibble: given the same contents, it seems that this wonderful compendium deserves a larger format than the 6.5 × 9-inch page size.

Printed as it is on high-quality, glossy paper, this book is heavy—5 pounds—and it can't be called inexpensive. But it is the book you've been waiting for if you care at all about minerals from Brazil. If you attend the Tucson, Pomona, Ste-Marie-aux-Mines, Springfield, Denver or Munich shows, you might seek out Luiz Menezes and, after

congratulating him on his contributions to this fine work, you can pick up a copy from him on the spot. The publisher is not accepting retail mail orders from the U.S. right now, but you may order the book from Luiz Menezes at the address above.

Thomas P. Moore

Displays of Nature: History, Minerals & Crystals of Utah's Bingham Canyon Copper Mine

By Jerry North. Self-published (2010) by Jerry North. Softcover, 8.5 × 11 inches, 65 pages. Price $25 plus shipping; order on www.DisplaysofNature.net.

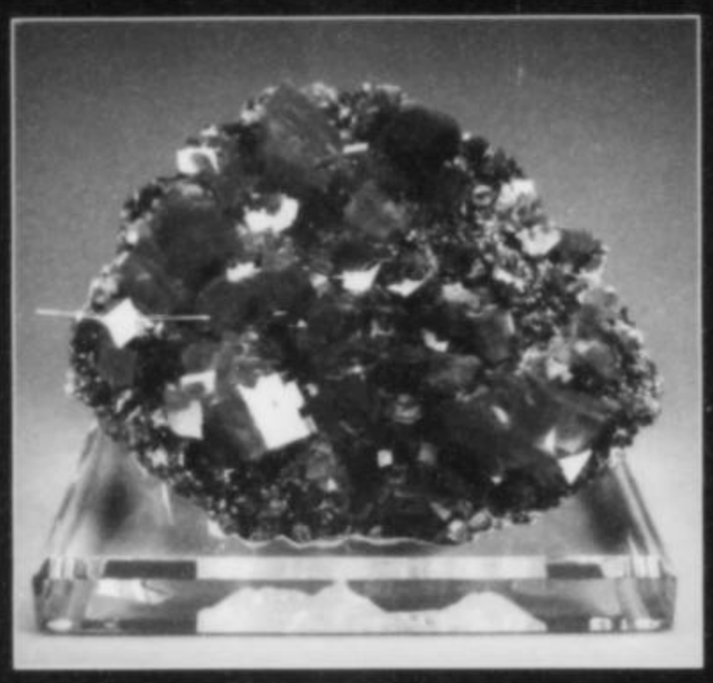
Jerry North, a geologist and mineral collector, was employed from 1966 to 1986 at the Kennecott Copper Corporation's huge open-pit copper mine at Bingham Canyon, Salt Lake County, Utah. For some of that period, one of his jobs with the company—to his delight—was to scramble about the mine collecting suites of crystallized mineral specimens, some of which went to the official company collection, others to interested parties who had requested them through the company. But North kept enough specimens for himself to mount a competitive case at a Utah mineral show in 1994 and win a trophy for "best self-collected specimens." It was about then that he decided to write an informal, collector-oriented account of Bingham Canyon—and this attractive, extremely well illustrated, 65-page monograph is it.

An introductory chapter called "The Story of the Mine" is itself introduced by a handy one-page chart showing significant dates in the mine's evolution, from earliest gold-prospecting activities in the 1860s all the way to the "projected end" of large-scale copper and molybdenum mining in 2036. Six more pages offer a summary of the local geology and illustrated accounts of the methods used in modern mining and ore-processing; especially interesting here is a geologic map of the orebody and its neighborhood, with overlain numbers showing where notable mineral-specimen finds have been made. A checksheet of 78 minerals occurring at Bingham Canyon has asterisks marking the 28 species deemed to be of collector interest. The rest of the book is devoted to a photo gallery of specimens, with a short, clearly written patch of text for each, many of the patches including chatty collecting stories. The specimen photographs, all of which are superb, are by Jeff Scovil, and their subjects are all from the author's collection.

