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Articles

Columns

COVER: SMOKY QUARTZ GWINDEL, 9.5 cm, from the Göscheneralp, Uri, Switzerland. Daniel von Flüe collection; photo by Thomas Schüpbach. See the article on quartz gwindels in this issue.

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4631 Paseo Tubutama
Tucson, AZ 85750
520-299-5274
E-mail: minrec@earthlink.net
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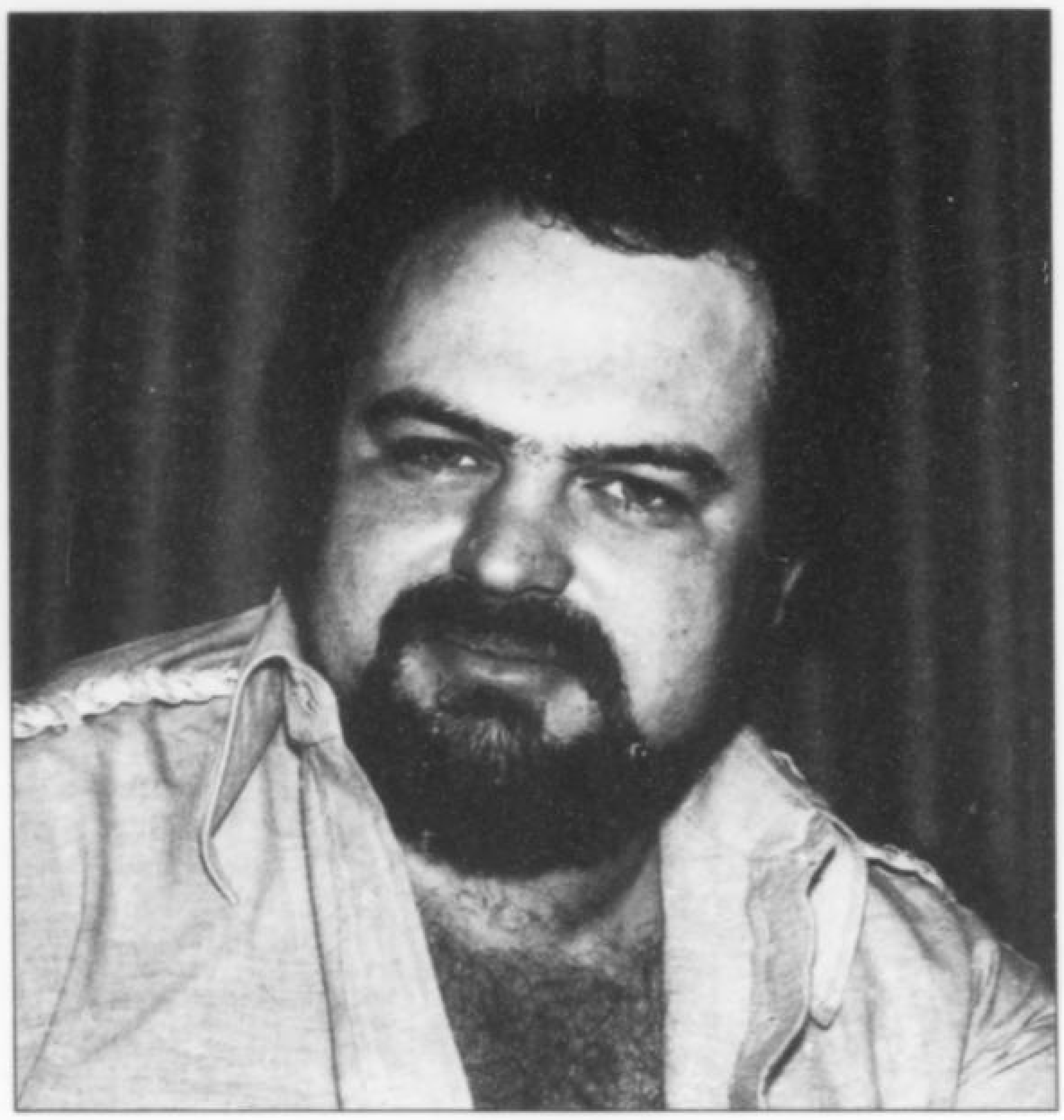
notes from the EDITORS



Richard A. Kosnar (1946–2007)

Died, Richard A. Kosnar, 60

Richard Andrew "Rich" Kosnar was born in Jersey City, New Jersey on November 13, 1946, the son of Mary Antoinette Fiamingo and Andrew William Kosnar, a construction contractor of Hungarian/Czech ancestry with family roots in the mining area of Zinnwald in Bohemia. Rich began collecting minerals and fossils as a youngster in 1957, and in 1963, he made his first visit to a trap rock quarry to collect zeolites and associated species, at the Upper New Street quarry in Paterson, New Jersey. He developed a love for Trap Rock minerals and collected at various other quarries in New Jersey from 1963 through 1971, including the Summit quarry and the world-famous Prospect Park quarry. He attended Upsala University to study mineralogy and geology, and also studied engineering for highway engineers at Rutgers. He later worked as the project engineer of the Route I-80 Roadcut, West Paterson Section (1969–1970), where trap rock specimens were recovered during the excavation for the new highway. Rich married his first wife, Linda Scarpone, in 1966, and together they had one son: Erik.

Kosnar was also attracted to pegmatite localities, and he collected at Mt. Apatite, Auburn, Maine (1967), the Pulsifer quarry, Paris, Maine (1968), the Gillette quarry, Haddam Neck, Connecticut (1968), the Strickland quarry, Portland Township, Connecticut (1968), and the Slocum quarry in East Hampton, Connecticut (1968). He also mined localities in North Carolina for emerald and other minerals (1970), and formally established his "Mineral Classics" company at his Keyport, New Jersey residence in 1970.

Kosnar visited Colorado in 1970 and moved there permanently in 1971. Over the following years he traveled throughout South America, Europe, Morocco and the U.S. in pursuit of fine minerals. He procured many thousands of superb specimens for museums and collectors throughout the U.S. and Europe. In Colorado he mined amazonite with Clarence Coil and his son every year from 1970 through 1986. During this period of time they discovered some of the finest color and quality amazonite crystal groups ever found, as well as albite, smoky quartz, goethite, fluorite, and many rare species at their various commercial claims.

In 1971 Kosnar undertook his first collecting trip to the Italian Alps, and began collecting classic European Alpine and worldwide "Alpine-type" specimens. During the 1970's and 1980's he also mined sapphire, ruby, and garnet in Montana. He was in partnership with mineral dealer Walt Lidstrom from 1972 until 1976 when Walt passed away. He has also had limited partnerships over the years with other collectors and dealers. In 1972, he made a trip to the ore mines of Peru where he acquired many imported specimens.

In 1976 Kosnar published an article in *The Mineralogical Record* with co-author Hal Miller, on "The Colorado Mineral Belt," following it in 1979 with an article on the Sweet Home mine. He mined the Dixie mine in Idaho Springs for leaf gold and crystallized gold in 1976, and that same year began importing mineral specimens from Bolivia's famous localities including Huanuni, Viloco, Llallagua, the San Jose mine in Oruro, Tasna, Morococala, Chicote Grande, and Cerro Rico de Potosí. It was at Potosí that he acquired a spectacular 6-inch twinned phosphophyllite crystal on matrix which is considered by some to be the finest mineral specimen in existence. In 1977 he reopened the now-famous Sweet Home mine in Alma, Colorado to mine specimen rhodochrosite, hübnerite, fluorite, svanbergite and goyazite crystals. Other localities mined include the Calumet Iron mine; Italian Mountain; and Mt. Antero. In July 1979, several years before specimens were generally available to the public, he organized a mining expedition to the Sawtooth Mountains in Idaho to dig for gem aquamarine crystals, crystallized topaz, helvite, spessartine, smoky quartz, and feldspar. Following his divorce from Linda he married Tresa Bergman, the daughter of his mining partner, in 1979; together they had two sons, Brian and Brett.

Kosnar assembled one of the finest comprehensive collections of New Jersey trap rock minerals in private hands, and also built a fine collection of old, rare Franklin and Sterling Hill minerals. His exceptional Colorado collection includes a fantastic suite of leaf and crystallized golds, fluorites, and rhodochrosites, as well as suites of minerals from Mt. Antero, the ore mines of the San Juan Mts. and the Leadville area, amazonite and associated species from the Crystal Peak area, and many antique and rare specimens.

In 1986 Kosnar became seriously and chronically ill with several diseases including Epstein-Barr Syndrome, and his traveling days ended. He became totally disabled, but continued to maintain his superb mineral collection and to study the minerals that were his life's passion. In the mid-1990's, with the help of his wife, he wrote a series of articles, published in Italian (he was fluent in an old Calabrian dialect of that language), about Colorado gold and its localities for the mineral magazine, *Rivista Mineralogica Italiana*. It must be said that since the 1980's, following a car accident and the gradual onset of his medical difficulties, there was controversy regarding some of his labeling. This may have been a symptom of several strokes (revealed by an autopsy) and numerous medications.

During the 1970's, Kosnar had made many trips to Brazil and imported several thousand mineral specimens, including three new pegmatite phosphate species which were later named whiteite, Mn-whiteite and zanazziite. In 1993 a new pegmatite phosphate, *kosnarite,* from Oxford County, Maine was named by Kosnar's friend, the late Eugene E. Foord and others in recognition of his contributions to the mineralogical community. Kosnarite was later found in Brazil in the Jenipapo district. Kosnar assembled an extensive suite of some of the finest kosnarite specimens and also specimens of associated jahnsite, goyazite, quartz, albite and lepidolite.

Richard A. Kosnar died on January 15, 2006. Management of Kosnar's "Mineral Classics" dealership has been taken over by his son, Brian Kosnar, who has been a regular at major shows for several years, and travels to mineral localities in pursuit of specimens. His website is www.MinClassics.com.

WEW

Juanita Curtis (1917–2006)

Died, Juanita Curtis, 89

Micromounters around the world were saddened to hear of the death of Juanita Curtis on September 24, 2006. Juanita, inducted to the Micromounters Hall of Fame together with her husband Charles (Bob) Curtis in 1983, was the most senior surviving member of the Hall, and a true anchor point for things mineralogical on the West Coast.

Born October 31, 1917 in the farming country near Offerle, Kansas (about 27 miles from Dodge City), Juanita Young did not remain long in the plains, but moved with her family to Colorado, where her farrier father took a position as night watchman at one of the mines. We don't know if any of her three brothers took up mineral collecting there, but Juanita did, beginning with "pretty rocks" from the mines. Unfortunately, her mother made her abandon those when the family moved again, to California. Perhaps that's why she later chose to stick to micromounts as being small and easier to carry!

In the lean years of the 1930s, opportunities for continued formal education were not easy to come by, and Juanita had to earn her living at a young age. She worked at a movie theatre in Norwalk, California, but her native intelligence and innate curiosity carried her through the steep learning curve of mineralogy on her own. She was self-taught, but she was very bright, and she learned well. She continued working after her 1939 marriage in Reno, Nevada, to Bob Curtis, who took a job for a crane and rigging company in the oil patch just outside Bakersfield. It says a lot about Juanita that when crunch time came for a rush job, she was able to operate a crane herself, and often spent time loading and unloading the trucks. When World War II struck, they both worked for Lockheed Aircraft, but some years afterwards, Juanita took a trial position with the California Federation of Mineralogical Societies (CFMS). The "trial" lasted until her retirement in 1974! During her employment, she acted as Executive Secretary and Treasurer, and buried herself in committee work. In fact, she never really left, for she was always volunteering and being called on for one thing or another in mineralogy long after that.

A problem in thinking of Juanita is that she wasn't plain "Juanita." She and husband Bob formed one of those pair bonds that just stick in other people's minds. It was always "Bob and Juanita," or "Juanita and Bob"; in whatever they did, they were involved together. Whether as members of the Long Beach Mineral & Gem Society and the Mineral Research Society of Southern California, or when she founded the Southern California Micromineralogists and the Pacific Micromount Conference (together with Dr. Fred Pough), they were a pair. Bob did photomicrography and he and Juanita created famous displays, one of which was exhibited for years at the Natural History Museum of Los Angeles County. That one was aided by Ben Chromy, another Hall of Fame member, but Juanita went on to create others, to generate and publish micromounters' trading lists, to develop mini-courses on micromounting, and always to keep active with volunteer work at the Museum. That activity brought them together into the Micromounters Hall of Fame, in which Juanita was the first female member.

In the rush to celebrate her mineral achievements, it would be easy to forget Juanita the person. That would be to miss a large part of her impact. A personal attribute, always emphasized in Hall of Fame inductions, is generosity towards others. Juanita had that and more. Micromounter Jocelyn Thornton of Wellington, New Zealand, herself now a member of the Hall of Fame, says "Juanita and Bob had what seemed to me an ideal set-up—a family room added to the house with a wall of desk and drawers, with two microscopes and Bob's camera all set up. All I wanted to do was sit and look at Juanita's micromounts—so many beautiful ones. She was a good teacher in identifying things, and generous in sharing to a beginner. She advised me to budget my money so that I had enough for a really good light, even if it meant a less complicated microscope, not a zoom. Juanita had a wicked sense of humour—I very much enjoyed her company. She was a real night owl; Bob was the early bird."

Juanita is gone, but her legacy remains. First is her mineral, juanitaite [$(Cu,Ca,Fe)_{10}Bi(AsO_4)_4(OH)_{11}\cdot H_2O$] (described by Anthony Kampf, William Wise and George Rossman in the Mineralogical Record, vol. 31, p. 301–305). She discovered it, and she did that because she was an indefatigable field collector, always willing to go with hammer in hand. Then there is her Hall of Fame membership. There is her collection, now in the Natural History Museum of Los Angeles County. There are magazine articles and photomicrographs throughout the literature. There is a memorial case dedicated to her at "Geo-Garden: An Exhibition of Minerals & Fossils" at Cal State, Fullerton, and there will be a memorial exhibit at the next CFMS show in June, 2007. Finally, there are the people she met and influenced throughout a long and inordinately full life. To be remembered is where a true legacy lies.

I would like to express my gratitude to Juanita's daughter, Julie Curtis-Steele, to Jocelyn Thornton, to Dr. A. R. Kampf, and to Sugar White for information received. Other information was taken from documentation held in the Micromounters Hall of Fame.

Quintin Wight

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Pink Fluorite

from an Exceptional New Find at Chumar Bakhoor, Pakistan

Roberto Appiani
Via A. Mantegna, 1
I-20058 Villasanta, Milan, Italy

At the 2006 Munich Show, Italian dealer Riccardo Prato exhibited in his Pregi Gemme stand five extraordinary fluorite specimens from Pakistan collected in September 2006. Fluorite from Pakistan is not new, and pink octahedral crystals, sometimes associated with aquamarine and fluorapatite on muscovite, have been known for several years. However, the specimens from this find are far superior to those from previous discoveries, ranking them among the finest known examples of the species.

THE CHUMAR BAKHOOR PEGMATITES

Chumar Bakhoor Peak is located at an elevation of 5,520 meters near a side valley of the Hunza River Valley in the Nagar district, Northern Areas, Pakistan. Although it is geographically closer to Nagar village (in the Hispar Valley), Chumar Bakhoor is within the territory officially under the jurisdiction of Sumayar village. Only Sumayar villagers are allowed to work the deposits. The pegmatites that crop out on the western side of the mountain above 4000 meters elevation can be reached from this village.

Blauwet and Shah (2004) have described the locality and (citing Voillot, 1994) recounted the history of the pegmatite deposits at Chumar Bakhoor:

> The gemstone deposits at Chumar Bakhoor were discovered in 1984 by Muhammad Shah, a local hunter from Sumayar. While hunting wild game, Muhammad came across some aquamarine crystals. He did not disclose his find to the local villagers; rather Muhammad brought the crystals to the market in Gilgit where he sold them. In 1985, Muhammad and three friends returned to Chumar Bakhoor to hunt and collect minerals. The four kept their mines and finds private until 1987 when hunters Gohar Hayat, Muhammad Shifa and Muhammad Akbar chanced upon the men working the pegmatites. Hayat, Shifa and Akbar also took up mining in the high mountains, and by the summer of 1987, the Nagar deposits were no longer secret. In 1988 hundreds of people ascended to the pegmatites, kicking off a bonanza of aquamarine finds.

The pegmatites on Chumar Bakhoor proved to be extensive. Five hundred meters of pegmatite had been exposed by 1994, and by 2003 more than a kilometer of outcrops had been worked to a depth of up to 20 meters (the excavations are limited only by the lack of oxygen). Fifty-five groups of six men each are allowed by the local mining committee to mine the deposits.

The Chumar Bakhoor pegmatites have yielded many extraordinary specimens of deep azure-blue, prismatic aquamarine crystals of remarkable quality and size (up to 50 cm long), easily distinguishable from those of other localities because the crystals were

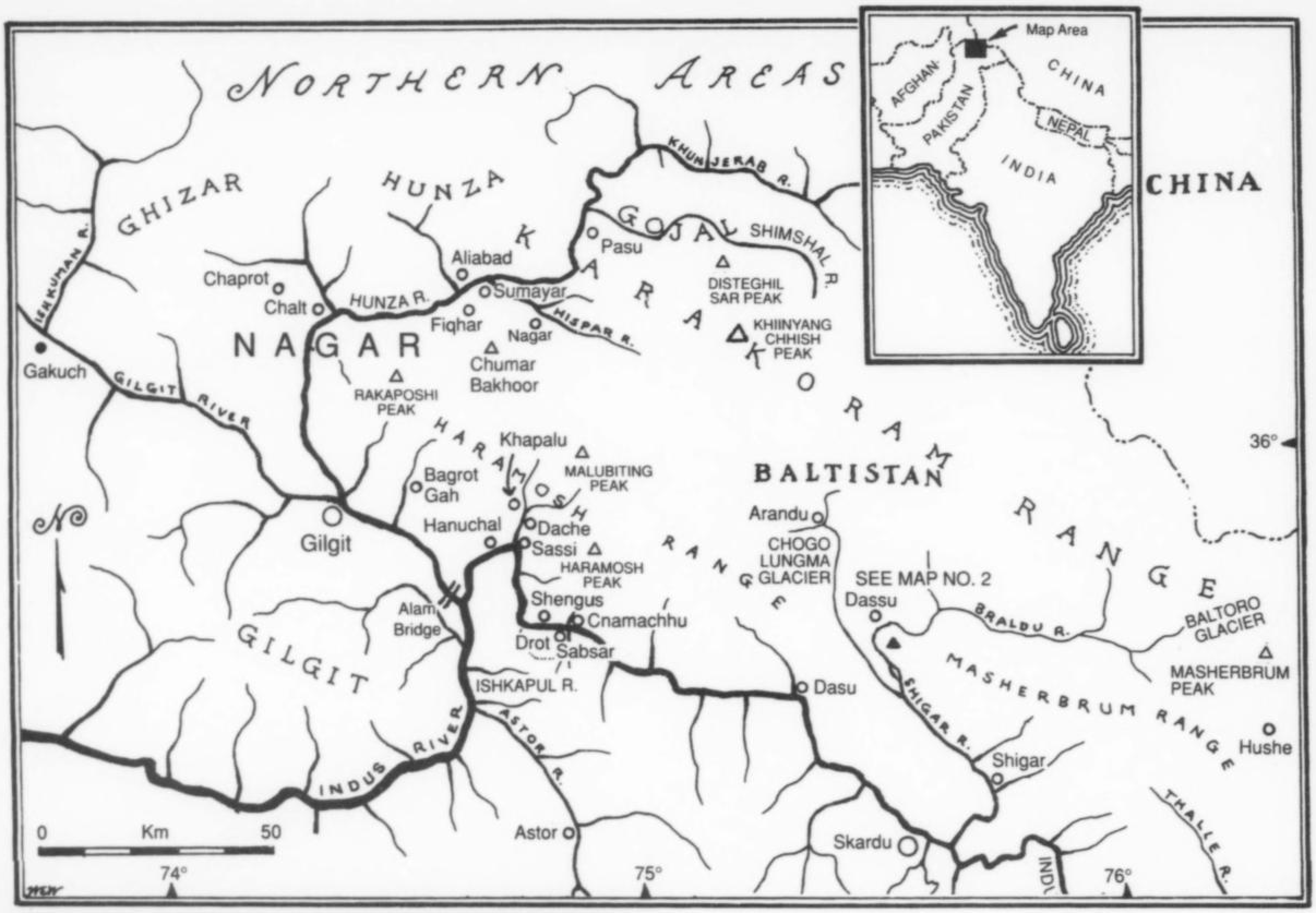


Figure 1. **Location map, Northern Areas, Pakistan, showing Chumar Bakhoor and the village of Sumayar.**

Figure 2. **Snow-covered Chumar Bakhoor, and the village of Sumayar in the foreground. Ricardo Prato photo.**

deposited on large muscovite druses. Several notable examples are pictured in Wayne Thompson's *Ikons, Classics and Contemporary Masterpieces of Mineralogy* (2007).

Commonly the aquamarine crystals are associated with splendid pale pink to deep orange-pink crystals of fluorapatite up to 5 cm, and with fluorite in octahedral or dodecahedral crystals, pink or green in color, up to 10 cm, sometimes forming groups of rather large size. Specimens in which aquamarine, fluorapatite and fluorite crystals are associated on a single matrix specimen are rare and can be extraordinarily aesthetic.

THE 2006 DISCOVERY

The fluorite specimens described in this short note were all found in the same pocket on September 25, 2006 in the upper pegmatites near the summit of Chumar Bakhoor. Collecting at these elevations is made difficult by the high altitude and snow. Normally, by the end of October, the snow (and the associated risk of avalanches) has begun to endanger activities at the collecting sites. However, in certain years even the September weather conditions have become hazardous. A number of people have been killed by rock falls and avalanches, including the original discoverer, Muhammad Shah. Riccardo Prato reports that, having been informed of this find, he had to wait for two days in the village of Sumayar because nearly a meter of fresh snowfall was impeding the miners in their march down the mountain.

Figure 3. Fluorite specimen with crystals up to 9 cm on muscovite; from the 2006 find at Chumar Bakhoor, near the Hunza River Valley, Pakistan. This is the largest crystal found in the pocket (shown also in Fig. 5). *Pregi Gemme* specimen; Roberto Appiani photo.

Figure 4. Fluorite—detail of a 14 × 16-cm specimen with transparent pink crystals up to 5 cm on an edge; from the 2006 find at Chumar Bakhoor, near the Hunza River Valley, Pakistan. *Pregi Gemme* specimen; Roberto Appiani photo.

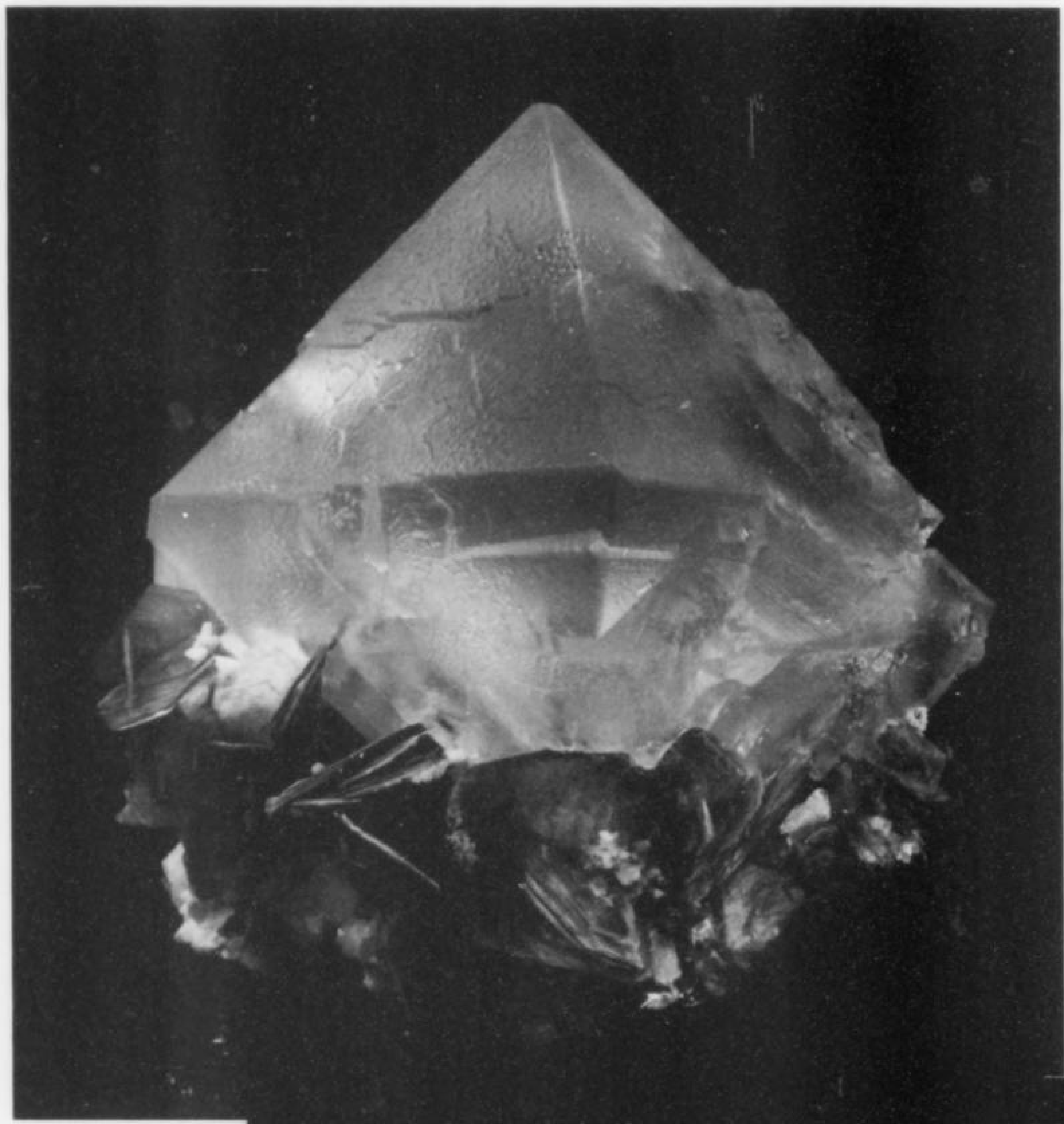


Figure 5. Fluorite on matrix, 12 cm specimen, with a crystal 9 cm on an edge, from the 2006 find at Chumar Bakhoor, near the Hunza River Valley, Pakistan. This is the largest crystal found in the pocket (shown also in Fig. 3). *Pregi Gemme* specimen; Roberto Appiani photo.

Figure 6. The largest of the fluorite specimens, 14 × 19 cm, with crystals up to 4.5 cm; from the 2006 find at Chumar Bakhoor, near the Hunza River Valley, Pakistan. *Pregi Gemme* specimen; Roberto Appiani photo.

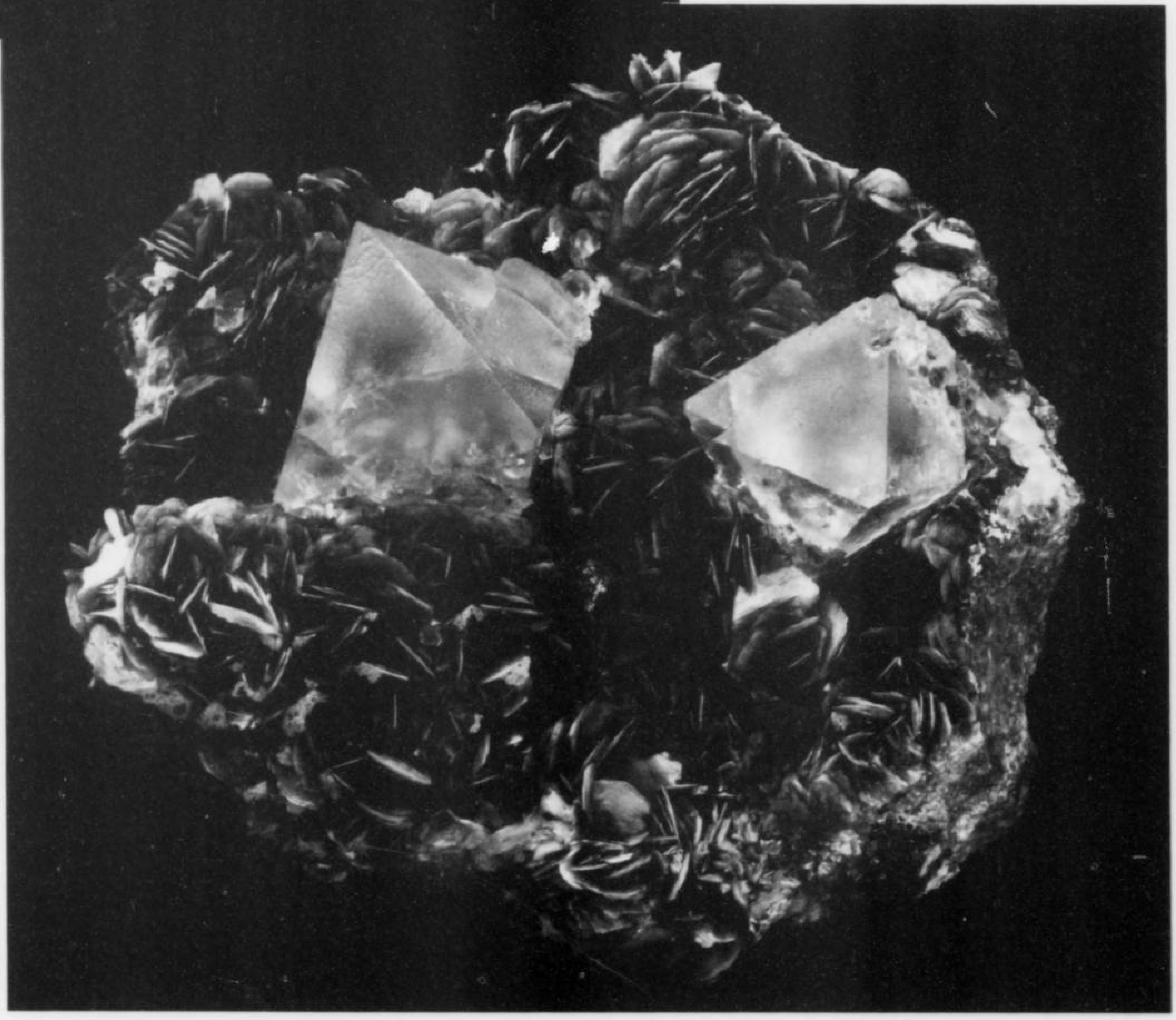
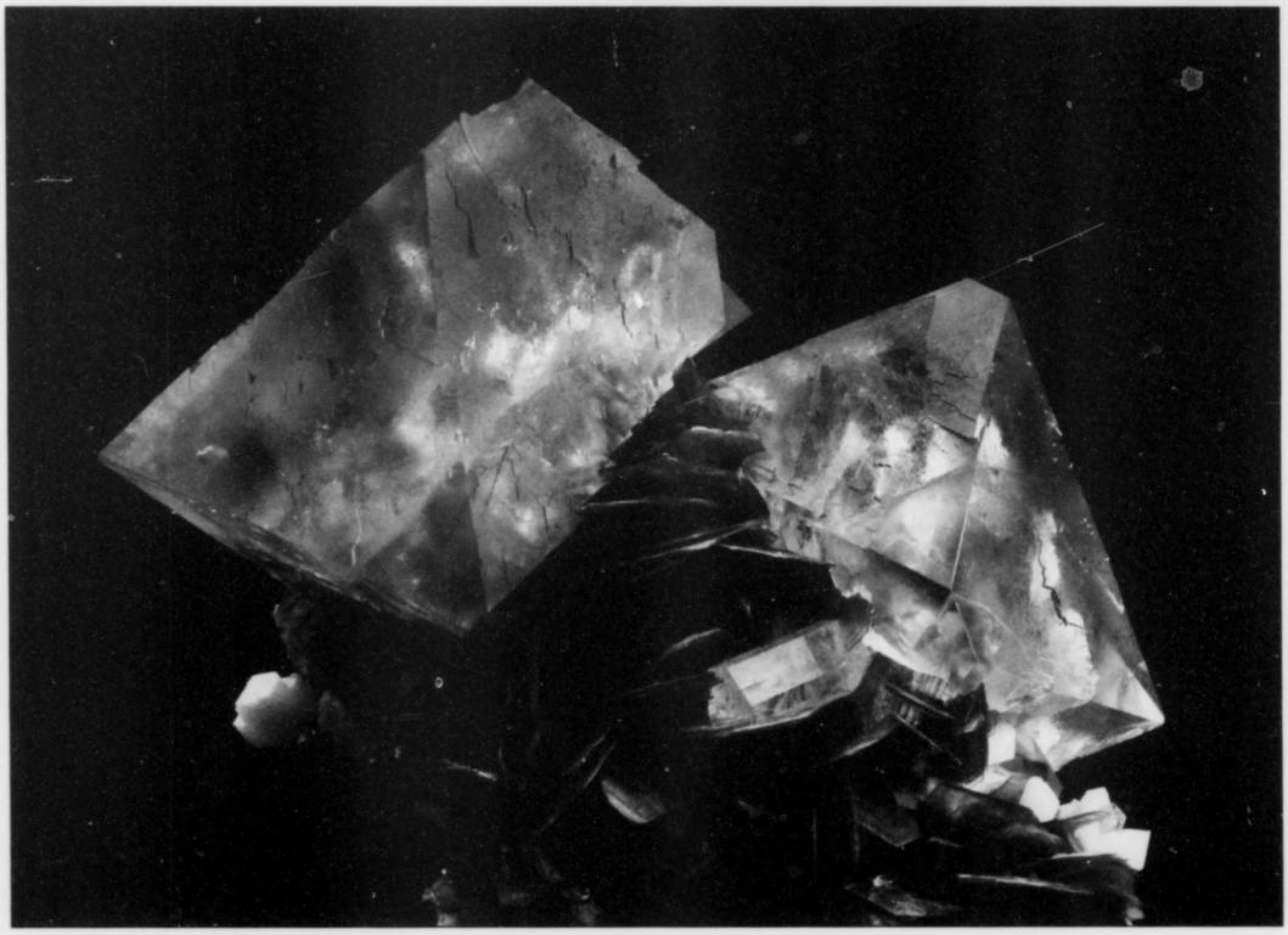


Figure 7. Fluorite with aquamarine on muscovite, 10 cm, with fluorite crystals up to 4.5 cm on an edge; from the 2006 find at Chumar Bakhoor, near the Hunza River Valley, Pakistan. *Pregi Gemme* specimen; Roberto Appiani photo.

Figure 8. Fluorite with aquamarine on muscovite, 10 cm, with fluorite crystals up to 4.5 cm on an edge; from the 2006 find at Chumar Bakhoor, near the Hunza River Valley, Pakistan. This is another view of the specimen shown above in Figure 7. *Pregi Gemme* specimen; Roberto Appiani photo.



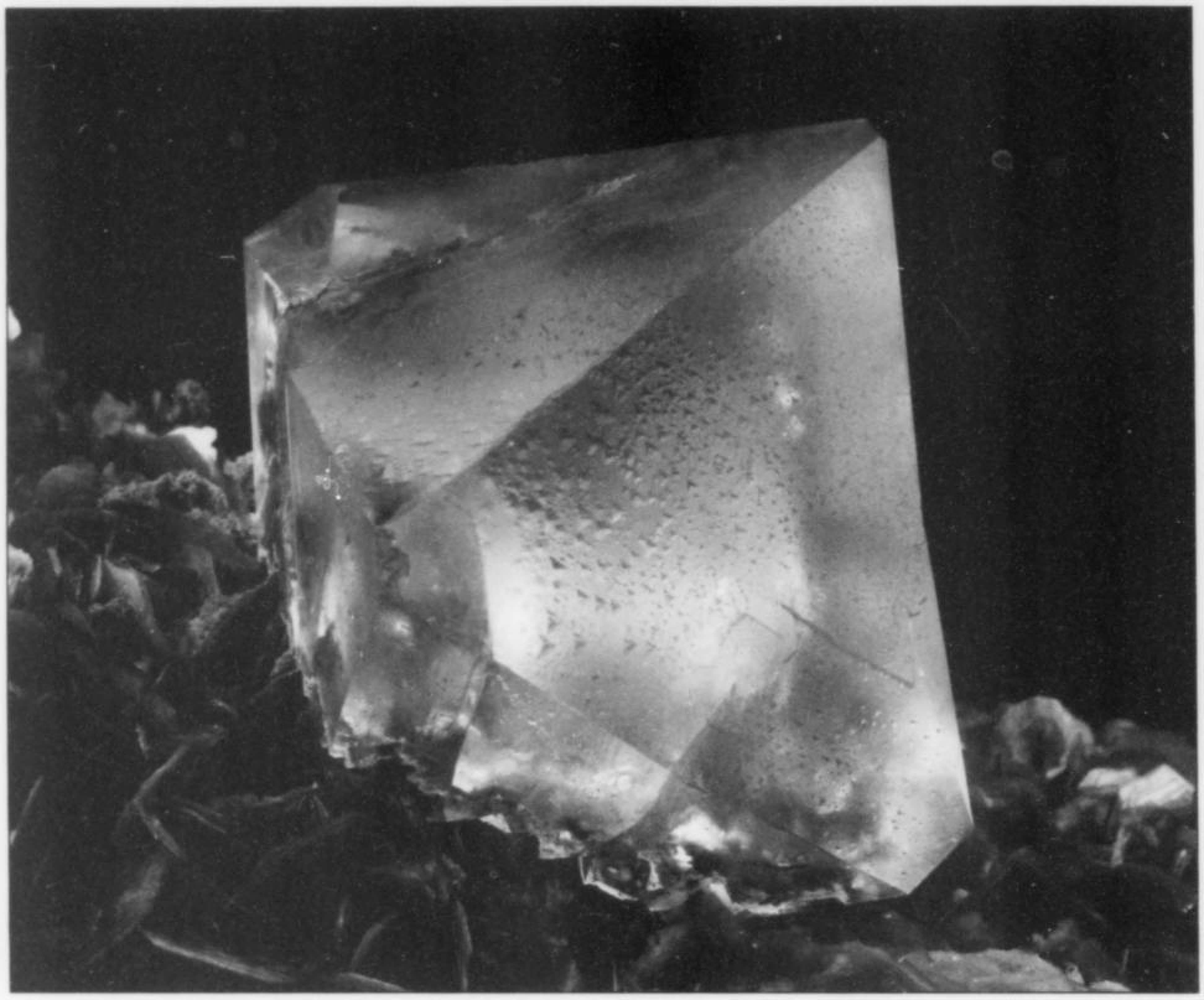


Figure 9. **Fluorite crystal, 5 cm on an edge, on muscovite, from the 2006 find at Chumar Bakhoor, near the Hunza River Valley, Pakistan. This is a detail of the specimen shown in Figure 4. *Pregi Gemme* specimen; Roberto Appiani photo.**

In the early days of mining at Chumar Bakhoor, most specimens were damaged through lack of extraction skills and lack of proper packing materials. Today, however, the miners remove specimens with great skill and trim them on-site with generator-powered diamond saws, then pack them carefully in cotton and newspaper.

The exceptional quality of the specimens from the new find fully justified Riccardo Prato's wait. The relatively small pocket yielded a few matrix specimens with perfect octahedral fluorite crystals up to 9 cm, and three crystals with no matrix. The comparison with the classic Alpine specimens, in particular those from Savoy (France) and Switzerland, is unavoidable because of the close similarity in color and crystal habit, made all the more interesting by the differences in associated minerals. Four of the five matrix specimens recently exhibited at the 2006 Munich Show, the best of the pocket, are pictured here. The color, the transparency and the perfection of the crystals shown in the photos are so obvious that no further comment is needed.

ACKNOWLEDGMENT

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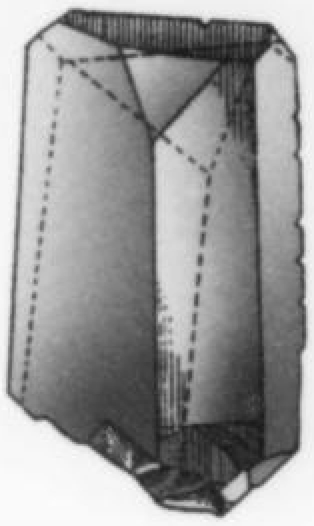
REFERENCES

APPIANI, R. (2006) Fluorite; nuovo ed eccezionale ritrovamento al Chumar Bakhoor, in Pakistan. *Rivista Mineralogica Italiana*, **30** (4), 250–253.

BLAUWET, D., and SHAH, M (2004) The pegmatites of Chumar Bakhoor: Nagar's treasure trove. *ExtraLapis English* no. 6: *Pakistan: Minerals, Mountains and Majesty.* Lapis International LLC, East Hampton, CT, 48–53.

THOMPSON, W. A. (2007) *Ikons, Classics and Masterpieces of Mineralogy.* Special Supplement No. 3 to the *Mineralogical Record*, **38** (1), 192 p.

VOILLOT, P. (1994) Der wilde Weg zu den Aquamarinen. *Lapis*, **19** (11), 38-45.



Alpine Quartz Gwindels

Thomas P. Moore
3750 E. Via Palomita #34102
Tucson, AZ 85718

Beautiful, rare, and utterly distinctive-looking, gwindel quartz specimens have always been highly cherished. Gwindels form in Alpine-type clefts by complex processes which are still in some measure mysterious, and remain controversial. Truly fine, in some cases very large, gwindels have been found only in a narrow belt of localities in the central Swiss Alps; in the French part of the Mont Blanc massif; and since about 1990 in the Polar Urals of Russia.

INTRODUCTION

Recent discoveries in Russia notwithstanding, there is no type of mineral specimen which more clearly says "Alpine" than the beautiful twisted-stack habit of quartz known to English-speaking collectors (borrowing here from their Swiss-German compatriots) as *gwindel* quartz. Typically sharp, lustrous and gemmy, always distinctive-looking, the colorless to dark smoky brown gwindels from Mont Blanc, France and the central Swiss Alps have always been top-shelf collectors' items, even in collections strictly of quartz. Great stately matrix specimens showing gwindels to 20 centimeters or more across lend grandeur and gravity to many an Alpine-minerals suite, and little "closed" gwindels make up in extreme rarity and dainty charisma for what they lack in size.

In his *Mineralogy For Amateurs* (1966), John Sinkankas, considering the many types of quartz specimens, ranked Swiss gwindels behind only Japan-law twins, and just ahead of euhedral rose quartz crystals, as the most desirable, indeed the "most expensive," in the great family of quartz. Even this judgment must probably now be called obsolete, as new supplies of Japan-law twins from Peru, Madagascar and elsewhere have been lavish, and even though gwindels too have become more common since the 1960's they also have shattered old records for size and beauty. These curved, toothy, icy, flashing objects from the high Alpine clefts now probably rank as *the* most highly coveted quartz specimens among serious collectors.

The term *gwindel* (an alternative spelling is *quindel*) is of German origin; according to Warin (2005) its root is a Swiss-German patois word meaning "twisted knee." Italians, noting the twisted, or helical, shape, call gwindels *elicoidali* (Macchieraldo, 2005). In France, the terms for "open," comb-shaped gwindels are *tourné* or *peigne* ("comb"), while another term, *sucre* ("sugar"), is reserved for "closed," straight-edged, gwindels: despite their transparency these curved, blocky forms are held to resemble petite lumps of sugar (Warin, 2005). But early writers did not know *what* to call what we now call gwindels, indeed didn't know what to make of them, and sometimes said some very odd things about them . . .

A BRIEF HISTORY OF GWINDELS

According to Gautron and Žorž (1999), the first known drawing of a quartz gwindel is in a 1708 work by one Johann Jacob Scheuzer, *Beschreibung der Natur-Geschichten des Schweizerlands* ("Description of the Natural History of Swizerland")—the drawing is not described by the modern authors. Another gwindel drawing appeared in the 1784 collection catalog of one L. Tscharner, whose accompanying note calls the specimen "a little rooster comb" (Stalder *et al.*, 1998). In 1784–1786 the physician and amateur naturalist Gottlieb Konrad Christian Storr (1749–1821) was much more forthcoming: in Leipzig he published a vastly detailed two-volume work, *Alpenreise vom Jahre 1781* ("An Alpine journey of the year 1781"), describing his naturalistic investigations and musings while traveling in Switzerland. More than 70 pages of the second volume of *Alpenreise* are filled with mineralogical and petrological observations as filtered by Storr through his homemade

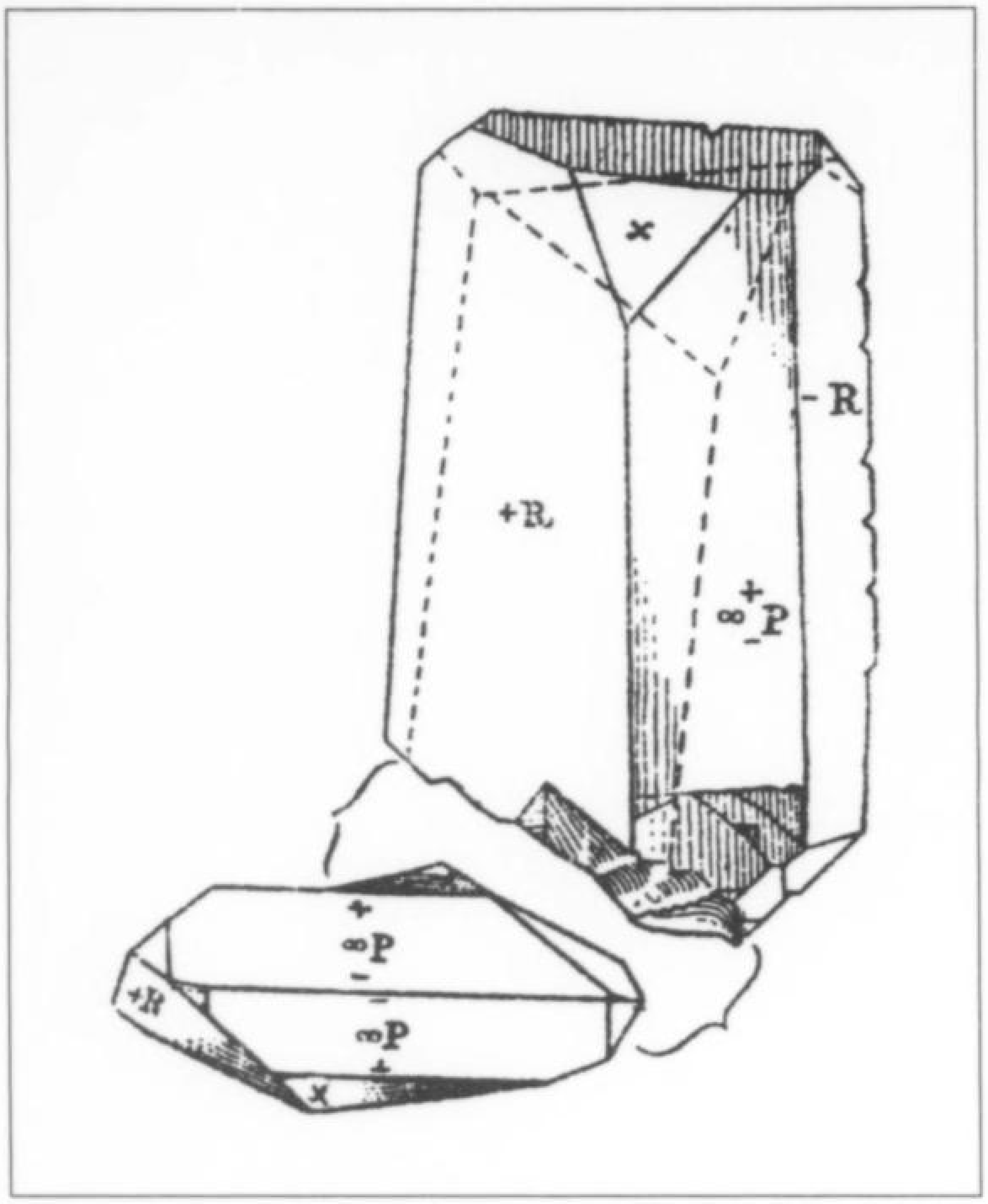


Figure 1. **Crystal drawing of a quartz gwindel from Disentis, Switzerland by Scharf (1864), *Jahrbuch für Mineralogie,* plate 9, Fig. 50.**

theories of nature and homemade terminology: he called gwindels "Schwerquarz" (hard quartz) and considered them to exemplify a distinct subspecies of quartz. The book contains a drawing of a gwindel specimen, reportedly from "Aiguilles bei Chamonix" (the Aiguilles Rouges massif, just north of the Mont Blanc massif), accompanied by the caption: "A tabular druse of Schwerquarz, which . . . both because of the pressurized formation and because of the peculiar singularity of the growth aggregate, by which the form of the quartz specimen resembles the form of Schwerspat [barite], is quite remarkable" (Schroeter, 1948). Anyway the drawing is good, and to judge from it the specimen is superb.

The first scientific description of the morphology of quartz gwindels appeared in 1836, with the work of C. S. Weiss on specimens from St. Gotthard, Switzerland. Quite accurately this observer noted that the composite stacks of crystals had grown up from matrix along the perpendicular crystallographic axis *a* and collectively appeared rotated, or twisted, about that axis, the crystals' long axes *c* all being tilted regularly either to the right or the left. He also noticed that the presence and orientation of the composite *x* or '*x* trigonal trapezohedron face (see later) betrays the handedness of the gwindel (Weiss, 1836).

About the mechanism by which gwindels form, Weiss could only speculate that the "inner crystalline qualities" of quartz as acted upon by unspecified external forces are somehow responsible. In 1882, Professor E. Reusch of Tübingen University suggested that eddies in the flows of the hydrothermal fluids depositing quartz in clefts establish "twists" in the first depositional lamellae, the twists then becoming templates for gwindel growth (Reusch, 1882).

The first descriptive classification of gwindel types came in 1894, with the work of G. Tschermak, whose nomenclature is still universally used today. Tschermak described (1) "open" gwindels, with the rhombohedral faces of individual quartz crystals forming comb-like serrations on both edges; (2) "half-closed" gwindels, with one serrated and one smooth, continuous edge, and (3) "closed" gwindels, with both edges smooth and continuous. But Tschermak (probably wrongly) regarded gwindel formation as in some way an artifact of twinning in the individual crystals, and, like Weiss before him, he regarded the "torsion" which formed the gwindels as somehow an inherent property of the crystals; Lacroix, in his *Mineralogy of France* (1892), followed this view (Gautron and Žorž, 1999).

Major writers on gwindels during the 20th century have regularly confessed in print that much about them is not understood (Frondel, 1962; Gautron, 1989; Stalder *et al.*, 1998; Warin, 2005). Among the puzzling facts as regards their occurrence are that gwindels are routinely found as mixtures of right-twisting and left-twisting forms in the same clefts, and that they routinely keep company with non-gwindel quartz: the same matrix (cleft wall) may have one or more gwindels while also having "normal" quartz prisms. As regards the process by which gwindels form, modern thinking of course has made efforts to get beyond simple invocations of mystery, but much does remain mysterious. The possible role of Dauphiné twinning and the probable role of pyroelectricity both are central in one line of thought (see later), but no settled agreement about exactly how gwindels form has yet been reached.

GWINDELS CLOSE-UP

Gwindel Morphology

Quartz crystals have four crystallographic axes: the *c* axis, which is generally parallel to the long direction of the crystal, and three identical, symmetrically arranged *a* axes perpendicular to it, emerging from the prism edges. In most specimens of "normal" quartz which collectors are used to seeing, the prismatic crystals (whether single or twinned) rise from the matrix with the long crystallographic *c*

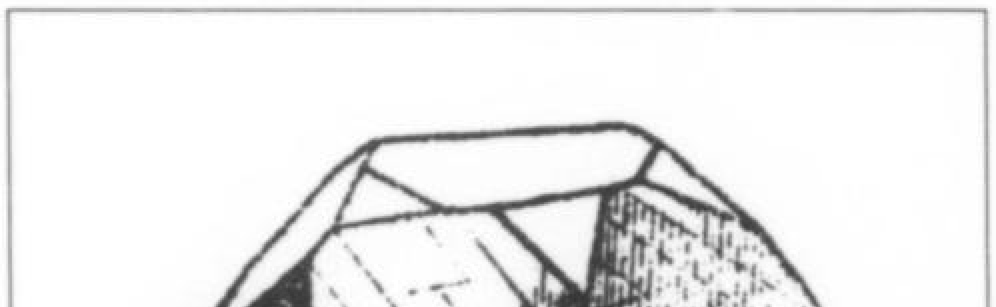


Figure 2. **Crystal drawing of a quartz gwindel from Switzerland by Sadebeck (1876), *Krystallographie,* plate 9, Fig. 215.**

axis more or less vertical, and are terminated by two alternating but usually unequal rhombohedrons. Gwindels, by contrast, are aggregate forms in which a bottom or "root" crystal lies horizontally on its prism edge (i.e. it is attached at the end of an *a* axis). A single, slightly rotated stack of crystals extends vertically from it, creating a twisted tabular aspect. The "root" crystal typically has its *c* axis more or less parallel to the matrix, as do all of the other, subparallel crystal domains which stack upon it to form the gwindel. The vertically oriented prism faces of the crystals in the stack merge, causing the final form of the gwindel to appear tabular.

