

MINING AND MINERAL SPECIMENS

The number of specimens and the array of colors and crystal forms that await visitors at gem-and-mineral shows can sometimes seem overwhelming. The specimens, which come from localities on six continents and from every mineralogical environment, number well into the thousands. Who collects all these specimens and how they do it is an interesting story.

Of the many mineral specimens that are available on the markets today, very few are “collected” in the sense of having simply been gathered from the surface. Virtually all come from some type of mining. The dictionary defines “mine” as a “pit or excavation in the earth from which mineral resources are taken.” While that may seem simple enough, our supply of mineral specimens actually comes from three distinctly different types of mining: as a by-product of production mining; as the exclusive product of specimen mining; and as the product of collective sharing arrangements between mining companies and miners.

The key to understanding how these collection systems evolved is found in the history of mineral collecting. The growth of interest in mineral collecting in the United States was a direct result of the rapid expansion of the western mining industry in the late 1800s. During this period, thousands of underground mines, most small by modern standards, were developed to recover a variety of minerals, initially gold and silver. Almost without exception, these early mines exploited high-grade ores from vein- or replacement-type deposits—mineralogical environments that often produce fine specimens. Early miners routinely found mineral specimens of extraordinary quality and size. But because mineral specimens at the time were neither in demand nor considered valuable, most were discarded in mine-waste dumps or destroyed in crushing operations.

Even spectacular specimens of native gold were routinely melted down into bullion. But by 1890, such specimens had begun to attract the interest of mine owners, some of whom assembled remarkable collections and displayed them at national exhibitions to attract investment capital. These remarkable specimens fired an interest in mineral collecting and, by 1900, when western mining had expanded beyond gold and silver to lead, zinc, copper, and other metals, a national collectors’ market had developed.

Since mineral specimens now had monetary value, miners began collecting them in the course of their work and carrying them out of the mines in their lunch buckets to sell to collectors, shops, mail-order houses, museums, and dealers. Through the 1950s, miners seeking secondary incomes and private collectors willing to take the time and effort to sort through mine dumps were the main sources of mineral specimens.

But all that changed in the 1960s. First, thanks to higher levels of both education and disposable income, public interest in mineral collecting boomed, creating strong demand that drove specimen prices to record levels.

Miners and private collectors, however, were no longer able to supply the growing specimen markets. Most of the high-grade ore deposits that had been mined during the frontier era and which had yielded many fine mineral specimens were now depleted. Ore grades throughout the mining industry had declined, and the lower-grade ore deposits that were now being mined yielded fewer specimens. Many older mines that had been noted

sources of specimens had already been replaced by much larger mines working lower-grade ores.

Meanwhile, the mining industry was seeking to improve its efficiency by tightening operating regulations and demanding higher production levels from miners. Because gathering mineral specimens often interfered with ore production, most companies now prohibited their miners from collecting. Facing new liability and insurance issues, many mines also posted their properties against trespassing and prohibited visitors from collecting specimens from their dumps. Miners, of course, did their best (as they still do) to surreptitiously remove mineral specimens from the mines, but were unable to supply the quantities necessary to meet demand.

Spurred by high specimen prices, a new breed of miner—the professional specimen miner—appeared in the 1970s. These individuals, who usually had some knowledge of geology, mining operations, and specimen marketing, mined exclusively for mineral specimens. Professional specimen miners either had contracts with companies for access to their mines, reopened inactive or abandoned mines, or began entirely new excavations.

Contractors pay fees for exclusive access to the active operations of mining companies. Such arrangements now exist at many major mines in the United States, including both underground and open-pit operations. Companies notify contractors when veins, pockets, or vugs with collectible mineral specimens are encountered in the course of their operations. The contractors, who carry their own insurance and sign disclaimers against any company liability, respond quickly. Whenever possible, companies shift mining operations to other sites to allow contractors time to recover specimens. This arrangement allows specimens to be recovered with minimal or no interference with mine production. Contractors also often work at night or on weekends when regular mining operations are suspended.

Contractors have made impressive recoveries in recent decades. These include fine specimens of realgar and orpiment from Nevada's open-pit gold mines, and superb examples of azurite, malachite, and turquoise from Arizona's open-pit copper mines.

The contractor system is most active in the Deccan Traps area of India, where commercial basalt quarries are the world's leading source of zeolite-mineral specimens and professional specimen collectors contract with quarry owners for collection rights. Quarrying operations often expose vugs in the tough, hard basalt that are filled with beautiful zeolite minerals. Recovering these specimens intact without professional expertise and specialized equipment would be virtually impossible. The contract system in India enables professional collectors to earn a living, makes basalt quarrying more profitable, prevents the destruction of fine specimens, and assures the international markets of a steady supply of zeolite-mineral specimens.