Understandably, North's enthusiasm for Bingham Canyon mineral specimens is very strong, and comes through everywhere in the book—but what is shown nevertheless is that this is not a specimen locality that comes at all near the first rank. Decent-to-good specimens of a few common species (aragonite, barite, galena, sphalerite) and, rarely, excellent specimens of two species (pyrite and vivianite) have emerged—but because of the highly mechanized mining methods, unfriendly to preservation of crystals, very few Bingham Canyon specimens of anything have been seen on the mineral market over the decades. Therefore the book's chief appeal for collectors is in the slightly sad pleasure its photo gallery offers in showing us nice, aka "interesting," things now gone, or at least unavailable: specimens of Bingham Canyon apophyllite, okenite, copper, enargite, chalcopyrite, tetrahedrite, and a few others, such as we almost surely have never seen. Sometimes we even encounter major surprises, e.g. a thumbnail-size rhodochrosite specimen, whose photo fills a whole page, which could pass for the product of a very good day at Silverton, Colorado in the 1970s (the author writes that he "spent a lot of time hoping to find more [such rhodochrosite] . . . but it was not to be").

Readers interested in mining history and lore will enjoy the generous number of photos of goings-on at Bingham Canyon at many times from about 1910 to the present; the account of the mine's history is clear and thorough; the Bibliography contains 26 titles, about half of them websites. In short, this monograph is a workmanlike account of a major copper/molybdenum mine which also is a minor locality for crystallized minerals, not generally well known to collectors. You may order a copy via the self-publishing author's website (cited above).

Thomas P. Moore



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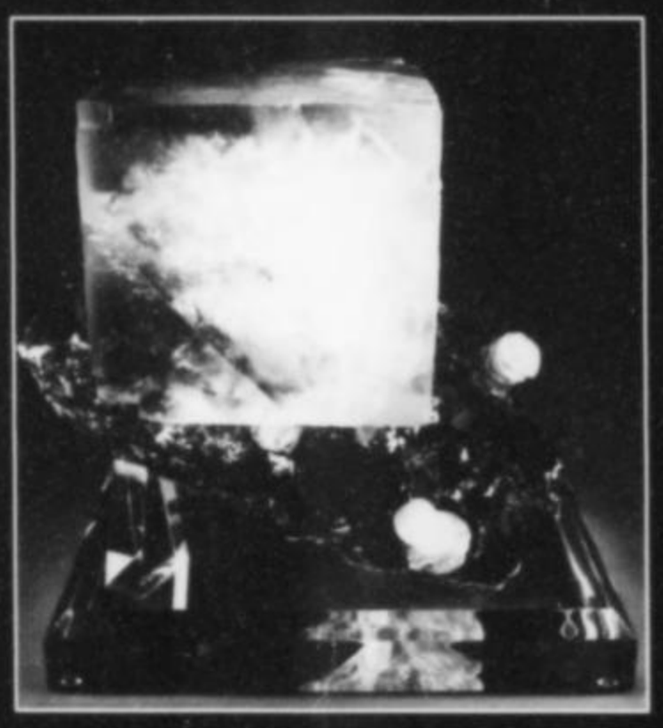

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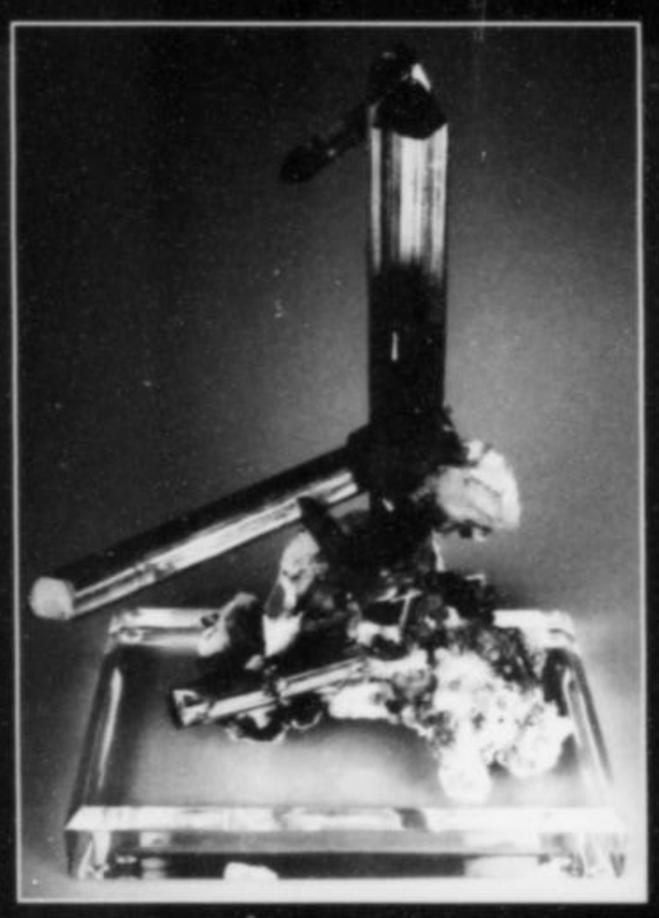