During growth, the gwindel acquires a "twist" such that we can imagine that all the crystals' *c* axes have been rotated progressively, either clockwise or counterclockwise, around the communal, vertically oriented *a* axis. The observed angle of twist in either case is almost always between 1° and 5° per centimeter, with an average value of 3.7° (Frondel, 1962; Rykart, 1989; Warin, 2005)—although Stalder *et al.* (1998) give 13° per centimeter as the top of the normal range. By measuring several hundred gwindel specimens from world localities, Gautron and Žorž (1999) have determined statistically that an apparent range of twist values between 1° and 5° per centimeter exists because a scale factor is involved, i. e. that the degree of twist is a function not just of the height of the gwindel but of the ratio of the thickness to the height. They calculated a "twisting constant" of 4°. In the simplest case, this means that for a twisted quartz crystal with a cross-section measuring 1 × 1 cm (not yet developed into the tabular gwindel habit—the ratio of height to thickness is 1), the amount of twist would be about 4°, but as the gwindel elongates vertically into the typical tabular shape its ratio of height to width increases along with the total amount of twist; the most extreme case observed by Gautron and Žorž is a gwindel from Val Strem, Graubünden, Switzerland measuring 21 times taller than it is thick, with an amazing 84° of twist. The 4° twisting constant of Gautron and Žorž (1999) is in rough agreement with the average of 3.7° per centimeter observed by Frondel (1962).

The terminations of the "root" crystal are the usual alternating positive (*r*) and negative (*z*) rhombohedrons, the *r* faces generally being larger than the *z* faces. As the gwindel elongates into a tabular shape, each of the two termination faces that intersect the large composite prism face on each end also elongates vertically to form a chisel-shaped edge that is gently and smoothly curved. But, because the *r* and *z* faces alternate around the trigonal termination, the rhombohedron *r* face on one side of the chisel edge meets a rhombohedron *z* face at the edge, and since the *r* face is dominant, it often creates a much wider bevel on its side of the edge. In some cases the merged dominant rhombohedrons form a zone as large as the merged prism faces: such gwindels, with smooth, gently curving chisel-edges on both ends, are the so-called "closed" gwindels.

Closed gwindels—the transparent, smoothly curved *sucres* beloved of collectors—are much rarer than open gwindels and almost never measure more than 5 cm (Gautron and Žorž, 1999). This suggests that they may represent the earliest phase in the growth of a gwindel. If a closed gwindel continues to grow it will thicken and swell, with comb-like serrated edges gradually appearing, first on one side and then on the other. During the process the vertical chisel-shaped edges formed by the merging or extending of the terminal rhombohedron faces on each end begin to break up into a vertical series of points, and the chisel-edge takes on a serrated aspect; in "half-open" gwindels the row of points is relatively fine-scale and appears on only one side of the gwindel, the other side retaining its continuous chisel-edge.

Gautron and Žorž (1999) describe in some detail a process of selective deposition of quartz along edges of the closed, "baby" gwindels, then a gradual, slower evolution of closed through half-open to fully open forms as the gwindel's size increases. The same writers, and Žorž (2002) alone, further propose that if fully open gwindels continue to grow (more in thickness than in height) they may in some cases "regress" to more closed-looking forms, the rhombohedral teeth of the combs on their sides merging once again into a single (but more equant) composite pyramid face. This may be a result of the declining ratio of height to thickness, and the reduced amount of twist attainable in the fatter crystals. These "old," larger and thicker, semi-closed gwindels at last evolve into rather blocky tabular shapes which look superficially like single crystals of orthorhombic aspect (it was such a gwindel that made G. C. K. Storr think of barite), with many intricate steps and notches betraying their composite nature but with a much reduced degree of twist. Some "old" gwindels, too, may show chlorite-outlined phantoms which testify to prior stages of growth.

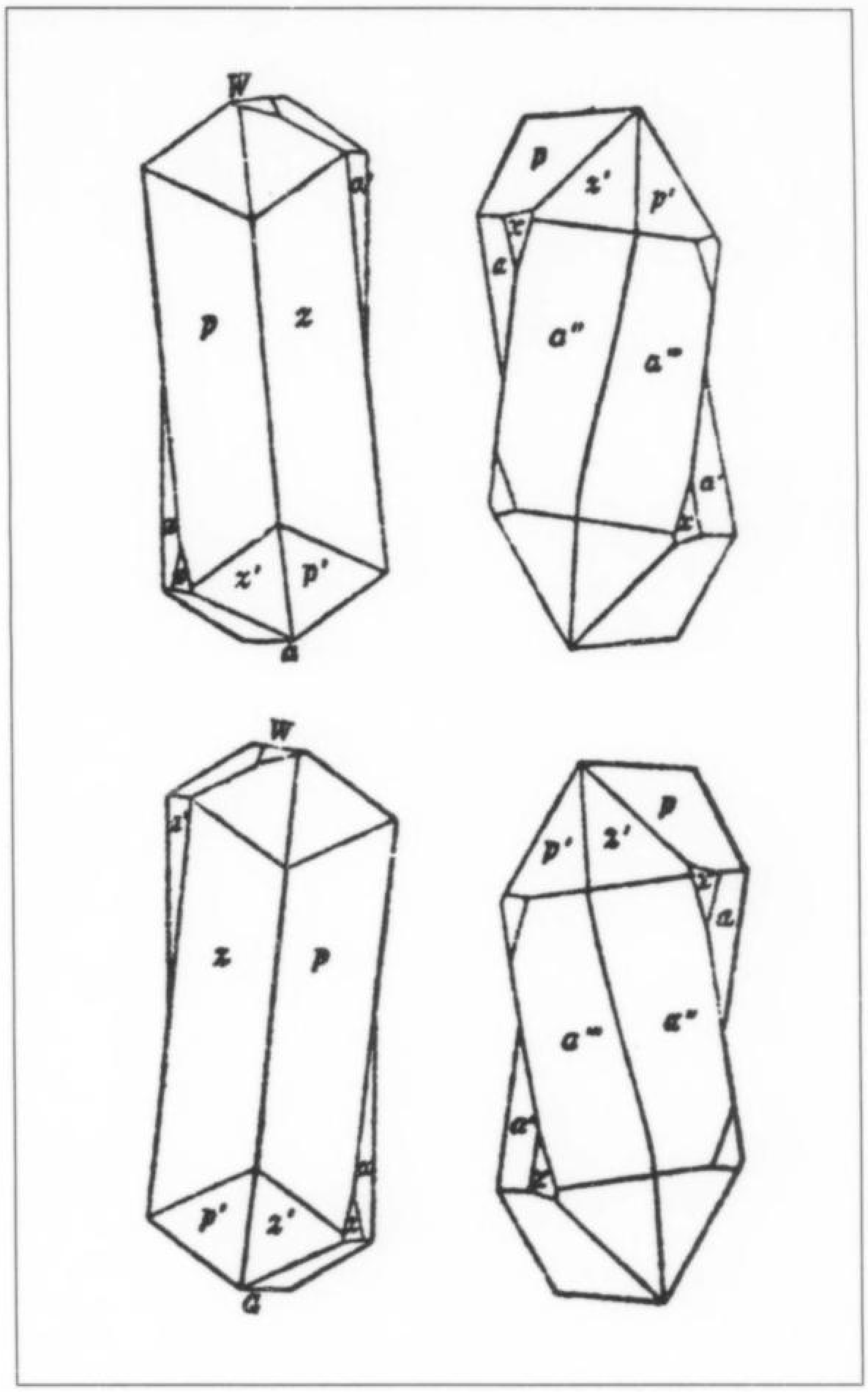


Figure 3. **Crystal drawings showing left-handed and right-handed quartz gwindels from Switzerland; by Tschermak (1894), *Wien. Denkschrift*, plate 4, Figures 19–22.**

Enantiomorphism ("handedness") in the structure of quartz is clearly a factor in the development of gwindels. All crystals and crystal domains in any particular gwindel *must* be of the same handedness, either right-handed or left-handed (Warin, 2005). Consequently there is no obstacle to the development of a gwindel from a crystal with Dauphiné twinning, since both members of the penetration twin are of the same handedness, just rotated about the *c* axis. Quartz twinned on the Brazil law, however, cannot form gwindels because the two components of the twin are of opposite

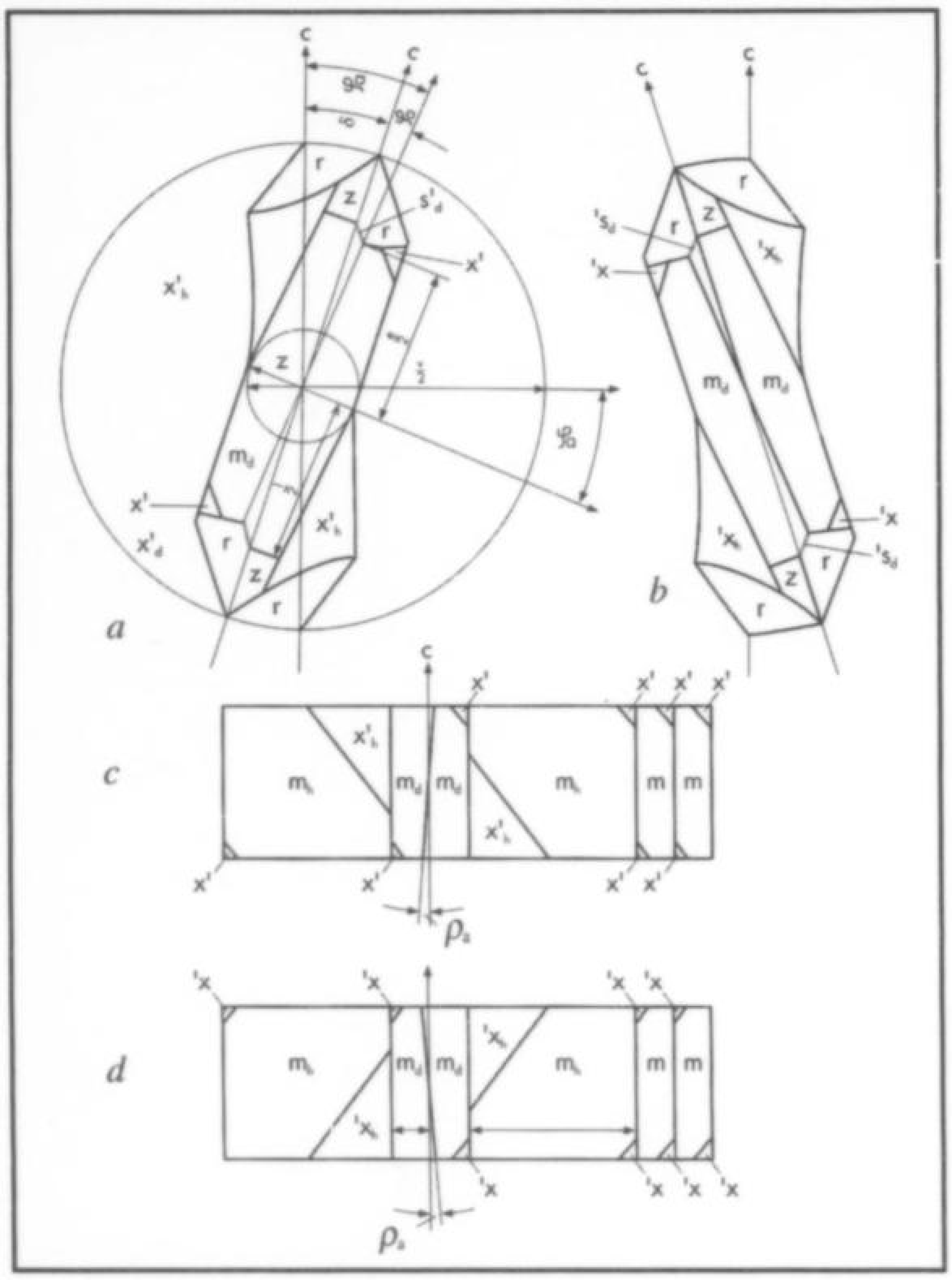


Figure 4. **Angular measurements relative to crystallographic forms used in describing "twist" of quartz gwindels (Gautron and Žorž, 1999).**

handedness. The handedness of a quartz crystal or twin determines the direction of the twist of the gwindel, either clockwise (right) or counter-clockwise (left). Left-twisting and right-twisting gwindels are equally common in nature.

In individual quartz crystals we can distinguish handedness only if faces of the trigonal trapezohedron *x*, very commonly accompanied by the trigonal pyramid *s*, are present. Looking at a single crystal whose major forms are the first-order prism *m* $\{10\bar{1}0\}$, the positive rhombohedron *r* $\{10\bar{1}1\}$, and the negative rhombohedron *z* $\{01\bar{1}1\}$, we know that the crystal is right-handed if it shows the trigonal trapezohedron *x* $\{51\bar{6}1\}$, commonly also with the trigonal pyramid *s* $\{11\bar{2}1\}$, extending toward the upper right from the upper-right corner of the *m* face. We know that it is left-handed if it shows the trigonal trapezohedron '*x* $\{6\bar{1}\bar{5}1\}$ and trigonal pyramid '*s* $\{2\bar{1}11\}$ extending toward the upper left from the *m* face.

In the tectosilicate structure of quartz, in which there is no center of symmetry, enantiomorphism results from how the tetrahedral SiO_4 polyhedra connect, at their points, to form helical chains, which, like spiral staircases, turn either clockwise or counterclockwise. The chirality on the atomic scale is opposite to that observed in the visible euhedral crystal: left-spiraling structures give rise to right-handed crystals, and vice versa (Frondel, 1962). In similar, seemingly perverse fashion, a gwindel composed of individual right-handed crystals twists to the left, and a gwindel composed of left-handed crystals twists to the right (Frondel, 1962; Rykart, 1989).

The *a* axes of quartz are polar, and Frondel (1962) has noted that the end attached to matrix is always the negative end, and that the free end (and thus the direction of gwindel growth) is always the positive end—that is, the end that becomes electrically positive when the crystal is compressed. The polarity is the same regardless of

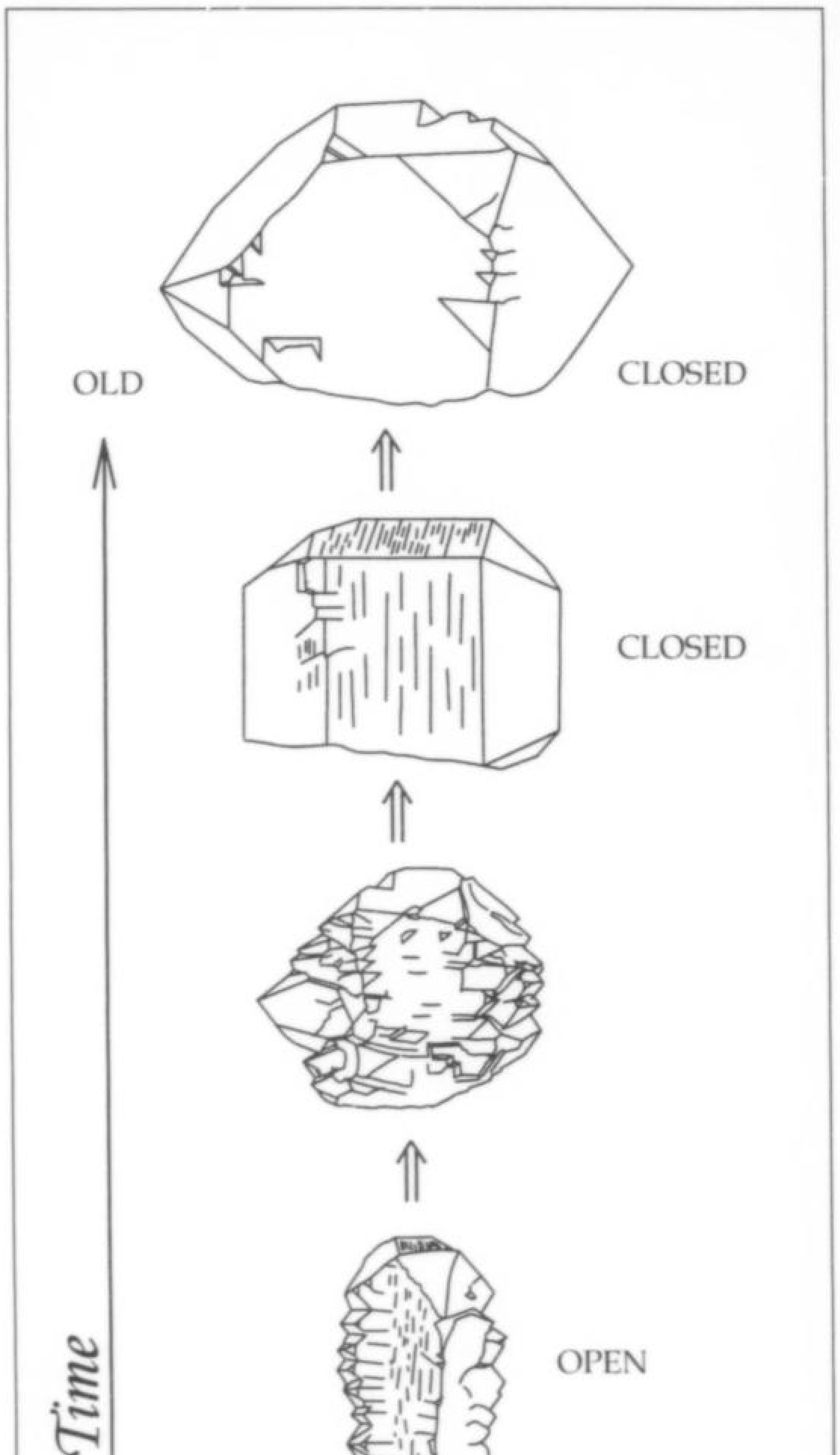


Figure 5. **Morphological evolution during the growth of a quartz gwindel, from a small and simple "closed" gwindel, through "half-open" (or "half-closed"), to fully "open," and finally to "closed" again (Gautron and Žorž, 1999).**

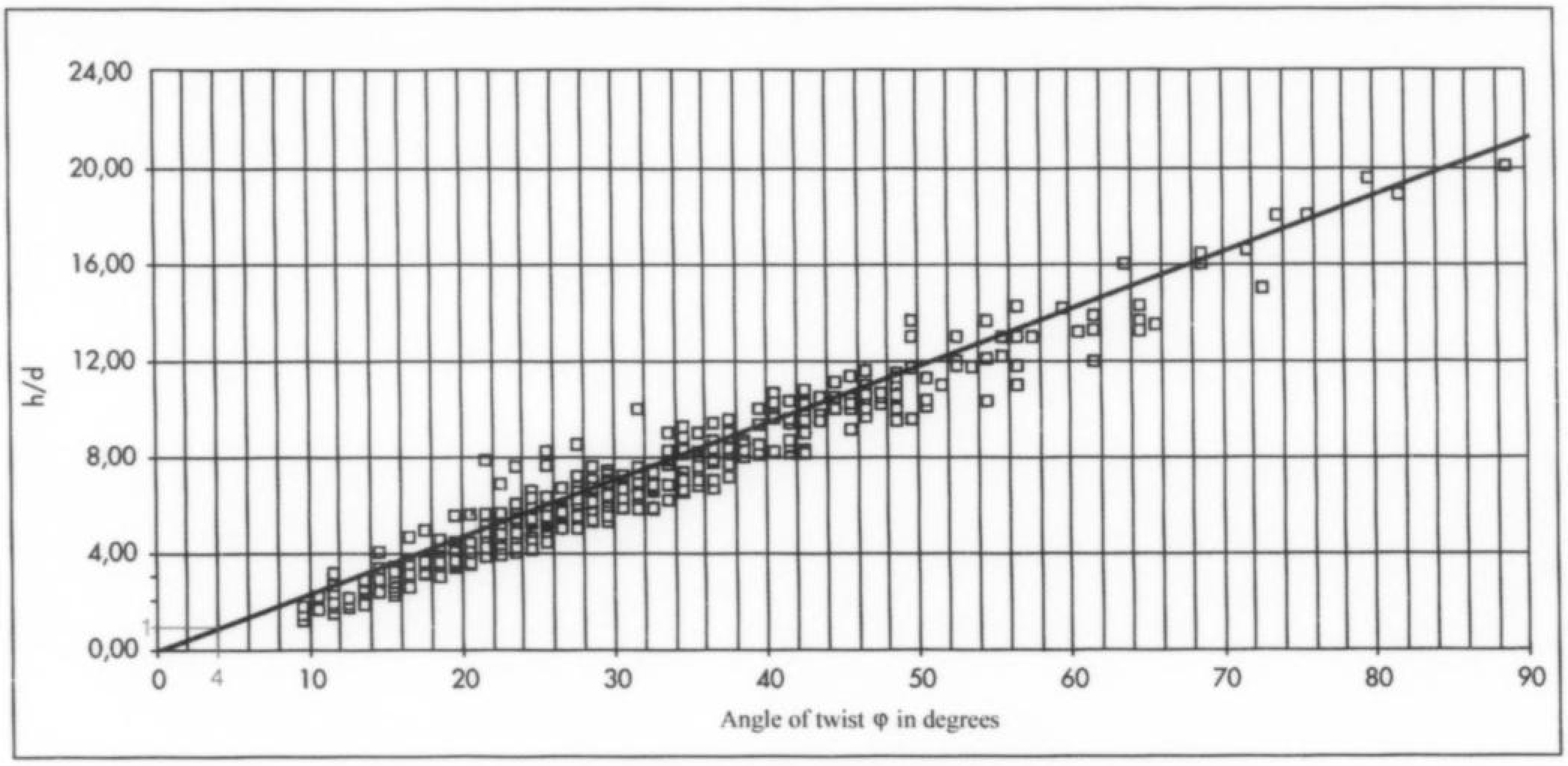


Figure 6. **Empirical/statistical determination of the 4-degree twisting constant for quartz gwindels, based on the measurement of many gwindels (Gautron and Žorž, 1999).**

the handedness of the crystals. Interestingly, rare twisted prismatic crystals are known in which the (non-polar) *c* axis is more or less vertical. (These appear to be "normal" unflattened crystals twisted about the *c* axis like a drill bit, but such a twist is geometically equal to a twist about an *a* axis.) In extremely rare cases a crystal twisted about *c* can develop into a tabular gwindel by growing sideways, in the positive direction of an *a* axis. Such a specimen was seen at the 2006 Denver Gem and Mineral Show.

When trigonal trapezohedron faces (*x*) are present on a gwindel they typically benefit from the twist, as the *x* faces on the stacked component crystals are brought into planar alignment with each other and merge into one enlarged face. Especially in young, rapidly growing closed gwindels, with small individual crystal domains merging smoothly, a very large aggregate *x* face is typically formed; it is a wide, shallow-angled, triangular bevel over much of the front of the composite crystal (Žorž, 2002)—see the photos of closed gwindels shown here. As the gwindel grows and opens, the composite *x* face ramifies into steplike forms; the gwindel now takes on its "crystalline wave" appearance (as it is often called—Warin 2005), having become a thing of complex, flashing beauty, reflected light coming at the observer in rhythmic waves from many domain faces, including a curving, multi-stepped *x*.

A Gwindel Formation Process (?)

The foregoing qualitative description is, of course, a simplication of matters which can be described in quantitative detail, taking established principles of crystallography and of the physics of crystal growth as axioms. Still greater simplification is necessary if we turn now to theories regarding the mechanism of gwindel formation. As mentioned, no theory on this has yet acquired the status of orthodoxy.

In considering the possibilities we must be careful not to make unfounded assumptions. For example, it is convenient to describe gwindels as having developed from an off-set stack of very thin but crystallographically normal crystals of quartz—but there is no proof of this. Frondel (1962) noted the existence of very small, tightly twisted fibers of quartz in chalcedony, and suggested that something akin to spiral dislocations might be responsible; the amount of twisting in affected crystals may decline as crystal size increases. In fact, Gautron and Žorž (1999) clearly seem to assume that the initial prismatic crystal on which the later domains are stacked to create a typical gwindel was itself already twisted to begin with. Wendell Wilson (personal communication) speculates that an ordinary, untwisted, horizontally lying quartz crystal might not be sufficient as the starting point for a gwindel, but rather that an initial twisted-prismatic phase would have to be involved before the growth direction switched to be parallel to an *a* axis. It is difficult to envision how a prismatic quartz crystal, growing with elongation parallel to *c*, could have grown that way via layers being added on one *side*, parallel to *c*, so perhaps, by this line of thought, the subsequent growth of gwindels in the direction of the *a* axis merely extends the twisted structure of the original "root" crystal.

Žorž (2002), in his book *The Symmetry System*, suggests that crystal growth, symmetry and habits are heavily influenced by electrical properties of crystal structures. In his system the crystallographic unit cell is largely replaced by the "orbital polyhedron," the inherent pattern of spatial distribution of positive and negative electromagnetic charge— proton and electron densities—in the crystal's structure. This charge distribution perforce "must correspond to" the symmetry of the crystal as expressed in the familiar terms of the 32 point groups of the six crystal systems—"charge densities and symmetries [in the older sense] are closely interwoven," he admits—but the axiomatic point Žorž proposes is that crystals possess electromagnetic axes just as they possess geometric crystallographic axes. But electromagnetic axes, unlike crystallographic axes, may change in response to changes in surrounding conditions, and this kind of change can warp the shape of the resulting crystals. An orbital polyhedron adapts immediately to any pressure or temperature change during crystal growth, and the growth in turn is conditioned by changes in the electromagnetic regime.

Along these same lines, Gautron and Žorž (1999) suggest that gwindels are products of pyroelectrically accelerated growth from slowly cooling, supersaturated silica-bearing solutions: a pyroelectric charge on the quartz prism faces somehow causes regular offsets in crystal domains. But it does not seem clear just *how* the electromagnetic phenomena express themselves in the offset stacking of crystals; nor is it clear why the authors assume that "the twisting of quartz crystals is conditioned by Dauphiné twinning" (Gautron and Žorž, 1999). All of the gwindels from Mont Blanc which the authors studied are twinned on the Dauphiné law, and this perhaps

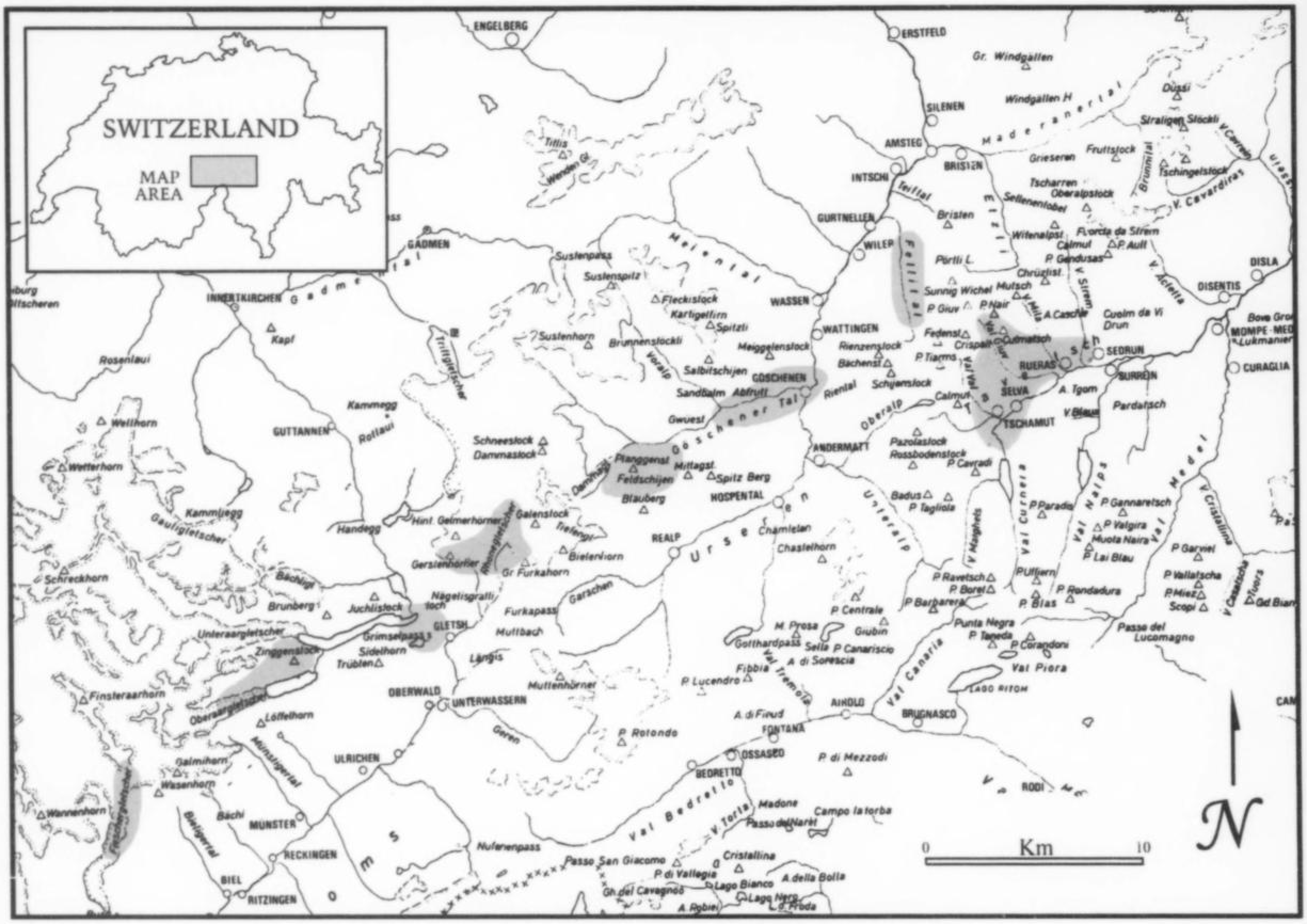


Figure 7. **Geographical distribution of quartz gwindels in Switzerland, primarily in a narrow belt from the Fellital and Tavetsch areas in the northeast to the Fieschergletscher in the southwest.**

is why they assume that such twinning is a necessary precondition for gwindel formation—but also they worry on the page about a 1967 French university dissertation describing Mont Blanc gwindels *not* composed of Dauphiné twins; and Frondel (1962) generalized that "Both Brazil and Dauphiné twinning appear to be relatively rare in twisted crystals [gwindels]." In fact, as already mentioned, it is impossible for Brazil-law twins (incorporating, as they do, both left-handed and right-handed domains) to form gwindels.

Clearly, mysteries remain, and readers are welcome to puzzle over the process of gwindel formation. Remember that any theory aspiring to explain the process must account for various empirical observations:

(1) The fact that gwindels and normal quartz crystals may coexist in the same pocket.
(2) The preponderance of gwindels generated from more or less flat-lying crystals.
(3) The 4-degree twisting constant.
(4) The great preponderance of medium-smoky color in gwindels (colorless and very dark "morion" gwindels are very rare, and amethystine gwindels are almost unknown).
(5) The predominant restriction of gwindel formation to Alpine cleft-type environments.
(6) The apparent nucleation of gwindels as elongated prismatic crystals.

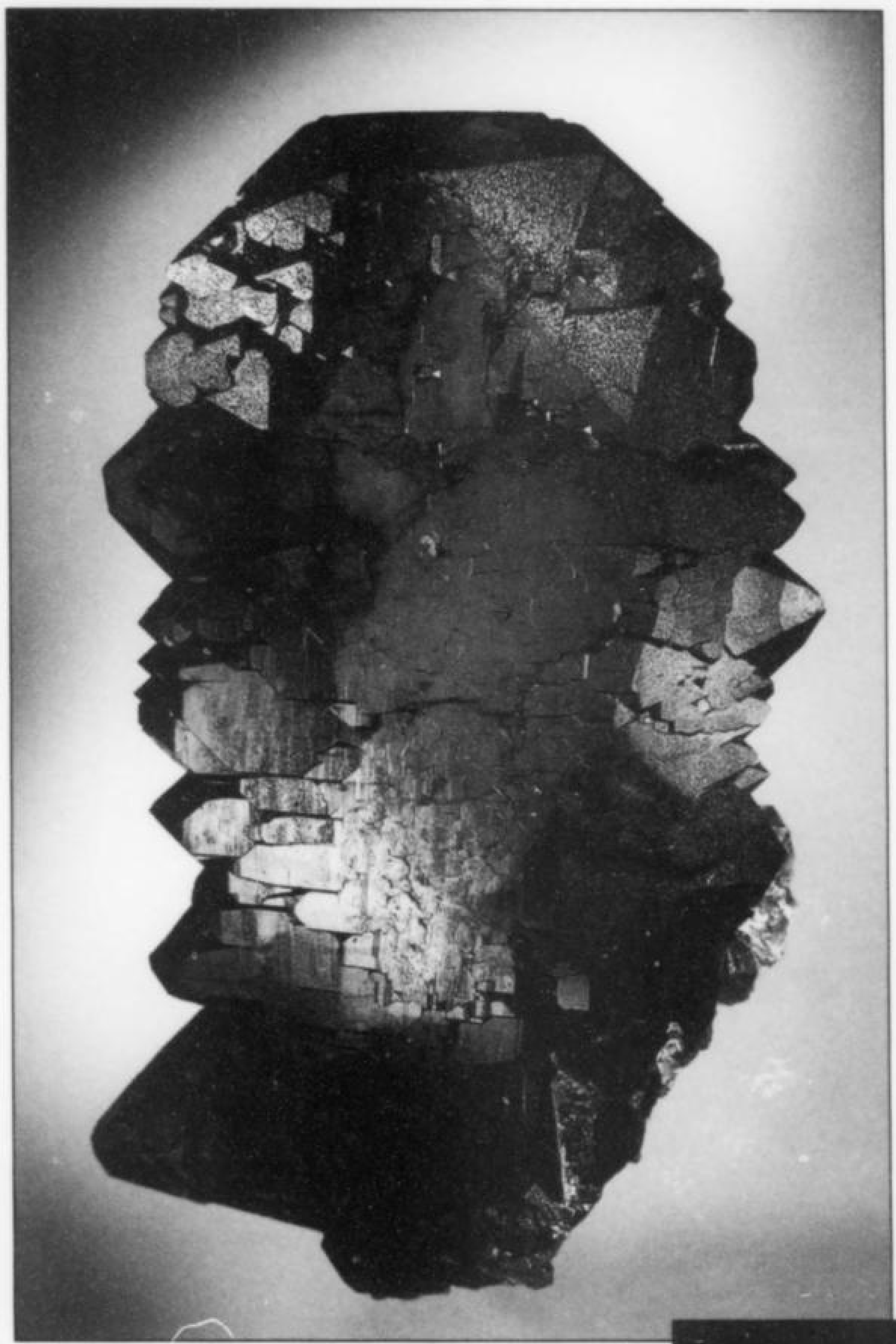
Let us now wade back out of the marshlands of theory and, having looked at *what* gwindels are, survey *where* they are.

OCCURRENCES OF GWINDELS

Geologic Setting: the Central Alps

The Alps of central Europe are products of a still-ongoing orogeny which began about 80 million years ago, when the African plate, moving north, met the Eurasian plate, and the Tethys Sea (whose modern-day relic is the Mediterranean Sea) began to close and disappear. The modern Alpine mountain belt is marked on its southern margin by complex ophiolitic rocks of the microplate which bears Italy and is still being squeezed up against Europe, while the Alpine core, bearing the highest mountains, is characterized by granitic massifs with elongations running generally parallel to the mountains' large-scale strike, i.e. east-northeast to west-southwest.

Switzerland's most cleft-rich regions and most storied mountains belong to the Aare and Gotthard granitic massifs, separated by the narrow valley of the Upper Rhône River, whose underlying structure is called the Tavetsch "intermediate" massif. The Aare and Gotthard granite bodies originally were plutons intruded during the early Paleozoic into Precambrian gneisses. According to an older view (see Parker, 1973), they are *autochthonous* (formed in the same place where they are now found), having been uplifted during the later orogeny without being laterally displaced, while the older gneisses enclosing them underwent folding and thrusting. A more recent view is that the granite massifs are *parautochthonous*, i.e. displaced, in this case to the north, while parts of them also were partially folded and overturned, so that they are nappes in part,



almost as intensely deformed as the gneisses which neighbor them on the high peaks (Graeser, 1998).

In any case it is safe to generalize that, as a consequence of the compression of the felsic crust while the Tethys floor was subducting under Europe, the granites and gneisses experienced degrees of deformation which varied locally. At the same time (as has long been agreed), the orogeny's violence led to the formation of mineralized clefts. Tension gashes split open in "pressure shadows" as granites and gneisses yielded (with imperfect plastic deformation) to tectonic pressures. Remobilized fluids derived from the rocks then deposited crystals on the cleft walls. Areas which suffered the most intense deformations are richest in clefts; for example, the central and southern parts of the Aare massif, the whole of the Gotthard massif, and the central part of the Mont Blanc granitic massif to the southwest, are extremely cleft-rich, while tectonically quieter areas to the north and northeast of these are relatively cleft-poor (Parker, 1973; Arlt, 2004a). Persistent *Strahlers* (professional Alpine mineral collectors) who for centuries have been opening clefts on Mont Blanc and at hallowed sites in the Aare and Gotthard massifs have been digging crystals which are as young (or as old) as the Alps themselves, for these mountains belong to the youngest of earth's generations of mountain belts.

Gwindels of the Central Swiss Massifs

Parker (1973) offers a complex scheme, inter-relating geographical, geological and mineralogical elements, for classifying Swiss Alpine clefts. In this scheme the two most commonly occurring cleft parageneses (with subtypes, ignored here) embrace most of the finest mineralized clefts of the central massifs; Parker (1973) calls these parageneses *Fundortgruppe 4* (Locality Group 4, dominant in the western and central parts of the region) and *Fundortgruppe 3* (Locality Group 3, dominant in the east). Their mineral lists are

Figure 8. **Smoky quartz gwindel, 11 cm, from the Fellital, Uri, Switzerland. Bruno Bonetti collection; Thomas Schüpbach photo.**

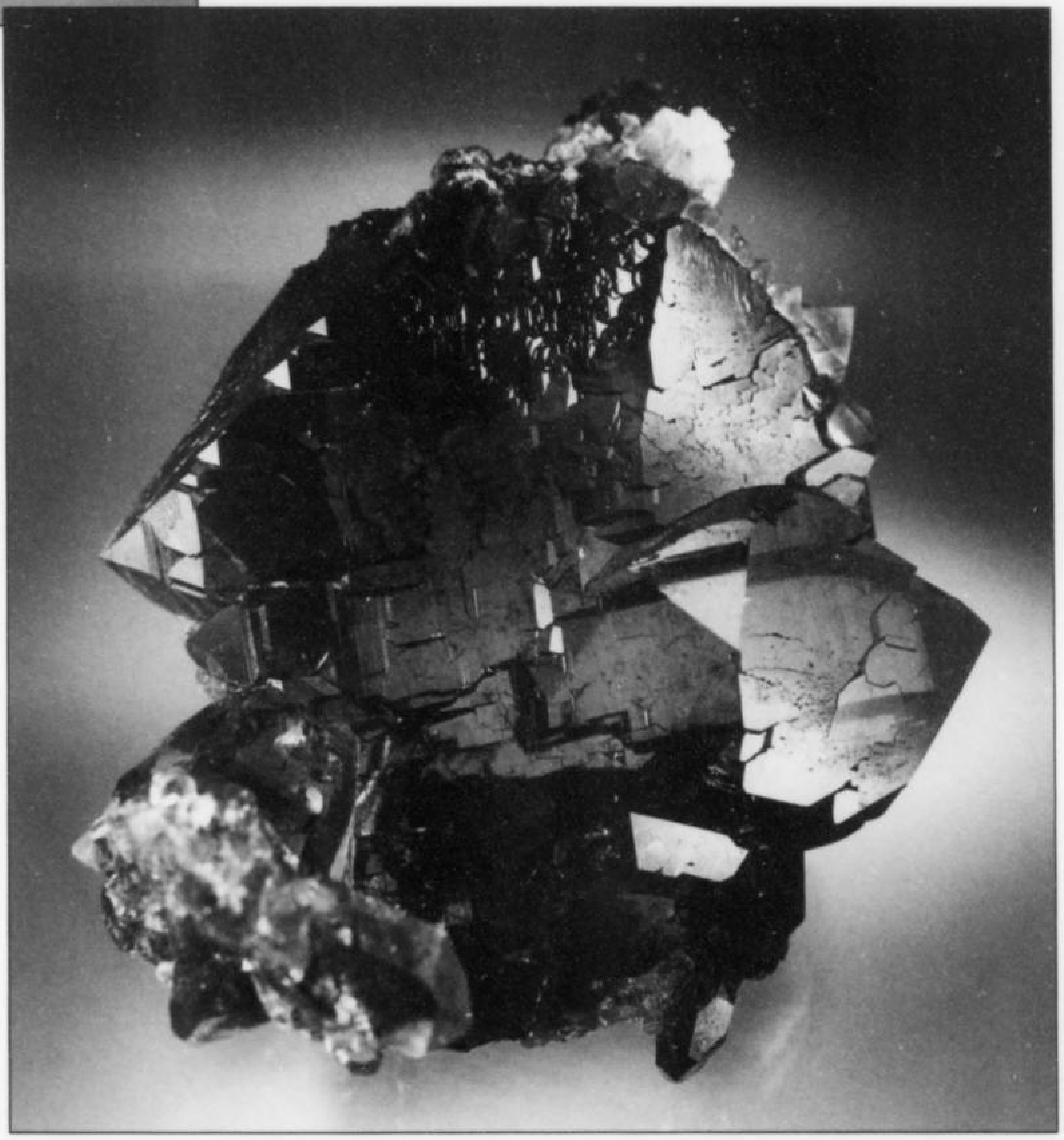
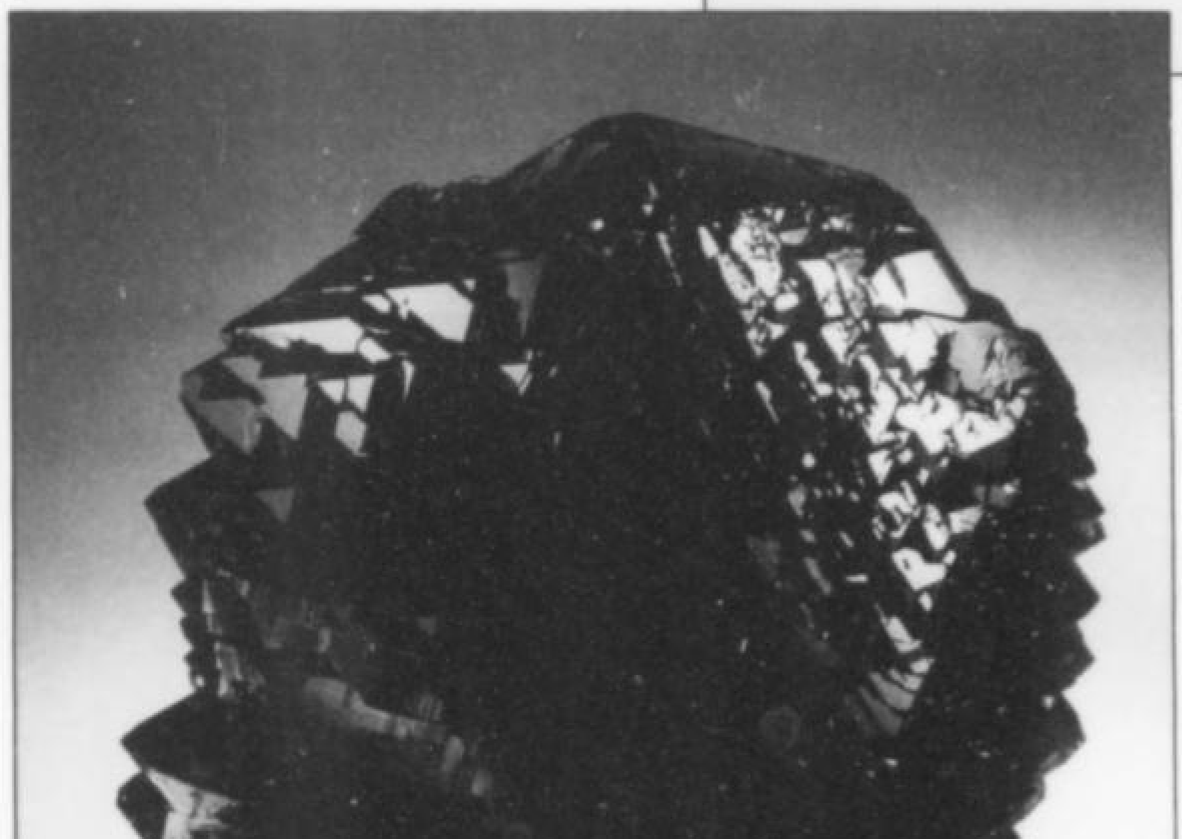


Figure 9. **Smoky quartz gwindel with pink fluorite crystals, 9 cm, from the Göscheneralp, Uri, Switzerland. Frank Woldert collection; Thomas Schüpbach photo.**

Figure 10. **Smoky quartz gwindel, 6.5 cm, from the Göscheneralp, Uri, Switzerland. L. Beeler collection; Thomas Schüpbach photo.**

Figure 11. **Smoky quartz gwindel, ca. 9 cm, from the Göscheneralp, Uri, Switzerland. D. von Flüe collection; Thomas Schüpbach photo.**



headed by quartz, as are, to be sure, the lists of nearly all others of Parker's *Fundortgruppen*, but *3* and *4* are the only assemblages in which quartz commonly—or at least more than very rarely—forms gwindels. In the more widespread *Fundortgruppe 4* the most common species after quartz are fluorite and calcite; the fairly common species are orthoclase ("adularia"), albite ("pericline"), chlorite, fluorapatite and hematite; subordinate species include epidote, titanite, pyrite, anatase, brookite and a few zeolites. *Fundortgruppe 3* is very similar, but orthoclase ("adularia"), actinolite (fibrous "amianthus"), apophyllite and zeolites are more common than in *4*; milarite is found, very rarely, in *3* alone.

The mineralized clefts showing these parageneses are distributed through a zone of the Gotthard and southern Aare massifs with an axis running roughly between the Fellital, in the east-northeast, through the Göschener Valley, the Furka Pass and Grimsel Pass areas, the Zinggenstock, and finally, in the west-southwest, to the Fieschergletscher (Fiesch Glacier, above the village of Fiesch). In its southern margin, where clefts are most numerous, the zone encompasses the Gotthard Pass area and, to its east, the region of the Upper Rhône Valley called Tujetsch (formerly Val Tavetsch), where the little stream drainage called Val Giuv has produced many of Switzerland's very finest gwindels.