Quasi-professional specimen miners also collect specimens in certain company mines. These are regular production miners who work in mines in which management condones controlled, cooperative specimen-collecting, a system that has worked well in many small mines in such nations as Peru, Bolivia, and China.

When production mining exposes vugs filled with valuable minerals, managers suspend operations or shift them to other sites, then send in specially trained miners to recover specimens as quickly as possible without interfering with ore production. After specimens are sold to dealers, the proceeds are distributed between the miners and the managers. In recent years, this system has resulted in the recovery of many fine

specimens of such minerals as rhodochrosite and manganocianite from China and realgar and orpiment from Peru.

Another group of professional specimen miners collect specimens by reopening inactive or abandoned mines. This approach can be very costly and offers no assurance of financial success. After inactive or abandoned mines have been leased or purchased, governmental operating permits must be acquired and environmental bonds posted. Before the search for specimens can even begin, most old mines must be reconditioned through installation of new ground-support and ventilation systems. Many attempts to reopen old mines end up as financial failures, but those that succeed can be hugely profitable. Most recent finds of museum-grade pieces of gold-in-quartz have come from a few underground California mines that were reopened exclusively for specimen recovery.

Perhaps the classic example of a successful reopening of an old mine for specimens is Colorado's Sweet Home Mine. A silver-lead mine that dates to 1874, the Sweet Home had, over the years, produced many superb specimens of rhodochrosite. But it had operated only sporadically since the 1930s and had been completely inactive after the 1960s. In 1990, it was reopened by professional specimen miners who employed such state-of-the-art prospecting instruments as ground-penetrating radar to help locate rhodochrosite-filled vugs in the host rock.

This venture yielded a wealth of fine rhodochrosite crystals that supplied the international collectors' markets for more than a decade. The most remarkable recovery was the Alma King, a six-inch, 5.5-pound, perfect rhombohedron of transparent, gem-quality, cherry-red rhodochrosite on a contrasting matrix consisting largely of white quartz needles. The Alma King is valued at more than \$1 million.

Another example of successfully reopening an old mine for mineral specimens is Mexico's famed Ojuela Mine. Although this 414-year-old, silver-lead-zinc-gold mine has not produced ore in decades, professional specimen miners now lease various sections and levels of the mine and continue to recover world-class specimens of adamite, wulfenite, and other minerals.

Other professional specimen miners concentrate on near-surface mineral deposits. Amateur collectors have visited most of these sites for decades and have removed most of the interesting and valuable specimens from the surface. But professional specimen miners lease these properties, then bring in heavy equipment to excavate the deposits to recover valuable specimens that were beyond the reach of the amateur collectors. Recent successes in surface excavation have resulted in many fine specimens of bright, orange-red vanadinite from Arizona's Trigo Mountains, beautiful prisms of sherry-colored topaz from Utah's Topaz Mountain, and deep-blue barite crystals from the Stoneham area of Colorado.

Because these surface localities have not been "proven" by modern mineral-exploration methods, financial risk is high. So, too, are costs. Excavation must proceed slowly to avoid destroying or damaging specimens; after recovery, fragile specimens must be protected and specially packed for transport. One very important factor that can neither be planned for nor purchased is luck. A few feet or sometimes just a few inches can make all the difference between opening—or missing—a crystal-filled pocket that can financially make or break the venture.

Specimen mining in Third World nations is often conducted with primitive methods. In Sakoany, Madagascar, local residents, who have few other employment opportunities, recover celestine geodes from hand-excavated underground workings. In many similar places, specimen mining has great local economic importance. Other nations in which artisanal miners perform extensive manual excavation are Namibia, where recoveries include gem-quality aquamarine, and Malawi, which produces the world's finest aegerine.

In Third World nations, the role of professional specimen miners ends when they sell their recoveries to dealers. But in the United States and other developed nations, the work of professional specimen mining only begins with specimen recovery. Considerable time, effort, and expense must then be invested in sorting, cleaning, and trimming specimens before they can be marketed.

Specimens must also be marketed in a manner that maximizes income, and that requires contacting dealers, advertising, and exhibiting at gem-and-mineral shows, all of which incur additional expenses. Specimen pricing is critical and must be neither so high as to restrict sales nor so low as to minimize or even negate profits. When many specimens are involved, marketing can take years, thus precluding hope of a quick return on the investment.

Professional specimen miners, whether artisanal diggers in Namibia or miners using state-of-the-art exploration equipment in Colorado, together with collective recovery systems in places like China, now provide virtually all the mineral specimens on today's market. While rarity, visual appeal, and mineralogical associations always figure into the price of a specimen, the production costs of professional specimen miners are the main factor in determining a specimen's final retail price.

The next time you visit a gem-and-mineral show and marvel at the thousands of mineral specimens on display, remember that professional specimen miners have invested a great deal of time and work to make them available. And given the risks and costs of specimen mining, it is a wonder that so many beautiful specimens are available—and affordable.

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