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Support organization:
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Fax: (209) 966-3597
Website: www.parks.ca.gov
Mailing: P.O. Box 1192
Mariposa, CA 95338
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Oct. 1–April 30, open 10–4, closed Tuesdays
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Piggott, AR 72454
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11–4 Sat. (Daylight Savings Time)
Specialties: Fine collection of geodes from Keokuk, Iowa, area; worldwide collection of minerals

Carnegie Museum of Natural History

Head: Section of Minerals: Marc L. Wilson
Tel: (412) 622-3391
4400 Forbes Avenue
Pittsburgh, PA 15213
Hours: 10–5 Tues.–Sat., 10–8 Thurs.,
12–5 Sun., closed Mon. & holidays
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Tel: 775-784-4528, Fax: 775-784-1766
E-mail: rdolbier@unr.edu
Website: http://mines.unr/edu/museum
Mackay School of Earth Science & Engineering
University of Nevada, **Reno,** NV 89557
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Specialty: Comstock ores, worldwide minerals, mining artifacts, Mackay silver

New Mexico Bureau of Mines & Mineral Resources—Mineral Museum

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E-mail: vwlueth@nmt.edu
Fax: (505) 835-6333
Associate Curator: Robert Eveleth
Tel: (505) 835-5325
E-mail: beveleth@gis.nmt.edu
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Socorro, NM 87801
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Tel: (520) 883-3033
E-mail: adomitrovic@desertmuseum.org
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Tucson, AZ 85743-8918
Hours: 8:30–5 Daily (Oct.–Feb.)
7:30–5 Daily (Mar.–Sept.)
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E-mail: minerals@nmnh.si.edu
Collection Managers: Paul Pohwat and Russell Feather
(Dept. of Mineral Sciences)
Washington, DC 20560-0119
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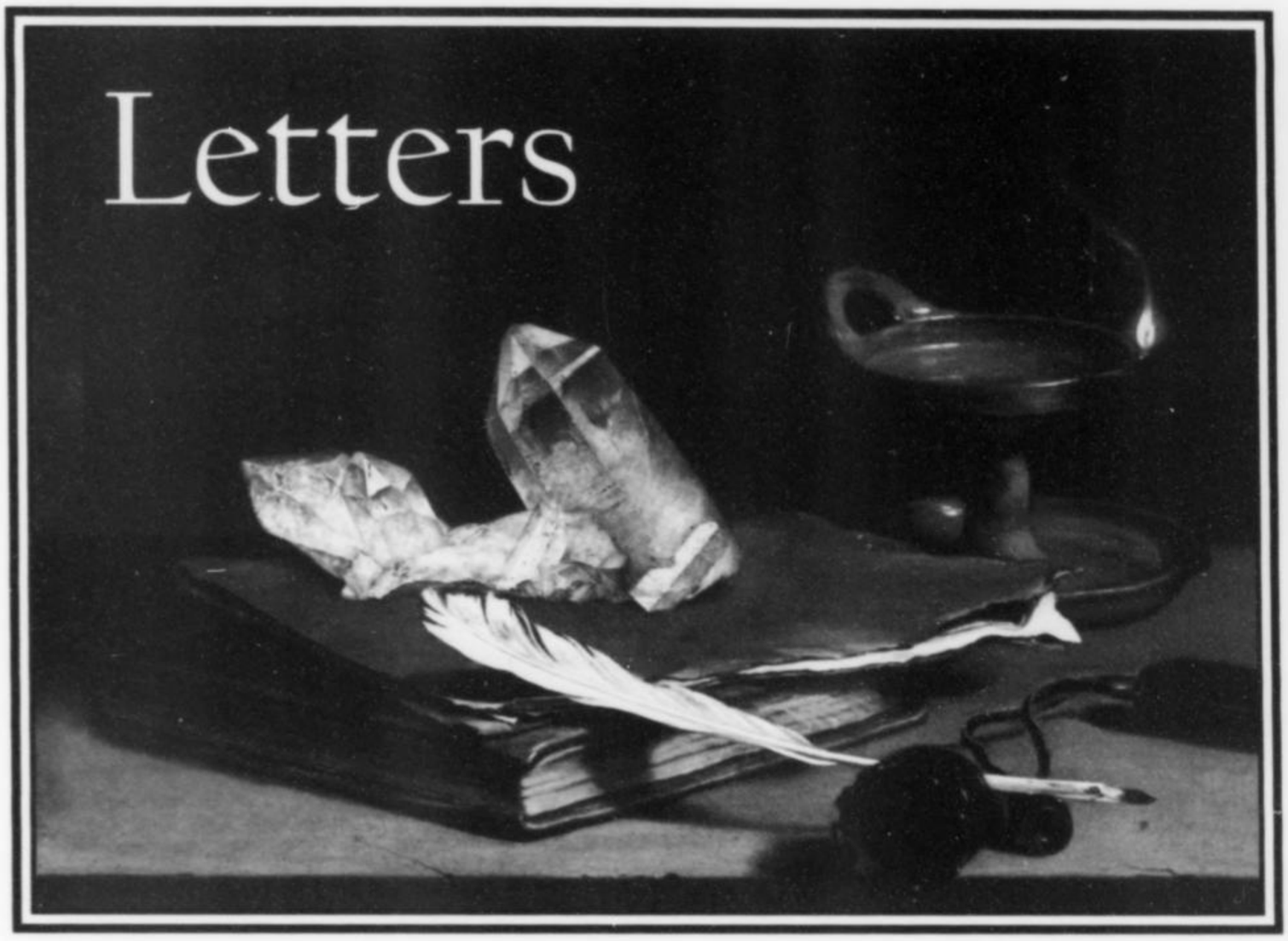