Mineralized clefts in the granites, granodiorites and gneisses of the region reach greater dimensions than do clefts anywhere else in the Alps, and individual quartz crystals found in them may approach 1 meter long. Some spectacular discoveries have become legendary: a famous cleft opened in 1719 on the Zinggenstock produced 300,000 kg of quartz crystals (Gautron, 1989), and the great quartz crystal grotto discovered on the Tiefengletscher in 1868 (for good accounts see Wilson, 1984b, and Gautron, 1989) measured 2 × 4 × 6 meters and yielded 14,500 kg of magnificent, very dark smoky quartz prisms, some reaching 95 cm long. During the early 1960's the master strahlers Hans and Ernst Rufibach and Kaspar Fahner found several mega-clefts of smoky quartz on the Zinggenstock, the Rufibachs taking out great crystal plates to 1 square meter (Rufibach, 1979). In most cases the quartz of these clefts is transparent and highly lustrous, with an icy-pristine look which is hard to describe but which experienced collectors recognize as distinguishing Swiss Alpine quartz. The crystals may be totally colorless, or of the totally

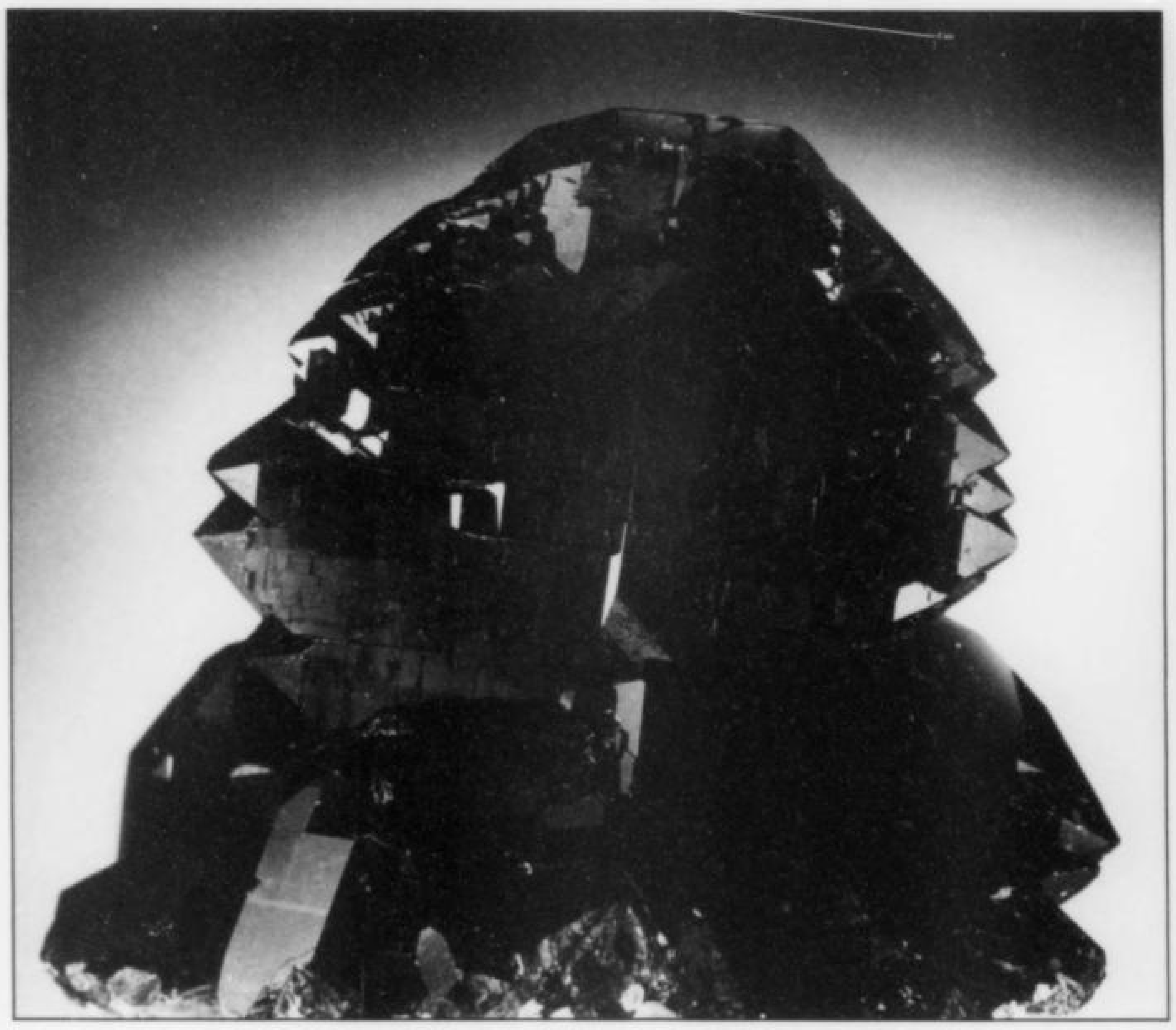


Figure 12. **Smoky quartz gwindel, 8 cm, from the Göscheneralp, Uri, Switzerland. L. Beeler collection; Thomas Schüpbach photo.**

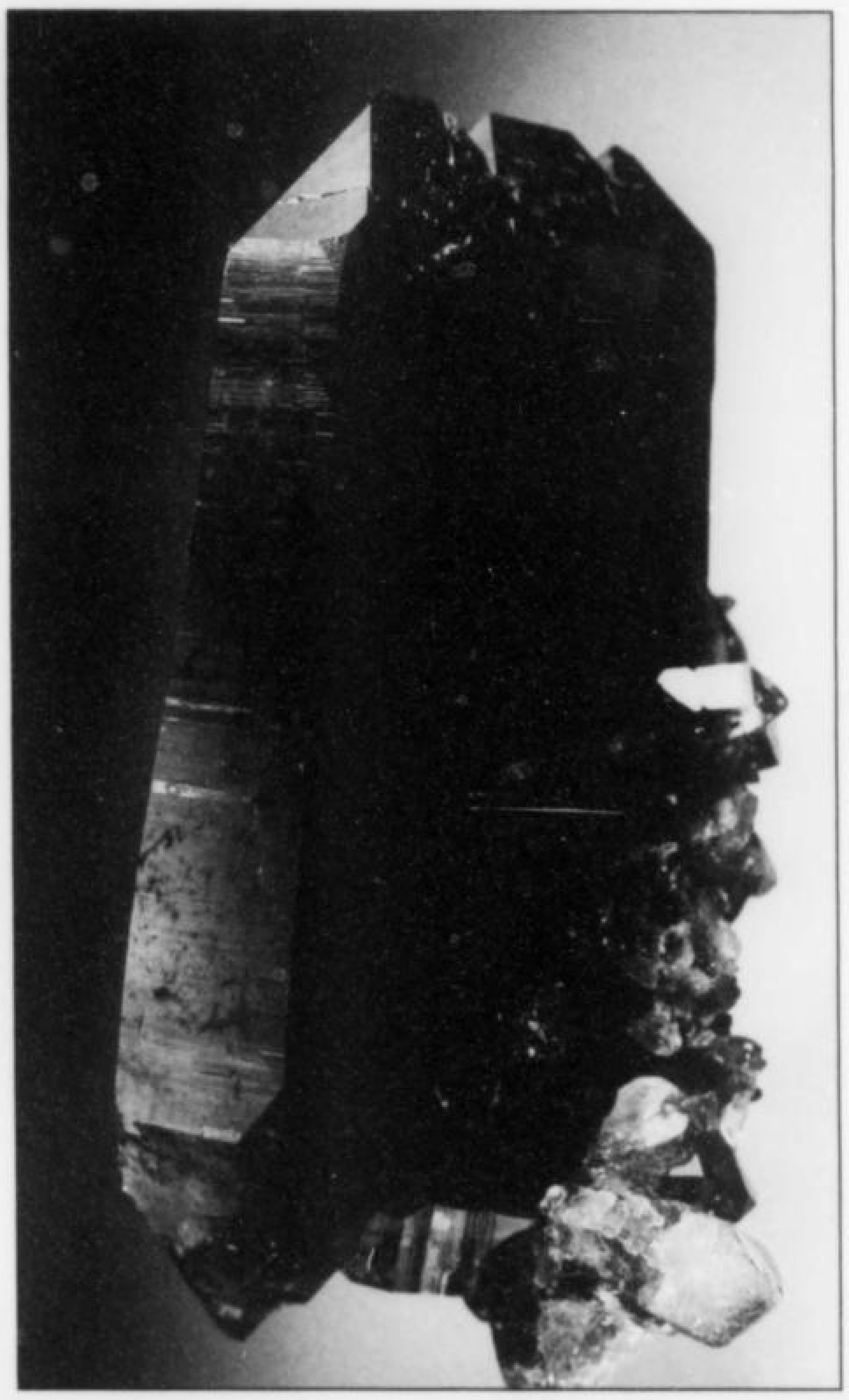


Figure 13. **Smoky quartz "closed" gwindel, 8.5 cm, from the Göscheneralp, Uri, Switzerland. L. Beeler collection; Thomas Schüpbach photo.**

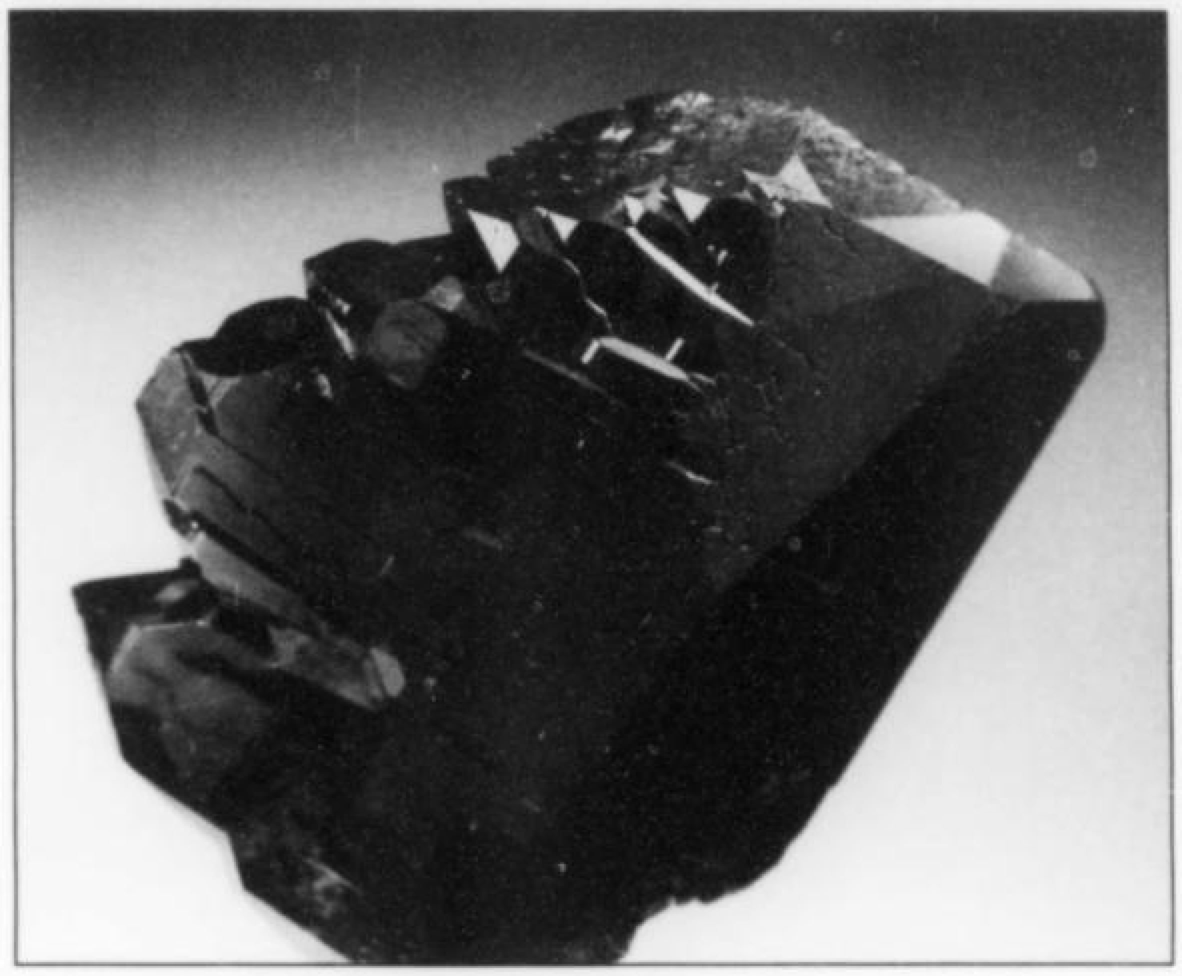


Figure 14. **Smoky quartz "half-open" gwindel, ca. 4 cm, from the Göscheneralp, Uri, Switzerland. L. Beeler collection; Thomas Schüpbach photo.**

black variety that Europeans call "morion," or of any intermediate degree of smokiness. Gwindels, too, vary widely in smokiness, even within single clefts—and some single clefts in the region have given up well over a hundred gwindels (Parker, 1973).

A few important Swiss gwindel discoveries of the past few decades are listed below, roughly in geographical order from west to east.

H. Streun and Kaspar Fahner opened several large clefts on a ridge of the ***Zinggenstock*** during the 1950's. Besides calcite, orthoclase ("adularia") and fluorite crystals, many beautiful specimens showing gwindels of very dark smoky quartz on a matrix of Aare granite were taken out. The collecting sites lie very near a quartz vein from whose pockets Hans and Ernst Rufibach dug many tons of "normal" smoky quartz specimens in a famous find of 1966 (Parker, 1973).

While the ***Oberaar Power Station, Grimsel region*** was being constructed during the early 1950's, many rich clefts yielded wonderful mineral specimens, including some with octahedral pink fluorite crystals to 17 cm on edge. A cleft in a drainage tunnel produced half-open and open gwindels to 20 cm across associated with pink fluorite, orthoclase, and microcrystals of fluorapatite and milarite (Parker, 1973).

A cleft opened in the mid-1990's on the ***Scheuchzerhorn,*** near the Oberaargletscher, proved to harbor a gwindel bonanza on one of its walls: over a surface 2.8 meters long were scattered 138 open gwindels and 15 closed and half-open gwindels—the wall was removed in seven sections (Stalder *et al.*, 1998).

In 1948 a tongue of the Gerstengletscher, just north of the Grimsel Pass, underwent large-scale melting, creating fresh rock exposures, and Hans and Alexander von Bergen were able to open a cleft which produced 770 kg of quartz crystals of many habits. The giant cleft did not contain gwindels—but a site very nearby called ***Tafelgrätli*** (roughly, "little flat ridge") produced fine gwindels even before the1948 find and continued to do so for some years thereafter (Parker, 1973).

A major cleft opened in 1958 at the ***Göschenen Power Station*** proved to contain a number of very large gwindels associated with lustrous, transparent, pale pink fluorite octahedrons to 2 cm and tabular white calcite crystals. Some marketed specimens from this occurrence were said, inaccurately, to have come from "Göschenen, Stäupliloch" (Parker, 1973).

The peak of the mountain called ***Feldschijen*** is a mere 1.5 km

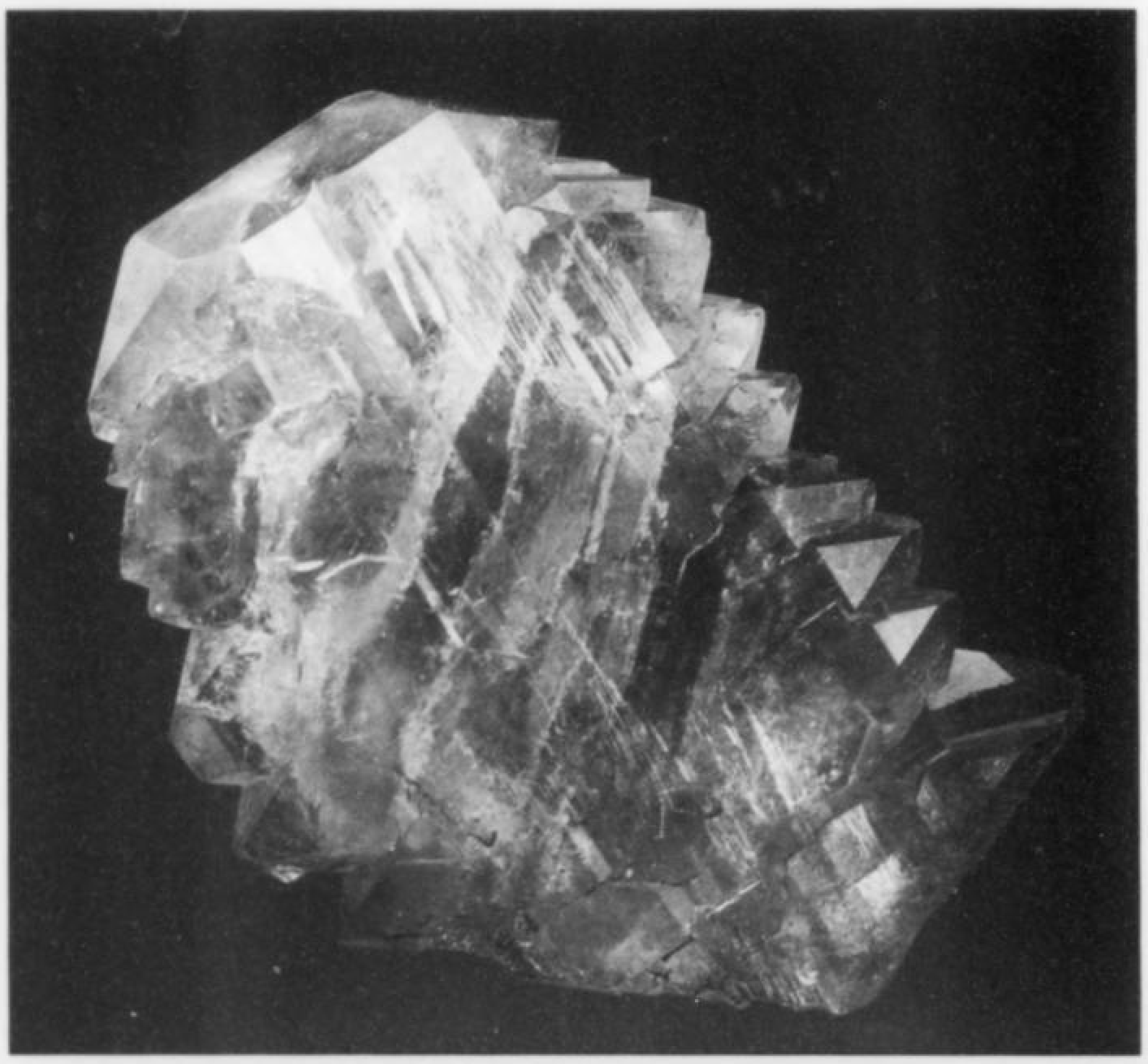
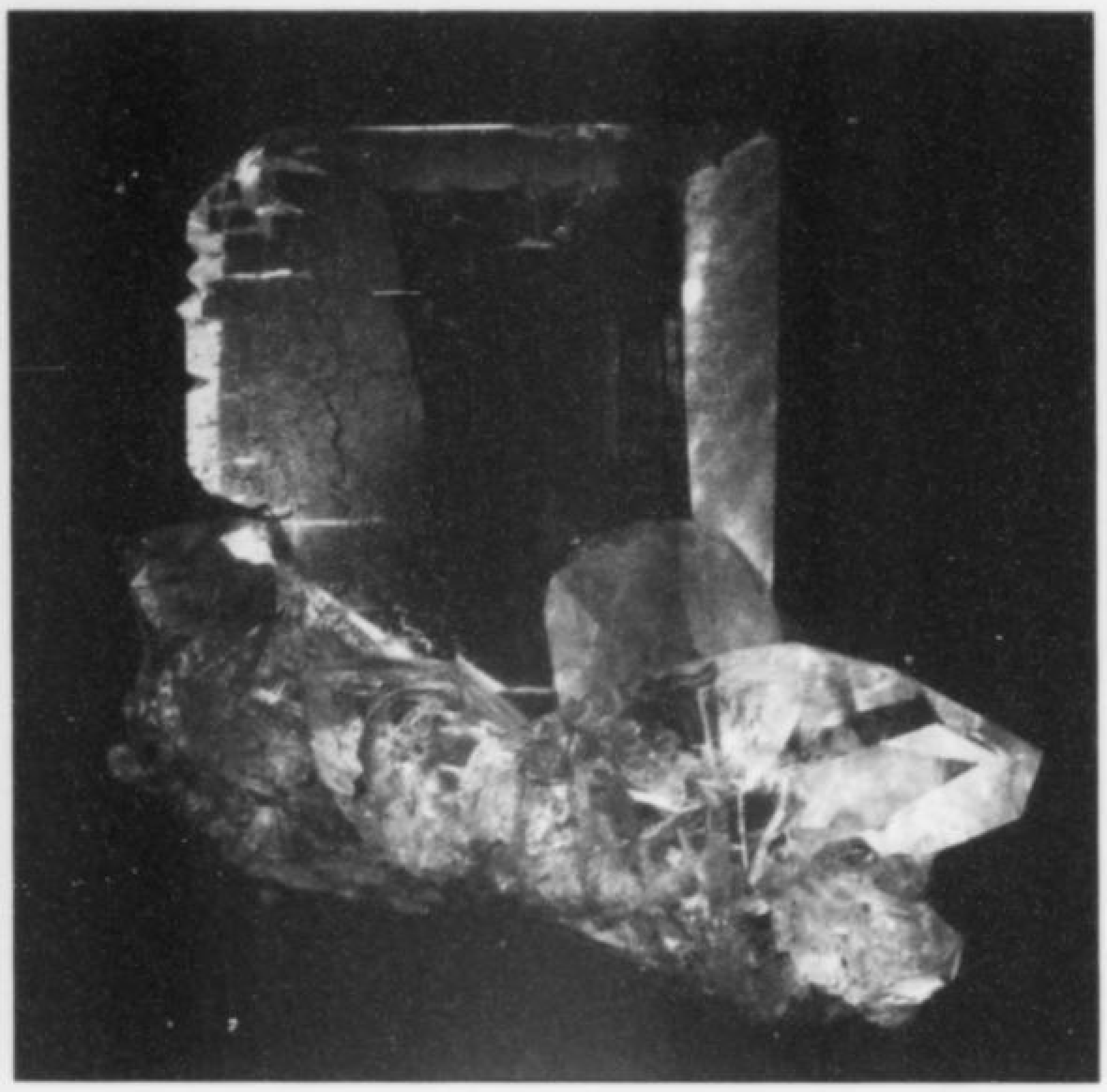


Figure 15. **An extreme rarity: a quartz gwindel with amethyst tips, 2.8 cm, from the Furka region, Uri, Switzerland. Roger Martin collection; Thomas Schüpbach photo.**

Figure 16. **A "closed" smoky quartz gwindel that is just beginning to open on the left side, 3.7 cm, from Näglisgrätli, Grimsel area, Switzerland. Eric Asselborn collection; Jeff Scovil photo.**



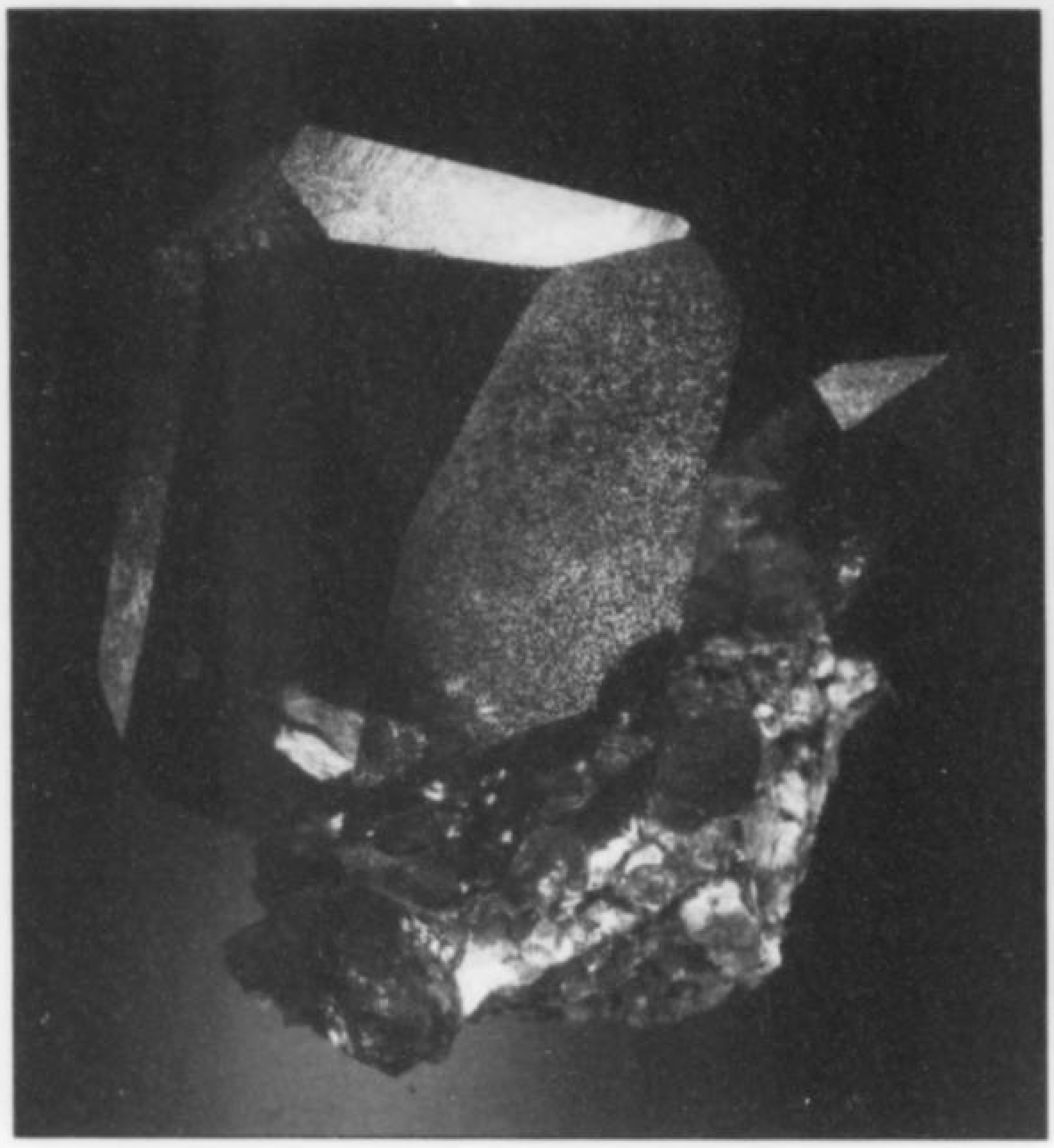


Figure 17. **A smoky quartz "closed" gwindel, 4 cm, from the Bächligletscher, Grimsel area, Switzerland. Eric Asselborn collection; Jeff Scovil photo.**

climb southwards from the southern shore of the Göscheneralpsee (lake), about 15 km north-northeast of the Grimsel-Furka Pass area. Fine specimens of smoky quartz and pink fluorite associated with well-crystallized calcite and zeolites are known to have come from the Feldschijen in the 1880's and 1940's (Parker, 1973), but fate deferred two spectacular quartz discoveries there until 2003. First, Paul Känel and his teenage son Lukas opened a cleft containing "normal" smoky quartz crystals in groups to 40 × 80 cm (Bode, 2004), and then in August two novice strahlers, Leo Beeler and Daniel von Flüe, during their very first mineral-collecting trip into the mountains, discovered a cleft from which they eventually took a ton of superb smoky quartz specimens, with single prisms to 20 cm long and clusters to 50 cm across. Among the quartz specimens from this "beginners' luck" find were a few sharp, lustrous gwindels, both open and closed, measuring between 1 and 10 cm (Arlt, 2004b).

A 30 km^2 area ***south of the Gotthard Pass*** has long produced Switzerland's finest hematite "iron roses" (see Moore, 2005b), and gwindels also have sparsely appeared there. The digging of the St. Gotthard road tunnel under the Pass during the early 1970's uncovered many clefts lined by lustrous, transparent, colorless prisms of quartz, among which were a few gwindels (Parker, 1973; Stalder, 1984). In 1999 the strahler Vladimir Pusec appeared at the Tucson Show with some fine, cabinet-size gwindel specimens which he had recently dug somewhere in the St. Gotthard area (Moore, 1999).

Hematite-rich clefts opened during the mid-1960's in and near

Figure 18. **Smoky quartz gwindel with albite, 18 cm, from Val Giuv, Graubünden, Switzerland. Luis Curschellas collection; Thomas Schüpbach photo.**

Figure 19. **An extreme rarity: a smoky quartz gwindel that is "open" at the bottom and "closed at the top, 7.5 cm, from Gletschhorn, Uri, Switzerland. J. Jauch collection; Thomas Schüpbach photo.**

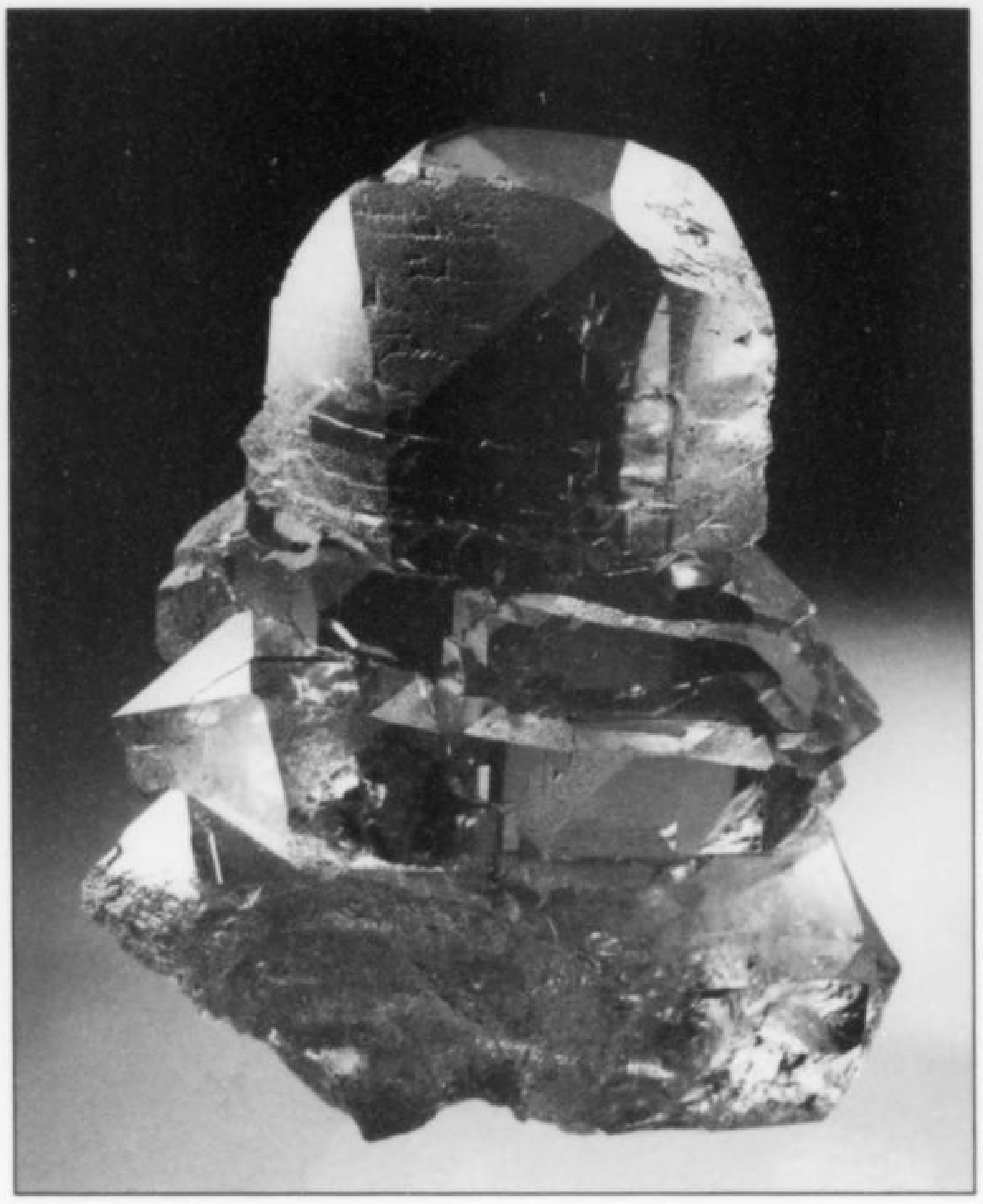


Figure 20. **Smoky quartz "half open" gwindel, 6 cm, from the Kreuzlistock, Tujetsch (=Tavetsch), Grisons, Switzerland. Eric Asselborn collection; Jeff Scovil photo.**

the Fellital, just southwest of the Maderanertal (renowned for its brookite specimens), produced gwindels fairly abundantly; in some cases they are associated with platy hematite crystals and hematite "iron roses." The strahler X. Gnos dug specimens, both on the mountain called ***Fedenstock***, above the Fellital drainage, and at a site called ***Aeschenwald***, near the village of Wiler, during the 1960's (Parker, 1973; Stalder *et al*., 1998), and in later decades, further clefts on the Fedenstock have produced gwindels of varying degress of smokiness (Stalder *et al*., 1998).

The isolated peak called ***Piz Aul*** (or ***Piz Ault***), above the village of Vals in Canton Graubünden, produced some smoky quartz gwindels in the mid-1970's; specimens from the discovery, with gwindels to 3.75 cm across, were marketed at the 1976 Detroit Show (White, 1977).

Piz Aul represents the easternmost point of the "gwindel belt," and we must backtrack a bit to reach the belt's, and Switzerland's, greatest gwindel locality. Twenty-eight kilometers west-northwest of Piz Aul and 17 km east-northeast of the Gotthard Pass lies Sedrun, the largest town in the famously mineral-rich part of the Upper Rhône Valley called Tujetsch (formerly Val Tavetsch). For more than a century, at a myriad of collecting sites in the small stream drainages which decline to the Rhône in Tujetsch, crystal-

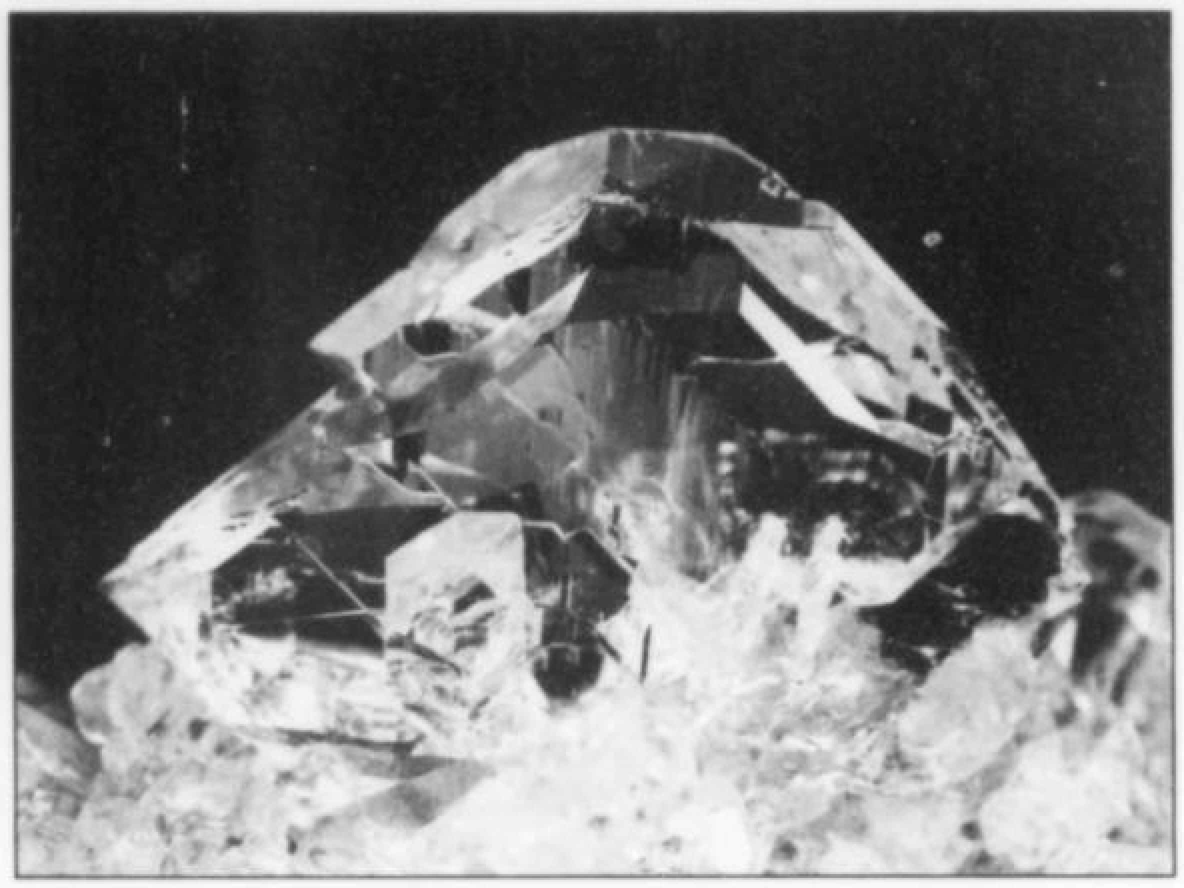


Figure 21. **Colorless quartz gwindel, 2 cm, from the Lötschental, Wallis, Switzerland. Collection and photo, Thomas Schüpbach.**

lized clefts in gneisses, granodiorites, syenites and aplites have yielded minerals of the *Fundortgruppe 3* paragenesis of Parker (1973). During the 1960's the strahler L. Monn collected sharp, lustrous gwindels in the tiny stream drainage just west of Sedrun called ***Druntobel*** (Parker, 1973). The gorge in western Tujetsch called ***Cavradischlucht,*** source of Switzerland's (and some of the world's) finest hematite specimens, produces abundant smoky quartz crystals, and some gwindel specimens which reached the international market during the late 1980's may have come from the Cavradischlucht (although they also may have come from the Grimsel area) (Robinson and King, 1988).

The drainage called ***Val Giuv*** (or ***Giuf***) in Tujetsch has produced world-class quartz gwindel specimens. The little valley begins at the peak called Piz Giuv and runs about 4 km south-southeastward, then bends due east to run another 3 km before joining the Upper Rhône below Reuras; a good hiker starting from that village can reach the most cleft-rich areas near the top of Val Giuv in three or four hours. And many have done so: Val Giuv has been combed by strahlers for well over two centuries, written records of mineral finds in the valley going back to 1680 (Jahn, 2004). In 1868 in Val Giuv, Giachen Fidel Caveng collected lustrous yellowish hexagonal-prismatic crystals of a then-unknown species, purposely misrepresenting the locality as neighboring Val Milà; as a result, the species that should have been named after Val Giuv was instead named *milarite*. The world's best milarite still comes from Val Giuv, where what is probably the champion specimen was found by Conrad Berther in 2000 (for the collecting story see Moore, 2004).

Quartz occurs in Val Giuv not only as gwindels but also as lustrous, transparent smoky prisms to 10 cm long, very commonly twinned on the Dauphiné law; as colorless transparent crystals of typically "Swiss Alpine" brilliance; as crystals included by tiny crystals of chabazite, pyrite and fluorapatite, and by hollow "anhydrite tubes"; as faden crystals; as crystals showing multiple phantoms outlined by chlorite; and, especially during the past fifty years, as excellent amethyst crystals, some sceptered, to 13 cm long (Jahn, 2004). In 1817 Pater Placidus a Spescha (a revered patriarch among strahlers) recorded his discoveries of smoky quartz in Val Giuv, and in 1866 the mineralogist Kenngott devoted several parts of his *Mineralogy of Switzerland* to quartz gwindels from the locality (Jahn, 2004).

The best gwindels from Val Giuv come from clefts in a rock type informally called "Giuv syenite," exposed mainly in the uppermost parts of the drainage, where it contacts the granite of the Gotthard massif. Of what have probably been hundreds of finds of gwindels in Val Giuv over the centuries, three spectacular recent ones command attention. In 1979, at a site lying between the rock prominences called Emprema and Secunda Muota (see detailed map in Moore, 2004), Alfons Schmet opened a cleft which produced large cabinet-size specimens in which highly lustrous, open, beautiful smoky quartz gwindels to 15 cm share matrix space with equally lustrous "normal" smoky quartz crystals. The second great discovery occurred on August 16, 1996, at an altitude of 2800 meters on the prominence called 5 Giuvstöckli, when the brothers Luis and Damian Curschellas opened a 1 × 2 × 6-meter cleft containing good crystals of orthoclase ("adularia"), cobweb-like aggregates of actinolite ("amianthus"), and microcrystals of fluorapatite, epidote and stilbite—with smoky quartz prisms to 23 × 48 cm, and between 50 and 60 brilliantly lustrous open quartz gwindels. Matrix specimens from this find boast shining dark brown gwindels rising from beds of white "adularia" crystals and gray-green "amianthus" cobwebs, for a beautiful color contrast (Jahn, 2004).

Luis and Damian Curchellas are to be credited also with the third major discovery in recent times in Val Giuv. Beginning in late September 2003 and culminating in August 2004, the brothers labored long and expertly to penetrate, first, deep snow and ice cover and, next, a serious thickness of Giuv syenite, eventually to open a 50 cm × 2 meter × 6-meter cleft which produced smoky quartz crystal matrix plates to 80 cm long, with individual crystals to 25 cm, plus a few magnificent, medium-smoky open gwindels.

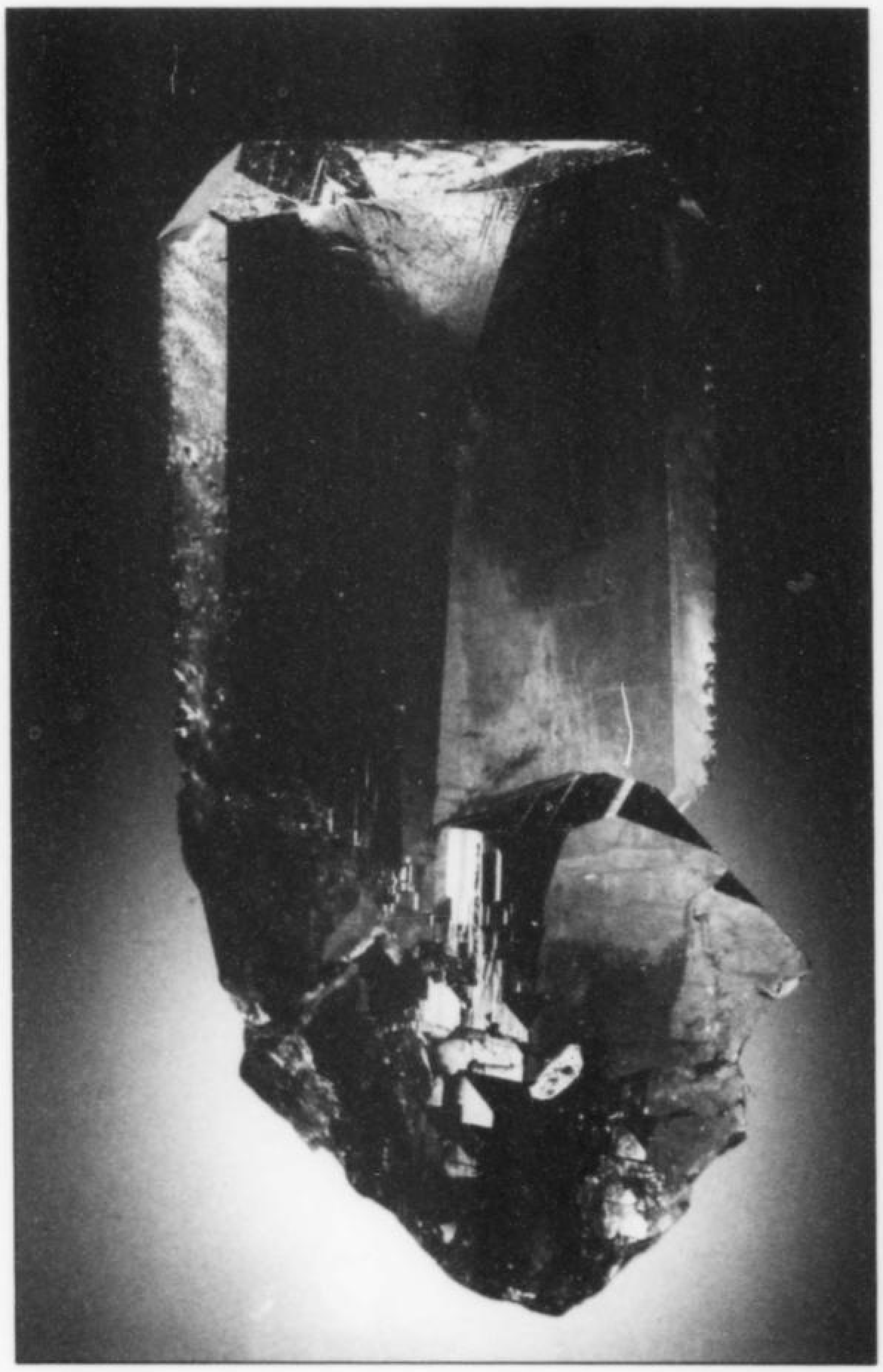


Figure 22. **Smoky quartz "closed" gwindel, 4.8 cm, from Val Giuv, Grisons, Graubünden, Switzerland. Eric Asselborn collection; Jeff Scovil photo.**

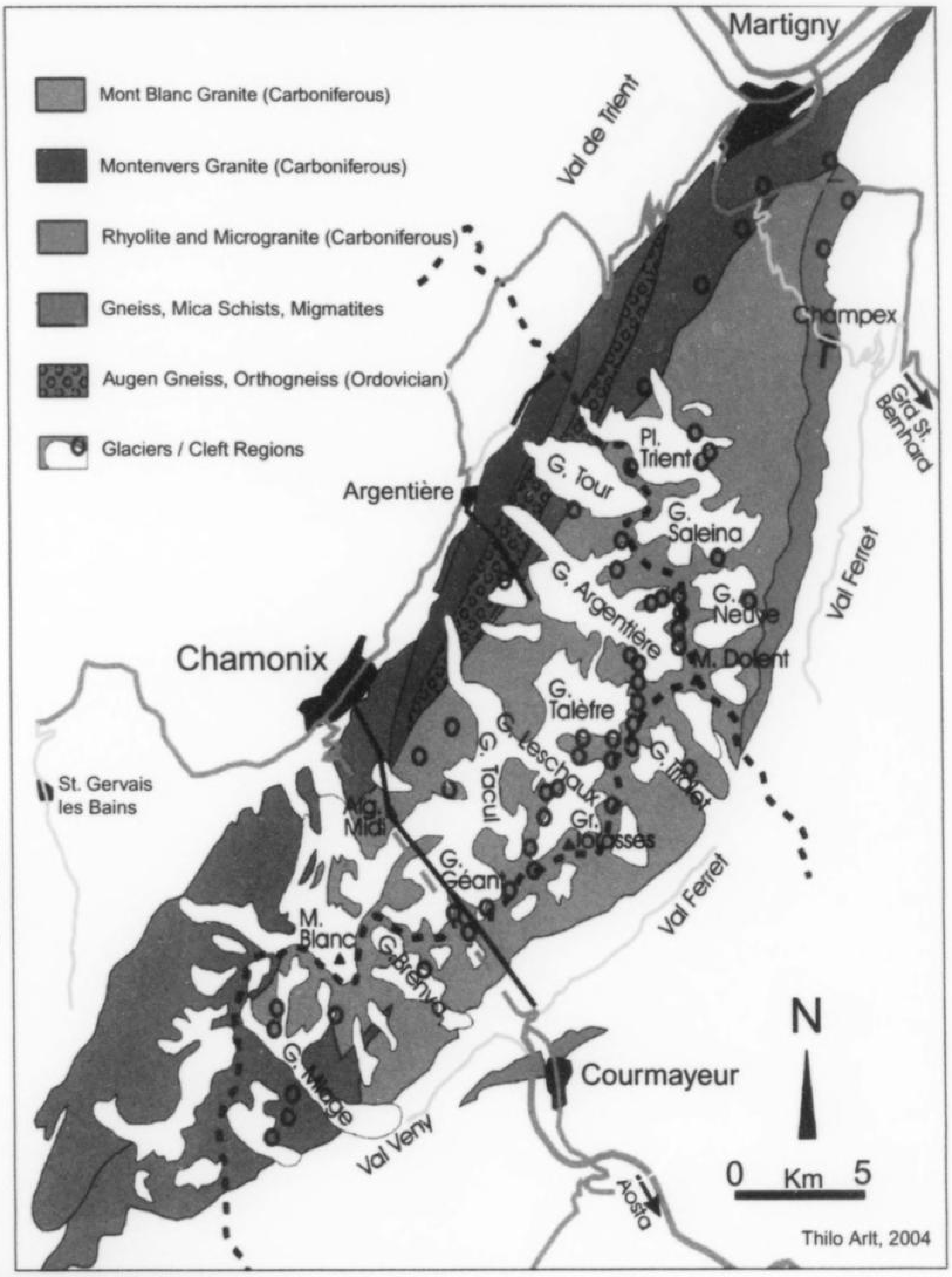
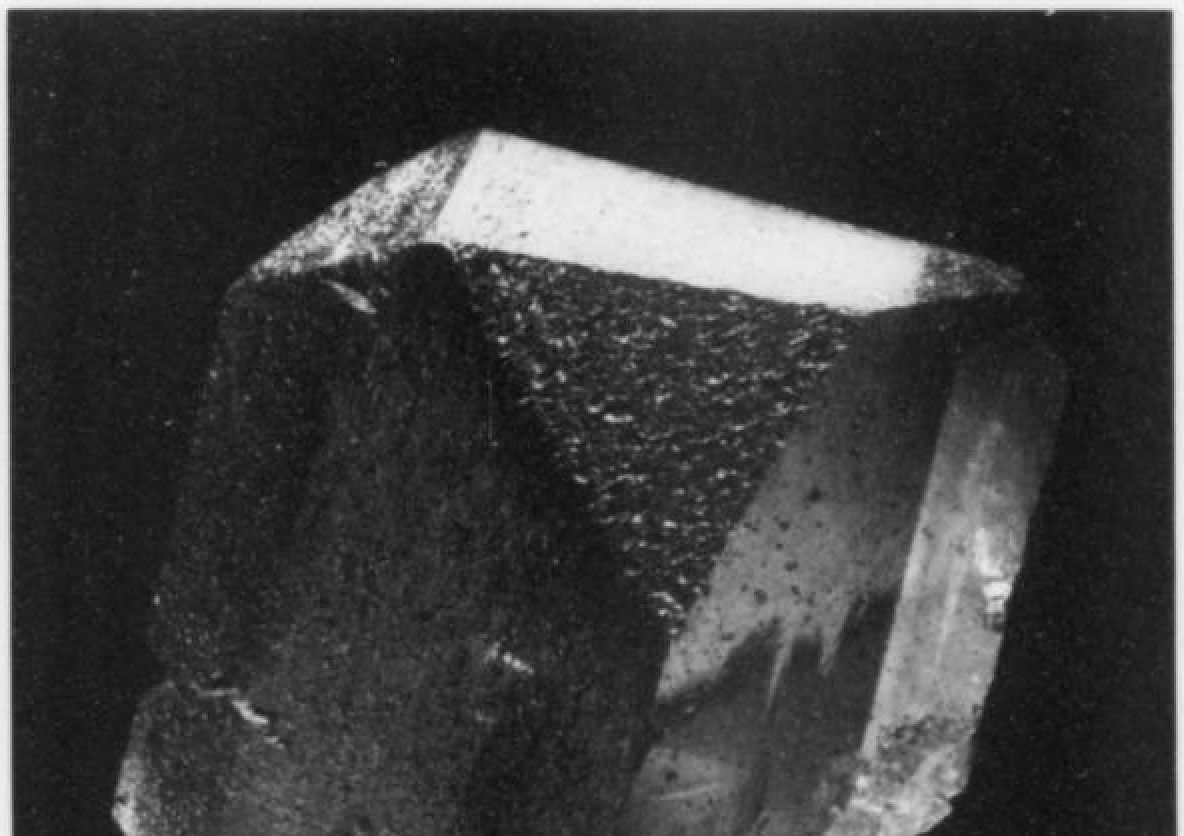


Figure 23. **Geology and glaciers in the Mont Blanc Granite of the French Alps near Chamonix. Cleft areas potentially productive of quartz gwindels are also indicated (Arlt, 2004a).**

Figure 24. **A pale smoky quartz "closed" gwindel, 2.6 cm, from Eperon Ouest, Aiguille Croulante, Mont Blanc massif, France. Laurent Gautron collection; Jeff Scovil photo.**



In what may be a "first" in the world of Swiss strahling, a film was made of the extraction process for some of the major pieces: Gieri Venzin, then at work on a film about strahling, visited the Curchellas' cleft on August 25 and made the brothers, as they put it, "film stars." Perhaps the footage will be on hand for viewing when the Curchellas brothers appear, as is their custom, at Swiss mineral shows to sell off some of the new specimens to ever-appreciative collectors (Sialm-Bossard, 2006).

Gwindels from Mont Blanc

In recent years, specimens from the Mont Blanc granitic massif of France-Switzerland-Italy have emerged in numbers and qualities such that this Alpine locality now must be judged a peer of Val Giuv where quartz gwindels are concerned.

The Mont Blanc massif crops out as a mountainous oval-shaped region between the towns of Martigny (Wallis, Switzerland), Chamonix (Haute-Savoie, France) and Courmayeur (Aosta, Italy), the borders of the three countries meeting at a point just southeast of the Argentière glacial field. Like the Aare and Gotthard massifs, Mont Blanc has a granite core and a border zone of older metamorphic rocks, and, again like the Swiss massifs, it is most cleft-rich in its middle and southern parts, such that the best collecting sites

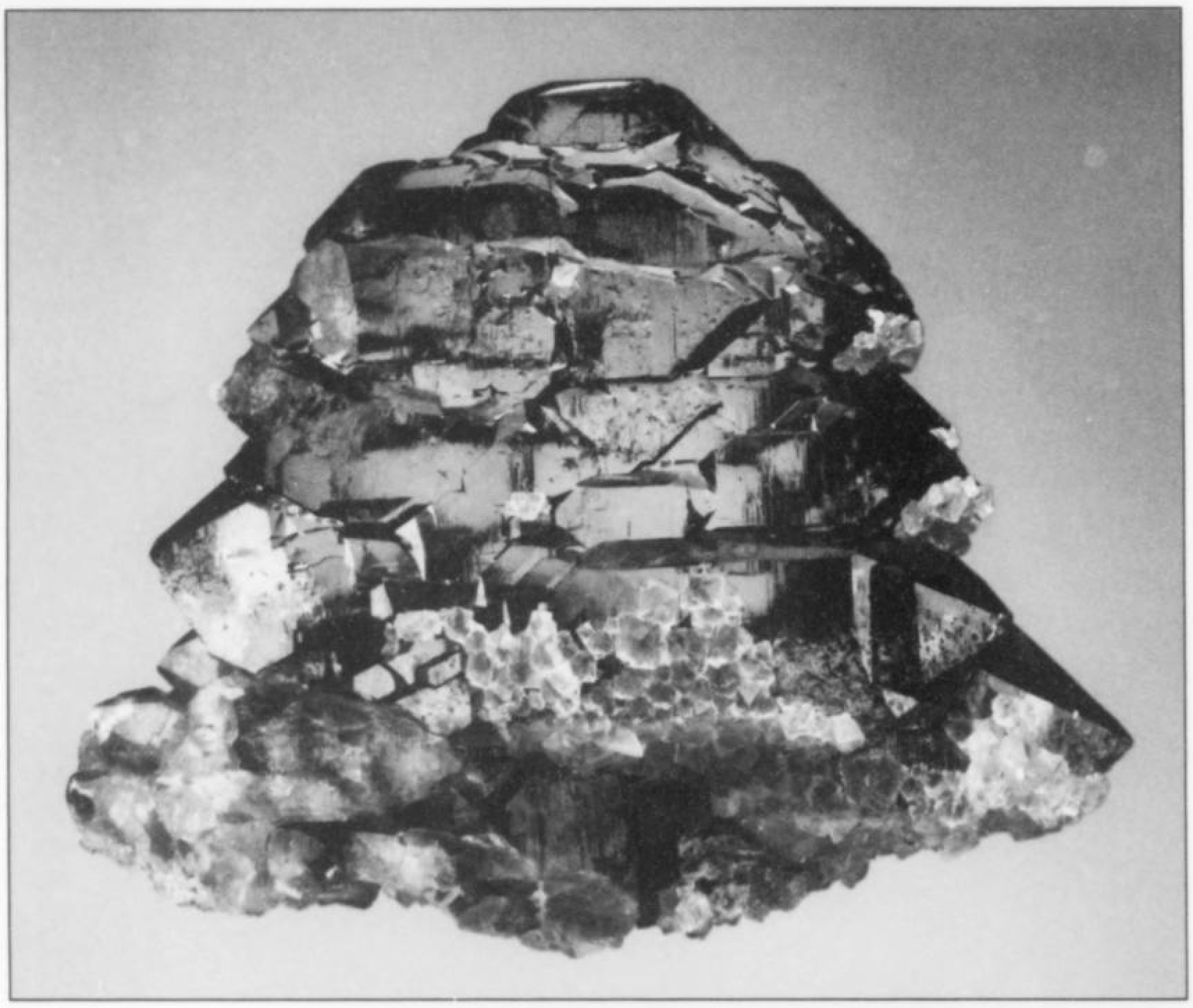


Figure 25. **Smoky quartz gwindel with pink fluorite, 12 cm, from the Mont Blanc massif, Chamonix, France. Wayne Thompson specimen; Jeff Scovil photo.**

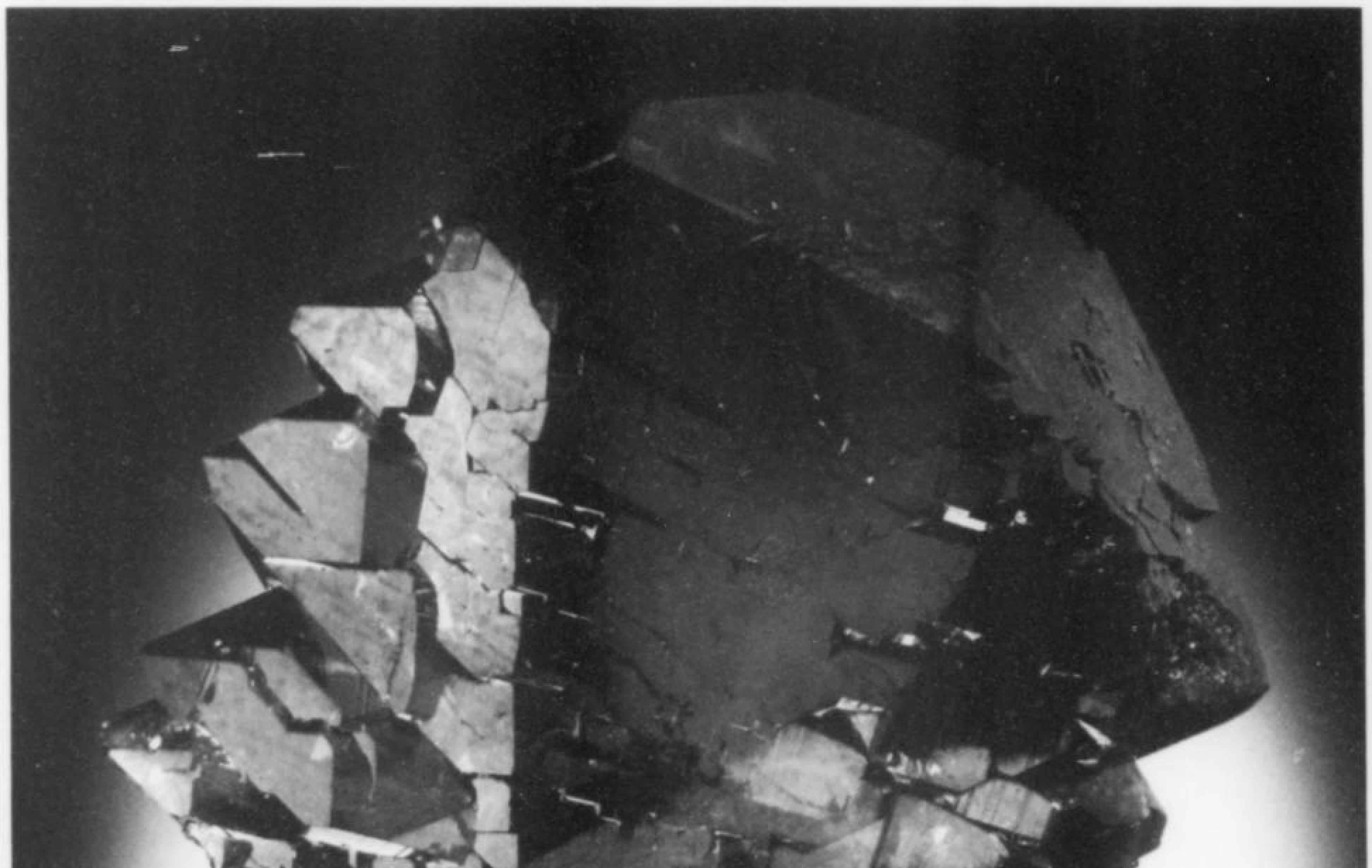


Figure 26. **Smoky quartz gwindel, 12.2 cm, from the Mont Blanc massif, Les Courtes, above the Argentière Glacier, France. Francis Benjamin collection; Jeff Scovil photo.**

lie in France, in rocks exposed around the Argentière, Talèfre and Leschaux glaciers. The Mont Blanc massif and its neighbor to the northeast, the much less cleft-rich Aiguilles Rouges massif, were intruded as plutons about 300 million years ago—later than their Swiss counterparts—then uplifted and variably deformed during the Alpine orogeny, with contemporaneous formation of crystal-bearing clefts (Arlt, 2004a). The clefts themselves have been dated to 18–16 million years; on average they are between 50 cm and 1.5 m wide, exceptionally reaching 10 m, i.e. they are smaller in general than the clefts of the Aare and Gotthard massifs in Switzerland (Benz, 2004).

Increased market availabilities of Mont Blanc specimens in recent

Figure 27. **Smoky quartz gwindel with chlorite overgrowth, 8 cm, from above the Argentière Glacier, Mont Blanc massif, France. Thilo Arlt collection; Thomas Schüpbach photo.**

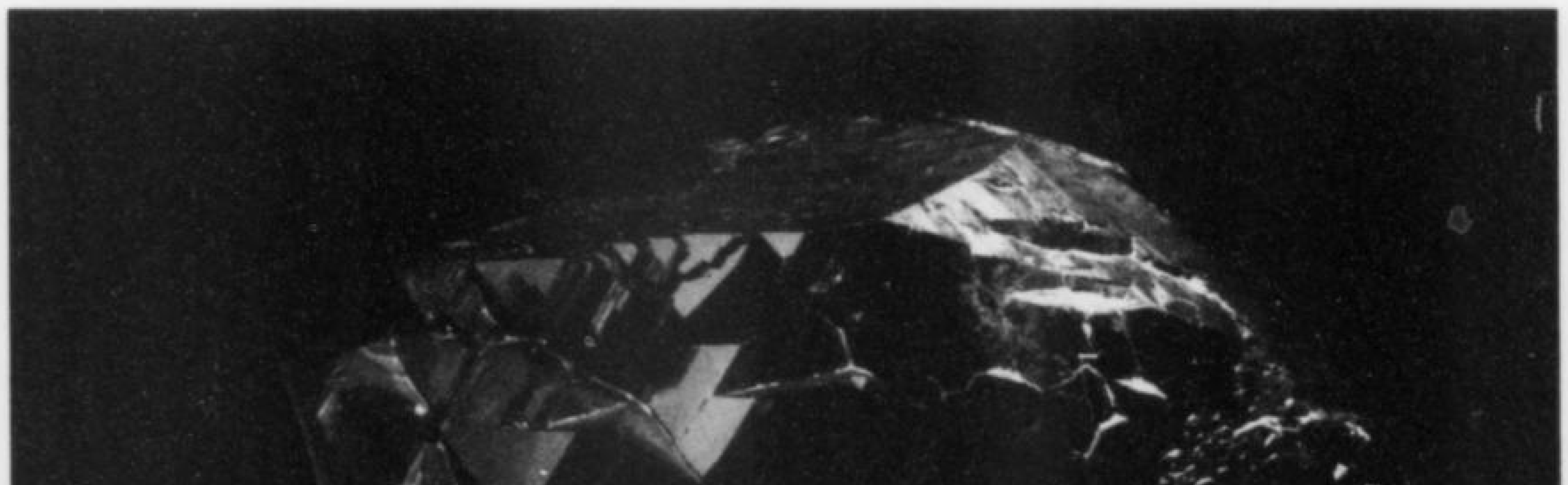


Figure 28. **Smoky quartz gwindel, 9.6 cm, from the southern face of Les Courtes, above the Argentière Glacier, Mont Blanc massif, France. Laurent Gautron collection; Jeff Scovil photo.**

years has been a result of accelerated melting of the glacial ice, exposing new crystal-bearing clefts (Arlt, 2004a; Monistier, 2004). The melting has also brought on new dangers for strahlers (since we are in France now we must call them *cristalliers*), as rockslides are now more likely, and meter-wide cracks in the glacial ice or the raw rock may be perilous, and yet tempting, to try to cross. Many collectors in the first decade of the 21st century have been enjoying their new Mont Blanc quartz and pink fluorite specimens, but they also have been complaining about the high prices invariably asked for such pieces. Both the prices and the complaining about them deserve to be called traditional, but any discontent should be tempered by knowing that cristalliers, during collecting forays, continuously risk their lives in very alarming ways; not even the most skillful mountaineers among them can be immune from the dangers inherent in this kind of collecting.

About 60 mineral species have been found in the clefts of Mont Blanc. The main sequence of crystallization for the major species is epidote-smoky quartz-orthoclase-chlorite-calcite-fluorite (Benz, 2004); the better crystallized species are epidote, calcite, hematite, scheelite, rare-earth minerals (these last exclusively as microcrystals), non-gwindel quartz of many kinds (including fine amethyst from a site called Amethyst Peak), and, of course, some of the world's finest octahedral pink fluorite (Gautron, 1999b). The cover of the May-June 1992 *Mineralogical Record* shows a 14 × 18-cm Mont Blanc specimen, once in the F. John Barlow collection, with pink fluorite crystals to 2.9 cm studded all over a smoky quartz crystal; it is one of about a dozen specimens collected from an ice-filled pocket breached in 1989 by J. F. Charlet and R. Ghilini (Wilson *et al.*, 2004).

Of course, the dominant species in the clefts of Mont Blanc is quartz, as crystals ranging in general between 10 and 15 cm, exceptionally approaching 50 cm. Most gwindels measure between 3 and 10 cm, but giants to 20 cm (Benz, 2004) or 30 cm (Gautron, 1999b; Arlt, 2004a) are known. Overwhelmingly the majority of smoky quartz crystals from Mt. Blanc are medium-brown; the extremes of colorless and black ("morion") quartz are very rare (Benz, 2004).

During the last 20 years or so—as the glaciers have begun to melt—spectacular gwindel specimens have come from the central granitic zone of Mont Blanc, where the major glaciers called ***Argentière***, ***Talèfre*** and ***Leschaux*** line up in a rough row on the French side of the border with Italy. Specimens showing the cherished closed gwindels have been found in this area, and a few gwindels found near the peak called ***les Courtes*** show something never before seen on gwindels from anywhere: amethystine overgrowths (Gautron, 1999b). Very rare, too, and highly prized, are gwindels showing central white faden lines, betraying fracturing and rehealing during tectonic widening of the clefts.

Supplies of Mont Blanc gwindels on the specimen market began to pick up in the mid-1980's: in 1983 the cristalliers/mountain guides Charlet and Ghilini (who would later open the great pink fluorite pocket) brought to the Munich Show a good selection of pink fluorite, "normal" smoky quartz and smoky quartz gwindels which they had dug on Mont Blanc (Wilson, 1984a), and the Denver Show of 1987 saw the marketing of about 200 recently found Mont Blanc specimens including about 50 showing gwindels in sizes to 15 cm (Wilson, 1988). In July 1994, a group from Munich led by Johann Nuffert discovered a 1.5 meter-wide cleft on the ***Col du Rochefort***, a few hundred meters north of the French-Italian border, which yielded about 30 kg of smoky quartz crystals including 15 specimens with very sharp, medium-smoky gwindels, on matrix and loose, with individual gwindels to 10 × 10 cm—these specimens did not reach the international market (Nuffert, 2004).

Two expeditions out of Chamonix, in September 2003 and August 2004, produced magnificent gwindel specimens from a site at an elevation of 3700 meters. The open gwindels are highly lustrous, completely transparent, and of a medium degree of smokiness; about 15 matrix pieces from the occurrence were brought by a French dealership to the 2005 Tucson Show (Moore, 2005a). And an enormous, ice-filled pocket of pink fluorite opened on Mont Blanc in 2005 by Jean-Franck Charlet yielded, besides hundreds of fluorite specimens, many fine, lustrous crystals of smoky quartz, including a few sharp gwindels to 10 cm, these having been marketed at Munich in 2005 (Wilson, 2006a).

(A Very Few) Gwindels from Elsewhere

Outside the Swiss and French localities as described above, gwindels are exceedingly rare in the Alps. An optimistic view, though, is that because Alpine cleft occurrences are by their nature isolated and idiosyncratic, small discoveries are always possible, even in areas not dominated by Parker's *Fundortgruppen 3* and *4*: a fine thumbnail-size gwindel in my collection reportedly comes from ***Val Cavrein***, near Disentis, Graubünden, Switzerland, a region from which Parker (1973) does not note gwindels. The Italian part of the Mont Blanc massif (whose quartz in general has thus far proven inferior to that of the French and Swiss parts) has been declared a nature preserve, and mineral collecting there is no longer permitted (Arlt, 2004a; Monistier, 2004), but let us note one superlative gwindel from another Italian Alpine province: in 1967 a beautiful, transparent, very pale smoky gwindel measuring 27 cm across was found in an old copper mine at ***Prettau in the Valle Aurina*** (***Ahrntal***), Trentino-Alto Adige (Niedermayr, 2002). The nearby Alps of Austria, too, have occasionally yielded gwindels: Rykart (1989) mentions specimens from ***Törlkopf near Mallnitz, Kärnten***, and from ***Untersulzbachtal, Salzburg***.

We might expect abundant gwindels from the Alpine-type clefts of Pakistan, lately so generous of crystallized "Alpine" minerals of many kinds, but recorded discoveries are almost non-existent: Gautron and Žorž (1999) remark without elaboration that "The mountainous zones of Pakistan also produced some specimens of gwindels," and Žorž (2002) ascribes some of these to the ***Skardu*** area. Wilson (2006b) reports an excellent, 8-cm, pale smoky gwindel found at the Alchuri locality near the ***Shigar Valley*** in 2004 and several more found there in 2006.

Outside the Alpine regions gwindels are almost unknown—except of course in Russia. Frondel (1962) cites a 1909 Italian reference for gwindels from the venerable marble quarries of ***Carrara, Tuscany***. A few gwindel specimens have been found at the hyalophane occurrence of ***Busovača, Bosnia-Herzegovina*** (Žorž, 1996, 2002) and near the villages of ***Budinarci and Mitrašinci near Berovo, Macedonia*** (Žorž, 2002). In the winter of 1995–1996 an Alpine-type cleft at a site very near ***Athens, Greece*** produced a superb smoky gwindel 8 cm across (Wendel and Kapellas, 1997). Specimens from Brazil have occasionally been noted: Warin (2005) illustrates a pale

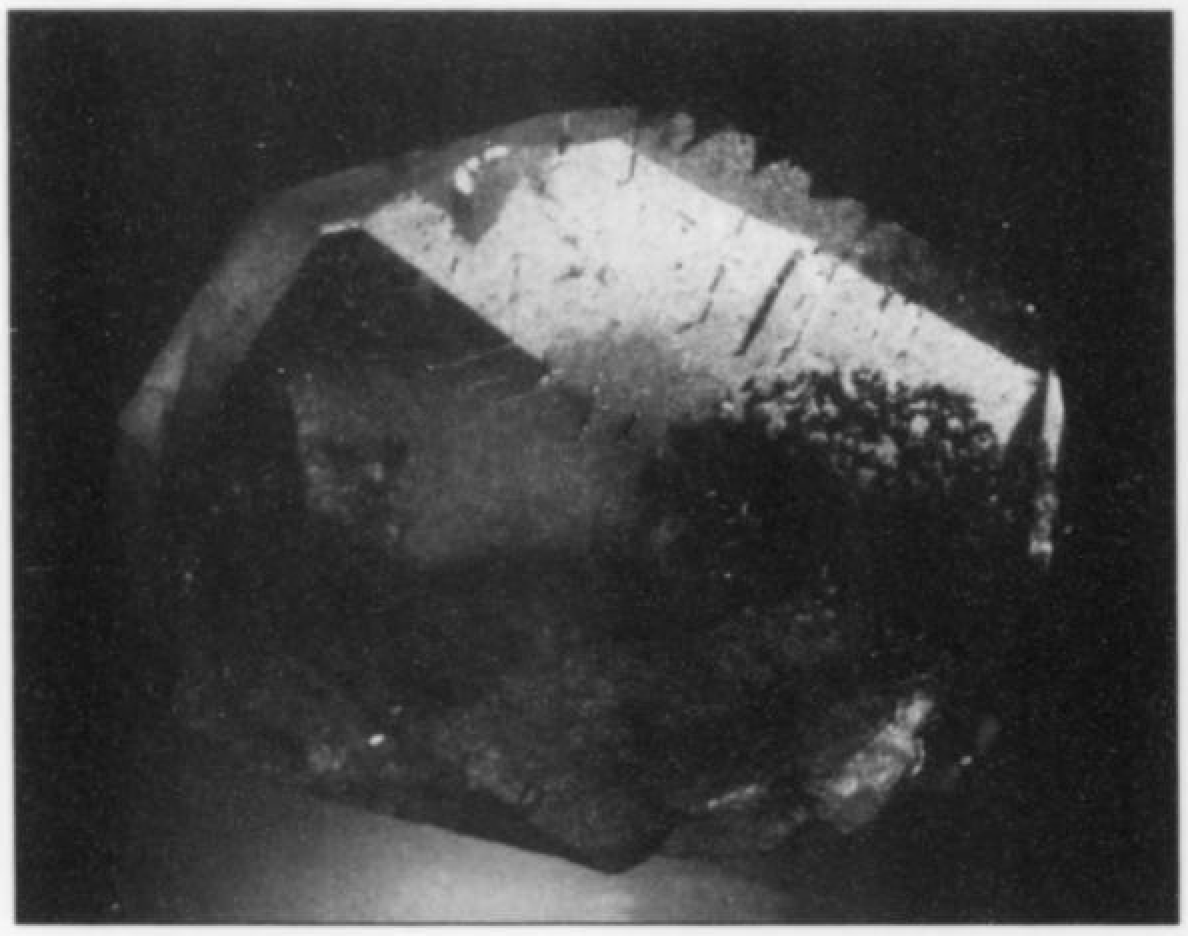


Figure 29. **Smoky quartz "closed" gwindel, 9.3 cm, from the Dodo mine, near Neroika, Subpolar Urals, Tyumen Oblast, Russia. Heliodor Minerals specimen; Jeff Scovil photo.**

Figure 30. **Smoky quartz gwindels, 18.5 cm, from the Dodo mine, near Neroika, Subpolar Urals, Tyumen Oblast, Rusia. Heliodor Minerals specimen, collected in 1974; Jeff Scovil photo.**

Figure 31. **Smoky quartz gwindel, 7.3 cm, from the Dodo mine, near Neroika, Subpolar Urals, Tyumen Oblast, Russia. Marcus Grossman specimen; Jeff Scovil photo.**

smoky open gwindel about 5 cm across from ***Novo Horizonte, Bahia***, and gwindels have been cited from the ***Corinto district in Minas Gerais*** (Asselborn, 1998; Gautron and Žorž, 1999).

Gwindels have been reported from the ***Republic of Georgia***, in the Caucasus, and from ***Tibet*** (Žorž, 2002). At the Rochester Symposium of 1995 one dealer offered very dark, gemmy gwindels to 18 cm which reportedly had come from near the ***Gujivas River, Pamir Mountains, Tajikistan*** (Scovil, 1995; see also Rykart, 1989).

But, as every contemporary collector knows, it is two huge quartz mines in the Subpolar Urals of Russia which now well and truly rival Mont Blanc and Val Giuv for superb, and commonly very large, smoky quartz gwindels. Two articles by E. V. Burlakov in vol. 30, no. 6 of the *Mineralogical Record* (November-December 1999) describe, respectively, the ***Dodo and Puiva quartz deposits near Mount Neroika***, both of which have won fame among mineral collectors since the Soviet Union's collapse in 1991 and the subsequent widespread marketing of Russian specimens in the West. The deposits combine features of hydrothermal quartz vein and Alpine-type cleft mineralization, and, though just 10 km apart, they differ somewhat in their mineral suites: e.g. the world's finest brookite comes from the Dodo mine, the world's finest ferro-axinite from the Puiva mine. Magnificent quartz gwindels have reached the market from both mines during the last 15 years. The Dodo deposit (and not the Puiva) has produced specimens showing multiple gwindels—from three to six—on matrix (Burlakov, 1999a). Individual Dodo gwindels do not reach the sizes of Puiva's largest, but one Dodo specimen pictured in Burlakov (1999a) has two gwindels whose combined width spans completely an 18.5-cm matrix, with "normal" quartz crystals around their bases. The Puiva deposit has produced superb gwindels to more than 25 cm: a single open gwindel of this size pictured by Burlakov (1999b) is beautifully sharp, lustrous and transparent.

CONCLUSION

Indeed it is hard to "conclude" about gwindels—except to pass on the good news that top-quality specimens are not at all "concluded" things on the mineral market today. Many collectors—necessarily well-funded collectors, to be sure—during the past few years have been able to purchase superb, and in some cases enormous, gwindel specimens from Mont Blanc and the Polar Urals. Swiss specimens are very much rarer than these, although, for all the familiar "Alpine" reasons, we might always reasonably hope for new discoveries in Val Giuv or elsewhere. In addition, the uncovering of new clefts by the retreat of glaciers might be viewed as one of the few benefits of global warming.

Perhaps the mysterious processes which produce gwindels will soon be explained to the satisfaction of all; as scientifically literate people we are obliged to hope so. In that event, however (I don't mind admitting), I'll miss, a little, the sense of mystery which seems immanent in a gwindel, leaping, like a little reflected point of playful light, in the direction of the observer. We observers all must reconcile to our own satisfactions that which is scientific and that which stubbornly *will* seem magical when we turn our most beautiful mineral specimens slowly in the light.

ACKNOWLEDGMENTS

Several people have been helpful—nay, indispensable—to me during the process, not only of gathering data on gwindels but also of acquiring a "feel" for the difficult topic of gwindel crystallography. Accordingly I must thank Si and Ann Frazier for their thorough proofreading and critiquing of an early draft; Wendell Wilson for coming through with some searching oral discussions (and for more proofreading, and, of course, for his scalpel-sharp work on the graphics and layout); and Bob Downs, Pete Richards, Tony Kampf and Kay Robertson for further reviews of the article. With willing promptness, Curtis Schuh retrieved some valuable old German references from his files, and helped with some French translations. And for providing beautiful photographs of gwindel specimens I thank Thomas Schüpbach, Jeff Scovil and Wayne Thompson.

BIBLIOGRAPHY

ARLT, T. (2004a) Strahlen in Mont Blanc-Granit. *Schweizer Strahler* 2/2004, 14–22.

ARLT, T. (2004b) Anfängerglück. *Schweizer Strahler* 3/2004, 5–6.

ASSELBORN, E. (1998) Quartz gwindels (abstract). *Mineralogical Record*, **29** (1) Supplement, S2-S3.

BANCROFT, P. (1984) *Gem & Crystal Treasures*. Fallbrook, CA: Western Enterprises/Mineralogical Record. 488 pages.

BENZ, M. (2004) Mineraliensammeln im Mont-Blanc-Gebiet (I): die Gletscher von Argentière und Talèfre. *Lapis*, **29** (7/8), 13–27.

BODE, R. (Ed.) (2004) Ein Rauchquarz Fund am Feldschijen, Uri. *Mineralien Welt*, **15** (1), 2.

BURLAKOV, E. V. (1999a) Famous mineral localities: the Dodo deposit, Subpolar Urals, Russia. *Mineralogical Record*, **30**, 427–442.

BURLAKOV, E. V. (1999b) Famous mineral localities: the Puiva deposit, Subpolar Urals, Russia. *Mineralogical Record*, **30**, 451–465.

FRONDEL, C. (1962) *The System of Mineralogy*, 7th Edition. Volume III: Silica Minerals. John Wiley & Sons. 334 pages.

GAUTRON, L. (1989) Alpine quartz. *UK Journal of Mines and Minerals*, **7**, Autumn 1989, 29–39.

GAUTRON, L. (1999a) Les quartz du Massif du Mont-Blanc. Hors Série V—1999, *Le Règne Minéral*, 38–44.

GAUTRON, L. (1999b) Les indices minéralogiques du Massif du Mont-Blanc. Hors Série V—1999, *Le Règne Minéral*, 59–66.

GAUTRON, L. and ŽORŽ, M. (1999) La pyroélectricité à l'origine des quartz tordus. Hors Série V—1999, *Le Règne Minéral*, 45–52.

GEIPEL, R. (1986) Kristallschätze der Schweiz präsentiert im Kristallorama in Meiringen. *Lapis*, **11** (10), 34–35.

GEIPEL, R. (1993) Alpine Schätze: das Kristall-Museum Obergesteln. *Lapis*, **18** (10), 8.

GRAESER, S. (1998) Alpine minerals. *Rocks & Minerals*, **73** (1), 14–32.

GRAMACCIOLI, C.M. (1975) *Die Mineralien der Alpen, Band I*. Stuttgart: Franckh'she Verlagshandlung. 264 pages.

JAHN, S. (2004) Klassische Weltfundstellen: Val Giuv. *Mineralien Welt*, **15** (1), 34–67.

MACCHIERALDO, M. (2005) A brief summary of the mineral occurrences and geology of Monte Bianco. http://web-tiscali.it /mmacchieraldo/artmbian.htm

MONISTIER, G. (2004) Mineraliensammeln im Mont Blanc-Gebiet (II): Fundstellen auf der Italienischen Seite. *Lapis*, **29** (7/8), 37–51.

MOORE, T. (1999) What's new in minerals: Tucson Show 1999. *Mineralogical Record*, **30**, 211–221, 224, 238–240.

MOORE, T. (2004) Alpine milarite. *Mineralogical Record*, **35**, 405–418.

MOORE, T. (2005a) What's new in minerals: Tucson Show 2005 *Mineralogical Record*, **36**, 285–301.

MOORE, T. (2005b) Alpine "Iron Roses." *Mineralogical Record*, **36**, 491–503.

MOORE, T. (2006) What's new in minerals: Denver Show 2005. *Mineralogical Record*, **37**, 74–82.

NIEDERMAYR, G. (2002) Kristallschätze der Hohen Tauern. *Mineralientage München Messethemenheft 2002*, 41–60, 62.

NUFFERT, J. (2004) Ein reichhaltiger Gwindlfund am Mont Blanc. *Lapis*, **29** (7/8), 33–36.

PARKER, R. L. (1973) *Die Mineralfunde der Schweiz*. Basel: Wepf & Co. Verlag. 433 pages.

REUSCH, E. (1882) Über gewundene Bergkrystalle. Sitzungsberichten der Königlichen Akademie der Wissenschaften zu Berlin, 1882. Offprint, 17 pages.

ROBINSON, G. W. and KING, V. T. (1988) What's new in minerals? Fifteenth annual Rochester Academy of Science Mineralogical Symposium. *Mineralogical Record*, **19**, 331–338.

RUFIBACH, E. (1979) Die neue Kluft am Zinggenstock. *Lapis*, **4** (9), 19–23.

RUFIBACH, E. and MARTIN, R. (2004) Beobachtungen an Quarzkristallen aus der Kluft am Zinggenstock. *Schweizer Strahler*, 4/2004, 6–10.

RYKART, R. (1989) *Quarz-Monographie*. Thun, Switzerland: Ott Verlag. 413 pages.

SCHWAB, P-N. (1998) Chamonix and its Alpine minerals. *Rocks & Minerals*, **73**, 34–38.

SCHROETER, J. (1948) Frühe Beiträge zur Erforschung der alpinen Kluftmineralien. *Schweizerische mineralogischen und petrographische Mitteilungen*, **29**, 215–221.

SCOVIL, J. (1995) What's new in minerals? Rochester Symposium 1995. *Mineralogical Record*, **26**, 576–578.

SIALM-BOSSARD (2006) Eine Rauchquarz-Kluft im Giuvgletscher. *Schweizer Strahler*, 3/2006, 6–13.

SINKANKAS, J. (1966) *Mineralogy For Amateurs*. Van Nostrand Reinhold. 585 pages.

STALDER, H-A. (1984) Die Mineralien des Gotthard-Strassentunnels. *Magma*, **4**/84, 43–58.

STALDER, H-A., WAGNER, A., GRAESER, S., and STUKER, P. (1998) *Mineralienlexikon der Schweiz*. Basel: Wepf Verlag. 579 pages.

WARIN, R. (2005) Quartz Gwindel: le mystère levé par l'image. *Minéraux & Fossiles*, #338, Avril 2005, 25–33.

WEIBEL, M. (1966) *A Guide to the Minerals of Switzerland*. London/New York/Sydney: Interscience Publishers. 123 pages.

WEISS, Chr. S. (1836) Über rechts und links gewundene Bergkrystalle. *Abhandlungen der königliche Akademie der Wissenschaften*, Berlin. Offprint, 19 pages.

WENDEL, W. and KAPELLAS, K. (1997) "Alpiner" Rauchquarz aus Attika, Griechenland. *Lapis*, **22** (3), 35–37.

WERNER, B. (2000) Ein Fund, der fast verschlafen wurde. *Schweizer Strahler*, **12** (4), 154–158.

WHITE, J. S. (1977) What's new in minerals? Detroit Show 1976. *Mineralogical Record*, **8**, 58–62.

WILSON, W. E. (1984a) What's new in minerals? Munich Show 1983. *Mineralogical Record*, **15**, 117–120.

WILSON, W. E. (1984b) Great pockets: the Tiefengletscher quartz grotto. *Mineralogical Record*, **15**, 253–255.

WILSON, W. E. (1988) What's new in minerals? Denver Show 1987. *Mineralogical Record*, **19**, 113–120.

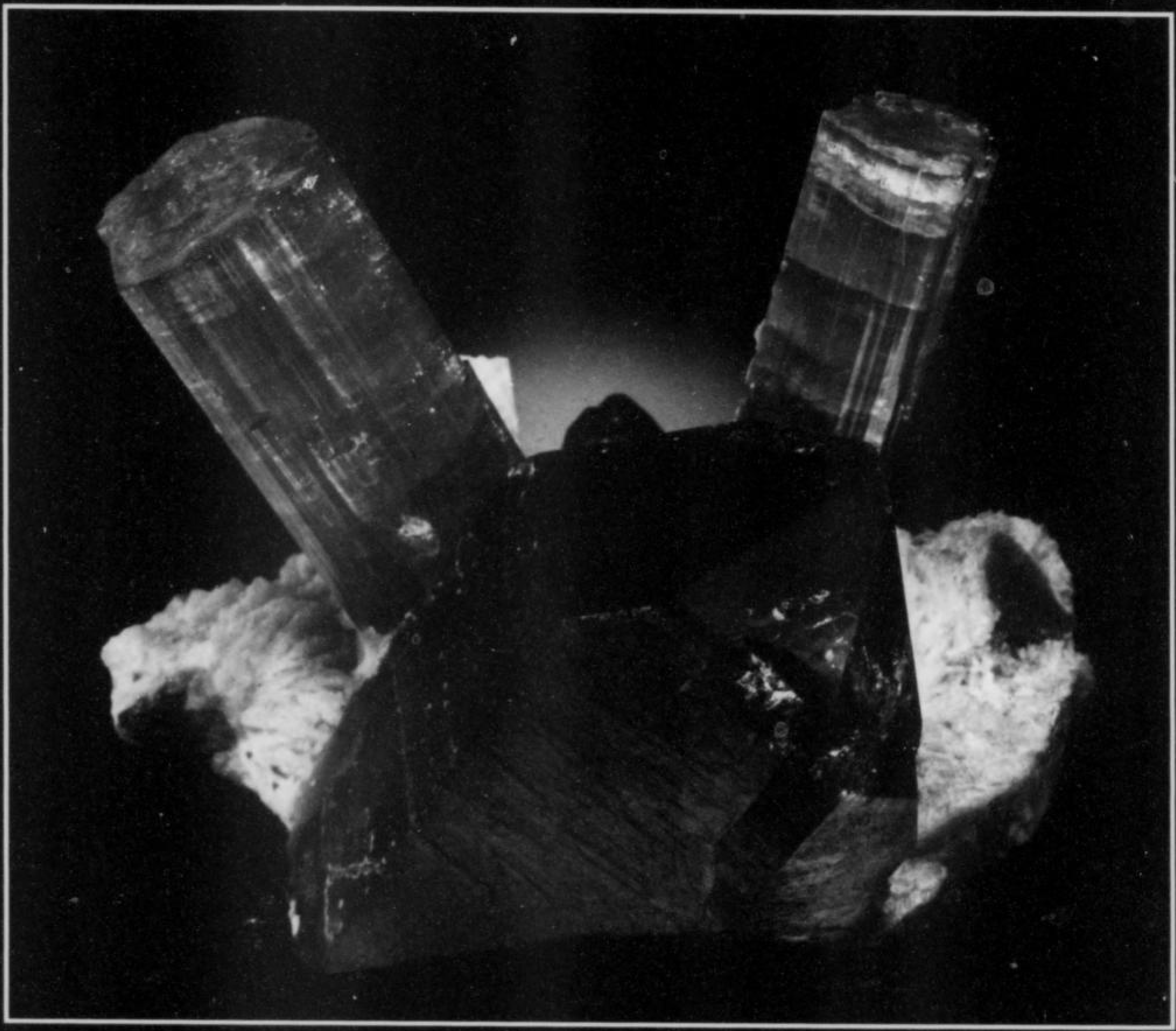
WILSON, W. E., BARTSCH, J. A., and MAUTHNER, M. (2004) *Masterpieces of the Mineral World: Treasures from the Houston Museum of Natural Science*. Houston Museum of Natural Science/Mineralogical Record. 264 pages.

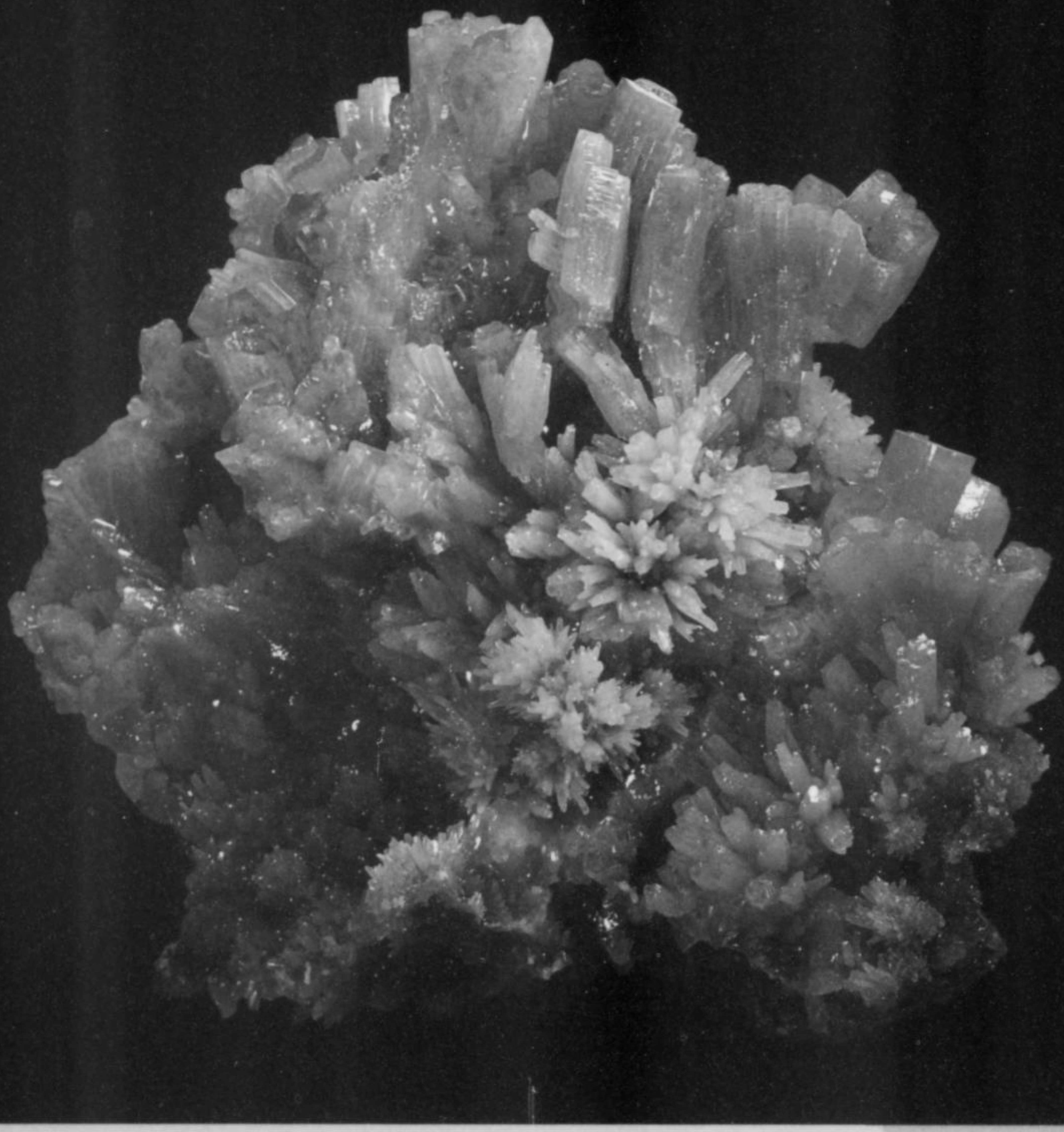
WILSON, W. E. (2006a) What's new in minerals: Munich Show 2005. *Mineralogical Record*, **37**, 82–87.

WILSON, W. E. (2006b) Minerals from Alchuri. *Mineralogical Record*, **37**, 534–536.

ŽORŽ, M. (1996) The hyalophane occurrence at Zagradski Potok near Busovača, Bosnia and Hercegovina. *Mineralogical Record*, **27**, 325–346.

ŽORŽ, M. (2002) *The Symmetry System*. Published by Mirjan Žorž. 333 pages.





Pyromorphite, 4 inches, Daoping mine, Guangxi Prov., China.
Ex-collection Steve Smale.

Wilensky photo

Collector Profile:

KAY ROBERTSON
AND HER MINERAL COLLECTION

Thomas Moore
3750 E. Via Palomita #34102
Tucson, AZ 85718

Kay Robertson spent a privileged childhood and youth in Venice, where her German-Jewish father was a dealer in art and antiques, but the coming of World War II displaced her and her family to southern California, where, age 86, she lives today. Kay has been a major presence in the world of serious mineral collecting, both in the U.S. and Europe, since the mid-1950's, and now has a collection as rich and varied as her life itself has been. The collection contains about 13,000 specimens, including a subcollection of minerals from Germany which is among the best such assemblages in private hands in the world.

INTRODUCTION

Visitors to many Tucson Shows past might have noticed an imposing-looking elderly lady, gray hair pulled back in a bun, progressing across the floor of the Convention Center's "Main Show" to engage veteran collectors and dealers in intense conversations. Since about 1992 (my own first time at the Tucson Show, and the first time I met her), Kay Robertson has circulated about the shows with the aid of a cane, a walker, or a good friend's arm. But it is not hard to imagine how, in earlier times, she must have moved about tirelessly, seeing everyone and everything, telling stories, flashing newly acquired specimens, and in general keeping other advanced collectors quite on their games by confronting them with her knowledge of classic mineral occurrences, especially those of central Europe. Her alert, intelligent bearing and German-accented voice very clearly convey that this talkative lady is best attended to with respect, for she is a living archive of the history of serious mineral collecting, both in the U.S. and Europe, since the mid-20th century.

Kay has lately turned 86, and says sadly that increasing infirmity now has brought an end to her Tucson pilgrimages; the 2005 show was regrettably her last. She remains intellectually keen, however, and has by no means ceased her activities mineralogical, artistic and social. She is still occasionally able to make it to local mineral shows in southern California, and nearly every day she works at the job of writing, in longhand, a book about her life. In myriad corners and cul-de-sacs and along many walls of her small, lavishly cluttered, one-story house there are cabinets holding portions of her enormous mineral collection, which is as distinctive and idiosyncratic as the life story that she is now committing to paper. Below is a sketch of these two, necessarily intertwined stories—of Kay and of her collection.

PRIVILEGE, WAR AND EXILE

Kay Robertson was born in 1920, and the earliest phase of her life transpired on a classical Old European stage, with bright backdrops of wealth, high culture, and cosmopolitanism. Later, when war had ended that order of things, exile, Yankee-style improvisation and Western American backdrops took over. (In these respects, coinci-

Figure 1. **Kay Robertson with friend August Hartlaub in 1964, visiting the State Mineralogy Institute in Regensburg, Germany.**

dentally, Kay's life resembles that of the great Russian-American writer Vladimir Nabokov, whose novels she has never read but with whom, as with William Shakespeare, she shares a birthday: April 23.)

Her father, Adolf Loewi, belonged to the venerable Bernheimer family of dealers in art and antiques, whose ancestral city was Munich. Earlier Bernheimers had supplied works of art to European royalty, and served high-ranking families as interior designers and decorators; Kay's great-grandfather was once commissioned to build a throne for the British Viceroy of India. Having served periods of apprenticeship in New York and Madrid, Adolf Loewi formally entered the family business in Munich in 1908. However, as he was only a Bernheimer because his father had married into the family, Adolf was debarred from full partnership in the business. In 1911, therefore, he moved to Venice to set himself up as an independent art dealer, choosing as his headquarters a beautiful medieval building, once the Abbey of St. Gregory (*Abbazzio di San Gregorio*), on the Grand Canal.

When World War I came, Adolf returned to Germany and enlisted in a Bavarian regiment which fought on several fronts during the next four years. In 1919 he married Kay's mother, a girl named Katherine from a working-class Munich family. Back in Venice in 1920, he leased the luxurious *Palazzo Nani Mocenigo*, where he would maintain an art gallery and raise a family. Kay (Gabriella Katherine Loewi) was born in the *palazzo*; of two sisters who later were born there as well, one died young and the other lives today in northern California.

In 1923, Adolf Loewi became honorary German consul in Venice, and thus was inaugurated a busy, opulent decade from which Kay's earliest memories derive. She and her sisters went to a school for the children of the small colony of expatriate Germans in Venice; she recalls being dressed in laces and ribbons for formal entertainments, and wealthy art clients and diplomats coming through, and a grand banquet, once, for Admiral Canaris, a German war hero in command of a battleship which stopped to visit. At school Kay spoke German and at home she spoke both German and Italian. After school hours a succession of private teachers instructed the sisters in French and English, the other two of the four languages which Kay now speaks fluently.

During the early Depression years, Adolf Loewi did much to support and encourage the many poor artists, German and otherwise, who lived and struggled in Venice. But in 1933, the first year of Nazi rule back in the homeland, foul emanations of anti-Semitism forced the girls' withdrawal from the German school. Kay finished her formal schooling through an accelerated program of private lessons at home, and, during 1937–1938, in a finishing school for girls in Lausanne, Switzerland. This education was old-fashioned and "classical"—Latin, Greek, Italian history, art history, no math, no science—with the result that to this day Kay regrets her incompetence (as she calls it) in formal mathematics, and her unease even with chemical formulas, even, yes, of mineral species. As she had decided that she would soon enter her father's business in a "modern" and practical way, she took many elective courses at the Lausanne school, not only in art and design, but also in bookkeeping and business practice. Meanwhile a beloved teacher there, a Miss Bolton, helped her to firm up her English (which would come in handy quite soon).

In June 1938, Kay began work as her father's secretary, doubling informally as a creative assistant in interior design. In July, at the first shift to anti-Semitic policies by Mussolini's government, Adolf Loewi applied for an immigration visa; at the time of the Munich crisis of 1938 he was working in Paris and found himself barred, as a Jew, from re-entering Italy. Kay at this time was with him in Paris, since the two were completing together their last and greatest European commission: designing the interior of the new, very ornate Italian Embassy (today Kay's intricate ornamentation of the ballroom ceiling may still be seen in the embassy building which, after the war, became the Palais de Boisgelin). The Loewis finished this huge two-year job on January 31, 1939; on February 1 they boarded the *U.S.S. Washington*, and on February 9 they disembarked in New York.

Presciently, Adolf had set up a New York branch office in 1933, and upon his arrival six years later he was able to sell some major works to the Metropolitan Museum of Art, providing much-needed funds for further movement. The Loewis did not like New York, and by June 1939 they were already renting quarters in Beverly Hills, California. In December of that year they bought a large house above Sunset Strip, and Kay has remained, quite contentedly as she says, a Californian through all the decades since.

In 1943 the Loewi art firm co-ordinated a major show at the Los Angeles County Museum of Natural History and Art (as it was then called), displaying 465 pieces of woven silk contributed by several important U.S. museums and private collectors. The show attracted huge crowds, and Kay, who had written the show catalog, was ecstatic—thus began her long and happy association with the Los Angeles County Museum, eventually to take forms more mineralogical than artistic. After the war years the business flourished;

Figure 2. **A corner of the living room in Kay Robertson's house in Los Angeles, filled with books and memorabilia. She customarily sits on the sofa at left to do her writing. Tom Moore photo.**

Figure 3. **Kay Robertson at the 2003 Tucson Show. Peter Lyckberg photo.**

American museums and private collectors were buying art. From Europe, at various times, the Loewis had shipped or carried much stock—chiefly complete antique rooms (wainscotings), sculptures, and woven silks ranging in historical period from medieval to early 19th-century (Kay today still has a small stock of such pieces, and occasionally sells from it to raise mineral-purchasing money).

A cousin of Kay's had immigrated from Europe to Canada, and had enlisted in the Royal Canadian Air Force for World War II. In the service he became a close friend of a flight officer from Winnipeg, William J. Robertson, who would serve with distinction in the North Atlantic and Indian Ocean theaters. In September 1944, just after Kay had become a U.S. citizen, the cousin introduced her to Bill, and on July 7, 1945, in Victoria, British Columbia, they were married. After Bill's discharge from the service in 1946 the couple took an extended honeymoon-like road trip around the West (featuring stops in "rock shops"), and after their first child, a son, was born in the same year, they moved to Los Angeles, where Bill began an apprenticeship in Adolf Loewi's firm. Over the next five years, a daughter and another son were born. Only one of the three children, David John Robertson, survived to adulthood (indeed he has just become a grandfather); but James William Robertson died suddenly, aged six, of a mysterious seizure suffered at school, and Jane Alexandra Robertson, an invalid all her short life, died of cystic fibrosis at age eleven. In the 1950's and early 1960's Kay also had to deal with the failing health of her mother: despite the diversions provided by a successful marriage, an art business, and a growing interest in minerals, these were very difficult years.

In 1970 Adolf Loewi retired, and Kay and Bill took over all business duties. With his second wife (Kay's mother having since died), Adolf moved to Hawaii, where he died in 1977, and at this time the Robertsons bought out Kay's stepmother's share of the business. During the 1970's and the first half of the 1980's the Robertsons very actively marketed furniture, paintings, and decorative objects, especially textiles; Kay was "on the road" all over the U.S. and Europe for much of this time. But after Bill Robertson died in 1986 a slow deceleration set in. Kay closed down the last of the business in 2003, retaining only a private collection of textiles and of miscellaneous art works mainly of sentimental significance. As mentioned, she still occasionally sells works of art, but mostly, these days, she spends her time with her mineral collection. During the Robertsons' 40+ years of marriage, Bill, who was indifferent to minerals but skilled at carpentry, built many fine cases of drawers to house Kay's ever-growing collection. Now, although she has long since despaired of catching up on her cataloging, Kay has countless mineral-collecting stories to ruminate on and to tell, beginning with one concerning a malachite and two quartz specimens in a French jeweler's shop, a very long time ago . . .

THE GROWTH OF THE MINERAL COLLECTION

In the summer of 1928, when Kay was eight, the family took a trip to the resort town of Chamonix, France, at the foot of Mont Blanc. If Kay could swim across a small lake, her grandmother said,

Figure 4. **A pull-out drawer full of German specimens from St. Andreasberg, Harz Mountains, in Kay Robertson's mineral room. Tom Moore photo.**

she could have a doll. Kay made the swim. On the way to the store to buy the doll they passed a jeweler's shop where three mineral specimens, a malachite from the Congo, an amethyst from Uruguay, and a colorless quartz crystal group, were displayed in the window, and, of course, Kay told her grandmother "Forget the doll—get me those." Grandmother remembered: for Easter of the following year she wrapped up some crystal specimens and hid them like Easter eggs for Kay to find—the specimens were from a "curio cabinet" that Grandmother's children (Kay's father and uncle) had had in Munich during the previous century.

On a 1936 trip to the Hohe Tauern, Kay bought, for two Austrian schillings, a smoky quartz crystal (which she still has today) in a souvenir shop on the Grossglockner Pass, but that is the end of the short list of mineral-memories from Kay's European childhood and youth; the next encounter, dated 1942, is set in the desert of California. While seeking some private and beautiful spot at which to set up her easel and paint a landscape, she met an old man selling mineral specimens from his trailer (she recalls wulfenite and Virgin Valley opalized wood). After spending a while with the man Kay found that she'd spent so much money that she couldn't afford another night's hotel bill, and her little vacation was shortened by a day.

In Los Angeles during the early 1950's, Kay looked up occasionally from her many troubles to find that minerals were for sale at the Farmer's Market at Fairfax and Third, and a few other places around town: fifty cents, she recalls, could buy you, for instance, a pretty galena. The first mineral show Kay attended was held in 1952 at the Shrine Auditorium. There she was especially impressed by an exhibit which the Santa Monica Gem and Mineral Society had mounted, and she joined the organization. The members turned out to be overwhelmingly of the lapidary persuasion, but Kay quickly found and befriended two major exceptions, Verne Cadieux and Marion Godshaw; the latter did much to encourage her interest in "natural" minerals and to increase her knowledge of them, as did, somewhat later, the highly knowledgeable Jean Hamel. Taking out a subscription to *Rocks & Minerals* helped as well.