Name/Formula Hybrids

I am especially gratified to see that the *Mineralogical Record* (vol. 41. no. 4, p. 310) and others have finally decided to take a stand opposing the changes in mineral names published by Burke (2008) with the approval of the International Mineralogical Association. Those changes, made on what almost seemed, to me at least, a whim have opened, as Wendell Wilson points out, the proverbial Pandora's Box such that every Tom, Dick and Harry now feels free to add absurd layer upon absurd layer to the name of a mineral, thus defeating the original purpose of the changes, i.e., cleaning things up. Some simple common sense is needed here. It is well beyond high time to relegate Burke's nomenclature changes to the trash bin and restore the original names to all the minerals affected.

Cecil Cosse'
Spring, TX

Legal Nuggets

I have been enjoying the "Legal Nuggets" column by mineral collector and Federal Judge, Francis Allegra of the U.S. Court of Federal Claims in Washington DC, dealing with the legal issues related to collecting mineral specimens. Since my collection (like most mineral collections) is of scientific as well as aesthetic value, and is also of commercial value, representing both a lifetime of collecting as well as a significant investment, I want to applaud Judge Allegra's articles as being astute, timely and immensely useful. He puts into layman's terms issues of great legal complexity and concern, from scams and insurance and taxes and fakes, to liability, legal responsibility and financial consequences of a highly complex nature.

I look forward to Judge Allegra's columns, which represent an important step forward in our hobby in terms of equating it to collections of other significant artifacts, from paintings to sculpture to jewelry. Wonderful mineral and crystal specimens are to me the equivalent of other natural and man-made wonders of immense value and it is gratifying to see that some of the important issues related to acquiring, displaying and perhaps de-accessioning such treasures are being addressed in a series of serious but easily understandable and useful essays.

Keep up the good work!

Gene Meieran
Phoenix, Arizona

Indian Scolecite Cover

Today I received the new issue Number 2 with the wonderful scolecite on the cover. The locality given as Jalgaon is wrong because there is no scolecite in Jalgaon. The specimen has, beside the scolecite, stilbite and laumontite. I believe the locality is around Nashik.

Berthold Ottens
Walsdorf, Germany

Merelani Photo

On page 364 of the Merelani Issue (vol. 40, no. 5) there is a picture of a mine entrance taken by Tony Kampf, identified as the Samax mine portal in Block A. When we visited Tanzania we followed down what was identified by the miners as the "JW vein," and I'm certain we went down that cut and into that entrance. I was under the distinct impression that we were in Block C at the time. According to Google maps, the entrance is just south of the end of the runway, and shows up as a tiny black streak 12 mm from the tip of the "B" in "Block C" in the aerial photo shown on page 363. Can you confirm that this entrance is actually in Block C?

Quintin Wight
Ottawa, Ontario

Author John Saul confirms that you are correct; the pictured mine entrance is in Block C, and is not the old Samax entrance in Block A. *Ed.*

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THE MINERALOGICAL RECORD

Vol. 41, No. 5

Quartz var. Amethyst (11.3cm)
Deer Hill, Stow,
Oxford Co., Maine, USA

Specimen: Paradise Woods,

Photo: Joaquim Callén

Beijing Exhibition!

The Collector's Edge

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– George F. Kunz, The Curious Lore of Precious Stones, 1915

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Malachite in Shattuckite from Kaokoveld region of Namibia, 7.5 x 5.4 x 3.1 cm

Photo: Jason Stephenson