Soon she had a routine of regular visits to a mineral shop called

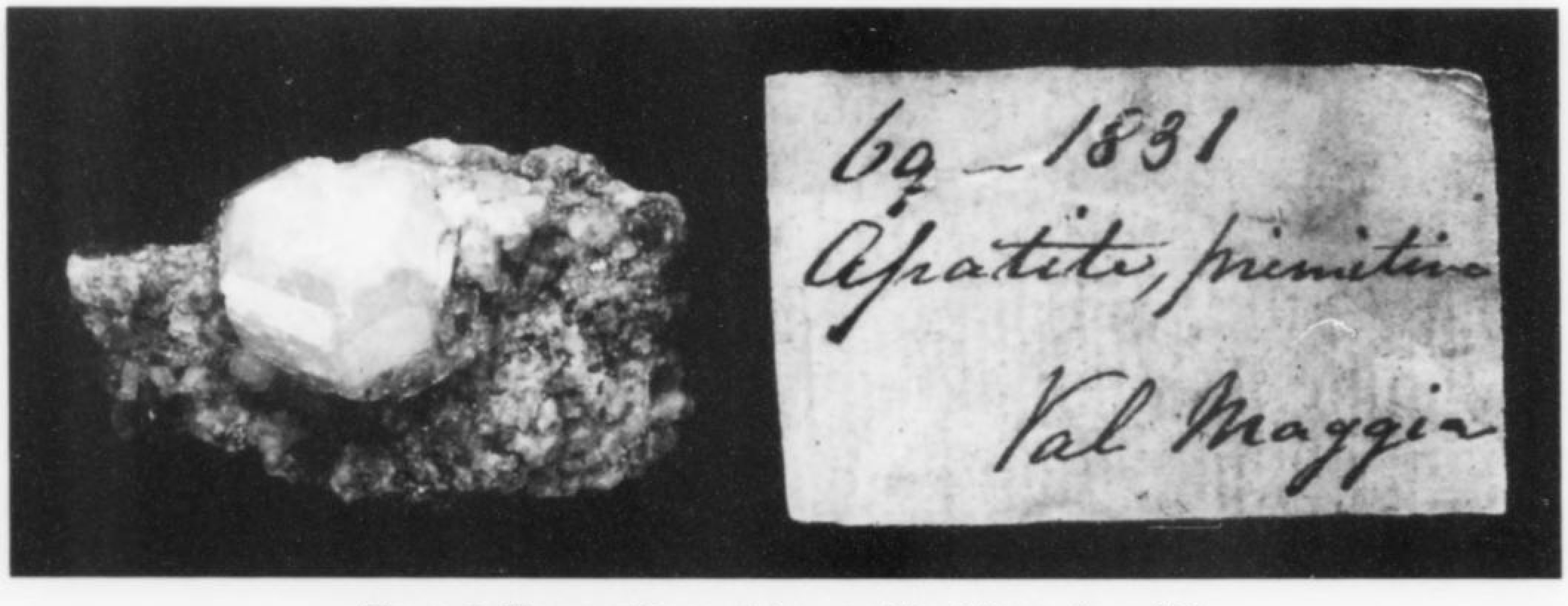


Figure 5. **Fluorapatite crystal on matrix, 1.8 cm, from Val Maggia, Ticino, Switzerland, with old handwritten label dated 1831. Kay Robertson collection; Jeff Scovil photo.**

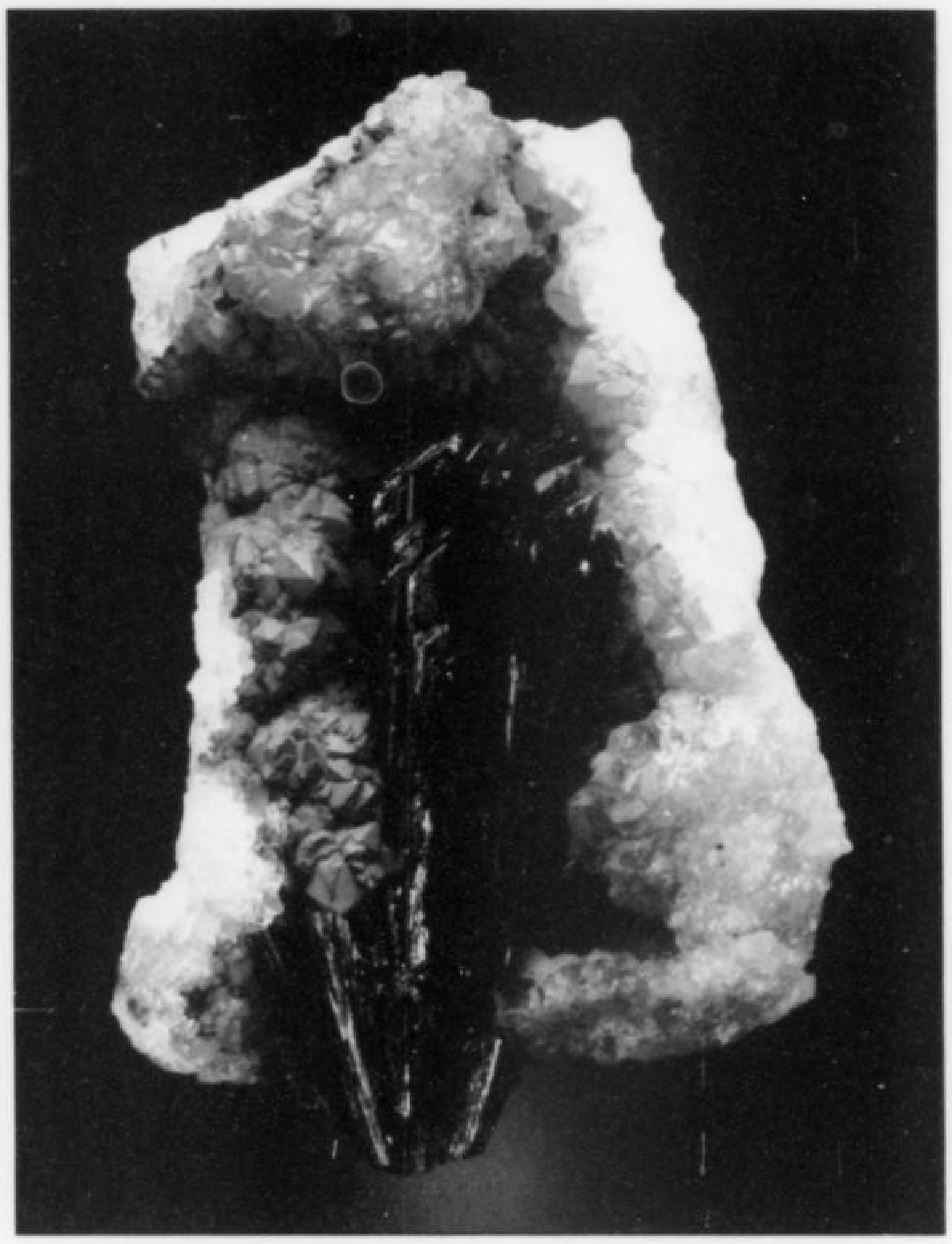


Figure 6. **Erythrite, 4.7 cm, from Schneeberg, Obersachsen, Germany. Acquired from the collection of Erich Lindemann, Hamburg. Kay Robertson collection; Jeff Scovil photo.**

"The Bradleys," and was taking her two then-living children along as she regularly looked in on the many small shows held around southern California on weekends. In 1955, for Bill and Kay's tenth anniversary, the family traveled to San Francisco for the California Federation Show—her first really large mineral event. While Bill was taking the children to Fisherman's Wharf a dazzled Kay lost control and bought *$35 worth* of mineral specimens, shocking herself with her profligacy. The $35 figure went on to become symbolic and even, eventually, mythic: Kay made a rule whereby she could not spend more than $35 on any single mineral specimen, and for the next 31 years she followed the rule without a slip. As her sophistication grew and as mineral prices inflated, the rule, of course, became increasingly quaint, but still it was not until 1986, when Bill died, that she let herself buy more expensive pieces. Today she looks back with a kind of prideful nostalgia on the $35-per-specimen era which, besides being almost congruent with her marriage, marked for her (one gathers) a kind of self-directed apprenticeship in mineral collecting.

Local adventures continued: in 1956 she talked a dealer called "Chuckawalla Slim" down from $10 to $5 for a fine miniature of English calcite—for quite a few years this Slim sold surprisingly good and surprisingly varied worldwide minerals out of his trailer, which he mostly kept parked in the desert just outside of Palm Springs. Also in the mid-1950's, more significantly for the future, Kay found the ads of the Arizona dealer Scott Williams in the pages of *Rocks & Minerals*, and eventually their seller-client relationship developed into the one of her many long-term mineralogical friendships that she has cherished most deeply. Before and after closing his business in 1965, Williams not only sold Kay hundreds of specimens but tutored her in the knowledge of them, explaining all that he could, instructing her in the arcana that every serious mineral collector must know. As her confidence grew, and while she continued very rapidly to acquire specimens, Kay also found related projects: she kept the books for the Santa Monica Society and did publicity for the organization's first shows; she co-founded a group called the Mineral Research Society which eventually published a booklet on Boron, California (Kay handled sales of this booklet); and, for her first significant publication, she wrote an article on the Wölsendorf, Bavaria fluorite locality for the August 1963 issue of *The Mineralogist*.

The Wölsendorf article was an early expression of the special interest in German minerals and German mineral localities which Kay began to develop in the late 1950's. Around 1958 she saw an ad in *Rocks & Minerals* in which a gentleman in Hamburg offered to trade German for North American specimens (although the ad was in English, Kay wisely responded in German). Herr Erich Lindemann turned out to be a childless widower of advanced age with a very fine collection of classic and contemporary German minerals. After they had completed a few mail exchanges of U.S. and Mexican specimens for German ones, Lindemann began pressing Kay to visit Germany, and so, in 1964, she undertook a four-week mineralogical tour—her first time in Europe since 1939. In Hamburg, Lindemann proposed to Kay an arrangement whereby she, in the U.S., would put a fair retail price on German specimens which he would send her, then sell them for him; for her trouble she could keep whatever specimens she wanted, paying Lindemann only half (her own set) price for these. Kay, not wanting to think of herself as a "mineral dealer," was very reluctant at first, but Lindemann needed money and she was flattered by his trust in her and excited by the possibilities for acquisition. Thus for the next few years she carried out the commission in a supercharged way, launching the building of a serious subcollection of German minerals.

The 1964 trip widened Kay's collecting horizons in multiple ways. While Bill was in London conducting company business, she visited and was entertained and instructed by mineralogical notables including Professor H. Ziehr, Werner Lieber, August Hartlaub (see below), the managers of the famous Krantz firm of Bonn (from whom she had been purchasing specimens since 1961), Alex Kipfer of Switzerland, and Dr. Alfred Hanauer. The last-named gentleman was then becoming Germany's first serious micromounter, and this was exciting, because Kay too had recently taken up micromounting (having acquired her first microscope after "trading for cash" with her sister a sable coat that had been their mother's). Kay was a found-

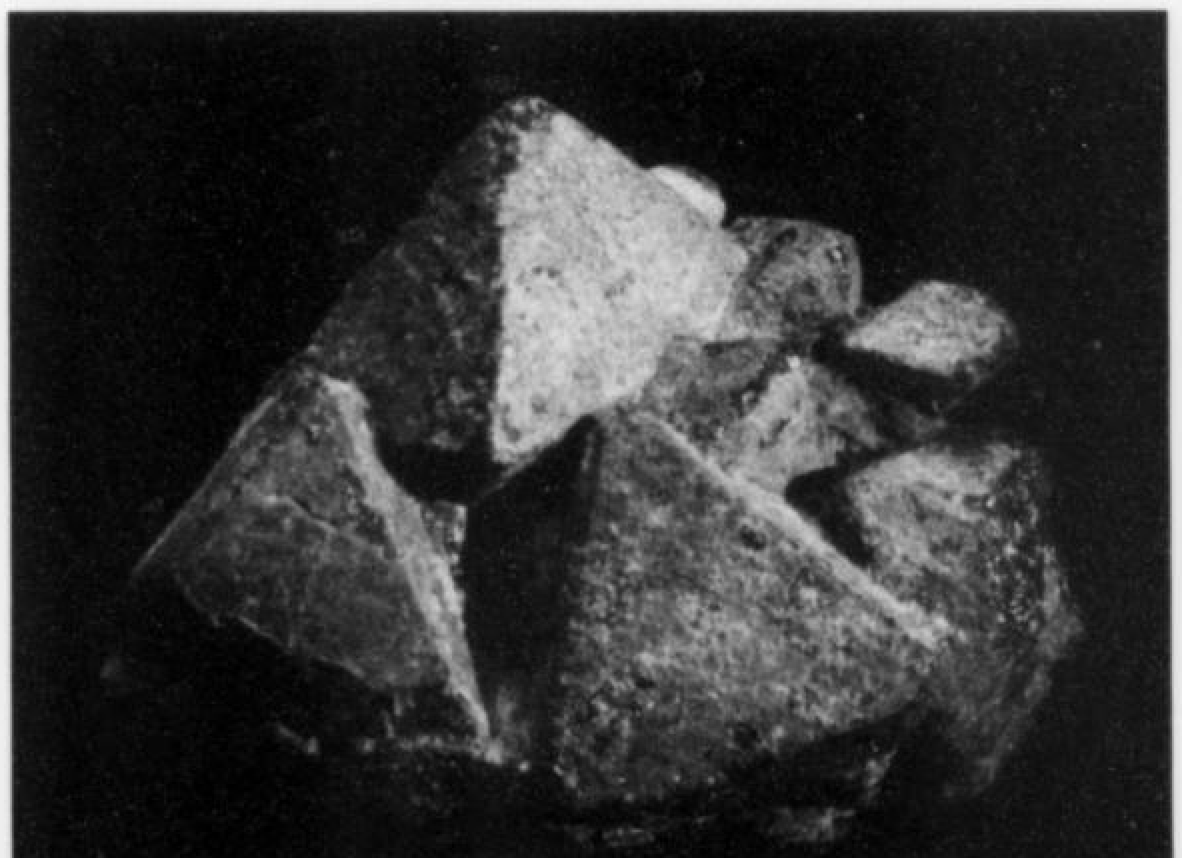


Figure 7. **Betafite, 5.8 cm, from Betafo, Madagascar. Kay Robertson collection; Jeff Scovil photo.**

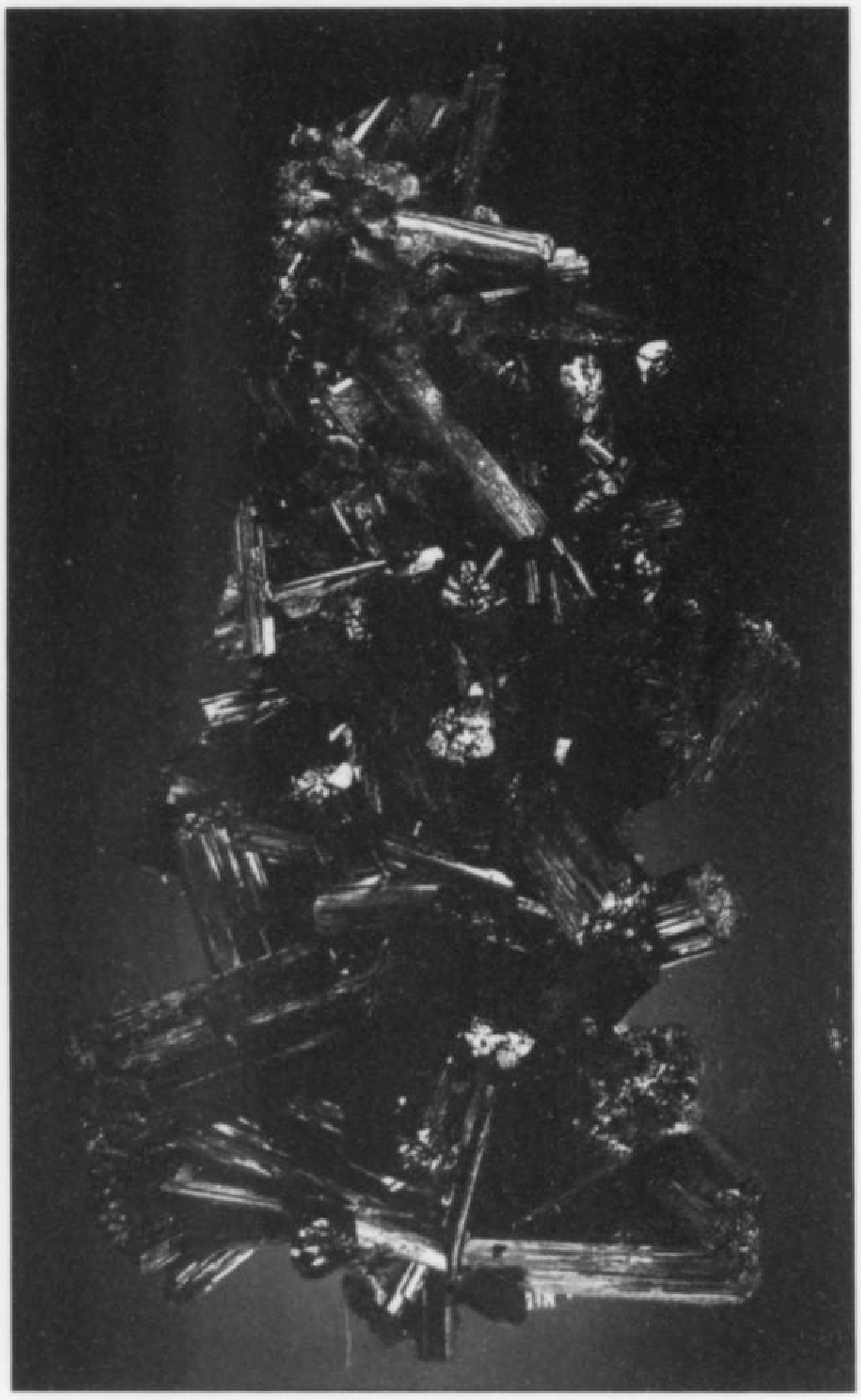


Figure 8. **Manganite crystal cluster, 11 cm, from Ilfeld, Nordhausen, Harz Mountains, Thuringia, Germany. Kay Robertson collection; Jeff Scovil photo.**

ing member of the Southern California Micromineralogists Society, and after the German trip she was able to bring, for example, exotic Hagendorf-Süd microspecimens of strunzite, strengite, hureaulite, phosphophyllite etc. to club meetings.

In fact, the Hagendorf-Süd phosphate pegmatite, in the Upper Palatinate region of Bavaria, is Kay's favorite classic German locality, and the one best represented in her collection today. She got her initial education in Hagendorf phosphates mostly from August Hartlaub, who worked in the mid-1960's at the Institute for Applied Mineralogy in Regensburg, and who had a basement full of minerals for sale from this and other German localities (following Kay's trip, Hartlaub regularly sent her parcels of selected pieces, asking $50 per parcel: the bargains included there would doubtless stagger the contemporary imagination). Although Kay had no formal training in mineralogy, let alone any access to determinative equipment, she was and is, with her artist's eye, extremely sensitive to the *look* of crystals, colors, matrix, associations, etc., and thus, after Hartlaub and others had "talked her up," collectors would send their Hagendorf specimens to her and ask for guidance. With some help from professional-mineralogist friends such as Bill Roberts, Joe Mandarino and Scott Williams, she usually could provide that guidance—in effect supplementing the work of the renowned Prof. Hugo Strunz, who at the time was busily publishing formal papers on Hagendorf mineralogy but who rarely replied to questions from amateurs.

Kay's "volunteer" efforts began to take a new turn when Peter Embrey of the British Museum stayed at her Los Angeles home for a few days in 1966 and closely examined her Hagendorf suite, finding many puzzles, including a tiny brown crystal whose identity neither Embrey nor Kay could plausibly guess at. After the visit, Embrey sent Kay a reprint of Laubmann and Steinmetz's 1923 description of Hagendorf "xanthoxenite": the authors' sketch showed a single crystal resting on one of a clump of jumbled (*wirrstrahlige*) yellow acicular crystals which they called cacoxenite. Kay realized that the "xanthoxenite" of Laubmann and Steinmetz was probably stewartite—"no other mineral from that locality looks like that!" she insisted—and that the yellow jumbled crystals were not cacoxenite (which is never *wirrstrahlige* at Hagendorf) but strunzite—and later research proved her right. The tiny brown crystal which had stumped both Embrey and Kay turned out to be a new species entirely, and Kay proposed that it be named *philolithite*, in honor of the Friends of Mineralogy (*philos* + *lithos*: "lovers of stones"), and in recognition of amateurs' contributions to mineralogy. Paul B. Moore, however, in formally characterizing the species, named it jahnsite, with *philolithite* going instead, much later, to a Långban species described by Kampf *et al.* (1998) in the *Mineralogical Record.*

The world of rare pegmatitic phosphates is perforce large and labyrinthine. Strunz claimed that Moore's "jahnsite" was xanthoxenite; a mineral that Clifford Frondel noted at the Palermo, New Hampshire pegmatite in 1949 was at first called xanthoxenite but later shown to be stewartite; later, phosphate pegmatites in New Hampshire and South Dakota, as studied by prominent mineralogists including Mary Mrose, Paul B. Moore, Donald Peacor, Richard Bideaux and John S. White, added yet more closely similar phosphates to the confusing mix. The whole "xanthoxenite problem," as Paul Moore called it (Moore, 1975), was not resolved until the mid-1970's, and probably would not have been resolved even then without Kay's "eye" and without the impetus of her communications with concerned parties. A 1976 letter to Kay from John S. White, then curator of minerals at the Smithsonian, thanked her for "the labor and the diligence [you invested in sorting out] the story of xanthoxenite. Without such a marvelous guide, I doubt that I could have reconstructed the story since it has become almost hopelessly complicated." This is Kay's proudest memory of how she, merely an amateur with a microscope and a good "eye," was able to contribute to mineralogical knowledge

From the mid-1960's onwards, Kay has continued to establish friendships with many eminent collectors and mineralogists including (besides those named above) Mark Feinglos, Russell McFall, Martin Hanauer (Alfred's son), Max Hey, Neal Yedlin, Lou Perloff, Arthur Montgomery and Fred Pough. About Pough, she remembers fondly (as do many collectors) how *A Field Guide to Rocks and Minerals* served as a central text in her early days of collecting, and, more personally, how Pough kept urging the Southern California Micromineralogists Society to mount a symposium, first in Santa Barbara, later in Santa Monica, to rival the famous micromounters' event in Baltimore: Kay and her friend Juanita Curtis handled logistics for the first two of these gatherings.

With the founding of the Friends of Mineralogy (and the *Mineralogical Record*) in 1970, Arthur Montgomery at once invited Kay to become a member. As it turned out, she served on FM's Board of Directors for many years, and when she could no longer sit in regularly at Board meetings she made a generous farewell gesture, donating $1000 to endow a "Best Educational Case" award to be given each year by the Friends of Mineralogy at the Tucson Show. And speaking of collectors' cases displayed at Tucson, Kay's cases

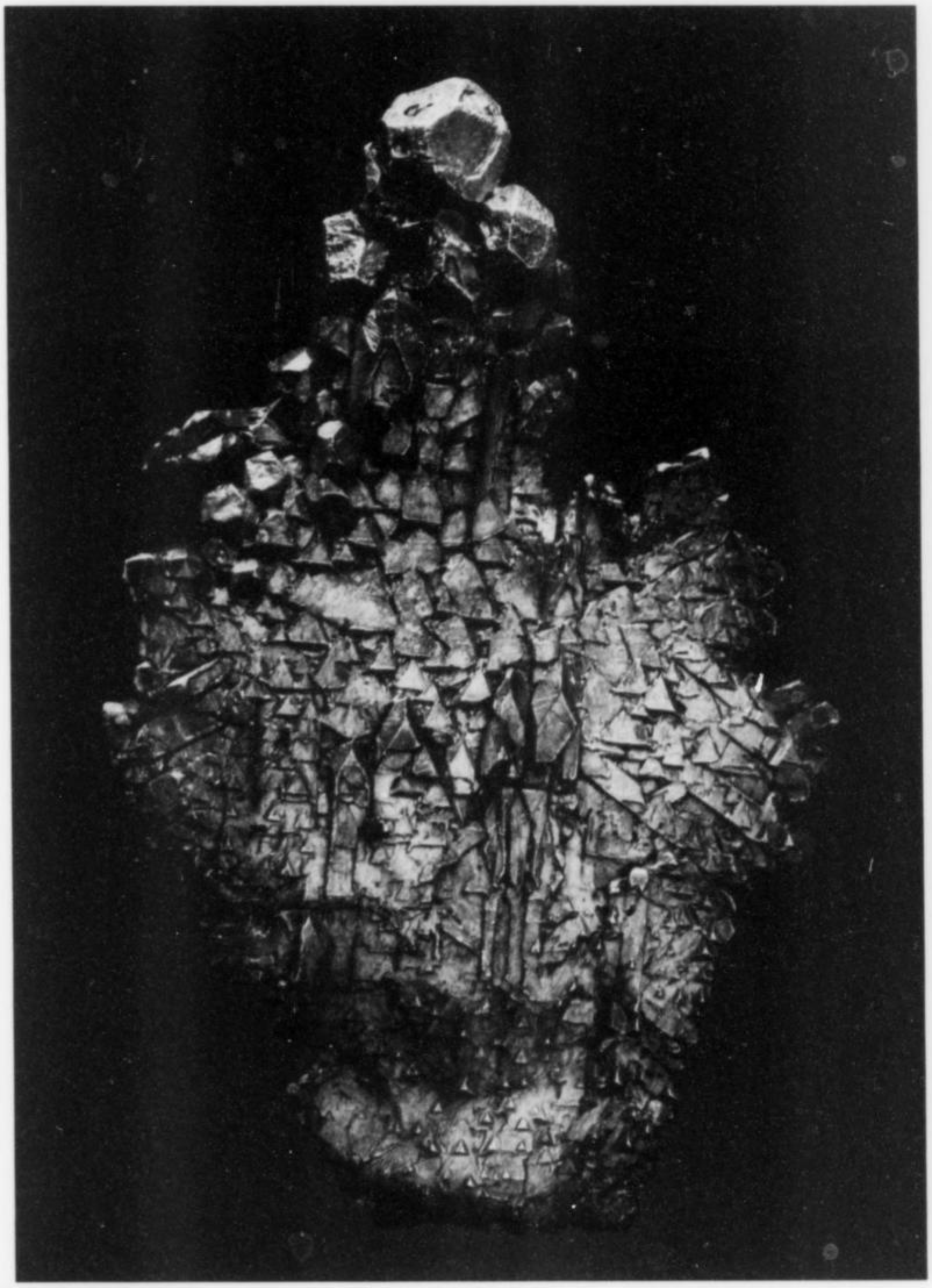
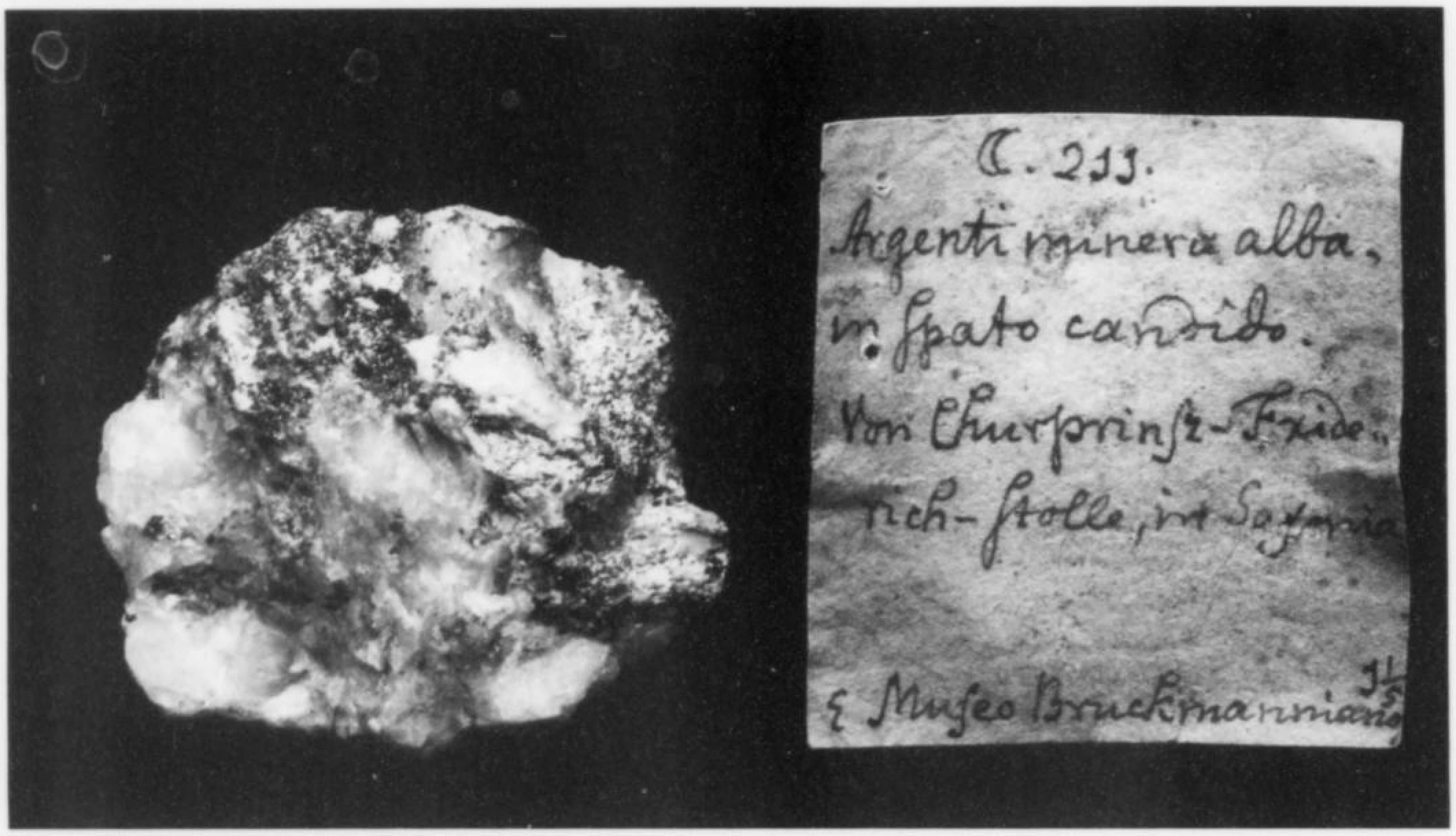


Figure 9. **Silver, 5.7 cm, from Kongsberg, Buskerud, Norway. Kay Robertson collection; Jeff Scovil photo.**

Figure 10. **Hureaulite, 2.75 cm, from Hagendorf-Süd, Oberpfalz, Bavaria, Germany. Kay Robertson collection and photo.**

over the years have been typically Eurocentric and erudite; they have included "Calcites from Andreasberg," "The Siegerland," "Minerals of Cornwall," and entire cases devoted respectively to Galena and the Apatite Group.

One of Kay's projects during the 1980's was to provide much-needed advice and moral support to the German publisher Rainer Bode while he was establishing the periodicals *Magma* (now defunct) and *Mineralien Welt* (now flourishing). Her publications during the decade include informal, informative show reports for Lanny Ream's newsletter *Mineral News*. And, with her multilingualism, her ability to read old German script, and her large collection of old European atlases and gazetteers, Kay has helped many curators and private collectors to decrypt old handwritten labels denoting places whose names and/or political affiliations shifted, perhaps multiple times, since the days of mining. To keep building her mineral collection she has made further forays to Europe: a major coup came in London in 1984, when she was able to buy from the English dealer Brian Lloyd about 80 important specimens from the early 19th century Neeld collection, including wonderful Iceland calcites and ancient, excellent mimetite specimens from Badenweiler in the southern Schwarzwald.



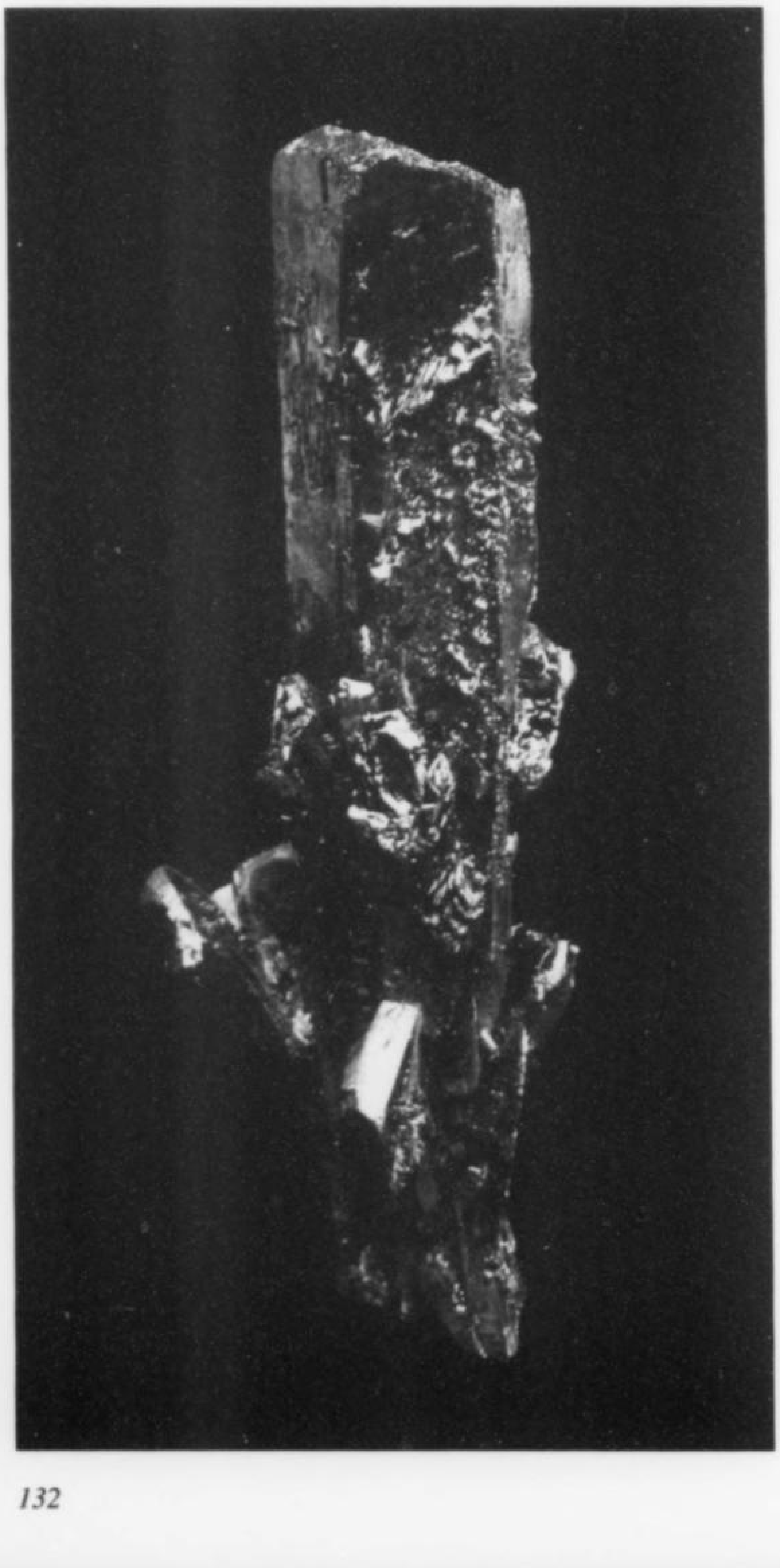


Figure 11. **Silver on 4.1 cm matrix from the Churprinz Friderich Tunnel in Saxony, with original parchment label. From the mid-18th century Bruggemann collection. Bruggemann, who lived in Wolfenbüttel near Braunschweig, was a friend of Goethe. Kay Robertson collection; Jeff Scovil photo.**

Figure 12. **Proustite, a hollow crystal 3.4 cm long from Joachimstal (Jáchymov), Bohemia. Formerly in the Isaac Walker collection—a gift to Kay from Peter Embrey when he was her house guest in 1966. It carries a German label dated 1827. The label says that the mineral is an "undescribed variety of red silver ore": proustite was described as a species in 1831. Kay Robertson collection; Jeff Scovil photo.**

A remarkable depth in specimens like those just mentioned is the most salient feature of Kay's collection today. Perusing it through one whole long weekend in Los Angeles, I was too simultaneously dazzled and frazzled to take many notes on individual specimens; general remarks, plus a few photos which Jeff Scovil took several years ago, will have to suffice to describe this extraordinary accumulation of more than 13,000 cataloged specimens, plus several hundred more which still await cataloging.

THE ROBERTSON COLLECTION

Kay lives with a housekeeper/cook who handles domestic imperatives, but her small house nevertheless is full of an elegant clutter, with books, paintings, *objets d'art*, and cabinet-size mineral specimens scattered everywhere, including on most sittable pieces of furniture in the living room. This is a gracious and sympathetic sort of clutter, the best of the ballast which a rich life has declined to drop—but to glance into the dining room, study, and bedroom is to see vague stacks of yet more "stuff" which includes flats of mineral specimens too. The "mineral room," quite small to start with, is difficult even to turn around in, as its volume is crammed with protruding specimen and filing cabinets, a microscope platform, her late daughter's old mineral collection, bookcases laden with mineralogical books in four languages, etc. A modest door in one

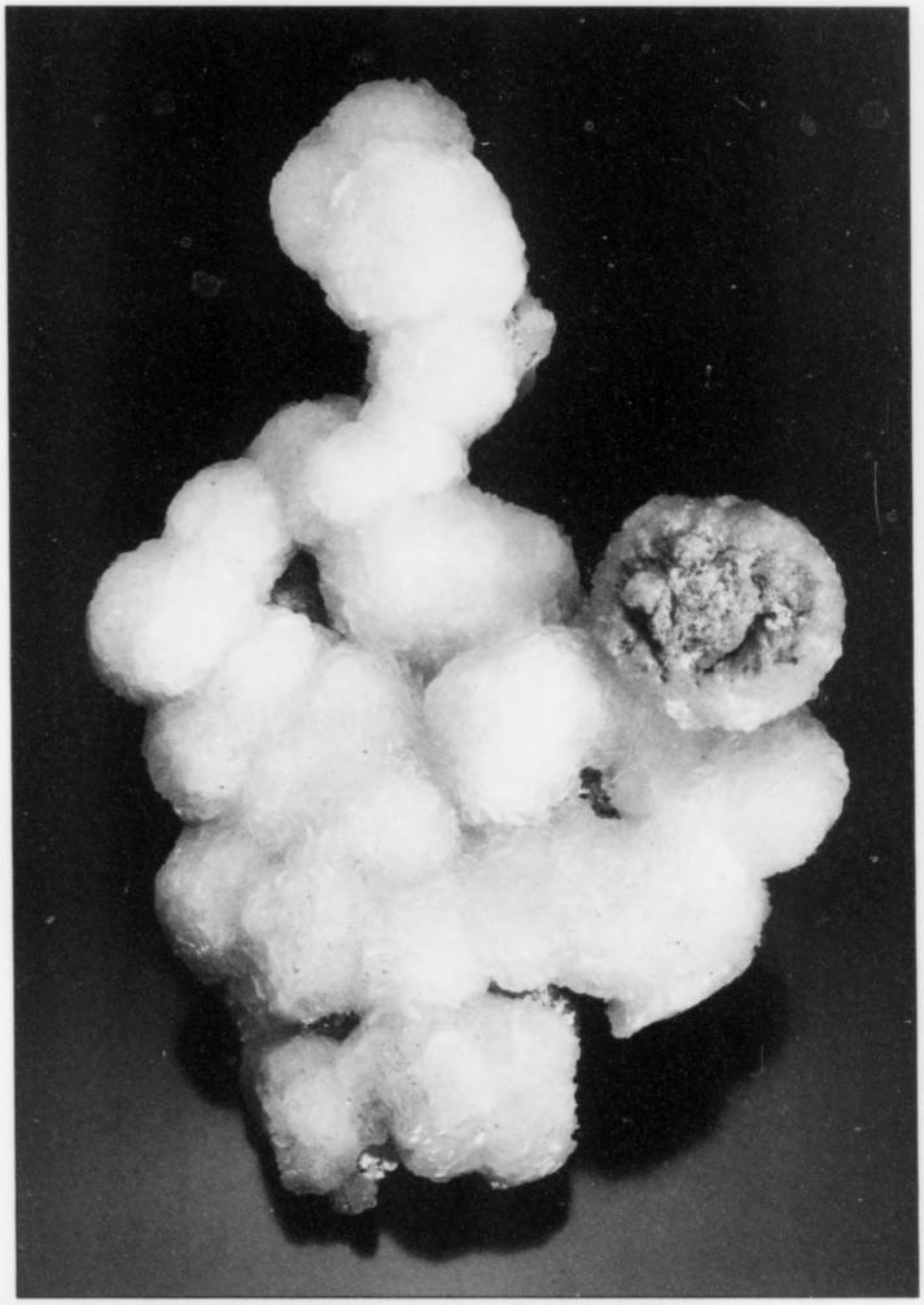


Figure 13. **Brucite, 15.4 cm, from Wood's Chrome mine, Lancaster County, Pennsylvania. Kay Robertson collection; Jeff Scovil photo.**

Figure 14. **Mimetite, a 6.2-cm matrix specimen from Johanngeorgenstadt, Obersachsen, Germany, with a label from the Royal Imperial Mineral Cabinet in Vienna dated 1806. Acquired through Brad van Scriver. Kay Robertson collection; Jeff Scovil photo.**

Figure 15. **Fluorite, 2.4 cm wide, from the Cäcilie mine, Nabburg, Wölsendorf district, Oberpfalz, Bavaria, Germany. A small number of these very unusual fluorite specimens came from the Cäcilie mine in 1963. They are twinned and elongated so that they resemble calcite crystals; some have red specks of included cinnabar. Kay Robertson wrote an article on the Wölsendorf fluorite-mining district in 1963, and her collection contains a suite of Cäcilie mine fluorite crystals. Kay Robertson collection; Jeff Scovil photo.**

corner leads, not to a storage closet as one would expect, but to a chamber lined head-high with cabinets full of still more specimens: this, it turns out, is the carbonate closet (plus drawers of uncataloged Hagendorf phosphates and a few drawers of rough and cut gemstones); complex silicates are in a huge cabinet of pull-out drawers in the hallway, sulfosalts and a cabinet of quartz are in the bedroom. The specimens are of all collectible sizes, from small-thumbnail to large-cabinet, and there are many drawers full of micromounts. You do not just inspect this collection, you cohabit with it, until, reluctantly, you *must* leave to catch your flight home.

When examined with any care, the collection gives consistent evidence of its creator's refined taste, keen eye for aesthetics, and encyclopedic knowledge of major occurrences for every major mineral species and a great many rare ones: more than 1,300 species are represented in all. The collection thins out a bit in material of later date than, say, 1985, although an occasional something-or-other quite fine from Dal'negorsk, Yaogangxian or Shigar is apt at any time to pop up, and many specimens of the newer things are uncataloged and thus have not yet reached the "main drawers." The collection's depth may perhaps be evoked through two, almost randomly chosen, examples. The epidote suite includes specimens from Zöptau, Moravia; Knappenwand, Untersulzbachtal, Austria; Seebachkar, Obersulzbachtal, Austria; Bourg d'Oisans, France; Mt. Blanc, France; eight localities in Switzerland; four localities in Piedmont, Italy; Arendal, Norway; Prince of Wales Island, Alaska; the Laxey mine, Idaho; twelve localities in California; Salida, Colorado; Hawthorne, Nevada; four localities in Baja California, Mexico; Capelinha, Brazil; the Morro Velho mine, Brazil; Ica, Peru; Kari-Kari, Potosí, Bolivia; Harts Range, Australia; Wadd, Baluchistan, Pakistan; and about twelve others—many of these localities are represented by multiple specimens. In the stibnite suite are beautifully crystallized specimens from Příbram, Bohemia; Kremnitz, Slovakia; Allchar, Macedonia; La Lucette, Mayenne, France; the Pereta, Cetine and Niccioleta mines, Tuscany, Italy; seven localities in Romania; Trepča, Serbia; the Ichinokawa mine, Japan; Kadamdzhai, Kirghizia; Bau, Borneo, Indonesia; Chiang Mai, Thailand; Maona Lari, North Island, New Zealand; the Stayton district, Hollister, California; Antimony Peak, Kern Co., California; the White Caps mine, Manhattan, Nevada; ten more localities in the western U.S.; Zacatecas and Oaxaca, Mexico; La Salvadora, Oruro, Bolivia; Julcani, Peru; and about fifteen others. While of course not all of the specimens are "killers," at least half in each suite for each common species are very good to extremely fine. A satisfying number of specimens display crystals on matrix, with recognizable associations: Kay cares that her specimens illustrate paragenetic suites (insofar as is possible) almost as much as she cares that they feature good crystal aesthetics. The labels are thorough and clear, and many, many specimens are accompanied by backward progressions of earlier labels. Browsing through these drawers carries much of the hidden-treasure or rare-educational-opportunity feeling that typically comes with prowling in back rooms of great museums with collections assembled over centuries.

Kay allots two large cabinets to the German subcollection (though stray German specimens are also found in the "general" cabinets), and anyone who, like the present writer, shares her special fondness for classic German mineral occurrences will spend his most rapt, slow-motion time of all in this part of the mineral room (where a map of Germany and an original painting of Kay's grandfather look down from the wall). They're all here, in multiple samples ranging in quality from "study grade" to absolutely superb: Freiberg acanthite and stephanite, Schneeberg proustite and erythrite and roselite and uranium-bearing species, Andreasberg pyrargyrite and dyscrasite and fluorite and pink apophyllite, Siegerland malachite and anglesite and millerite and galena, Schwarzwald fluorite and barite and silver, Obermoschel cinnabar and moschellandsbergite, Ems pyromorphite and cerussite, Johanngeorgenstadt mimetite, Öhrenstock hausmannite, Fichtelgebirge topaz and microcline and herderite, Ehrenfriedersdorf cassiterite and fluorapatite, Ilfeld manganite, Ronneburg whewellite, Hagendorf phosphates . . . *undsoweiter*. Unfortunately, in one of the cabinets the German specimens are piled on each other without protection, and the big pull-out drawers are shallow and rickety, such that one has to be careful, when moving the drawers in and out, to avoid decapitations or rollover disasters: thin foam rubber sheets cover these piled-on specimens, but it is still as if these precious things are fragile old friends which Kay has allowed to share her home with her awhile, provided that they somehow look after themselves.

However, Kay has provided very responsibly for the inevitable time when the collection must move on. She has long since willed that the whole thing, including the library, will go to the Natural History Museum of Los Angeles County, where it will come under the care of her longtime friend Dr. Anthony Kampf, curator of the Museum's already great mineral collection. Kay's tie with the Los Angeles County Museum goes back, as already noted, to the early 1940's, and very soon after Kampf's accession to the mineral curatorship in 1977 she knew that the collection could be placed in good hands there for the foreseeable future. The visitor to the Museum's public mineral display will notice that dozens of specimens already on view there have come as gifts from Kay Robertson—when she goes shopping for minerals these days she shops as much for the Museum as for herself. Tony Kampf will have a huge job to do when Kay's collection comes under his care, but, meanwhile, for Kay's single-handed and single-minded creation of this treasure—almost as if it were a work of art—applause and bravos, even tossed bouquets, are surely in order.

ACKNOWLEDGMENTS

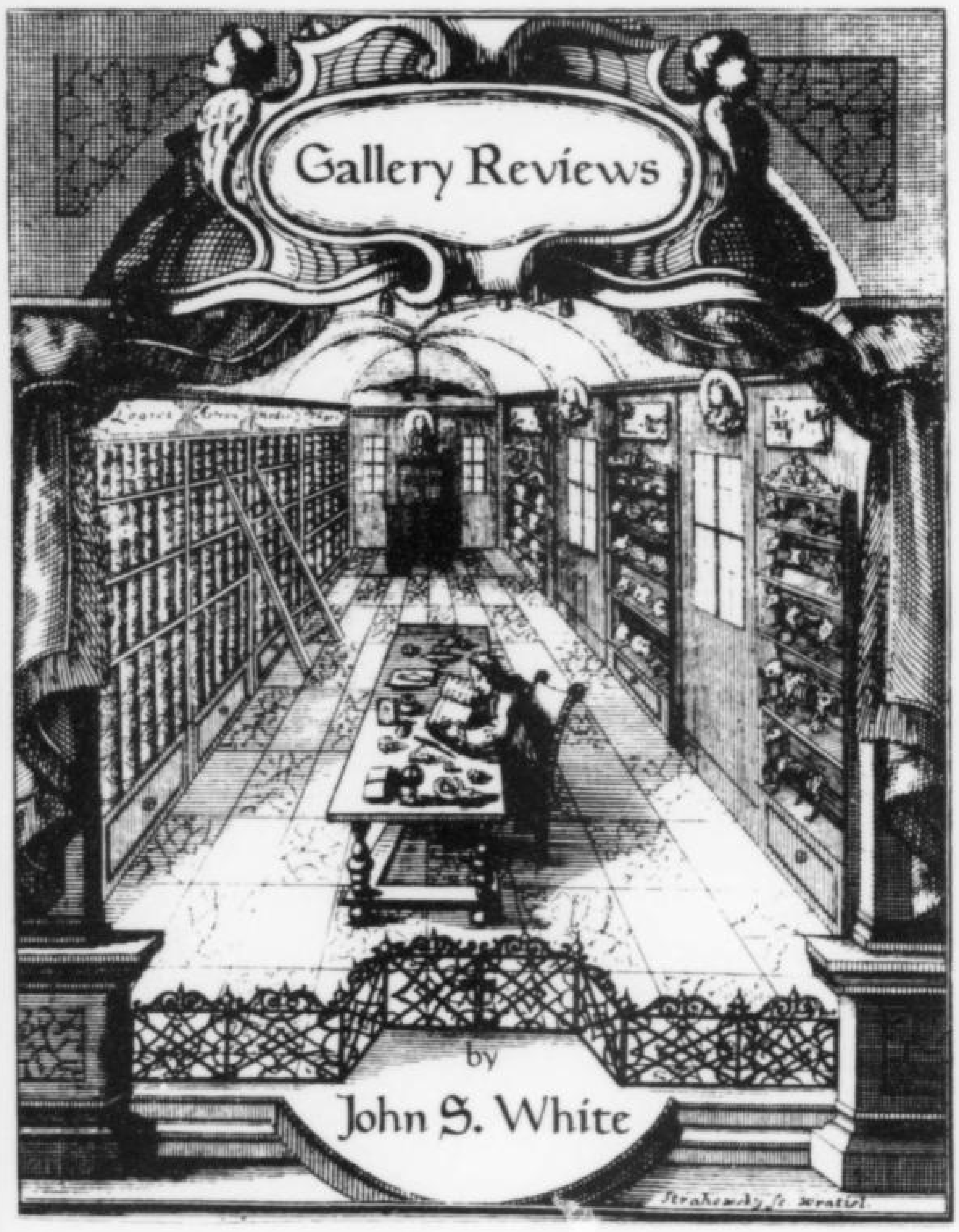
Although she says that having me visit her and appreciate her collection was "a pure treat," I still must thank Kay Robertson for her hospitality, and for providing logistic help, during the weekend I spent in Los Angeles taking notes for this article. Thanks also to Dr. Tony Kampf for the thorough guided tour he provided of the Los Angeles County Museum of Natural History's mineral collection.

REFERENCES

KAMPF, A. R., MOORE, P. B., JONSSON, E. J., and SWIHART, G. H. (1998) Philolithite: a new mineral from Långban, Värmland, Sweden. *Mineralogical Record*, **29**, 201–206.

MOORE, P. B. (1975) The xanthoxenite problem: chronology and comments. Unpublished communication with Kay Robertson.

ROBERTSON, K. (1963) A German fluorite deposit. *The Mineralogist*, August 1963, 4–8.



GALLERY REVIEWS

by **John S. White**

Since I have been unable to personally visit many of the museums that merit reviews, I have asked several other writers to participate. I have been fortunate in being able to find several highly qualified reviewers who have engagingly and authoritatively covered several important museums in the U.S. for this installment (authorship is noted below in each case). Also, I recommend a visit to the website of John Veevaert's *Trinity Minerals* (www.trinityminerals.com), where additional comments on five museums can be found, along with numerous photos. We hope that John will continue to add more museum reviews to this fine feature.

The Colorado School of Mines Geology Museum, Golden, Colorado

by John S. White

These days it appears that many colleges and universities are prepared to jettison their museums because they need the space for something else, or because the museums are not revenue generators, or because the financial burden of paying for staff to manage them properly has been deemed onerous. My recent visit to the Colorado School of Mines Geology Museum was refreshing, as the museum is an exception to all of these unhappy trends.

The museum collection was founded in 1874 by Arthur Lakes, the first curator, and since that time it has grown remarkably. The collection is located on the School of Mines campus in Golden, and occupies a wonderful large building that is just three years old. Inside, it is spacious, bright and inviting. It is so spacious, in fact, that the display cases are generously spaced apart and one gets the immediate impression that the display area could accommodate twice as many exhibits without appearing at all crowded. At the rate that specimens are being acquired, mostly by amazing donations and loans from supporters of the museum, more display cases may very well have to be added, and soon.

A second impression, once one walks around and becomes familiar with the layout of the place, is that donated specimens appear to be pouring in from a remarkably large support group. While one is accustomed to seeing labels in museums which carry a credit line saying something like "Gift of ……," this museum has entire cases of minerals throughout the gallery that are gifts of various donors, and also a couple of cases with minerals that are on loan. This is in part a reflection of the fact that Colorado is such a mineral-rich state, but it also reflects the frustration of would-be donors to the Denver Natural History Museum, whose administration seems indifferent to minerals.

The museum occupies two levels in this immense facility. The entrance-level floor is huge and mostly wide open, with skylights high above the display area. I am sure that on a sunny day natural light would be adequate to effectively illuminate the exhibits, but supplementary lighting is often necessary, and what is provided is more than adequate. There is a vast rectangular central area which extends from the entrance to the far windowed wall, and here one finds some half dozen vertical cases, three along each side, which celebrate the history of some of the most famous Colorado mining districts using minerals, photos and mining artifacts. The themes of these cases include Creede, Leadville, Gilpin, Cripple Creek, the San Juan Mountains, the Pikes Peak batholith, and general Colorado localities, and there is also a case (on loan from Dave Bunk) featuring Idarado mine manganocalcite. On the immediate right, facing the far end, is a large vertical case full of superb cabinet-size specimens from worldwide localities, all gifts of Bruce and David Oreck, of Oreck vacuum cleaner fame.

There are nine free-standing cases out on the floor, most of which contain but a single very large specimen or just a few largish specimens, including Aspen silver and a small selection of slices of petrified wood. At the far end on the right is a case filled with zeolite minerals from Table Mountain, standing in front of a window which looks out on Table Mountain itself: a more or less unique opportunity for the visitor to associate minerals with their source.

On the opposite side of the right wall is a more narrow corridor, but still spacious, lined on both sides with vertical cases filled with fine specimens arranged broadly by geography (Western United States, Mexico, South America, Worldwide Classics, Midwestern and Eastern United States; and one particular Colorado district, Gilman). Finally, at the end of this corridor one enters a small room, a special exhibit alcove, with outstanding specimens in large cases. Two of these are filled with Chinese species, all donated by Martin Zinn (there are numerous other donated specimens from Martin scattered throughout the rest of the gallery as well); another case contains a selection of wonderful elbaites from Newry, Maine, the gift of John Marshall. There are three "wow" cases of minerals on loan from Bryan and Katherine Lees: a stunning assembly of Sweet Home mine rhodochrosites, and a suite of vivid blue-green "amazonite" microcline with dark smoky quartz. The last case is also a loaner, this from Dave Bunk, and it contains a remarkable assembly of various fine minerals from the state of Colorado, a long-time specialty of Dave's.

Here and there throughout the gallery are small pedestal cases, each containing a single fine specimen. Some of these are also gifts from Bruce and David Oreck or from Martin Zinn, but two

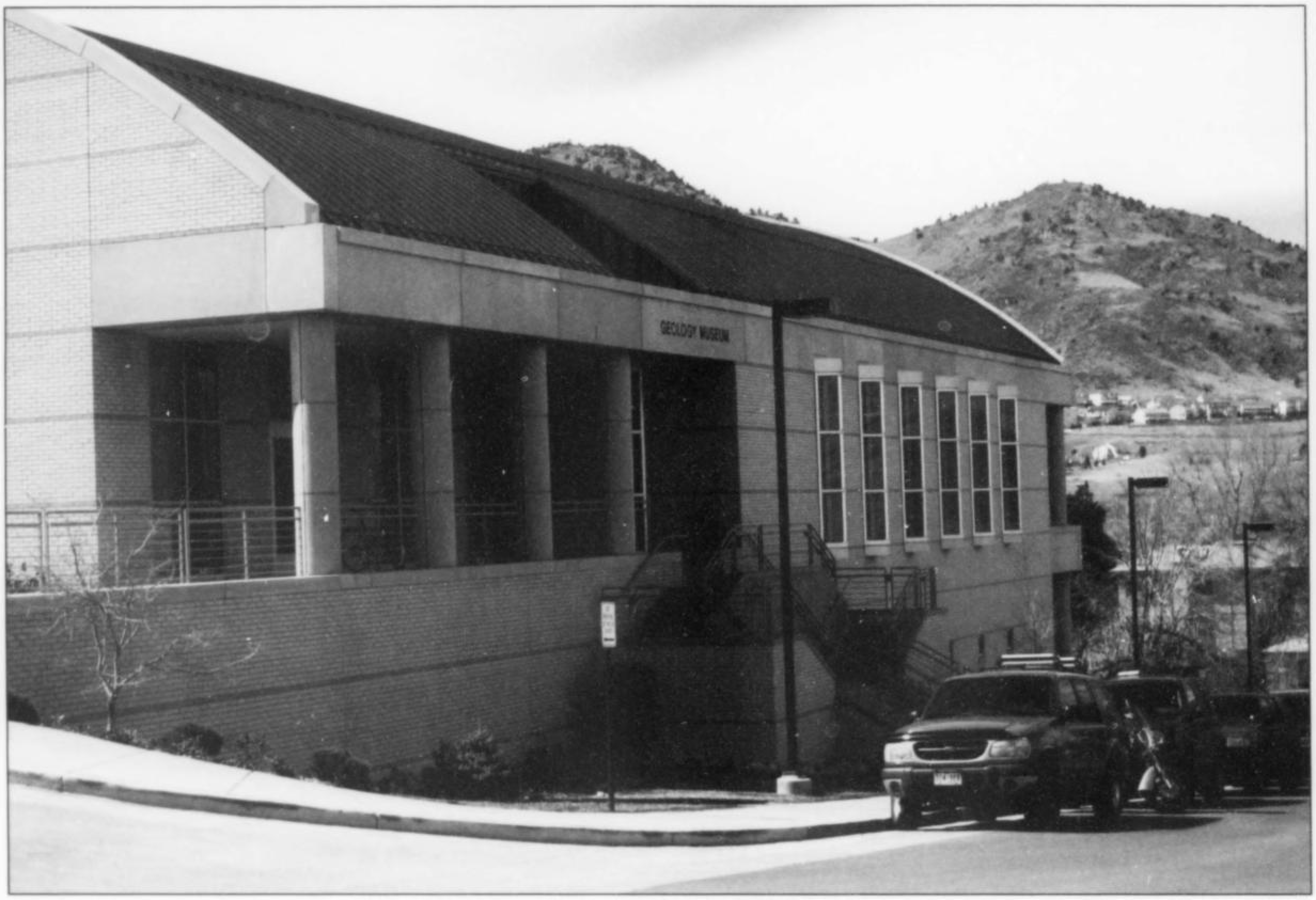


Figure 1. **The new Geology Museum of the Colorado School of Mines in Golden.**

specimens, a wulfenite and a covellite, are from the Museum's old collection.

There is more than enough to satisfy the mineral buff on this floor, but a trip down the stairs to the lower level is also worth the effort. There one finds a replica of a mine that you can walk through: more or less standard stuff. Inside it, however, is one of the most effective exhibits of fluorescent minerals that I have seen. Visitor entry triggers a sequence of lights on a timer so the minerals are seen, consecutively, in normal light and then in each of the two standard wavelengths of ultraviolet light. The ultraviolet light sources are very strong and well-balanced so that all of the fluorescent responses are maximized, making for one of the best displays of this feature in my memory. Also within the mine is a world-class display of mine lamps. The rockwork in the mine, I was told, recently won an award for the contractor.

Elsewhere on this floor is a variety of display cases, some appearing to have been recycled from an earlier exhibit. One of the two larger cases contains zeolites and related species from the Deccan Traps in India; the other contains boron minerals, all from Boron, California, from the collection of the late James Minette. There are a few flat cases with modest instructional materials about mineral properties and crystal forms, and there are some additional cases with meteorites and several large wall cases with fossils arranged by geologic era.

The downstairs area, while potentially interesting to school groups, is in no way comparable to what one finds on the floor above and can easily be overlooked if one's time is limited. It is somewhat unfortunate that the Indian and boron minerals haven't been moved upstairs where they would be a better fit.

As mentioned earlier, the lighting of the specimens throughout the museum is excellent; nor does there appear to be any dust problem. The labeling of the specimens, black type on white, is very effective and easy to read. Labels include chemical formulas, quite appropriate for a university museum, I believe, and the nomenclature used for the minerals is consistent and correct. I actually looked for errant nomenclature and was hard-pressed to find anything to fuss about except for several appearances of "garnet" after the species names (this usage is not technically wrong, but it is not necessary, nor is it consistent with the way the names of species in other groups are presented, as in the tourmalines, for example). I did find a "Japanese twin" (instead of the more correct "Japan-law twin") and the statement that quartz has no cleavage, but these are common errors and can be forgiven.

The arrangement of the minerals in the corridor on the right, by areas of the world from which they came, is a novel idea; at any rate I do not recall having seen this approach before. I found it effective and informative, and probably far more interesting to the casual visitor, if not to the serious collector, than the classical systematic arrangement by chemical composition that one tends to see far too often.

One lesson to be learned for museum exhibit planners is that visitors seldom look upward unless there is a very good reason to do so. I happened to note that a photo of Martin Zinn's mother, Betty Llewellyn, was mounted on the wall near the entrance to the special exhibit alcove. I asked Martin why that was there, and he explained that the alcove is called the "Betty Llewellyn Room," presumably because of a generous donation in her memory made by Martin for the purpose of making the room a reality. So he walked

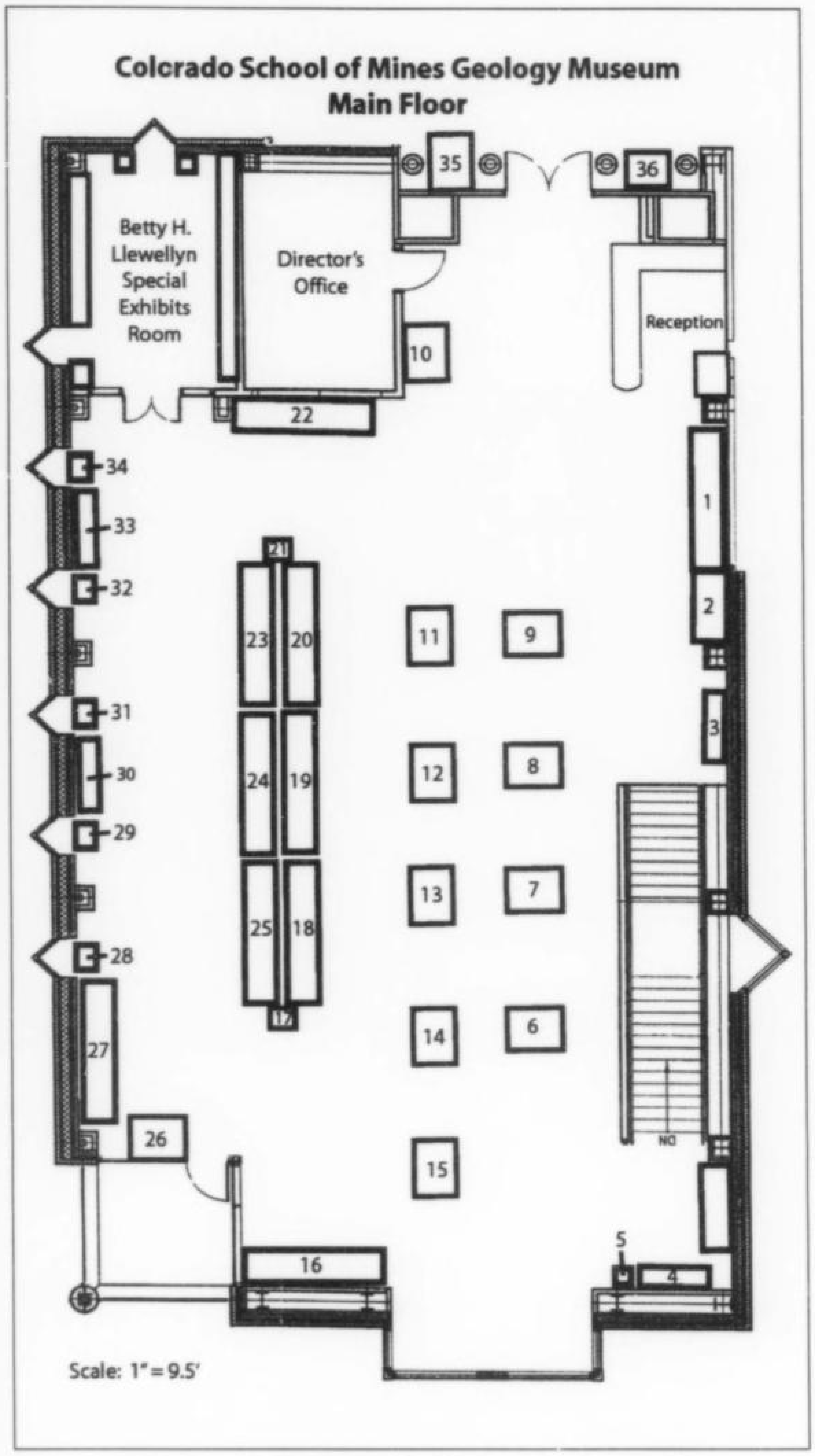


Figure 2. **Main floor plan of the Geology Museum, Colorado School of Mines.**

me around to the entrance and had me look up. Sure enough, at a very high level was a glass panel upon which was etched in light gray "The Betty Llewellyn Room." I hadn't seen it and I doubt that many others had either. A plaque on one side at about eye level would be far more effective.

After having reviewed so many disappointing galleries in the past, it is a pleasure to report on a mineral display effort that clearly merits high marks. The lighting is first-rate, the labeling is user-friendly and accurate, the amount of instructive text has been kept to a minimum, and the minerals, which are outstanding, are elegantly showcased, as they should be.

Up until recently, the museum has had the services of Paul Bartos, a knowledgeable, enthusiastic and very active curator. He has announced that he will be leaving to take a new (and much better paying!) position as Vice President and Chief Geologist for Esperanza Silver Corporation. A search committee (including among its members Martin Zinn, Bryan Lees and Bruce Oreck) has been formed to locate a suitable replacement.

In summary, I would say that everyone who loves minerals should be encouraged to make an effort to visit this very fine museum.

The Natural History Museum of Los Angeles County

by Rock Currier

The Natural History Museum of Los Angeles County is located at 900 Exposition Boulevard, and is open from 9:30 a.m. to 5 p.m. Monday through Friday, and 10 a.m. to 5 p.m. on Saturday, Sunday and Holidays. Parking is $6 and admission $9; credit cards are accepted. On the museum's website you can see a nice interactive floor plan of the gallery that you can click on for a brief tour of the gallery (www.nhm.org/research/minsci/exhibits.htm).

Here is certainly the best public collection of minerals and gems in California, and probably anywhere in the Western states. The museum's main entrance is on the north side of the building, facing Exposition Boulevard. The South entrance faces the park and The Coliseum. Either entry leads directly to the central rotunda, where your attention is immediately captured by the giant skeletons of a big Tyrannosaurus Rex about to chow down on a Triceratops. To the left and right are the large halls of African and North American Mammals displayed in their glorious natural habitats in dioramas ranging from small to huge—pretty stiff competition for an exhibit of minerals.

Yet, as you walk around the central foyer you come upon a large doorway in the northwest corner, seductively opening into a dark room with glittering things inside. The entrance is flanked by two big display cases containing a number of large, colorful mineral specimens, not the least of which is a 100+ pound specimen of octahedral pyrite. These displays act as magnets to draw people farther inside. Immediately to the left in the darkness one sees some diamond-shaped display cases glowing from hidden lighting, which appear to be floating in air. The colorful glittering wonders inside beckon. Now you are trapped, and are sucked the rest of the way in.

As you gravitate to the central forest of display cases, a glance to the right reveals a darkened alcove glowing with an unbelievable treasure of *gold*, the California state mineral. On exhibit are more than 300 pounds of gold at last count. There are beautiful examples of crystallized and wire gold mixed in with memorabilia and photos from the Gold Rush days. Slathered over everything are more big gold nuggets than you will see anywhere, except perhaps in the Diamond Fund museum in the Kremlin in Moscow.

As you enter the hall you see on the right a big section of well-lit floor-to-ceiling wall cases containing 180 mineral specimens from California. On the left, against the south wall, is another, even longer bank of display cases containing a systematic collection of well over 500 well-crystallized specimens. Both of these display areas contain surprises for even the most advanced collector. The California collection will surprise you with its quality, and the systematic collection contains many rarities. I never come away from the exhibit without noticing something that surprises me.

The north wall of the room is given over to educational exhibits. Starting on the right, the basic rock type/mineral-forming environments are explained. As you walk down the wall you are shown display cases with text, graphics and specimens demonstrating the various properties of minerals: crystal shapes, cleavage, hardness, specific gravity, etc. Other cases show fluorescent minerals.

You don't immediately notice the educational displays because you find yourself drawn to the forest of eye candy in the center of the room, where each of the island cases contains 10 to 12 of the museum's best specimens, many of them exceptional. The specimens are dazzling, and it is difficult to get tired of looking at them. From Zimbabwe there are two wonderful specimens of kermesite from Que Que, and from Zambia there is a wonderful

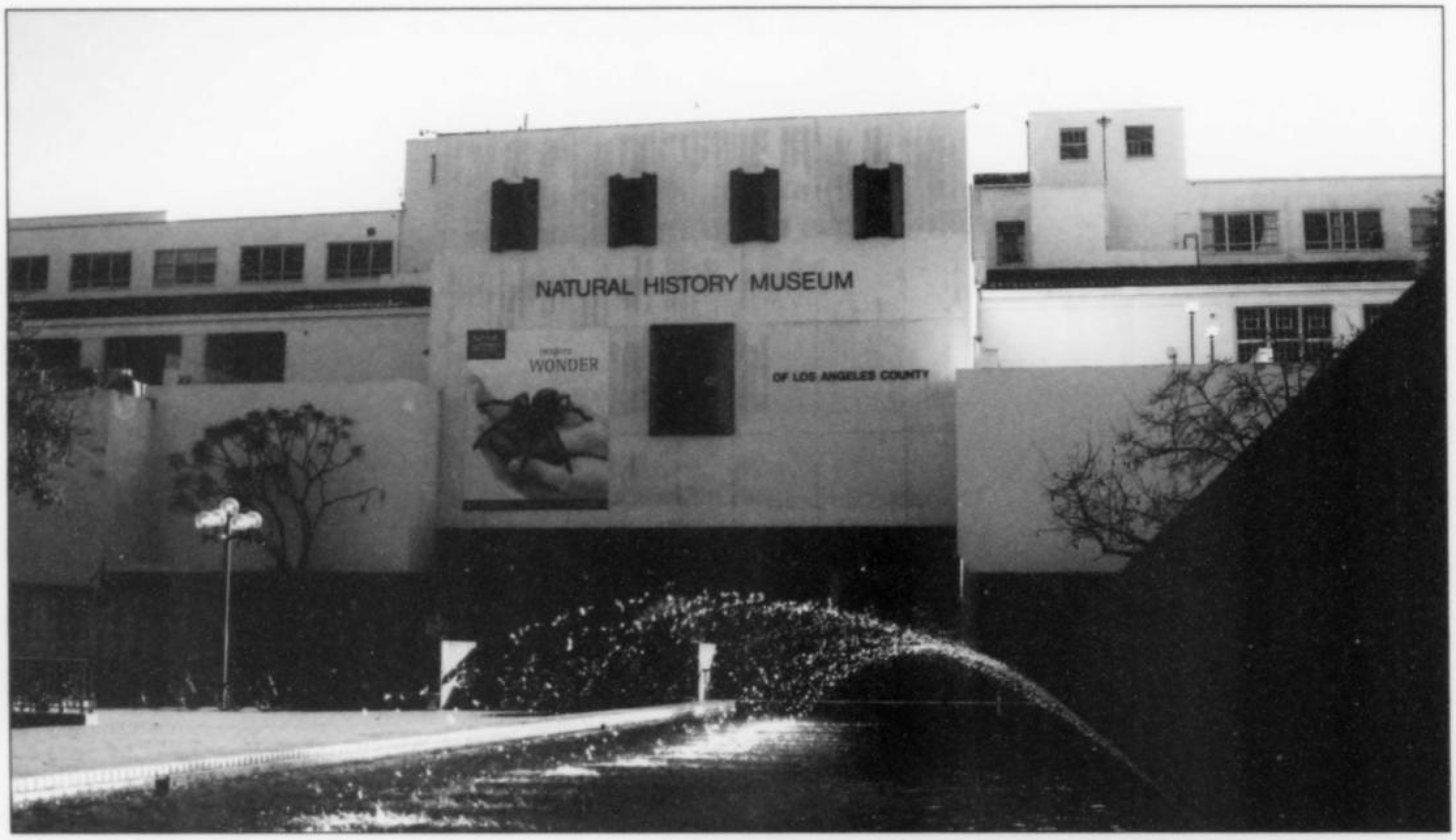


Figure 3. **Façade of the Natural History Museum of Los Angeles County.**

Figure 4. **Some of the exhibits in the Natural History Museum of Los Angeles County.**

football-sized specimen of hopeite with large pale yellow crystals. What would you dream of for your own collection? Big azurites? Silver specimens? Many of your dreams are here.

Once you get past the island displays you notice a black wall, and if you look closely you will see it is made of big polished slabs of labradorite. Mounted on the wall are well-lit cubic display cases containing outstanding examples of the lapidary arts—various carvings made from jadeite and nephrite jade not the least among them. In the center of this wall is a big steel portal leading to the Gem Vault, which contains a dozen or so small cubic island cases resting on pedestals; these cases are full of gemstones. Each display features different kinds of gems: diamonds, tourmaline, corundum (ruby, sapphire), beryl, collector stones, California rough-and-cut, etc. There are 20 to 25 stones in each case and even if you are an advanced collector you will find your nose pressed to the glass along with those of the schoolchildren.

At the far western end of the main gallery is a smaller gallery devoted to gems in their geological settings. Advanced collectors often space past the educational exhibits in museums, but if you take the time to examine these, you will learn things you didn't know. If you ignore the educational component of this exhibit, you may still want to take a peek at what may be the largest peridot crystal (from Pakistan) in the world, the Hixon Ruby (from Burma), or the superlative large green tourmaline on quartz (from the Cruzeiro mine, Brazil). One of the crowd-pleasers is a simulated pocket of tourmaline constructed by Peter Bancroft from Himalaya mine specimens taken from the museum's collection.

Finally, at the far western end of the hall lies a dark, narrow corridor flanked on its left with small shadowbox displays of fine gem crystals illuminated from beneath by fiber optics. Hidden away nearby are the offices of the Mineral Sciences Department, where you'll find Curator Dr. Anthony Kampf and Collections Manager Dorothy Ettensohn. Dorothy has been responsible for the well-being of the collection and numerous other facets of the operation since 1989.

Thirty years ago the mineral exhibit at the museum might kindly have been described as modest, and if you had seen the wonderful exhibits at Harvard, at the American Museum of Natural His-

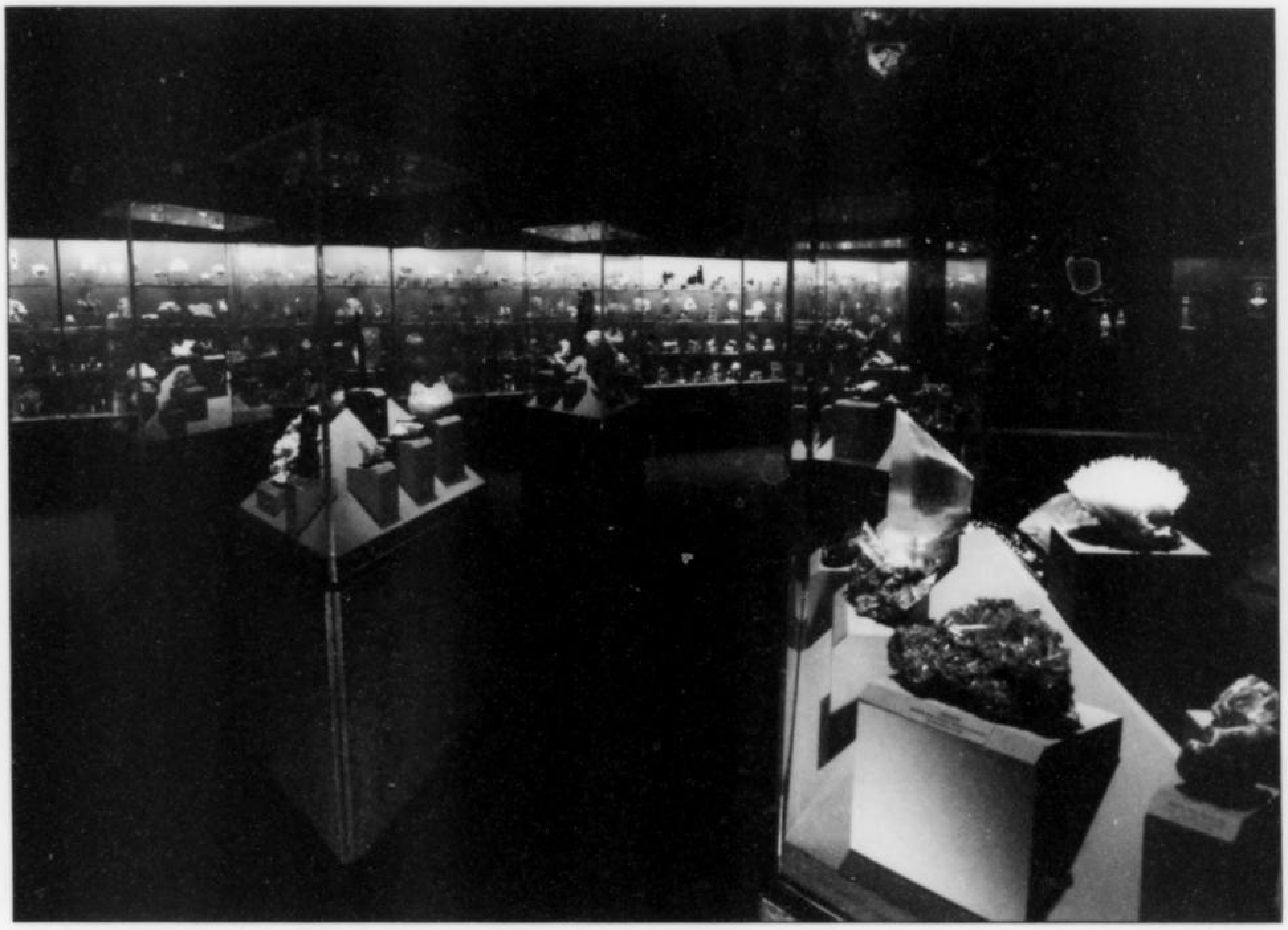


Figure 5. **Main exhibit area, Natural History Museum of Los Angeles County.**

tory or in the Smithsonian Institution, you regretted that the L.A. museum could not do better. In late 1977 the Museum hired Dr. Peter Keller and, shortly thereafter, Tony Kampf. Things rapidly began to change. In May of 1978 the Hall of Gems and Minerals opened to rave reviews. Peter Keller left the Museum in late 1980 to become Director of Education at the GIA, but he rejoined the museum in 1985 to work on an addition to the gallery, then served in upper management, leaving for good in 1991 to become Executive Director and then President of the Bowers Museum of Cultural Arts in Santa Ana, California.

Tony has now been with the museum for 30 years and has been in charge of its Mineral Sciences Department for the last 27. Dorothy joined the museum in 1989, after a nine-year stint at the Field Museum in Chicago. In the last 30 years the collection has increased in size and quality by an order of magnitude. The collection is currently estimated to have about 150,000 specimens, of which about 100,000 are micromounts, the majority from the Perloff/Weber Collection donated in 2005. This is but one of many collections, large and small, that the museum has acquired during Tony's watch. Ninety percent of the California specimens on display were added during his tenure. Many fine and world-class specimens have been added through donation and purchase. Tony also does research, and has described 23 new minerals and published nearly 150 scientific and popular articles. However, he still gets to replace the occasional burnt-out light bulb. It keeps him humble.

With the fate of so many institutional mineral collections in such seemingly uncaring hands, Tony's and Dorothy's steady hard work over so many years has convinced a number of collectors that this museum takes care of its specimens and is a place worthy of donations. It is likely that the institution will, in the future, receive more collections to care for.

One last aspect of the museum's gem and mineral operation that deserves mention is its Gem and Mineral Council support group (www.nhm.org/gmc). This organization, founded in 1985, not only provides funding for the Mineral Sciences department, but also provides its members with a broad range of programming, including lectures, field trips and social events, all managed by Jean Brandt who has served as Council Coordinator for most of the Council's history. The Council's foreign field trips have included visits to gem and mineral localities in Brazil, Germany, Kenya, Madagascar, Russia, Sri Lanka, Tanzania and Thailand, with Tony serving as a leader on most of these. Certainly the most widely known of the Council's activities is *The Photo Atlas of Minerals* CD-ROM, which it has published since 1998. Tony is co-developer of *The Photo-Atlas* with Dr. George Gerhold, and they have just completed a DVD version with nearly 16,000 images for your delight and edification [see their ad elsewhere in this issue].

The A. E. Seaman Mineral Museum, Houghton, Michigan

by Robert B. Cook

This outstanding, regionally focused museum is the official Mineralogical Museum of the state of Michigan. It is currently housed on the campus of Michigan Technological University, although a complete move to a greatly expanded facility at the nearby Quincy mine site (currently undergoing major restoration) is anticipated in a few years. The museum, which was described previously in the *Mineralogical Record* by Wilson and Dyl (1992), occupies approximately 10,000 square feet on the fifth floor of the EERC Building. Some 8,000 specimens are on display and another 30,000 are in easily accessible storage adjacent to the display area. There is also a well-stocked museum store. The collection is ably administered by curator Dr. George Robinson and directors Stanley J. Dyl II and Theodore Bornhorst.

The museum is well laid-out and lighted. The building is constructed around a central elevator and services core about which the museum, shop, curatorial offices, and specimen storage areas are located. The display area is designed to allow a general circular flow around this central core, such that one can move progressively through the major sections of the museum. Approximately 25% of the display space is devoted to Michigan Copper Country minerals

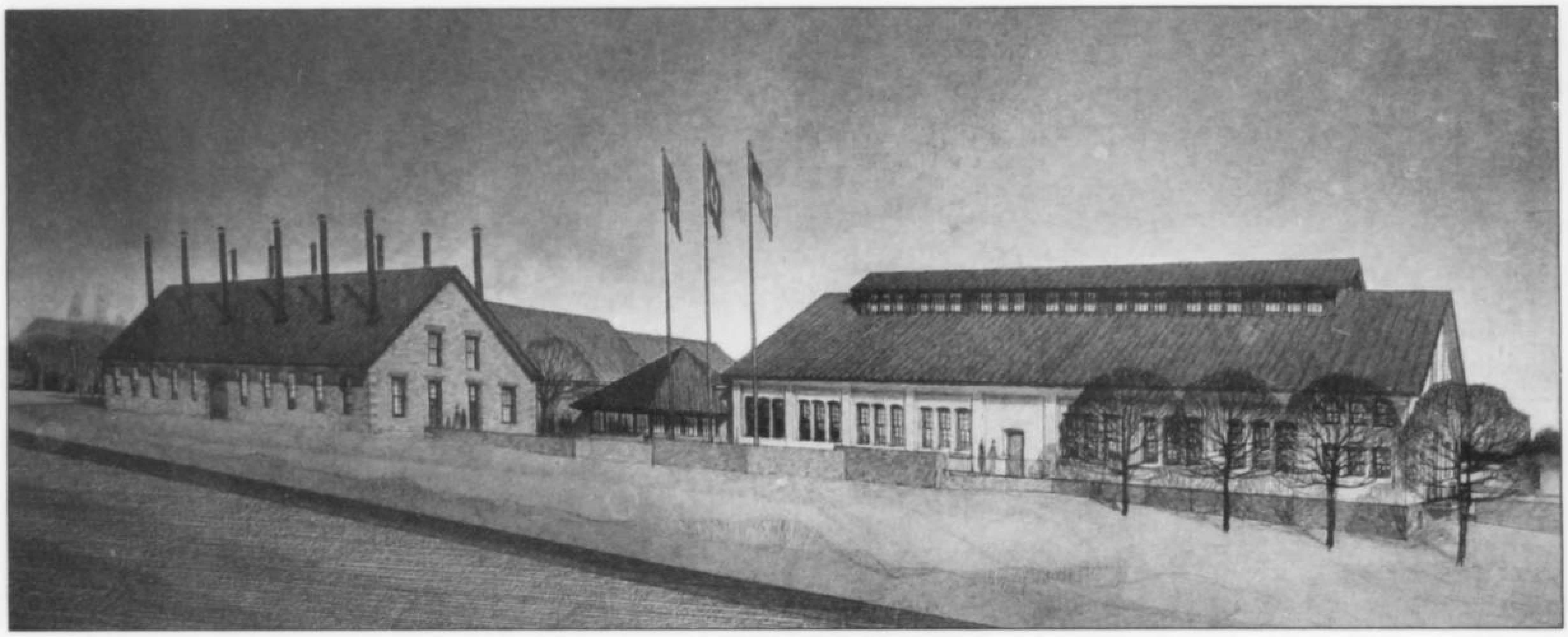


***Figure 6*. Architect's rendering of the future, greatly expanded facility of the A. E. Seaman Mineral Museum to be established at the Quincy mine site, Houghton, Michigan.**

which are arranged in several large, free-standing, four-armed or spoked cases that have effectively twelve discrete display panels, one on each side of an individual spoke, and arranged to allow a circular flow of patrons. Visitors who love the native metals might find it difficult to move beyond this area, as an abundance of what are clearly the world's finest native coppers and associated spectacular native silvers are on display here. Copper specimens are arranged by county of origin, and there is a case devoted to copper crystal forms. The area is augmented by a computer-animated movie that illustrates the geologic history of the Copper Country. Highlights of the museum's Copper Country holdings include exceptional specimens such as crystalline silver masses on prehnite, extremely sharp silver crystals on copper, a specimen with crystallized copper on silver (rather than the reverse, as is almost always the case), and specimens of silver on copper included in calcite.

Moving counterclockwise out of the Copper Country cases, one encounters a section which is devoted to minerals of the Iron Ranges, an interesting series of displays in a large six-armed or spoked case identical to those in the adjacent area. From there we move to a display of Michigan Basin minerals, replete with spectacular celestines from the Holloway quarry and sulfurs from Maybee. Proceeding on, one enters a lounge and temporary exhibit area. Here can be found seven cases of excellent specimens from the recently acquired Harold and Doris Dibble collection, as well as cases of recent acquisitions that include a lustrous Chinese cassiterite crystal 10 cm on edge donated by Steve Smale. Then one has the option of passing through the gift shop or bypassing it to enter the east wing of the museum. This area, which comprises about half of the museum's display space, is divided lengthwise into two fundamentally different segments by a central unbroken series of display cases. One side of these cases contains the systematic collection that features uniformly good, sometimes exceptional, specimens arranged chemically. Especially appealing are a kermesite from Que Que, Zimbabwe, and a stephanite from Arizpe, Sonora, Mexico with 3-cm crystals, donated by A. E. Seaman. On the opposite side are a series of exhibits on miscellaneous themes, including Russian minerals, zeolites, rocks and minerals of the three fundamental rock families, black smokers, plant fossils, meteorites, crystals from Europe, the Elmwood mine (Tennessee), and much more. Special exhibits in the area opposite the elevators, the foyer-like area into which the offices open, and central elevator-service core include a fluorescent minerals exhibit, a series of historical and introductory exhibits, and stand-alone items such as an enormous copper sheet and small mirrored pedestal cases devoted to the very best native silver and copper-in-calcite specimens.

The quality of display cases, labels, and lighting is uniformly good, though certainly not ostentatious. There are almost no windows in the gallery, so virtually all lighting is artificial. Cases in the regional sections are of uniformly medium-stained wood construction with fronts of slightly inclined glass, oriented to reduce or eliminate glare. Labels and related signage, which vary in size and content, are designed to convey maximum useful information and no more. Most are in black print on white stock, giving locality and

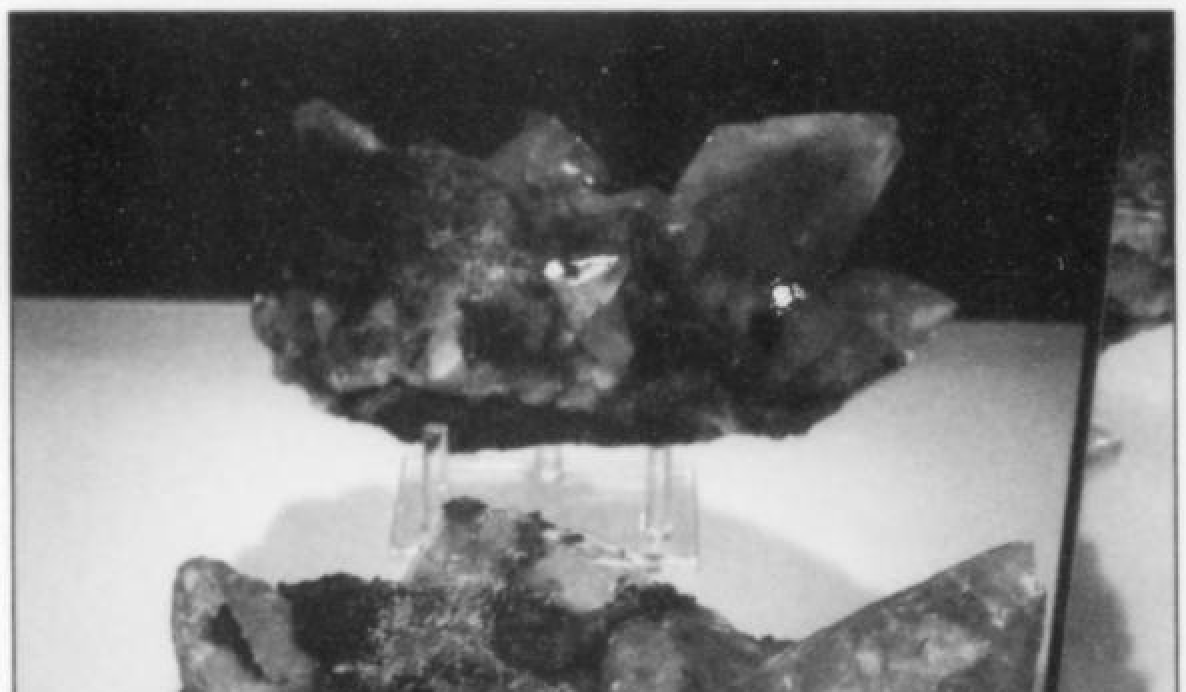


***Figure 7.* Large copper-in-calcite specimen from Michigan in a mirrored exhibit case, Seaman Mineral Museum.**

Figure 8 **. Native copper exhibit, Seaman Mineral Museum.**

donor or specific collection information as appropriate. Labels in the systematic collection include chemical formulas as well. Some theme cases include a central plaque containing specific locality, historical, or introductory data. Such plaques in the systematic collection cases list the chemical family and the minerals to be found in that particular case or set of adjacent cases.

Curatorial and administrative offices open into the gallery area, suggesting a refreshing opportunity for interested visitors to interact with staff. Adjoining these offices is an interior area devoted to specimen storage for the large systematic collection. The collection is quite broad and the general quality of its specimens very good.

A visit to the A. E. Seaman Mineral Museum is certainly worth every minute one might choose to spend admiring unexcelled Copper Country and other regionally important specimens. Much is to be learned, and the museum has a touch of quaint charm that makes it far from intimidating. It is clearly a museum on the way up, if one can judge from the scheduled move into a new venue such that the currently available display space will double: a planned

Figure 9. **Historical exhibits, Seaman Mineral Museum.**

second-stage renovation of an adjacent Quincy mine building will add at least another 10,000 square feet to the museum complex. This new display area, coupled with existing displays and tours of the surface mine facility, will make the Seaman Museum a popular destination for summer tourists to the Upper Peninsula, and should propel the museum into far greater general familiarity than it currently enjoys. Increasingly it will become a place many of us will build trips around, rather than a museum that we have all heard of but that few of us have visited.

Richard and Helen Rice began collecting in the late 1930's, and expanded their interests from Oregon's famous agates and petrified wood to fine mineral specimens. One of their decisions was to keep the "Alma Rose" rhodochrosite (see vol. 29, no. 4) instead of its brother, the "Alma King," now in the Denver Natural History Museum. The "Rose," with stunning red crystals to 9.5 cm perched on quartz and sulfides with fluorite and calcite, is one of the best specimens ever found in the Sweet Home mine. The Rices also collected some significant Arizona specimens, especially from Bisbee, including spectacular azurite and copper crystals. These have recently been augmented by some significant Morenci pieces. They built world-class suites of rhodochrosite from Capillitas and variscite from Fairfield. Visitors should also look for one of the world's finest sperrylites (from Russia—*Mineralogical Record* cover, vol. 29, no. 2), a dream 9-cm emerald crystal group on calcite from Coscuez (*Mineralogical Record* cover, vol. 25, no. 3), and one of the best Green Monster mine epidotes (perfect crystals to 9.4 cm with two large calcite crystals).

Figure 10. **Curator Rudy Tschernich, Rice Northwest Museum of Rocks and Minerals.**

Rice Northwest Museum of Rocks and Minerals, Hillsboro, Oregon (just outside of Portland)

by Bill Dameron

There seems to be a theme for the four reviews in this issue: at a time when many institutions are warehousing or deaccessioning "good rocks" to make room for dinosaurs and push buttons, these four museums are steadfastly insisting on the value of putting fine mineral specimens on public display. With the disclaimer that this is "our museum" (I live in the Pacific Northwest), it is nevertheless fair to say that the Rice Museum is the finest public display of world-class mineral specimens on the Pacific coast north of Los Angeles. Located a few miles west of Portland in a one-story (with full basement) ranch-style house and a separate, completely renovated two-story gallery, the museum receives some 25,000 visitors annually, over half of them being schoolchildren in groups.

The reaction of first-time visitors is usually "this is not quite what I expected." The comment refers both to the high quality of the minerals and to the former family home where many of them are exhibited. But all agree that the museum is, as the Michelin Guide would say, "worth a detour." The large former home of the Rices has low ceilings and is a rambler, but features rare myrtle wood doors and trim and is on the National Registry of Historic Places.

A display safe for gold holds 107 pieces, including all but one of the specimens in the former Washington State gold collection of F. John Barlow. Most of the sparkling crystallized wire specimens ever collected from the Ace of Diamonds mine make up the bulk of the suite. All but nine of the golds are from Washington State, but a leaf specimen weighing 42 ounces troy (2.88 lb) from Jamestown, Tuolumne County, California dominates the case.

The adjacent Northwest Gallery was opened in 2005. It features fine Pacific Northwest minerals and the best of curator Rudy Tschernich's worldwide zeolite collection—great specimens, mostly non-Indian. Rebuilt as a museum, the large high-ceilinged room is well lit, with easily viewed shelves. Storyboards are mounted above the top level of the shelves, with photographs of many of the localities, and of collectors in action in pits or hanging off cliffs. Putting

Figure 11. **Crystal Gallery, Rice Northwest Museum of Rocks and Minerals.**

this "human face" on the specimens brings them to life. Both the zeolites and the Pacific Northwest specimens are eye-openers for visiting collectors.

Labeling, lighting and display are excellent in the Gallery, and in late 2006 curator Tschernich made all new labels, well researched and complete, with chemical formulas, for the specimens in the "house" wing. The collection there, which has grown since the Rices' deaths, is arrayed in a large, well-finished former basement. Lighting consists of fluorescent tubelights on the sides of cases, far from ideal, but a significant energy saver. The shelves themselves are adequate, not as spiffy as in the new Gallery, and some are quite low (they house large specimens). There are no mineral stands, although some are needed for certain specimens. A winnowing of specimens in late 2006 raised the average specimen quality in this room significantly (there are some truly world-class specimens here), and more such winnowing will take place as new specimens are acquired. Plans are for photographs of the localities and field collecting to be placed above these shelves also, as in the new gallery.

In addition to the Rices' large petrified wood collection, a specially built large room features the collection of Dennis and Mary Murphy, well-known petrified wood dealers. The Murphy collection of about 450 pieces is on permanent loan. For mineral collectors who have never investigated petrified wood, it is a revelation. Virtually every color is represented, with various woods identified and some huge-diameter slabs included. For petrified wood fans, this room alone is worth a trip.

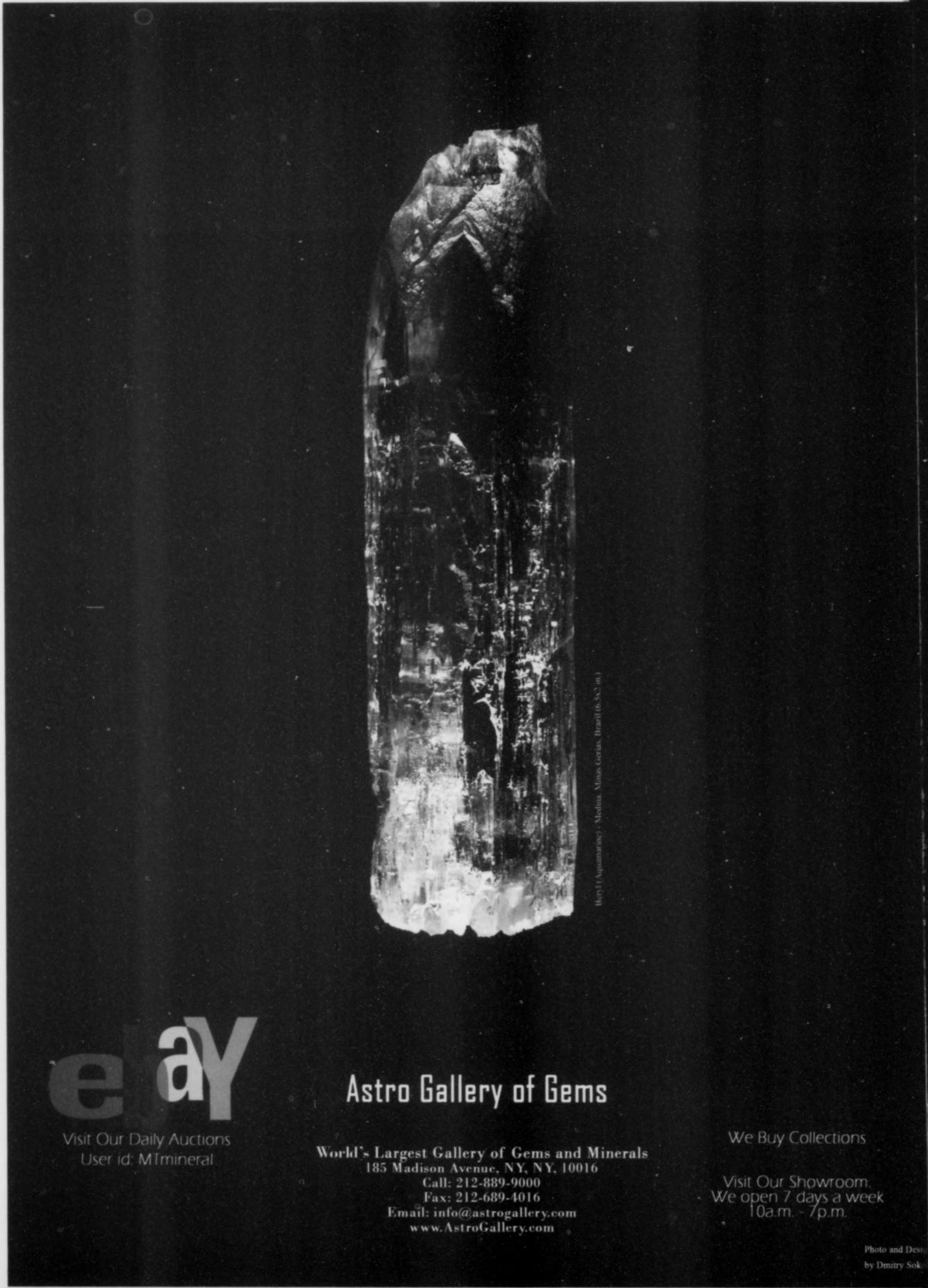
Portland State University and local dealer/collector Edwin Thompson have provided, as a long-term loan, a fairly comprehensive meteorite collection, with a good explanation of meteorite origins and types. The lapidary room includes an extensive rough-and-cut display, and a highlight of the room is gem carver Thomas Harth Ames's "Aurora Borealis, Mt. Hood," an exquisite carving of Contra Luz precious opal from Morrow County, Oregon. To round out visitors' appreciation of the earth sciences, there is a small fossil gallery, an "educational" room with excellent displays on crystallography and the uses of minerals, and a fluorescent gallery. A shop and geologic walk (basalt columns, sandstone, and a "finding pile" for the kids) complete the museum.

The Rices began planning for the museum before their deaths in 1997 (see Wendell Wilson's 1998 obituary on Richard), and their daughter Sharleen Harvey and her husband Bill were the driving forces and main contributors in finalizing their dream. New specimens are both purchased and contributed as the museum constantly pursues growth and improvement. The Pacific Northwest Chapter of the Friends of Mineralogy and other earth science groups are strong supporters. Museum Director Jane Guariniello has a small paid staff and many community volunteers to help. Rudy Tschernich, "Mr. Zeolite," took over as curator in 2003 and helped push through the new Gallery. The museum is an invited exhibitor at Tucson, Denver and other shows, and warmly welcomes collectors, providing personal, on-the-spot attention. If possible, visitors will want to avoid overlapping with school tours in this small facility. For directions to the museum, which is normally open to the public Wednesday through Sunday from 1:00–5:00 p.m., visit its website (www.ricenwmuseum.org) or call 503-647-2418.

REFERENCES:

WILSON, W. E., and DYL, S. J. II (1992) The Seaman Mineral Museum. *Mineralogical Record*, **23** 73–76.

WILSON, W. E. (1998) Died, Richard L. Rice, 86. *Mineralogical Record*, **29**, 82, 141.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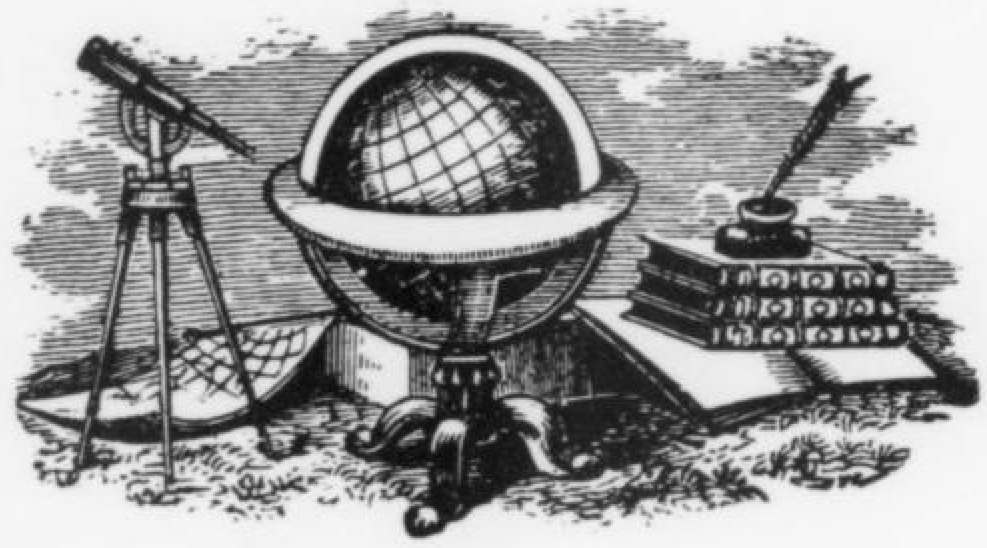
What's New in Minerals



Torino Show 2006

by Renato Pagano

[*October 5–8, 2006*]

Remember Torino, home of the 2006 Winter Olympic Games along with several other towns in Piedmont, one of the largest Italian regions? Well, Torino is also home to one of the most important European mineral shows, now in its 35th edition. This year the show hosted over 300 exhibitors, and attracted about 12,000 visitors.

The show takes place in the old Fiat automobile factory in Lingotto. This factory, designed by architect Giacomo Matté-Trucco, was completed in 1923, and a few years ago was restructured by architect Renzo Piano into an interesting complex of exhibition halls, restaurants, offices, a hotel, a commercial center and a small museum of fine arts—a gift of the Agnelli family, founders and still part-owners of Fiat, to the City of Torino. The Lingotto complex is well worth a visit; among other interesting features, it includes a test track on the roof, which was used in the early decades of the 20th century to test-drive the Fiat automobiles (at moderate speeds, one hopes, as the track is some 20 meters above ground). The Torino mineral show takes place in the 5,000-square-meter area known as Pavillion 1.

EXHIBITS

The organizers have been making a serious effort to complement the commercial activity at the show with significant cultural offerings. Invited exhibitors this year included 36 non-commercial organizations: museums, natural parks, associations, magazines etc. Most of these had cases, literature and posters to entertain and educate show-goers, especially the younger visitors.

The Piedmont Regional Natural History Museum displayed three cases of large quartz specimens from many world localities. The Milan Natural History Museum exhibited a case of their fine Elba specimens, a case of pezzottaite specimens from various collections and a new, impressive acquisition: a large specimen of honey-colored topaz from the Haramosh Mountains, Gilgit, Pakistan. The specimen, measuring some 35 cm across, has two main crystals: the largest measures 15 × 15 cm, and the smaller one about 8 × 8 cm.

At the end of the hall an auditorium hosted a series of talks and projections on mineralogy, gemology, mineralogical literature and related subjects.

ITAL IAN MINERALS

The flow of specimens from all parts of the globe is such that the Italian minerals seem a little overwhelmed by the Chinese, Pakistani, Moroccan and other foreign material. Nevertheless, the interested buyer would not walk away empty-handed.

Figure 1. **The Torino Show booth of Merveilles de la Terre ("Marvels of the Earth"), Grenoble. R. Pagano photo.**

Figure 2. **Sulfur crystal specimens from Cianciana, Agrigento, Sicily. C. Ferrito specimens; R. Pagano photo.**

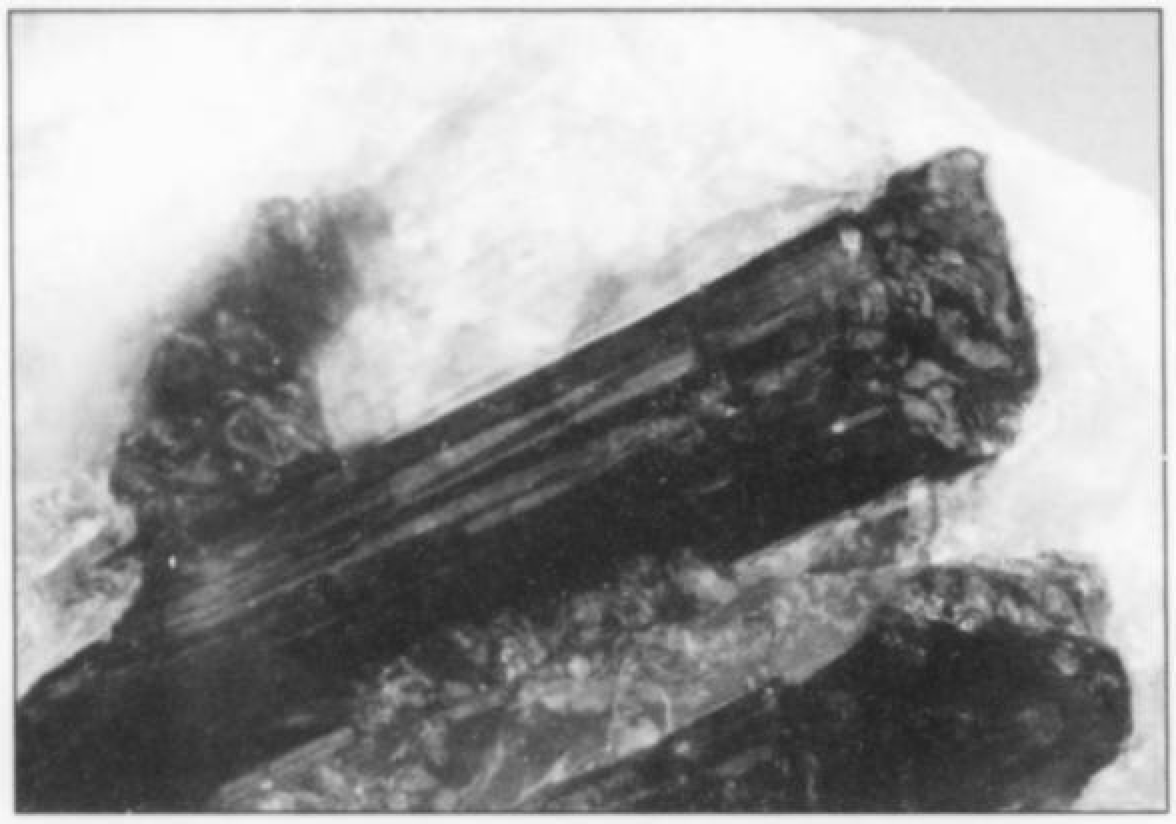


Figure 3. **Olenite crystal, 1 cm, from Curiglia, Val Veddasca, Varese, Italy. G. Bogni specimen; R. Appiani photo.**

Figure 4. **A small stephanite crystal on a 7-mm crystal of acanthite, from the Baccu Arrodas mine, Sarrabus, Sardinia. G. M. Motta specimen; R. Appiani photo.**

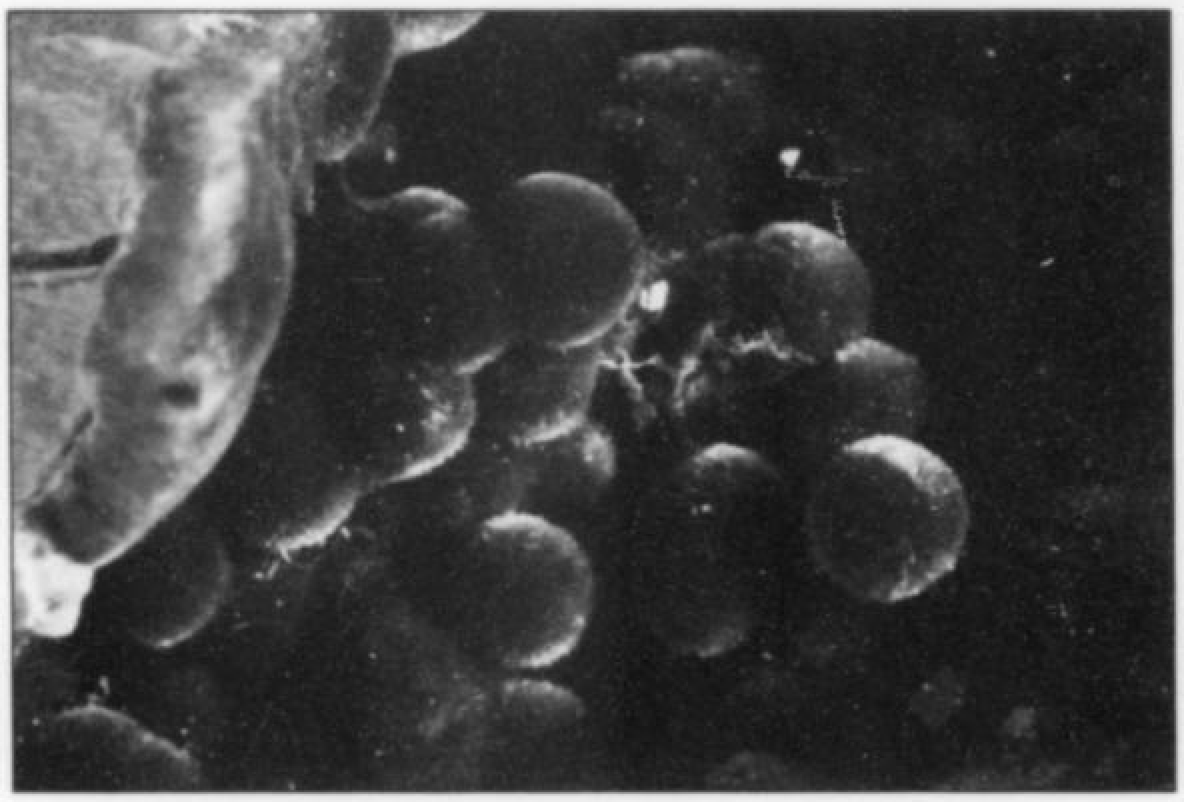


Figure 5. **Shattuckite, in a druse of acicular crystals, from Omaue, Kaokaland, Namibia. Field of view 1 × 2 cm; F. Ferrero specimen; R. Appiani photo.**

In the past, the mine of Cianciana near Agrigento has produced what are perhaps Sicily's most attractive, sparkling, beautifully crystallized **sulfur** specimens. These mines were closed some 40 years ago and, reportedly, they have been off limits because the tunnels, small and dangerous even in the days of operation, are now crumbling and polluted with sulfurous gases. Nevertheless, Corrado Ferrito (corrado.ferrito@hotmail.com) recently managed to work underground there anyway and collect some significant material. The specimens are drusy, with individual crystals up to about 2 cm, and their luster qualifies them as belonging to the best Cianciana tradition.

Some fairly good old-time specimens from Sicily also surface from time to time. Dealers Michele and Gaetano Lacagnina (L. G. Gemme, lggemme@libero.it) had a selection of **sulfur** and **celestine** specimens as well as druses of stout, pseudo-hexagonal **aragonite** crystals that fluoresce green under ultraviolet light.

An occurrence of **olenite**, a rare member of the tourmaline group, was recently described by Pezzotta and Guastoni (2006) in *Rivista Mineralogica Italiana* as blue-gray crystals up to 1 cm on matrix. Giorgio Bogni of Sesto Calende, Varese (*La galleria dei cristalli*, giorgiobogni@libero.it), following the indications in the article, prospected the area, found a better section of the same pegmatite

Figure 6. **Vladimirite crystals to 3 mm, from Irthem, Morocco. D. Respino specimen; R. Appiani photo.**

Figure 8. **Grossular crystals on matrix, 6.5 cm, from Hebei Preovince, China. P. Rossi and F. Tamagnini specimen; R. Appiani photo.**

and collected some excellent specimens which are probably the best known examples of this species.The specimens were reasonably priced and were quickly bought up by species collectors.

Among the few old-time specimens circulating at the show, a remarkable **acanthite** from the Baccu Arrodas mine, Sarrabus, Sardinia changed hands quickly and is now owned by collector Gian Mario Motta. The largest acanthite crystal on the specimen is no more than 7 mm across, but on it rests a sharp, lustrous crystal of **stephanite**.

WORLDWIDE MINERALS

Fabrizio and Luca Ferrero (elemento@inwind.it) brought back several good specimens from their recent trip to Namibia, especially druses of very fine, deep-blue **shattuckite** on matrix with **dioptase** from the Omaue mine, Kaokoveld.

Daniele Respino and Sandro Maggia (www.minernet.it) had a choice selection of uncommon minerals: **bavenite** crystals from

Figure 7. **Struvite crystal, 1 cm, in matrix from the type locality: St. Nikolai Church, Hamburg, Germany. L. Caserini specimen; R. Appiani photo.**

Cadalso de los Vidrios, Spain, blue **henmilite** crystals from the Fuka mine, Bicchu-cho, Japan, some good specimens of the uncommon arsenate **vladimirite** from Irtem, Morocco and various other minerals from worldwide occurrences.

Lino Caserini (linocase@tin.it) is one of the most active dealers in acquiring both newly mined specimens and old collections, and his offerings included an antique **struvite** crystal on matrix from the type locality of St. Nikolai Church, Hamburg, Germany.

Merveilles de la Terre (14 Rue Colbert, F-38000 Grenoble, France) are regular dealers at the Torino Show, as their home town is not far from there. Their colorful display included many very nice specimens of pale blue cubic crystals of **fluorite** from Mine Le Burg, Alban, Tarn, France.

Paolo Rossi and Fabio Tamagnini (Via dei Promontori 50, I–00122 Roma) travel frequently to China and they always have something of interest to offer. At the Torino show they had some fine **vesuvianite** crystals reportedly from Hubei Province and, from the same locality, nice, greenish, dodecahedral crystals of **grossular** up to 1.5 cm arranged in elegant groups on matrix.

CAVEAT EMPTOR . . .

Among the various foreign participants, several Romanian dealers have recently appeared at the larger European shows—Torino among others. Although some of them certainly have reasonable specimens of sulfides, calcite, rhodocrosite etc. from the classic localities of Baia Mare, Baia Sprie and others, a number of **fakes** have also appeared.

Some of the most intriguing specimens consist of sprays of long stibnite crystals, which are most likely loose individuals from China that have been glued onto a typical Romanian matrix. To cover the attachment point, small (2–4 mm) white crystals that at a distance look similar to calcite are deposited on the specimens. In some cases the result is quite realistic and even attractive. A closer look at the morphology of these white crystals, however, shows that they are not calcite but rather borax, as confirmed by IR and EDX analysis (courtesy of Steffen Mockel).

Other "Romanian" specialties are man-made red potassium dichromate crystals on matrix (sold as realgar), calcite druses or concretions dyed pink to pass them off as specimens of rhodocrosite, and home-grown alum crystals.

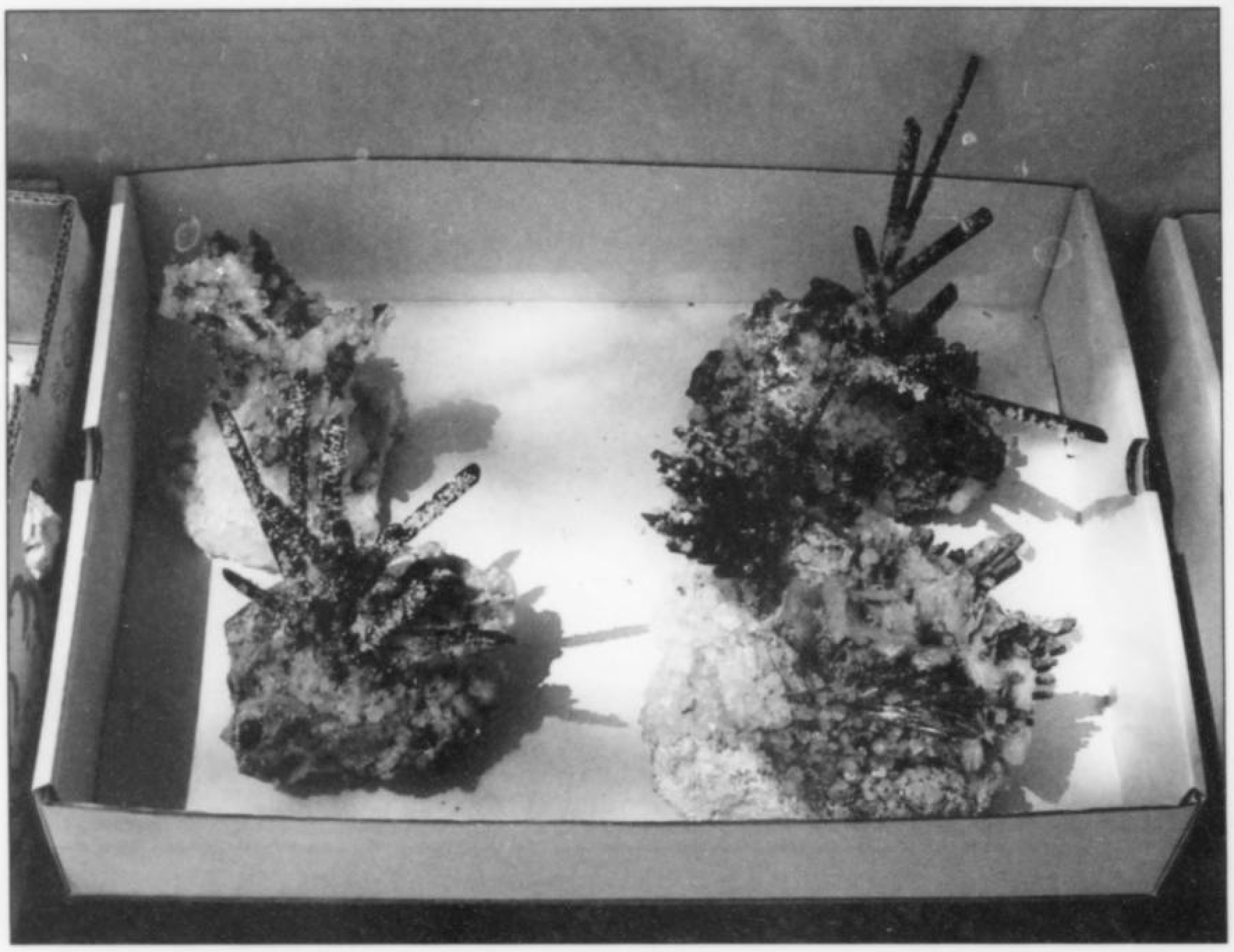


Figure 9. **Stibnite crystals (from China?) glued onto matrix (from Romania?) and partially covered by white borax crystals: a new "Romanian" specialty. R. Pagano photo.**

Figure 10. **Romanian "aquamarine" specimen; actually a plastic crystal glued into matrix. R. Pagano photo.**

Figure 11. **The AIKA International Collections Market in Beijing, China. Jeff Scovil photo.**

By the way, the most imaginative example of fake "Romanian" mineral that I recall was a spray of pale blue plastic rods about 5 mm in diameter and 4 to 5 cm long, neatly cemented to the matrix; these were being sold as "aquamarine" at the Sainte Marie aux Mines show. I must admit that I was tempted to acquire this prime example of inventive mineralogy.

Beijing Show 2006 — by Jeffrey A. Scovil

[*October 9–10, 2006*]

For the last several years China has been the rising star in the mineral world, producing a seemingly unending stream of superb minerals. This vast country with great mineralogical wealth has now taken the first step to becoming more than just a supplier of fine specimens. In October of 2006 the First International Mineral & Gem Crystal Conference & Exhibition was held in Beijing. The primary organizer was Dr. Guanghua (George) Liu of AAA Minerals, author of *Fine Minerals of China*.

Dr. Liu had the insight to realize that, with China's growing economy, it is a not just a supplier of fine minerals but also a potential consumer. The country's rush to modernize and industrialize has fostered the construction of many new museums. Universities are teaching more Earth Science courses, and the increase in personal wealth is creating a new group of middle-class collectors of many things including minerals. In an effort to keep pace with this growth and the Western mineral market, Dr. Liu organized the Conference, which was co-sponsored by the China Stone Collector Association (an Organization of the Land & Resources Ministry, PRC).

The event was held at the 5-star Tianlun Dynasty Hotel in Beijing. Over 200 people attended the event, mostly from China but also a few from the United States and Europe. Many papers were

Figure 12. **Mineral display at the First International Mineral and Gem Crystal Conference in Beijing. Jeff Scovil photo.**

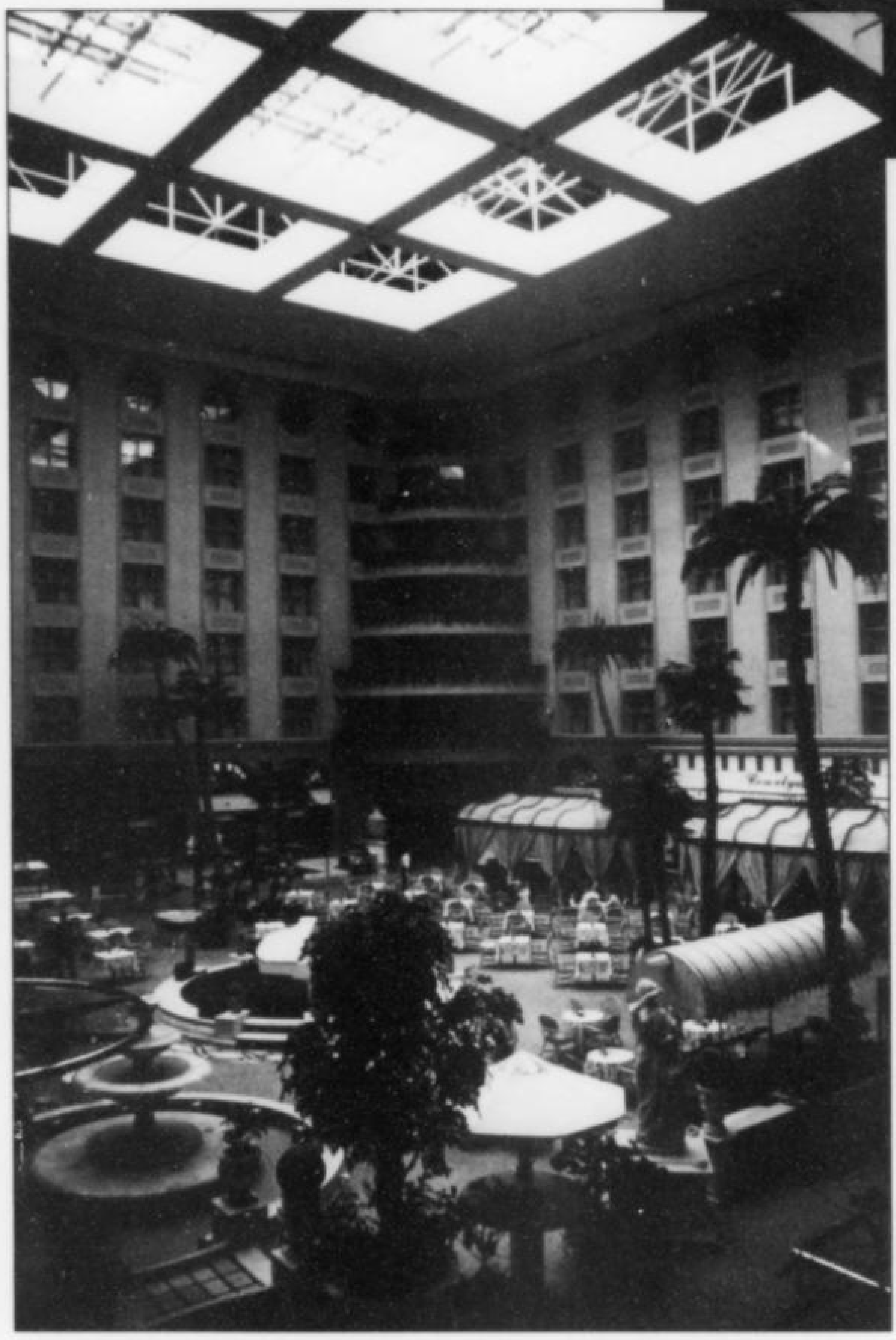


Figure 13. **Interior of the four-star Tianlun Dynasty Hotel in Beijung, site of the Conference. Jeff Scovil photo.**

presented on a wide range of topics in mineralogy and gemology. American speakers included Bob Jones on the history of the Tucson Gem & Mineral Show. Bill Larson spoke on California tourmaline pegmatites and their relationship to China, and his son William spoke on collecting as it relates to the young collectors of China and the United States. Edward Boehm spoke on gemstone investing, and even I was on program, speaking on mineral and gem photography. There was simultaneous translation of the presentations into both Chinese and English.

Two of the long walls of the meeting hall were lined with display cases full of minerals brought by speakers and dealers in attendance. Local television stations were shooting daily, and the conference was aired over several Chinese television stations.

Saturday night everyone attended a gala dinner event at an impressive restaurant. Entertainment included traditional Chinese music and singing, Mongolian musicians in traditional garb, and even a Chinese opera. Sunday afternoon there was a field trip to the ABCA International Collectors Market, where you could find anything from antiquities to paintings and, yes, minerals. During the Conference there was even a "satellite" show going on at the hotel next door, with about 20 dealers selling Chinese minerals. Before and after the Conference there was a week's worth of field trips to famous mineral localities in Hunan province.

The Chinese concept of mineral collecting is very different from that of the West. They tend to look at minerals more as sculptural objects and what we would call "found art," and they interpret the forms in the context of their history and traditions. This Conference is the first step in bridging the gap between the different collecting philosophies of East and West. Dr. Liu and his associates are to be highly commended for the incredible amount of work they put into the very successful Conference. I hope that it continues and grows with each passing year. I encourage readers to attend the upcoming conferences and the associated field trips. For more information Dr. Liu can be reached at www.aaamineral.com.

Munich Show 2006 — by Tom Moore

[November 1–5]

In this space I am almost through writing arias in the key of nostalgia concerning my revisits to Europe, where I resided for 14 years once upon a time. Happily, this 2006 trip to the Munich Show was my second in three years, and so even nostalgia is now at last beginning to yield to custom. Still delightful to me, though, were the cold grayness of the weather this year, with damp winds and even a wet *snow* which fell overnight one night in the streets around my hotel. It was with quiet, snow-day-vacation joy that I slogged through that snow (better say curbside slush), past the gray façade of St. Paul's Church rearing up into the equally gray sky amid ink-sketchy November trees, on my way to the *U-Bahn* that would take me out to the show. On most show-commute days, even the giant, featureless concrete-and-glass buildings at the show site seemed to bespeak a kind of reprieve from the Tucson and Denver scenes. Palm-trees-schmalm-trees, is how one can feel when something of Europe's ancient fogs remain in one's blood.

Of course those outwardly sepulchral buildings, once you got inside them, were full of frantically busy and cosmopolitan life. On the two set-up days a perpetual clotting of SUV's, trucks, cars, and handcarts all looking for back-up space crowded through the long ranks of tables. Throughout the show period, visitors found themselves immersed in a happy Babel of languages; endless parallel rows of tables with dealers' stands, and reticulations of spotlights on shelving; wildernesses of polished slabs, spheres, amethyst geodes and dinosaur skulls; plenty of mystically pendant, teardrop-shaped objects lit from within; completely enclosed shops with glass shelving jammed with jewelry, chains, beads, and mysterious "findings"; a "Heaven and Earth" labyrinth with a woodchip-lined path ending in a rose quartz lump-lined fountain; "Juwellness" merchants promising healing; fossil experts; booksellers; stands for all of the major magazine publications (with Renato and Adriana Pagano, as usual, holding the ground of the *Mineralogical Record*) . . . in all there was a general and enormous energy, creativity, commercial libido, and love for all things which come from the earth. Almost 1,000 widely diverse dealerships—I counted 989 listings in the show catalog—filled the three main cavernous *Halle* of this gigantic show, with most of the mineral dealers of interest in halls B2 and B3. At one end of B2, the majority of the high-end dealers were to be found in a carpeted area bounded by white partitions and, on one end, a stand-up wine and coffee bar. This little elitist domain was officially called the "International Mineral Pavilion" but was nicknamed "the Taj" by Bryan Lees, whose *Collector's Edge* dealership was to be found there, along with the likes of Rob Lavinsky's *Arkenstone*, Wayne and Dona Leicht's *Kristalle*, Riccardo Prato's *Pregi Gemme*, the sumptuous stands of Lino Caserini, Uli and Karin Burchard, Andreas Weerth, François Lietard, and more mini-wonderworlds for the tasteful and/or well-funded.

Show managers Johannes and Hermi Keilmann and their son Christophe had invited displays (as they do each year) on multiple themes, and there were in addition many small display cases—far too many to try to list here—put in by collectors and institutions. About the non-mineralogical show subtopics I'll say only that they ranged from "Dinosaur Fossils of Switzerland" to a human presence very much more alive than that: an *Edelsteinkönigin* (Gemstone Queen), 22-year-old Carolin Schmäler of Sulzbach, who, wearing an aquamarine/amethyst/citrine tiara fashioned in Idar-Oberstein, reigned in blonde grace and (as far as I could tell) good humor throughout the proceedings.

The minerals of, and mineral collecting in, Canton Uri, Switzerland constituted the show's #2-ranking theme. In a large enclosed alcove in hall B3 one found case after dazzling case of smoky quartz, pink fluorite and other Alpine treasures from the collections of members of the Swiss *Urner Mineralienfreunde* association. Further Uri-related displays were also on hand, and the show

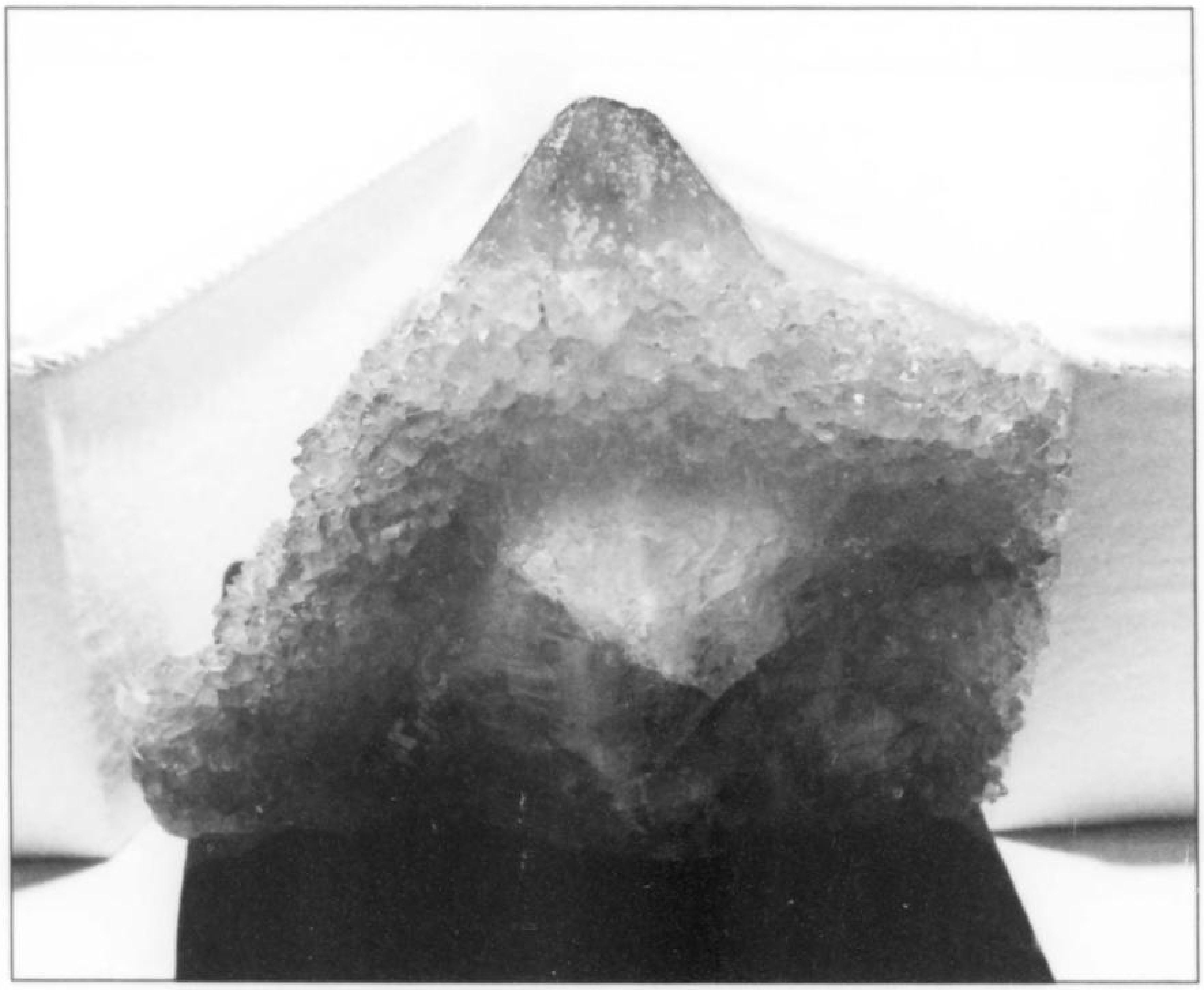


***Figure 14.* Magnificent specimen of rose quartz from the Berilo Branco mine, Minas Gerais, Brazil, exhibited by the Houston Museum of Natural Science in support of the show theme, "Masterpieces." John Veevaert photo.**

catalog pitched in with a series of well-illustrated articles about collectors' adventures in the *Voralptal, Gletschhorn, Feldschijen, Winterstock*, and other mountainous sites in Uri, including tunnel workings such as produced, for example, an amazing pyrrhotite specimen on display in the alcove, with a super-sharp, brilliantly lustrous, single crystal measuring 5 × 5 × 7 cm, fully as fine as any pyrrhotite from Dalnegorsk.

The chief show theme was denoted by the deliberately flexible, omnibus term "Masterpieces," and in B1 a large, complexly partitioned display area explored that concept. "Technological Masterpieces" included gleaming old specimens of petrographic microscopes made in the 19th century by German master craftsman Harry Rosenbusch (displayed by Olaf Medenbach), as well as wonderfully elaborated, very large wooden models of mining machinery and mine facilities from the collection of the Technical University of the Freiberg Mining Academy. "Artistic Masterpieces," hung up in long rows on the walls of the display area, included several of Eberhard Equit's exquisite mineral paintings, and some minutely detailed watercolors of mineral specimens and other natural subjects by Claus Caspari (1911–1980)—the Caspari works had not been seen publicly since the 1970's, but were provided for this occasion through the good offices of his son Stefan. "Fossil Masterpieces" included, besides some rhinoceros skulls and other hefty mammalian remains from sites in Bavaria, an extensive display concerning a famous scam perpetrated in 1726 on one Prof. Johann Bartholomaüs Adam Beringer of Würzburg, by his colleagues J. Ignatz Roderick and Georg von Eckhart: a lot of little gray pieces of sedimentary rock now known as *Lügensteine* ("lying stones"), containing fake fossils fabricated by Roderick and von Eckhart and left for Beringer to find. Beringer was completely taken in, and published a Latin monograph (a copy of which was on exhibit) on this fabulous "find" of fossilized ferns, crinoids, spiders, worms and less recognizable fantasy-flora and fauna. The *Lügensteine* themselves (now collectors' items) were displayed alongside corresponding plates from the rare Beringer book by Dr. Birgit Niebuhr of the *Institut für Paläontologie, Bayerische Julius-Maximilians-Universitäts*, Würzburg.

And finally there were the sorts of Masterpieces that *we* cherish most: about 50 world-class mineral specimens brought by Joel Bartsch from the great collection of the Houston Museum of Natural Science. In an innermost display alcove, some of these specimens got their own separate spotlit displays while others were arranged in well-spaced rows in wall cases. "Mineral Masterpieces" whose pictures (at least) you've admired on many occasions were present here: they included the "Alma Queen" rhodochrosite from the Sweet Home mine, Colorado; the "Dragon" gold from the Colorado Quartz mine, California; the "Rabbit Ears" blue-capped elbaite from the Tourmaline Queen mine, California; the 5-cm matrix specimen sporting several blue jeremejevite crystals, from Mile 72, Swakopmund, Namibia; the great Hiddenite, North Carolina emerald crystal discovered in 2004; the majestic purple adamite specimen from the Ojuela mine, Mexico, shown on the cover of vol. 34, no. 5 ("Mexico II"); the 7-cm cluster of proustite crystals from Chañarcillo, Chile; the finest extant specimen of spangolite from Bisbee, Arizona; and others almost as well known. Present as well were a few items from the Houston collection which, for me anyway, were surprises, e.g. a 25-cm galena twin from Balmat, New York and a huge cluster of copper crystals from Broken Hill, Australia.

Some people complained that this "Mineral Masterpieces" display area was too dark (and there was indeed a high probability of shoulder-bumpings and flash camera-interferences among the crowds of gawkers), and a few serious mistakes in labeling at first occurred (they were later corrected)—but the Keilmanns, as well as Joel Bartsch, of course, deserve high praise and gratitude for bringing so many of these highest-ranking aristocrats of the mineral specimen world to be seen by Europeans firsthand.

We proceed now to What is New In Minerals, circa late 2006, as seen at this tremendous show. It is a pretty impressive roster, into which I'll enter, as is my habit, via the show's home country, even though that means that several of the most blockbustery items from Asia will have to wait until near the end.

The very old mining district near the town of Annaberg, Upper Saxony—between Chemnitz and the Czech border, in the former East Germany—has seen no active ore-mining to speak of for many decades, but interesting finds on the old dumps and in abandoned underground workings are still being made. Near the village of Frohnau, the old Markus Röhling mine and the dumps of the Frisch Glück Stollen (formerly and more colorfully called the Ten Thousand Knights tunnel) are giving up, as we speak, very nice specimens of "black" **fluorite**—distinctive clusters of razor-edged simple cubic crystals, individually to 2 cm or so, which at first glance look quite black but actually are a very deep purple; other fluorite crystals from Frohnau are a rich, transparent orange, and clusters of both the orange and the deep purple kinds are sometimes adorned by bright orange, gemmy barite crystals to 5 mm. A small lot of this "black" fluorite appeared in Tucson in 2000 (see vol. 31, no. 3), and two years ago Marcus Grossmann offered another lot at the Munich Show (see vol. 36, no. 1). This time around, Jörg Walther of *Sächsische Minerale* (ahe75@freenet.de) had about 100 thumbnails and miniatures which he dug himself over the past few years, and the best of them are highly attractive fluorite specimens, especially those which are decked out with the orange barites or, as in a few cases, by 5-mm galena crystals. The *Sächsische Minerale* stand is one of the most-fun-of-all stops to be made on the Munich show floor, for it offers dozens of flats, almost exclusively of German minerals, mostly as small specimens in a quirky quality range from "study-grade" to superb. In general these are specimens recently found by Jörg and his colleagues, either in the field or in stashes in cellars in sundry mining towns of the Erzgebirge. What more in the way of educational fun can you ask, when you come to a mineral show in Germany, than to paw through such a stock?

Also from the home country (*der Vaterland*, if you prefer) comes exciting news of an old locality coming again to life: Jordi Fabre has obtained a few specimens showing gemmy green **boracite** crystals in matrix, found just this year in the Gröna mine, Bernburg, Sachsen-Anhalt. The mine lies in a former evaporite-mining region near Stassfurt, south of Magdeburg in the former East Germany; the boracite crystals are not to be confused with the better known ones from the Lüneberger Heath in the West, although they resemble them, being sharp, equant, complex, and embedded singly in dirty gray matrix of massive anhydrite/halite. The crystals in Jordi's specimens are only a few millimeters in diameter, but a pocket flashlight reveals them to be quite gemmy, and of a hue close to peridot-green. Of course it's uncertain whether more boracite specimens with larger crystals will appear in the future—but you can trust Jordi to monitor the situation.

Alpine-minerals enthusiasts revere a tiny collecting area called the Mörchnerkar, in the Zillertal Alps of Tyrol, Austria (actually, North Tyrol: South Tyrol has belonged to Italy since 1918, and the Zillertal Alps are just north of the Italian border). Some of the Alps' finest specimens of sceptered amethyst crystals and of hematite "iron roses" have been found over the decades in the Mörchnerkar area, and in summer 2006 the site yielded an outstanding find of **fluorapatite** crystals, specimens of which were sniffed out in Munich by Rob Lavinsky (who promptly bought some to resell, and who furnished the photo shown here of one of the best). From one cleft, Gerhard and Hannes Hofer collected hundreds of fluorapatite crystals

Figure 15. **Fluorapatite crystal, 5 cm, on matrix from Mörchnerkar, Zillertal Alps, Tyrol, Austria. Rob Lavinsky specimen and photo.**

fresh supplies of two "old" but highly desirable items. I mentioned in my report on the 2006 Sainte-Marie-aux-Mines show that the Burg mine in Tarn, France, was giving up some fine specimens of gemmy, baby-blue to deep blue **fluorite** crystals to 3 cm in clusters of diverse sizes, and, sure enough, more than 50 pieces, small-miniature to large-cabinet size, of this blue fluorite came to Munich with Claudette and Michel Cabrol (michel_cabrol@yahoo.com). Then there are the storied granitic rocks of the Mont Blanc massif, Haute-Savoie, long famous for giving up pink fluorite and smoky quartz from their clefts on the edges of glaciers. The glaciers of Mont Blanc are rapidly retreating—melting, dying, disappearing—as global warming kicks in, and this means that virgin rock areas are being exposed and are presently being combed by the *cristalliers* (i.e. French *Strahlers*). Quite a few new finds are emerging as a result. Many lots of excellent **smoky quartz** crystal clusters from Mont Blanc were scattered all over the show, but a very honorable mention goes to the German dealership of *Peter & Janet Wittur Mineralien* (wittur5@aol.com), where at least 50 gleaming specimens, representing a few years' summer collecting by the Witturs,

Figure 16. **Fluorite with drusy pyrite and quartz, 9.5 cm, from the Du Burg mine, Alban, Tarn, France. John Veevaert specimen and photo.**

measuring up to 10 cm across, as well as some lovely **amethyst** crystals; from a second cleft, Heinz Kirchtag and Kurt Novak collected more, and just as fine, fluorapatite specimens, mostly as single, loose crystals and subparallel clusters of two or three. The crystals are hexagonal-tabular, with at least two orders of modifying pyramidal faces, and they are mirror-faced, lustrous and for the most part transparent. The great majority are colorless but a handful are very pale purple. These beauties were brought to the Munich show by the father-son *strahling* team of Anton Watzl Sr. and Jr. (anton .watzl@epnet.at), who just may have emerged from the show with a few crystals still unsold (though don't count on it).

The French-specimen presence in Munich took the form of were offered for very reasonable prices. Fat, highly lustrous, totally gemmy smoky quartz prisms to 10 cm long form largely undamaged groups, and there is even a handful of medium-smoky **gwindels**, open and half-open, in thumbnail and miniature sizes.

Also at the Witturs' stand in Hall B3 was an impressive lot of **hedenbergite-included quartz** from the Island of Seriphos, Greece (see the locality article by Gauthier and Albandakis in vol. 22, no. 4). Outcrop collecting sites in the Seriphos skarn rocks are well known for producing fine specimens of ilvaite, andradite and, most of all, the world's best "green quartz," but little has been heard lately of the occurrence. The batch of specimens on hand at Munich was dug in June 2006 by Peter and Janet Wittur; it consists of about

Figure 17. **Fluorite with chalcopyrite, 6.5 cm, from the Du Burg mine, Alban, Tarn, France. John Veevaert specimen and photo.**

50 spiky clusters of velveteen grayish green, opaque to translucent, lustrous quartz prisms, with individual crystals to 6 cm long and groups from miniature size to 20 cm across. The same alluring table held about 15 very nice specimens of **andradite** of a style recognizable (if you know the stuff) as hailing also from Seriphos: sharp, pale brown dodecahedral crystals with parquet faces to 1.5 cm individually, in tight clusters to 12 cm across.

For micromounters and "species" collectors, a new item of interest from the ancient polymetallic mines of Laurium, Greece appeared at the show with Helmut and Daniela Braith of the Munich dealership of *Braith Stones* (braithstones@aol.com). Microcrystals found in 2004 on the 132 level of the Christiana mine in the Laurium district have just been described (by Nikita Chukanov in Moscow) as the new calcium arsenate species **attikaite**. In the small group of specimens offered at Munich, attikaite may be seen (under magnification) as pale blue-green crystals and spherical aggregates on mixed jarosite/"limonite" matrix, with microcrystals of conichalcite and arsenocrandallite.

Time now to discover the New World. Just before leaving for Munich I posted in my "what's new in the mineral world" online report a notice of the exciting new finds of **rose quartz crystals** at Mount Mica, Oxford County, Maine, from recent collecting activity conducted by Gary Freeman of *Coromoto Minerals* (www.coromotominerals.com). Dug in September-October 2006 from an extensive zone of pockets in the Mount Mica pegmatite, these specimens bear a distinct resemblance to specimens from the rose quartz crystal localities in Brazil and (especially) Afghanistan. Some are loose, thumbnail-size sprays of subparallel, bright pink, well-terminated crystals with individuals to 1.5 cm; others are cabinet-size pieces of the "Van Allen belt" style familiar from Brazilian localities, i.e. wavy belts and ridges of rose quartz points making girdles around portly, pale smoky quartz crystals. And there are even some specimens showing transparent-colorless quartz prisms with pale pink scepters. Gary and Mary Freeman brought a small selection of superb specimens of this material to Munich: the best of the thumbnails carried low four-figure prices, but these, after all, are major items for quartz collectors and New England specialists, and are at least an order of magnitude better than the old Newry, Maine rose quartz crystal groups.

Mexican minerals were made available in Munich—not for the first time—by exploration geologist Matthias Jurgeit (www.matsminerals.com), who in the past has brought out lovely specimens of silky gray, transparent, butterfly-twinned **calcite** crystals from prospects in volcanic ash deposits near Rodeo, Durango. This year Matthias had a nice selection of thumbnail and miniature-size Rodeo calcites, as well as some excellent **danburite** crystals with adhering calcite, amethyst and chalcopyrite from Charcas. Much less predictably, he had some winsome thumbnails and miniatures of pale pink **apophyllite** found in October 2006, *not* in the San Martin mine, Zacatecas, from which pink apophyllite has come before, but rather from a mine in the Naica district, Chihuahua. The lustrous, translucent, pale pink crystals are blocky, not pointed like those from San Martin, and they reach about 5 mm individually. They form tight, gleaming clusters, loose or on a matrix of pale blue bladed anhydrite crystals. Also, Matthias reports that just a few weeks ago a single pocket in the San Martin mine yielded blocky, twinned, lustrous, pale lilac crystals of **calcite** to 10 cm—he only had one (yet unsold) specimen to show off, and it is beautiful, with a 3.5-cm pink-lilac calcite crystal sitting up smartly on matrix.

Rob Lavinsky reports a discovery of yet more superb **pyrargyrite** specimens at Fresnillo, Zacatecas, Mexico: a few pieces with transparent blood-red pyrargyrite crystals to several centimeters across rising from massive white calcite came, in July 2006, from the 450 level on the San Carlos vein. Rob received only a couple of these pyrargyrites in time for Munich, but more, he promises, will be on hand in Tucson.

In the vast expanses of halls B2 and B3, which are filled by flats and motley unsorted litters of specimens brought in by entrepeneurs from China, India, Morocco, Peru etc., one prowls in search of one-of-a-kind sleepers, as well as for hints of interesting new discoveries.

Two of the latter, both from Peru, presented themselves this time around. Last April, in a small prospect pit near the famous Huanzala mine, Dos de Mayo Province, Huanuco Department, a number of attractive specimens of **barite encrusted by pyrite** were found, and about 20 of them were brought to Munich by some friendly folks from *Ramos Minerals* (ramosminerals@latinmail.com). The barite occurs as transparent, colorless to pale smoky gray, tabular crystals to 2.5 cm in jumbled groups without matrix, and very bright drusy pyrite coats all exposed surfaces of the barite crystals. The groups range between 3 and 10 cm across. And then, from the little Pucarrajo mine, located in a pass halfway between Pachapaqui and Huanzala (see the brief account by Hyršl and Rosales in vol. 34, no. 3), comes a nice suite of small, recently mined specimens of sulfide species: **arsenopyrite**, as groups of sharp, lustrous, 1-cm crystals with quartz; **galena**, as brilliant 2-cm cuboctahedrons; **tetrahedrite**, as bright black 2-cm tetrahedrons on drusy pyrite; and lesser pieces showing fairly good crystals of **pyrite** and **sphalerite**. This appealing little metallic litter of thumbnail and miniature-size specimens was shown in Munich by the dealership of *Macchupicchu-Peru* (mineralescristales_macchupicchuperu@hotmail.com).

Trusty Jordi Fabre had about 60 small specimens from a September 2006 find of **childrenite** at a brand-new locality in Brazil: Lavra do Poço Dantas near Taquaral, Minas Gerais. These childrenite specimens look distinctively different from the older ones long known from the Lavra da Ilha rose quartz locality, also near Taquaral. The thin, wedge-terminated, transparent brown blades of Lavra do Poço Dantes childrenite form loose, delicate clusters, some with red-brown microcrystals of roscherite, with individual childrenite crystals reaching 3 cm. Jordi was also proud of his new specimens from the Cigana (formerly the Jocão) mine near Galiléia, Minas Gerais: brown matrix pieces to 10 cm showing lustrous reddish brown crystals of **reddingite** to 5 mm and of **hureaulite** to 1 cm.

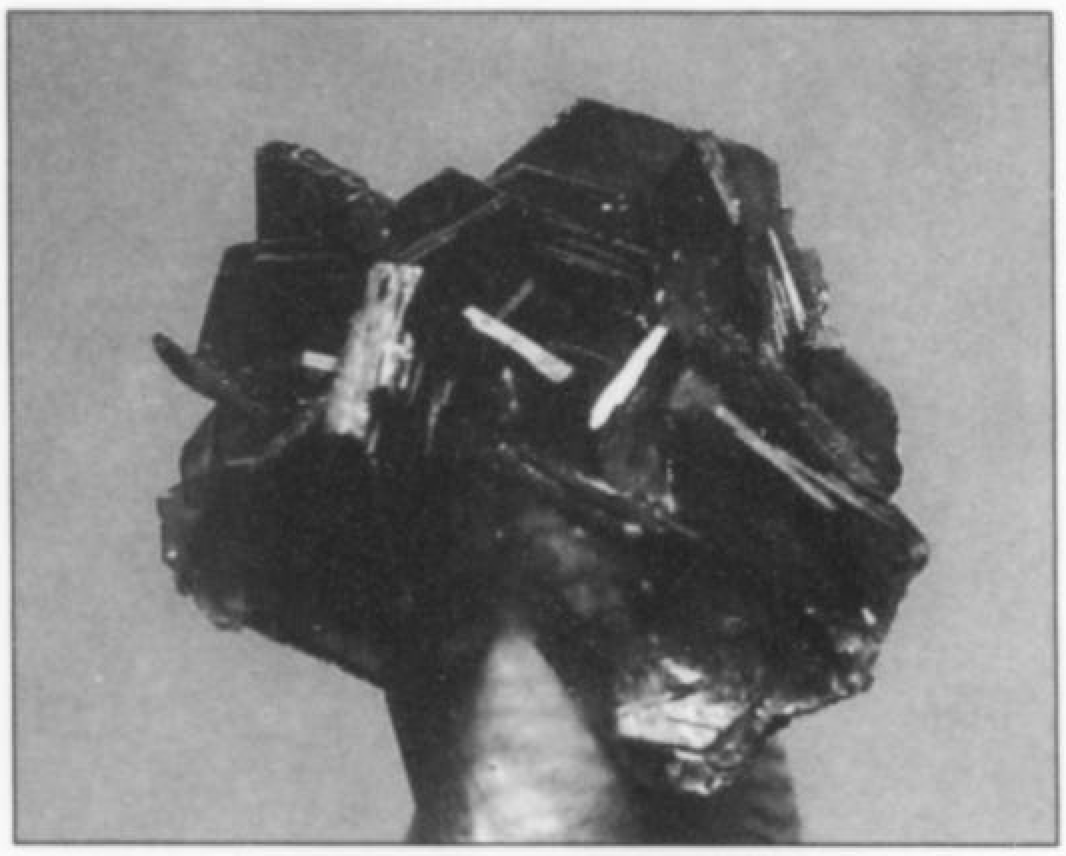


Figure 18. **Shigaite crystal cluster, 1.2 cm, from the N'Chwaning mine, Kuruman, South Africa. Kalahari Mineral Ventures specimen; John Veevaert photo.**

Several interesting—indeed exciting—new mineral finds in South Africa and Namibia stood out in Munich this year. The extremely rare hydrous Na-Al-Mn sulfate **shigaite** was found in extraordinary specimens in 1993 in the Wessels mine, Kalahari manganese field, Northern Cape Province (and a few more fine pieces emerged in 2002); shigaite in these beauties forms sharp, hexagonal, mica-like "books" and iron-roselike rosettes of lustrous amber to bronze-colored crystals to 2 cm across. Well, early in 2006, similarly outstanding thumbnail-size shigaite specimens were found for the first time in the old underground workings of the N'Chwaning I mine, very near the Wessels mine in the Kalahari field. N'Chwaning I is now inactive commercially, but French prospector Paul Balayer holds exclusive specimen-mining rights, and it was Paul and his crew who patiently followed small pink rhodochrosite seams in the black manganese ore beds until finally opening a fist-sized pocket on whose walls the dainty shigaite crystals and rosettes perched on sparkling drusy pink rhodochrosite. During the next weeks of work, a further 12 pockets yielded a few hundred shigaite specimens including about 15 top-quality thumbnails, many of which were on hand in Munich, watched over lovingly by South African mineral titans Bruce Cairncross and Desmond Sacco, who shared with Paul Balayer the stand of *Kalahari Mineral Venture* (palomu@africa.com). In some specimens, single, transparent reddish amber shigaite plates, super-sharp and of simple hexagonal-tabular form, to 3 mm stand alone and in jumbled clusters on the pink rhodochrosite. In others, dark red-brown shigaite rosettes to 2 cm across occur alone and on matrix. One exceptional thumbnail shows a dense convocation of lustrous red-brown shigaite platelets covering most of a transparent smoky brown barite crystal, with the tiny accent of a pink rhodochrosite spray near the top. These are truly fine examples of that truly scarce thing, an ultra-rare mineral species which can and occasionally does form aesthetic specimens.

Also brand-new from South Africa (found in August 2006), and also offered by Paul Balayer at the *Kalahari Mineral Venture* stand in Munich, are cabinet-size specimens of **siderite/sphalerite epimorphs after calcite** from the Aggenys mine in Northern Cape Province. The original calcite crystals, individually reaching 5 cm, were scalenohedrons with blunt trigonal terminations; the very sharp forms of these crystals are now memorialized by thin, silky yellow-brown to dark brown, hollow molds. The flat plates of interlocked epimorphs reach 25 cm across, and it's startling to pick them up, as they're very lightweight, all the calcite having dissolved away. About 200 specimens were collected, including about 50 undamaged, sleekly perfect-looking groups, most of them without matrix.

Wendell Wilson's report from the 2005 Munich Show (vol. 37, no. 1) noted a new discovery of pale green, translucent, cuboctahedral **fluorite** crystals to 4 cm on matrix from Riemvasmaak, near Pela on the Orange River, South Africa. According to Africa specialists Brice and Christophe Gobin, the collecting site is a lonely outcrop on the South African side of the river (which forms the border between that country and Namibia), and a new strike there, made about six months ago, has yielded more beautiful fluorite specimens, this time with gemmy deep green, simple octahedral crystals to 4 cm on massive purple-green fluorite with a little quartz. In the alcove of *Gobin Sarl* (gobin@club-internet.fr) I ogled a gorgeous 20 × 20-cm cluster of these gemmy green octahedral fluorite crystals—and I learned that most of the recent lot had already passed to Rob Lavinsky. While luxuriantly sipping wine (normally I'm a beer man) with Brice and Christophe in their booth in "the Taj" I also saw the best of a new lot of superb specimens of **dioptase on shattuckite** from Kaokoveld, Namibia—the sharp, deep green, doubly terminated dioptase crystals of typical form reach 2.5 cm, and they rest on baby-blue botryoidal cavity linings of shattuckite. Other recent specimens from the occurrence show very rich green, prismatic, somewhat coarse crystals of **malachite** in bundles to a few centimeters long, rising from the same baby-blue shattuckite beds.

A new oddity from South Africa, seen at several dealerships around the show but most notably with Clive Queit (queit@icon.co.za), is the very rare calcium borosilicate **oyelite**, as chalky white coatings over, and epimorphic shells replacing, pseudocubic crystals of hydroxylapophyllite to 1.5 cm, from the N'Chwaning II

Figure 19. **Octahedral fluorite cluster, 8 cm, from the Orange River area, South Africa. Brice and Christophe Gobin specimen and photo (specimen later sold by Rob Lavinsky).**

Figure 20. **Villiaumite crystal, 1.6 cm, in a vug in phonolite from the Aris quarry, Windhoek district, Namibia. John Veevaert specimen and photo.**

mine, Kalahari manganese district, Northern Cape Province. The white, somewhat shaggy forms of the oyelite epimorphs perch on glittering drusy calcite cavity linings (which, of course, save the specimens from hopeless ugliness). Desmond Sacco tells me that many specimens of the oyelite epimorphs were unearthed a few months ago.

A mineral dealership and mineral-touring concern called *Geo-Tours Namibia* filled a large space along one wall in B2, and proprietors Andreas Palfi (pha@mweb.com.na) and Ralf Wartha offered some new Namibian items there. The most intriguing of these was a find, this past summer, of gemmy orange **villiaumite** crystals from the Aris phonolite quarry. The crystals, reaching almost 2 cm, rest singly and as clusters in cavities in the hard, solid matrix of salt-and-pepper phonolite rock. Unfortunately, these specimens are sawn slabs—with frontages of flat, painfully clearly *sawn* surfaces—in which crystal-pocket holes appear; it is just too dangerous to try to trim out the pockets with hand tools. To look at the villiaumite crystals is instantly to think of grossular crystals from the Jeffrey mine in Quebec, as the vivid orange color, high luster, and complete gemminess are the same. At *Geo-Tours Namibia* there were also fine, loose, lustrous, single **epidote** prisms with wedge terminations from the Rehoboth area, to 3.5 cm long; and there were several flats of specimens from a remote exposure of altered siderite in the Khomas Highland, these showing sharp, lustrous, striated, red-brown single crystals and elbow twins of **rutile** in dark brown, crumbly matrix. The rutile crystals range between 1 cm and the size of a finger, and they look quite promising; the first find occurred about three years ago.

Those villiaumite specimens from Namibia make for a neat segue, here, entirely out of Africa and to Russia. Elsewhere in B2, a dealership called *Laplandia Minerals* offered villiaumite of the more usual sort, together with other exotica, from the intrusive hyperalkaline igneous bodies of the Kola Peninsula. Klaus Hielscher (Feldbergstr. 63, 61449 Steinbach, Germany) has been collecting furiously in the Kola Peninsula's Khibiny and Lovozero massifs, although many of the specimens he showed at the *Laplandia Minerals* stand are "older," he says, inasmuch as very little has come from the region of late. **Villiaumite** was seen here as rich red, gleaming cleavage faces to several centimeters across, in cabinet-size lumps; **kovdorskite** was on hand, as palest orange, glassy, wedge-shaped crystals to 1 cm in

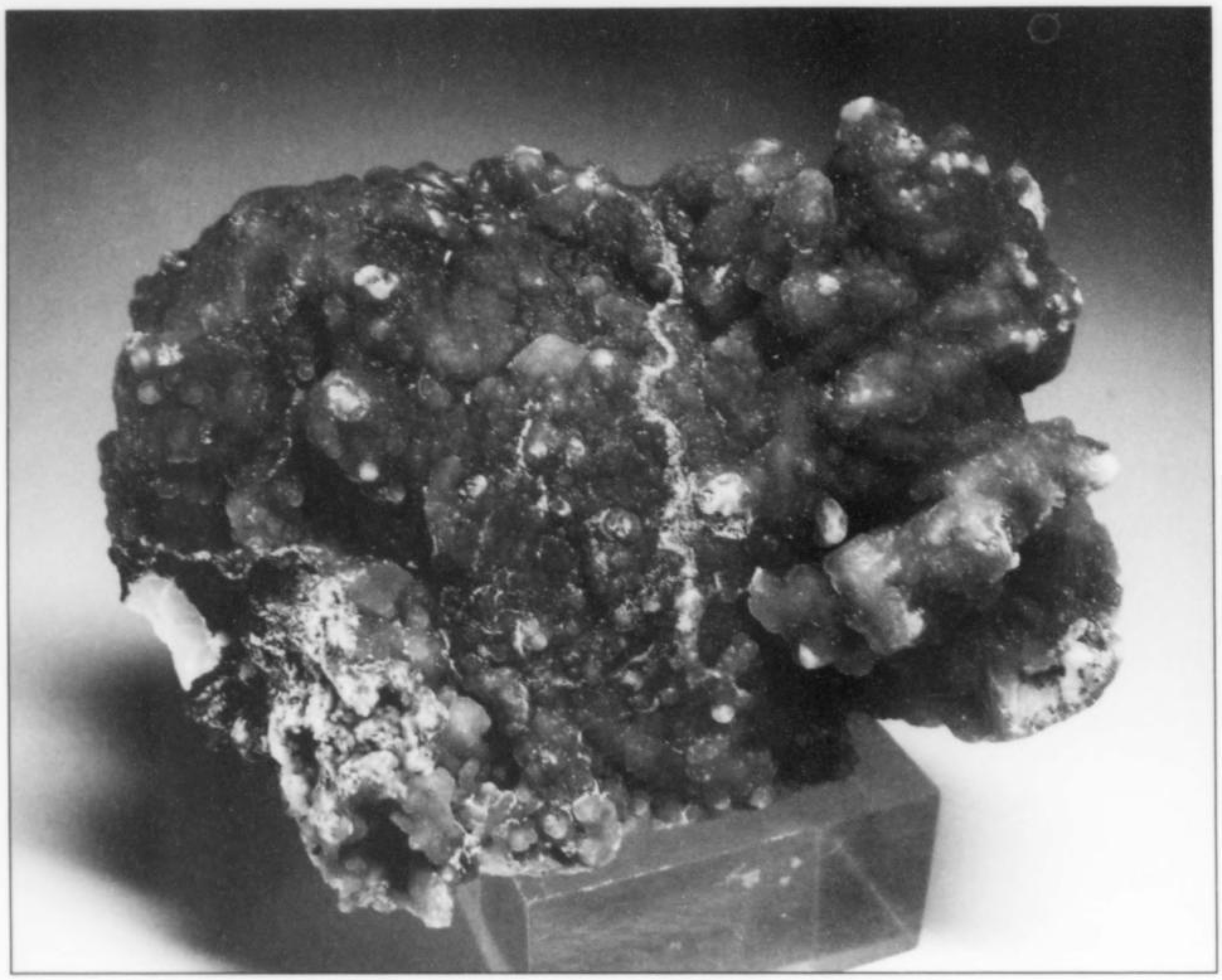


Figure 21. **Plumbogummite (pale blue druse) on pyromorphite, 9.3 cm, from the Yangshuo lead-zinc mine Yangshuo, Guangxi Province, China. John Veevaert specimen and photo.**

matrix coverages to 8 cm across; the very rare **bobierrite** was seen as sprays of pale blue, glassy crystals to 3 cm rising from matrix (these from the world's only significant bobierrite occurrence, the Zheleznyi mine, Kovdor massif, Kola Peninsula); and, front and center at the stand, a huge piece of nepheline/apatite matrix was seen to harbor a sharp, complete crystal of **eudialyte** fully 8 cm across, rose-red inside but with a thin, opaque brown crust of **wadeite**.

Not "out" on the show floor but safely harbored inside an innocent-looking box in the keeping of Riccardo Prato of *Pregi Gemme* were three quite amazing, unearthly-beautiful crystals belonging to Marco Amabili (and, last I heard, "available" from him: if you're an optimist, Marco's e-mail address is marco@me.unipr.it). They are thick, totally gemmy crystals of **heliodor beryl**, reportedly found years ago in the now-flooded Mine #2 at Volodarsk-Volhynia, Ukraine, and they measure respectively about 10, 15 and 20 cm long. The crystals are yellow-orange, lustrous and undamaged, but their really remarkable feature is that they show six distinct prism faces, with pyramids and small pinacoids at the terminations, i.e. they are not so heavily etched (as are nearly all other heliodors from this locality) that the morphology is obscured by phantasmagorias of ridges, waves and curves. They are easily the most impressive heliodor crystals I have ever seen.

Surprisingly, I saw little that was new from China (although some of the pale blue plumbogummite specimens from Yangshuo are quite impressive), or for that matter from India—although of course the show was awash in zeolites from the Deccan Plateau, lovely green fluorites from the Xianghualing mine, Chinese cassiterite, aquamarine, calcite, stibnite, etc. It was Pakistan that spoke most loudly for Asia this time around, but let's look first at a pleasant new plenitude of **chlorite-included quartz** from Nepal. Alpine-type clefts in the mountain called Ganesh Himal have yielded these pretty specimens before, but thousands more of them, representing several years of production, were brought to Munich by Nepalese miner Hari Prasad Timsina (quartznepal@hotmail.com), and further, smaller hoards were on view at other dealerships around the show. The thin, pointed quartz prisms are heavily dusted and included by dark green, fine-grained chlorite, but are transparent, colorless and highly lustrous in undusted parts; crystals to 60 cm long have been recovered, but most marketed specimens are bristling groups between 3 and 12 cm. They come from an underground quartz mine in Ganesh Himal; a separate but nearby quartz mine typically produces groups of thicker, unchloritized prisms. At this dealership, too, were a few nice crystals of **aquamarine beryl** to 12 cm long, pale blue and mostly cloudy inside (some cut gems give a cat's-eye effect), but sharp and lustrous, from workings in Kanchanjenga Mountain, Taplejung district.

From a pegmatite at Kaha Chee near Momeik, in the prolific Mogok gem district of Myanmar (Burma), comes a surprise, courtesy of Patrick de Koenigswarter of *Miner K* (minerk@club-internet.fr). According to Patrick, about 20 small, loose, sharp crystals of **pezzottaite** have recently been dug from this pegmatite, and the single crystal I saw at Munich, though small, is quite fine: a hexagonal tablet measuring 3 × 6 × 12 mm, bright medium-pink and translucent. Of course, pezzottaite is a recently described species (see vol. 35, no. 5) known heretofore only from its type locality, the Sakavalana pegmatite in Madagascar. It would be of highest interest both to mineral collectors and (take a deep breath) gem cutters should the new locality in Burma turn out to harbor these lovely pink crystals in quantity. If so, you heard it here first.

Well, the sun is sinking below the yardarm, and I have promised (a couple of times now) to end this report with some Big News from Pakistan—so here goes. From the moment I first hit the show floor on the first set-up day, with many dealers not even in evidence yet, an intense and palpable buzz surrounded one stand in "the Taj" that *had* been set up—that of the Italian dealership *Pregi Gemme* (pregigemme@iol.it), where Riccardo Prato had laid out in his glass

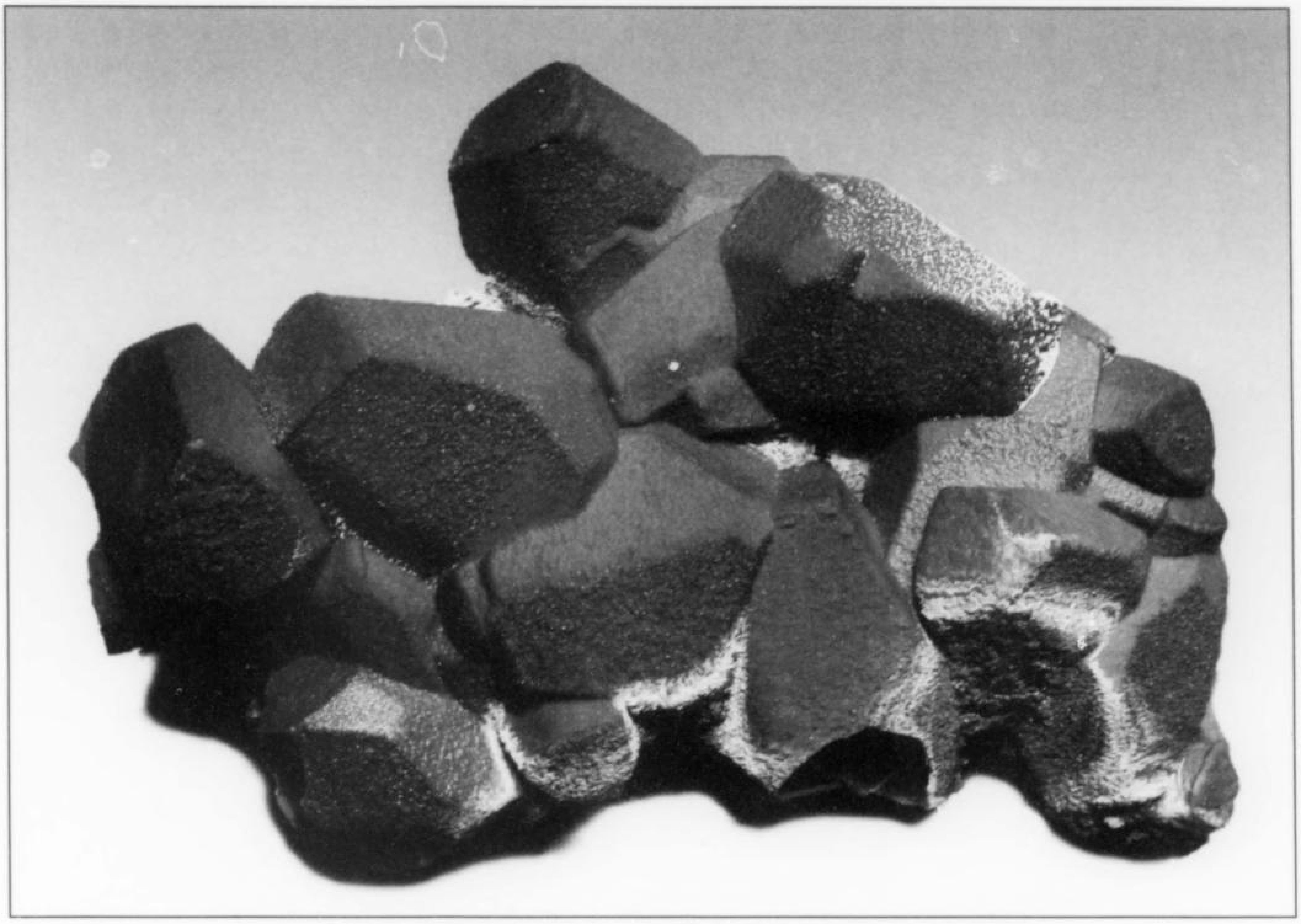


Figure 22. **Siderite/sphalerite epimorphs (molds) after large calcite crystals, about 20 cm, from the Aggenys mine, northern Cape Province, South Africa. John Veevaert specimen and photo.**

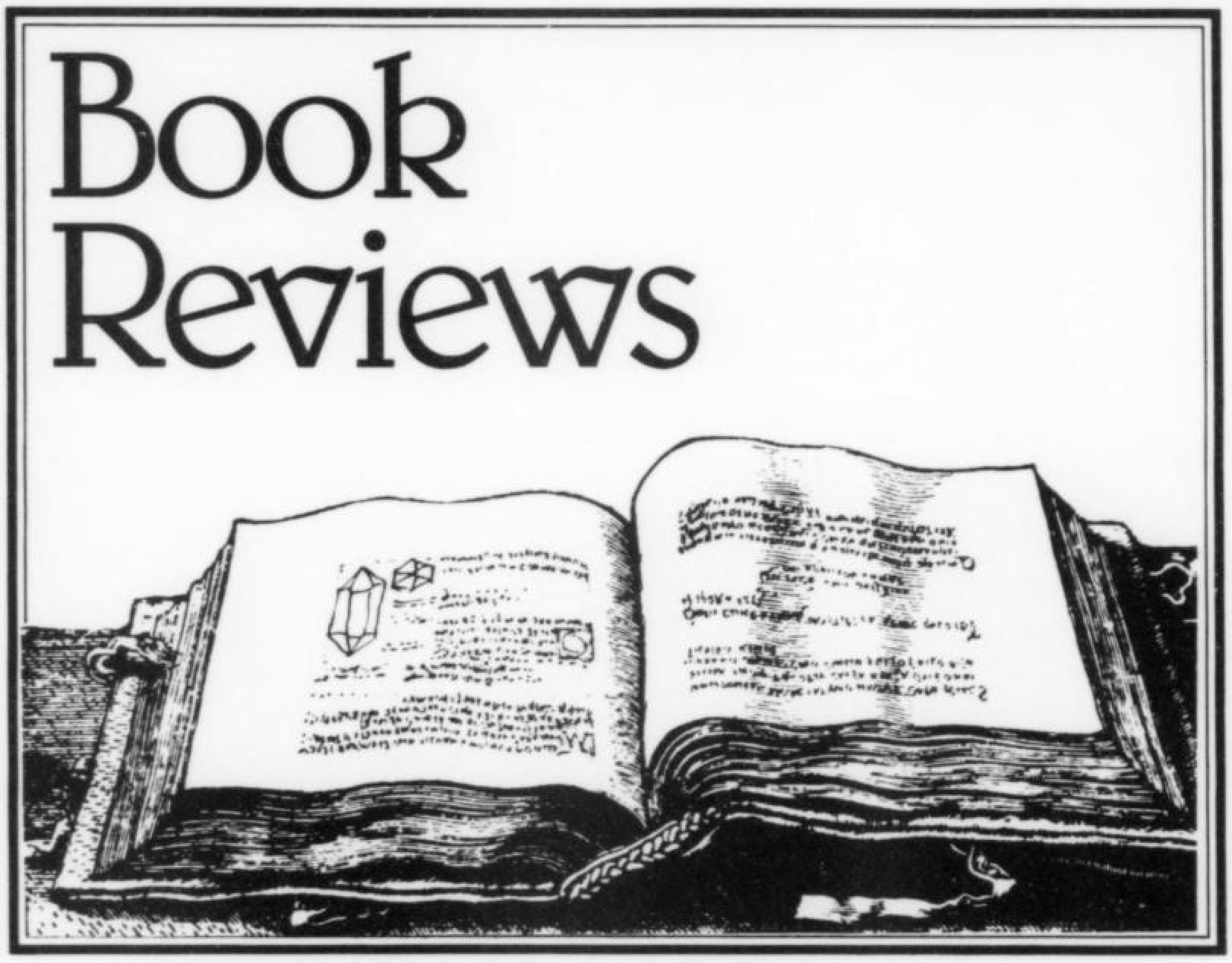
cases a handful of large specimens from new discoveries of epidote and pink fluorite in Pakistan. The combined effect of these two groups of fabulous specimens, plus some extraordinary Pakistani aquamarines, Chinese azurites, and a 36-cm plate of raspberry-red, gemmy elbaite crystals from the Jonas mine, Brazil, made the *Pregi Gemme* array everyone's favorite candidate for the (imaginary) award of Best Dealer Stand At The Show.

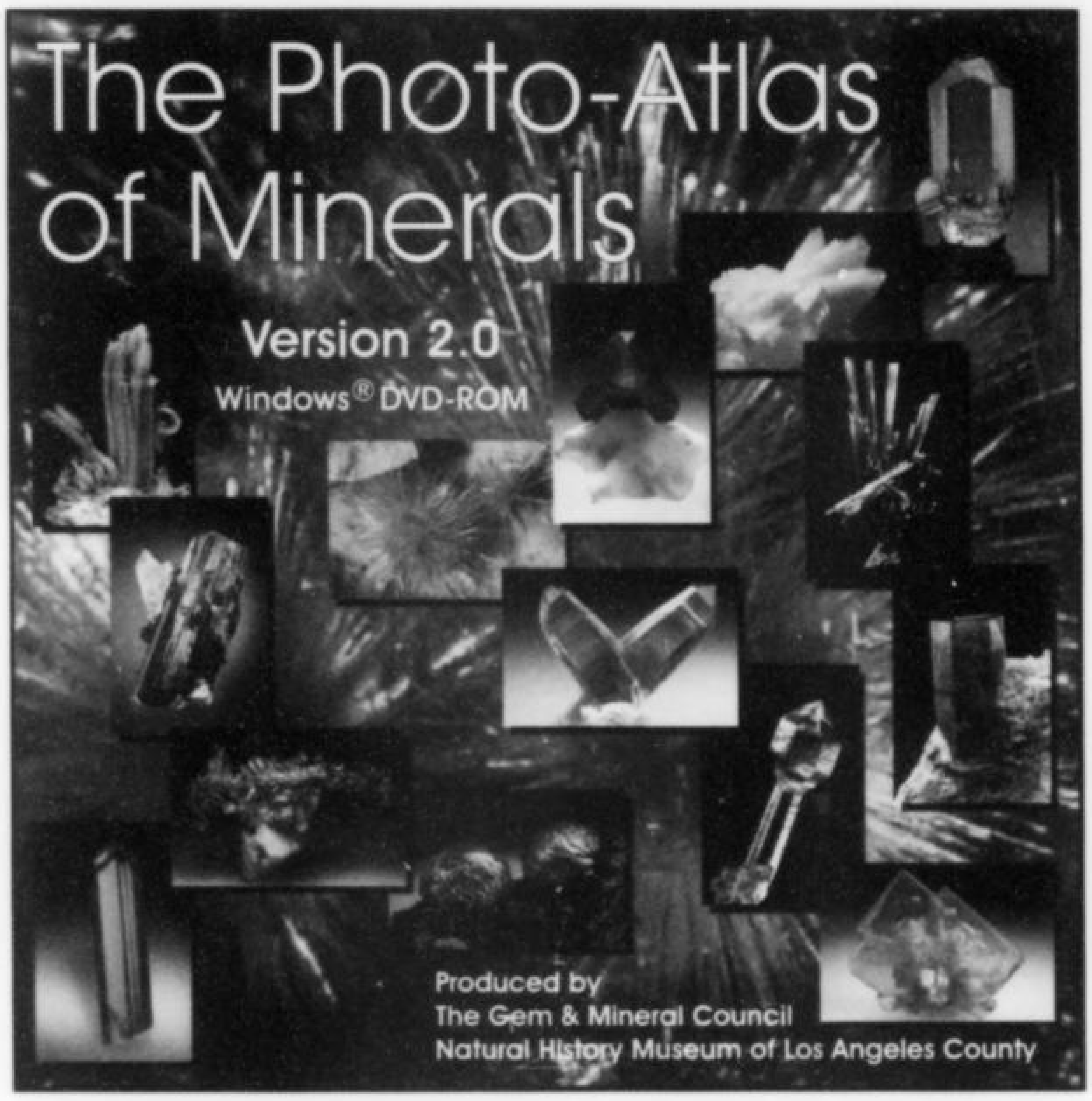
A huge, Alpine-type pocket opened in September 2006 in the Tormiq Valley, Skardu district, Northern Areas, Pakistan produced about 10 cabinet-size specimens of **epidote**, including single, loose, bladed crystals to 22 cm and a few clusters to 8 × 12 × 20 cm on gray-green amphibolite matrix with small white crystals of adularian orthoclase. The epidote blades are striated, brilliantly lustrous, and totally transparent in shades of dark green to brown—actually more brown than green, leading one to suspect that the species might actually be clinozoisite (Riccardo admitted that the crystals had not yet been chemically analyzed). Most of these spectacular gemmy crystals have crude terminations, or none, but one twin shows sharp terminations with V-notches to mark the twinning plane.

Riccardo's other show-stopper was a group of only 5 specimens of octahedral **pink fluorite** from the already well-known locality of Chumar Bakhoor, Gilgit district, Northern Areas, Pakistan. The pocket, opened in September 2006, yielded what *must* be considered the finest pink octahedral fluorites ever found anywhere in the world—yes, more dramatically beautiful than any from Mont Blanc in France, the Göscheneralp region in Switzerland, or the Huanzala mine in Peru, and larger as well. In all five of the Chumar Bakhoor cabinet specimens, the fluorite crystals rest on beds of silvery muscovite "books" which blanket rock matrix. The largest crystal is 12 cm (4.7 inches!) on edge, and the others range from 5 to 6 cm; some are simple, mirror-faced, razor-edged octahedrons while others show dodecahedral modifications plus subtle flutings on the {111} faces. Best of all, the crystals are highly lustrous, bright rose-pink, and completely gemmy, with the underlying muscovite showing quite clearly through multi-centimetric thicknesses of glowing roseate color. No other specimen-lots at this show could compete with this one for beauty, surprise, and pure mineralogical charisma. Lest you begin having daydreams of ownership, however, be advised that all of the specimens had been "spoken for" even before their enthronement in Riccardo's glass wall case on the first set-up day.

If you have enjoyed and/or been stimulated by all of these happy ravings, then you know your course: you must make it to the Munich Show yourself next year! There is nothing like a cold *Mettwurst* bought fresh from a butcher shop near the *Marienplatz*, and perhaps the faeryland sight of snow dusted on the great dome of the *Marienkirche*, to make you forget just how few Euros you received in exchange for your dollars. And anyway, who knows? Maybe the exchange rate will have improved by November 2007.

INTERNET DIRECTORY





The Photo-Atlas of Minerals

DVD-ROM, Version 2.0 for Windows©. Published (2006) by the Gem & Mineral Council, Natural History Museum of Los Angeles County. Developed by Dr. Anthony Kampf and Dr. George Gerhold. Price: $59.95, upgrade price $39.95. For information and to place an order visit: www.nhm.org/pam

The second edition of the Photo-Atlas follows the first edition after about five years. It avails itself of the most modern software tools, that have allowed the authors to come out with an excellent, easy to use product. The Atlas requires the use of a PC of suitable characteristics, as detailed on the envelope of the DVD (a PC supporting Windows 2000 or Windows XP or higher and with a good resolution screen will do the job). Also, we recommend installing the program on the hard disk of your PC: it will use about 4GB of memory, but its performance will be much improved. After reading the simple Instructions section, you will be ready to use the Atlas.

The Photo-Atlas is basically a very large collection of images, mostly at high resolution and of good to very good quality, especially those authored by high level mineral photographers like Jeff Scovil (2,300 photos) and Wendell Wilson (about 3,500 photos). Some images show well known, high class specimens, other images show rarely seen minerals, at times from exotic localities. In total, about 16,000 specimens of 1,700 species and 3,500 localities are included.

The Photo-Atlas is what it promises, i.e. a large set of images, but in addition, several of its features extend its scope well beyond that. Firstly, a page for each mineral species shows the main technical data (chemistry, symmetry, unit cell parameters, color, type locality etc.). In total, about 4,100 species are described, approximately all those approved by the IMA as of 2005. For 1,700 of them (about 40%) one or more images are included. Therefore, we can assume that for about 60% of the approved species no photo of acceptable quality was available. This is not surprising, as so many mineral species, especially of those approved in recent times, are known only as microscopic granules, or are intimately associated with other minerals and can be detected only by using the most modern mineralogical equipment. Others are earthy to powdery and unsuitable for producing a meaningful photograph. Prior efforts to present images of more species have yielded rather unsatisfactory results because of the modest (unphotogenic) quality of the specimens available.

This extension of the Atlas beyond plain iconography and into the field of systematic mineralogy has, of course, some limits: it will be difficult to update it frequently enough to follow closely the development of mineralogy (new species, discreditation of old species, new data, new localities etc.) as some of the best websites do: www.mindat.org, www.webminerals.com and others. To solve this problem, and also to enlarge the scope of the Photo-Atlas, each mineral page carries a "Link to Web" button that allows the user to connect quickly to Mindat, Webminerals, Handbook of Mineralogy, American Mineralogist Crystal Structure Database or JCrystalsoft.

The Photo-Atlas can be searched in various ways: by mineral name, locality, Strunz classification, physical properties (color, luster, hardness, density, streak, crystal symmetry), chemistry and various combinations of those factors. Other categories of images can be selected from the data base: twins, pseudomorphs, inclusions, gemstones, fluorescent minerals etc.

Some features of the Photo-Atlas are unique and make it functionally different from the various mineral websites available at present. First of all the quality and the resolution of the images is much higher than can be achieved by a website. To appreciate that, it is enough to activate one of the nicest features of the Atlas. Click the Photo

Gallery button on one of the mineral pages (e.g gold, elbaite, or fluorite etc.), and you will see on the screen a wonderful display of large thumbnail images. By clicking any of the thumbnails, the full-size image appears almost instantly, giving great visual enjoyment and, for the lesser-known species, an interesting aid for sight identification.

Another nice feature is the automatic sequencing of images in the Slide Show mode. It can be set to show all of the Atlas images, or just those of gemstones, of twins, of pseudomorphs, of microspecimens etc.

You have a question about the pronunciation of one of those difficult names? Or perhaps you are not too familiar with spoken English? Click the button near the mineral name and, if you have speakers on your PC, you will hear its proper English (or, rather, American) pronunciation. This feature can also be used in the Slide Show mode.

You have a little time to play with two or three friends, or even alone? You can try the Identification Game: select one of three levels of difficulty and then try to identify the pictures that appear in sequence on your screen—a more challenging exercise than one might expect.

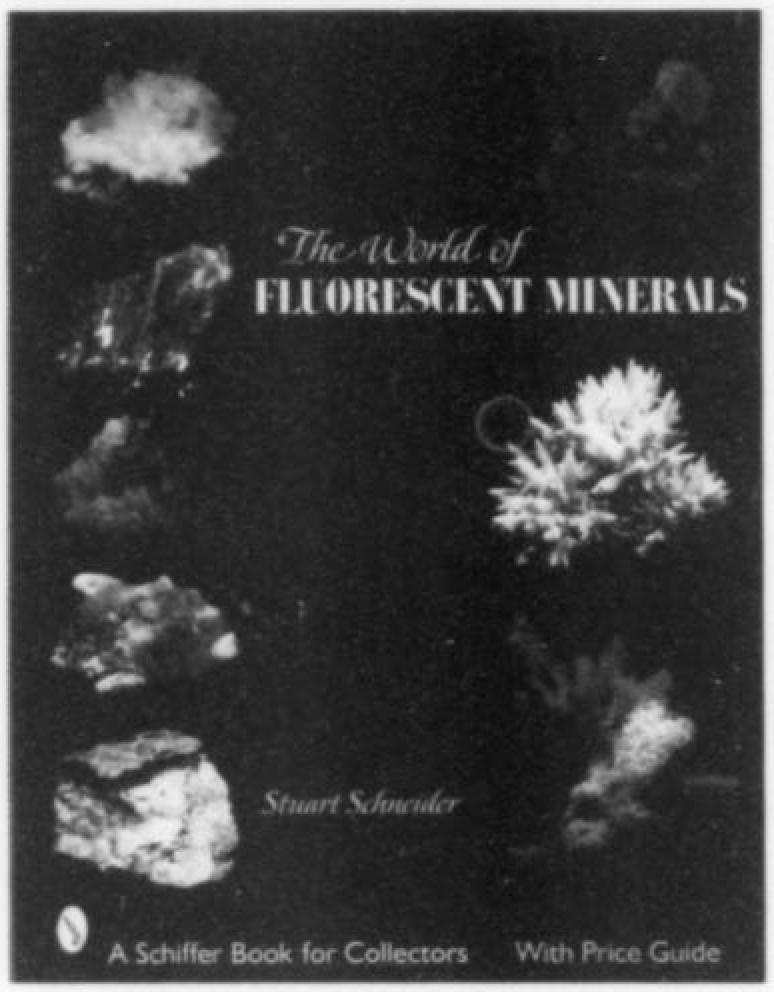
The more expert users can also add other images to the database in their PC. These images can then be retrieved, like the others, using the tools of the Atlas.

Finally a Glossary explains the scientific terms used in the mineral descriptions: about 400 of them, from acicular to xenomorphic: a useful tool to have, even beyond its use in conjunction with the Atlas descriptions.

The large quantity of images and data from many different sources has probably not allowed the authors to carry out a detailed verification of the locality and identification of some specimens, especially the microminerals. Users who are familiar with the various localities are invited to help improve the accuracy of the massive database by contacting Dr. Kampf or Dr. Gerhold. Updates will be posted on the web (at the date of this writing, Updates 2.01 and 2.02 are already posted).

In total, the Photo-Atlas is a very effective and useful tool. After reading the instructions, the user will enjoy exploring the various functions and looking at the images of favorite minerals or localities. The Atlas will then remain in his PC, ready to be opened and searched when needed. How can you be without it?

Renato Pagano
(As written for
Rivista Mineralogica Italiana)



The World of Fluorescent Minerals

By Stuart Schneider. Published (2006) by Schiffer Publishing Ltd., 4880 Lower Valley Road, Atglen, PA 19310 (www.schifferbooks.com). Softcover, 8.5 × 11 inches, 192 pages. Price $29.95 plus shipping. ISBN 0-7643-2544-2.

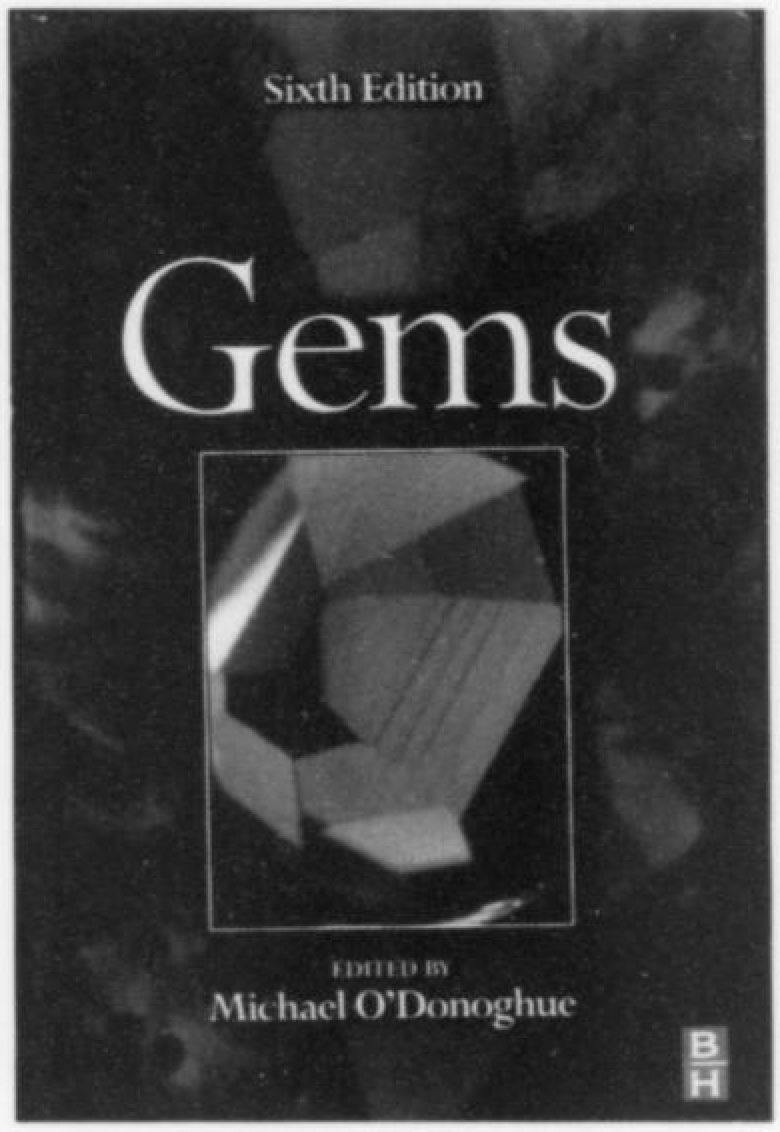
Stuart Schneider is the author of 18 books, counting this one, on collectibles (flashlights, cigarette lighters, ballpoint pens, Halloween costumes and many others just as unpredictable), and now he has produced a colorful, likable, informally written paperback volume for collectors of fluorescent minerals, with strong emphasis on fluorescent specimens from the Franklin-Sterling Hill mines and the Andover-area mines of northern New Jersey, where Schneider lives. The heart of the book is a photo gallery of fluorescent minerals, but there are also about a dozen short chapters on related topics. Some of these chapters handle relevant scientific concerns: the nature and origins of fluorescence, tenebrescence, triboluminescence and thermoluminescence; trace-element activators; and commonly fluorescent species, as presented in paragraph-length accounts. Other chapters offer practical information for hobbyists: shopping for and improving portable lamps; displaying and documenting fluorescent-mineral collections; contacting relevant clubs, collectors, and dealers (with a short list of some of these); photographing fluorescent minerals; field collecting in northern New Jersey; even a (somewhat incongruous) one-page photographic spread showing three antique miners' lamps. At the end, a bibliography lists 18 titles, and there is a detailed index of the book's references to fluorescent species.

As mentioned, the book's main action, including nearly all of its colorful photographs, is in the 160-page "Gallery of [Fluorescent] Minerals," with photos of hundreds of specimens, each shown as it appears in natural light and as it appears while fluorescing in longwave or shortwave ultraviolet light or in both (many specimens are shown three times). The printing quality here is excellent, showing clean, bright colors. To be sure, most of these specimens are massive, crystallization being a secondary concern, but the clarity and sheer beauty of their colors make this Gallery a pleasure to browse through, and the photo captions contain much out-of-the-way data on rare (or rarely fluorescent) species and their localities. Specimens in the Gallery are arranged by state or country of origin and, given the pre-eminence and charisma of Franklin-Sterling Hill in the fluorescent-mineral-collecting world, and given the author's address and field collecting experience, it is not surprising that New Jersey specimens take up the Gallery's first 49 pages. Fluorescent minerals from the rest of the U.S. get 36 pages; those from Canada (mostly from Ste.-Hilaire) get 12; those from Mexico, 4; and those from all of the rest of the world, 59.

One unusual feature of this book which I find dubious is its inclusion of a "value guide" to commercial prices for many of the fluorescent specimens shown. In the book's Introduction, Schneider explains that knowing a specimen's dollar value "is useful in buying and trading and it can help give you a feel for the rarity of a piece," and that the dollar values shown for specimens in the Gallery flow from the author's "experience buying and selling fluorescent minerals over the past seven years." Fair enough—but for the beginner, surely, there are serious pitfalls, as well as impediments to real learning, in judging a specimen's desirability in terms primarily of its "found" asking price. And the rest of Schneider's introductory "Value Guide," though it tries, does not and cannot begin to cover the gamut of subjective factors involved necessarily in such a strategy. In my opinion this book would have been better (and, from a beginner's standpoint, less scary) without, say, "Value $20–25" attached to a caption for a massive white piece of fluorescent calcite from Texas, and "Value $400–450" attached to a caption for another massive white piece, this time of the very rare mineral minehillite from Franklin. The effort to protect beginners from getting financially burned is commendably kind, but will in many cases be confusing, distracting, or intimidating; the attempt to quantify this kind of helpfulness in a mass-market book is probably misbegotten (though in fairness it may have been supplied at the request of the publisher).

With that reservation, I certainly can recommend this very pretty, inexpensive volume to all who fancy making at least occasional forays into the enchanted subkingdom of fluorescent minerals.

Thomas P. Moore



Gems: Their Sources, Descriptions and Identification. Sixth Edition.

Edited by Michael O'Donoghue. Published (2006) by Butterworth-Heinemann/Elsevier Linacre House, Jordan Hill, Oxford OX2 8DP, United Kingdom. Hardcover, 6.5 × 9.5 inches, 873 pages. Price $125.55, including shipping. ISBN-13: 978-075065856-0.

The Sixth Edition of what was originally Robert Webster's compendious *Gems* has been reworked and added to so many times by so many people that it no longer cites *anyone* as the author. It opens with a preface by the new editor, Michael O'Donoghue (who is cited in place of a formal author), and includes as well the prefaces to each of the earlier five editions, beginning with the original 1962 edition. Obviously this is an enduring work, and a well-known "standard reference," addressing itself to readers having diverse interests in gemstone materials: in the words of O'Donoghue's preface, it is an "exhaustive study of those substances, both organic and inorganic, natural and man-made, which have at some time been used as ornament." Keeping faith with such a broad mission statement, extremely abundant information is offered, not only for working gemologists and lapidarists but also for mineralogists, crystallographers, those interested in synthetic gemstones, those who study "value-enhancing" techniques for ornamental materials, those who are students of "the biological gem materials," and yes, even for mineral collectors. For this edition, twelve contributing authors have written chapters on their areas of expertise, and the rest of the work's 31 chapters have been edited or revised from previous editions or written afresh by O'Donoghue. One can't help wondering how much of Webster's original text remains. O'Donoghue assures us that some of it definitely does survive, but apparently not enough to grant Webster author status any longer. This awkward situation is somewhat reminiscent of Francis Alger's reworking of William Phillips's *Mineralogy* in 1844, popularly referred to as "Alger's Phillips's *Mineralogy*." Perhaps this new work should be called "O'Donoghue's Webster's *Gems*."

Two long opening chapters provide scientific background. Roger Harding's "The Geological Sources of Gems," 36 pages long (and with a "Further Reading" list which includes 36 book titles and 8 journal titles) amounts to a crash course in basic geology as applied to the genesis of gem minerals, and Ian Mercer's "Crystalline Gem Materials," 26 pages long, is an excellent review of the principles of crystallography. Then comes a sequence of 20 generous chapters on major minerals and other materials of ornamental interest—including two chapters on diamond and one each on, e.g., corundum, beryl, chrysoberyl, tourmaline, garnets, quartz, opal, jade, "The Natural Glasses" and marble. There follows the book's longest chapter, "Less Common Species," which offers nearly a hundred pages of short accounts of minerals ranging from adamite and algodonite (a copper arsenide) through weloganite, whewellite, wulfenite, xonotlite, yugawaralite, zincite, zunyite (and many others even within the sequence WXYZ)—all considered in light of their potentials as ornamental materials. Many of the chapters on major gem minerals will be of interest to the collector for their inclusion of very recent data on productive world localities: there are brief but clear and timely accounts of corundum occurrences in Thailand, Vietnam, Kashmir, Tanzania and Malawi; of emerald from Nigeria, Tanzania and Norway; of topaz from Pakistan and China; of many a gem from obscure localities in the ex-Soviet Union—and so on.

Mineralogical data offered along the way are exhaustive, and all data which a gemcutter may require concerning refractive indices, density, color, inclusions, pleochroism, birefringence and other important properties are provided. Additionally, 52 pages of "Identification Tables" list gem materials arranged by refractive indices, by hardness, by color, by crystal systems, by absorption spectra (illustrated, unfortunately not in color), by specific gravity, and by fluorescence. These tables are followed by charts showing birthstones, "emblems of the twelve apostles," unusual and obsolete gemstone names, and the great diamond finds of history. The book's annotated Bibliography is helpfully organized by subtopics, and lists separately the many major journals—including the *Mineralogical Record*—which will be of interest to different segments of the readership.

Visual illustration is not the strong suit of this book: most pictures are black-and-white, and the images in the 60 color plates are by and large not showstoppers. But it would be difficult to imagine a more broadly useful, hardier (the book is stoutly bound, and weighs almost four pounds), one-volume work on the general topic of "Gems."

Thomas P. Moore

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Letters

Roy Hopping Cabinet Found

In the "Notes from the Editors" column in the March-April 2006 issue, you pictured an illustration of a mineral cabinet advertised for sale by Roy Hopping in the March 1902 issue of *The Mineral Collector*. Enclosed are two photos of an identical cabinet in my collection.

As a teenager I often visited the mineral shop of John Grenzig, and when he passed away in 1944 his family began to sell off cases from his business. At that time I was doing war work in Baltimore, but somehow I got in touch with Mrs. Grenzig and asked to buy this cabinet. After the war I returned home to Brooklyn and found that Mrs. Grenzig had saved the cabinet for me. According to the Roy Hopping ad, the selling price for the cabinet in 1902 was $20. I paid $30 for it. I later learned that a prominent mineral collector had offered her $45 for it, but out of sentimentality I was given the cabinet at the lower price.

For years I assumed that this was an office cabinet for the filing of documents and supplies. There is a center divider for all of the smaller drawers which apparently lends support for the weight of the minerals. Thanks to the note in the *Mineralogical Record*, I now know who built it and approximately when, and that it had originally been built to house minerals!

Irving Horowitz
Floral Park, New York

The American Mineral Cabinet

Is a highly polished oak case with panelled sides, moulded top, carved wooden handles on the drawers and brass label holders which will allow the labels to be removed when soiled.

The drawer-stops are beneath the drawers, which will be appreciated by collectors who have had fine groups crushed by stop blocks. Between the fifth and sixth drawer is a sliding shelf to rest a drawer upon when out of the case for inspection.

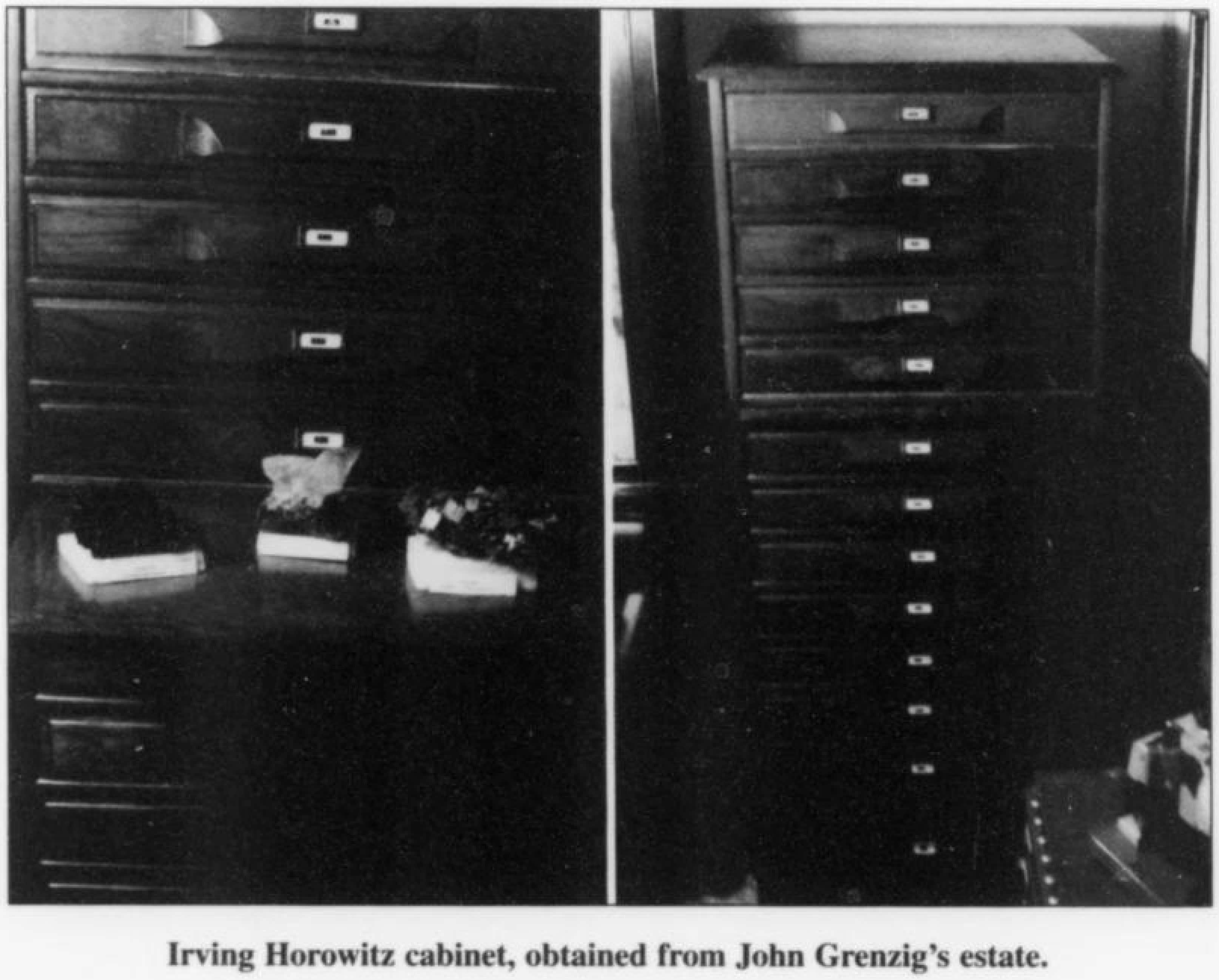
Dimension of cabinet: 5 ft. high, 2 ft. square.
Dimensions of drawers:
11 are 18x20x2½ inches inside.
1 is 18x20x4½ inches inside.
1 is 18x20x6½ inches inside.

Capacity: 390 pasteboard trays 3x4 inches, 780 trays 2x3 inches, or 1560 trays 1½x2 inches.

Weight 150 lbs. packed in excelsion and burlap, ready for shipment, price $20.00.

Roy Hopping, 129 FOURTH AVE., NEAR 13th STREET, **New York.**

Roy Hopping ad in *The Mineral Collector*, March 1902.



Irving Horowitz cabinet, obtained from John Grenzig's estate.

Prosper Williams: The Early Days

I first met Prosper Williams [see obituary in November-December 2005] in the summer of 1958, in Prieska, South Africa where I was buying tigereye. I had just driven down from South West Africa (now Namibia) after obtaining minerals from Tsumeb and Grootfontein. I had damaged the old 1939

Chevrolet that I had bought in Capetown for the trip and was arranging a train trip back to Capetown. I was staying at the railroad hotel and met Prosper, who at that time was a contractor building houses for railroad workers.

Prosper offered me a ride back to Capetown, saving quite a bit of time. During the course of our time together at the hotel there was some discussion about the few fine specimens that I had hand-carried with me rather than shipping them with the rest of my purchases. Of course, I romanced the life of traveling, buying, collecting and selling minerals.

My enthusiasm must have rubbed off because a few years later while I was exhibiting at the National Show, held that year in Normal, Illinois, I was pleasantly surprised to see Prosper with a large booth filled with very nice South West African minerals.

John Patrick
El Sobrante, California

Jeremejevite Localities

In your report on the 2006 Denver Show (November-December, p. 579) you described the new Myanmar jeremejevite occurrence as being only the fourth known world occurrence. Actually this species is well known from Emmelberg, Eifel mountains, Germany; blue crystals from there made wonderful micromounts. The first published description was in 1981. It became a well-known and important locality for micromounters. When crystals eventually became more difficult to find, some people dug deeply into the wall, sometimes at great risk. There were signs of "jeremejevite fever" among the collectors.

Later, jeremejevite microcrystals were also found at numerous localities in the Eifel Mountains, including Wannenköpfe near Ochtendung, the Herchenberg Mountains near Burgbrohl, and Niveligsberg Mountain near Drees. Richard Hughes has also recently reported jeremejevite (crystal size not mentioned) from Rangkul near Murghab, in the Kukurt Mountains, Pamir, Tadjikistan.

Jürgen Wachsmuth
Ulm, Germany

You are absolutely correct. I should have specified that I was referring only to localities for macrocrystals. *TPM*

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Executive Director: Teresa Taylor
Tel: (870) 598-3228
E-mail: pfeifferfnd@centurytel.net
P.O. Box 66
1071 Heritage Park Drive
Piggott, AR 72454
Hours: 9–4 Tues.–Fri., 11–4 Sat. (Daylight Savings Time)
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Collection Manager: Marc L. Wilson
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Hours: 10–5 Tues.–Sat., 10–9 F, 1–5 Sun., closed Mon. & holidays
Specialty: Worldwide minerals & gems

W. M. Keck Earth Science & Engineering Museum
Administrator: Rachel A. Dolbier
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
Hours: 9–4 Mon.–Fri. (closed university holidays) and by appointment
Specialty: Comstock ores, worldwide minerals, mining artifacts, Mackay silver

New Mexico Bureau of Mines & Mineral Resources—Mineral Museum
Director: Dr. Virgil W. Lueth
Tel: (505) 835-5140
E-mail: vwlueth@nmt.edu
Fax: (505) 835-6333
Associate Curator: Robert Eveleth
Tel: (505) 835-5325
E-mail: beveleth@gis.nmt.edu
New Mexico Tech, 801 Leroy Place
Socorro, NM 87801
Hours: 8–5 M–F, 10–3 Sat., Sun
Specialties: New Mexico minerals, mining artifacts, worldwide minerals

Arizona-Sonora Desert Museum
Fax: (520) 883-2500
Website: http://www.desertmuseum.org
Curator, Mineralogy: Anna M. Domitrovic
Tel: (520) 883-3033
E-mail: adomitrovic@desertmuseum.org
2021 N. Kinney Road
Tucson, AZ 85743-8918
Hours: 8:30-5 Daily (Oct.-Feb.) 7:30-5 Daily (Mar.-Sept.)
Specialty: Arizona minerals

U.S. National Museum of Natural History (Smithsonian Institution)
Curator: Dr. Jeffrey E. Post
E-mail: minerals@nmnh.si.edu
Collection Managers: Paul Pohwat and Russell Feather (Dept. of Mineral Sciences)
Washington, DC 20560-0119
Hours: 10 am–5:30 pm daily
Specialties: Worldwide minerals, gems, research specimens

William Weinman Mineral Museum
Website: www.weinmanmuseum.org
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E-mail: joses@weinmanmuseum.org
Curator: Julian Gray x415
E-mail: juliang@weinmanmuseum.org
Collections Manager: Cherry Johnson x405
E-mail: cherryj@weinmanmuseum.org
51 Mineral Museum Dr.
White, GA 30184
Mailing Address:
P.O. Box 3663
Cartersville, GA 30120
Hours: Mon-Sat 10-5, closed Sundays
Specialty: Georgia and worldwide minerals, fossils and mining artifacts

Museo Civico di Storia Naturale
Curator: Dr. Federico Pezzotta
Tel: +39 02 8846 3326
Fax: +39 02 8846 3281
E-Mail: Federico.Pezzotta@comune.miland.it
Department of Mineralogy and Petrography
Corso Venezia, 55
I-20121 **Milano,** Italy
Hours: 9 am–6 pm daily, closed Mondays
Specialties: Italian minerals, pegmatite minerals

Gargoti Mineral Museum
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Tel: ++91 2551 230528
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