

# THE SWEET HOME MINE

## Silver “Failure” To Rhodochrosite Bonanza (1872 – 2022)

### Mount Bross, Alma Mining District, Park County, Colorado

By Ken Kucera

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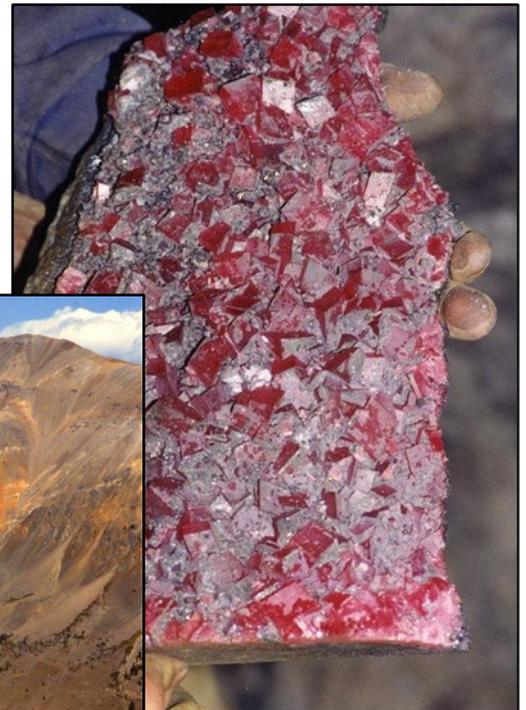
Figure 1 (above): World-renowned rhodochrosite specimens from the Sweet Home mine, Park County, Colorado. Named the Alma Queen (left) - main crystal measures 10 cm; the Alma King (center) – 66 cm tall with main crystal 14 cm on edge; and the Alma Rose (right) - specimen 45 cm tall. Shown on display at the Hardrock Summit 2021 gem and mineral show in Denver, Colorado. (Image credit: Hardrock Summit 2021)

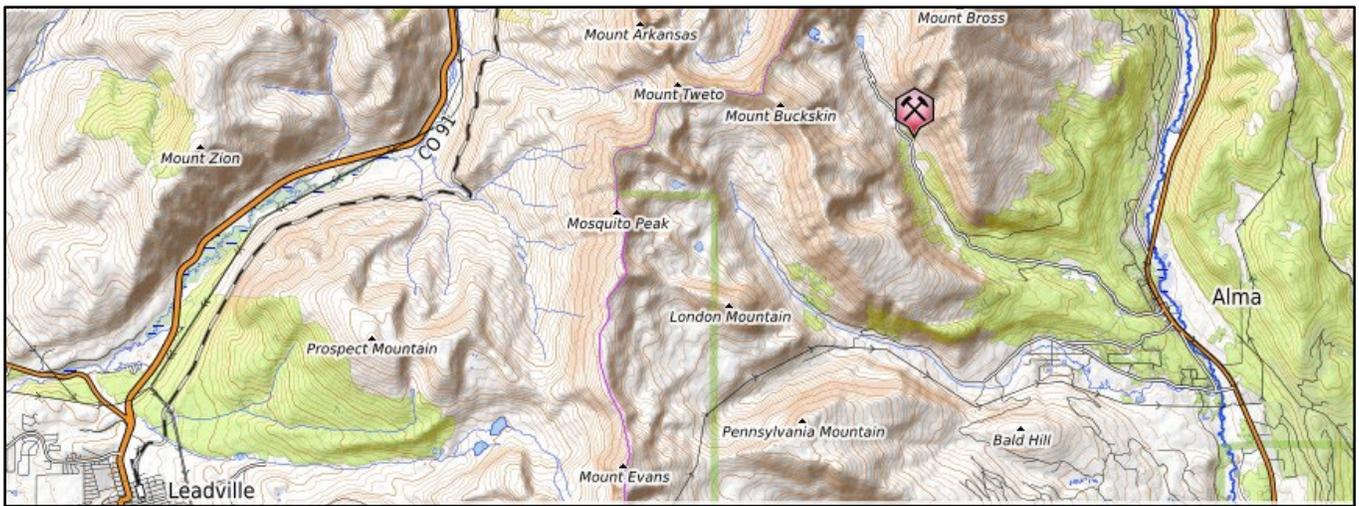
Amazingly beautiful and almost a little intimidating to look at, the Alma King, Alma Queen and Alma Rose rhodochrosite specimens from Colorado’s Sweet Home mine, were one of the main events at the 2021 Hardrock Summit Show at the Colorado Convention Center (See Figure 1). Looking at these pieces with wonder and awe, there was no mistaking the importance of the mine that produced them. For today’s mineral collectors, the Sweet Home mine is one of the best-known mines in the world. The name is synonymous with the finest rhodochrosite in the world and the most important Colorado rhodochrosite producer since 1895. And as it turns out, the Sweet Home also has one Colorado’s most interesting mining stories.

Figure 2 (near right): Mt. Bross with mineralized outcrops (yellow-brown). Sweet Home mine dumps are at lower-center of image, dated 1992. (Image credit: Chauncy Waldron)



Figure 3 (far right): Plate of rhodochrosite crystals being removed from the Four Ball Pocket, Sweet Home mine. (Image credit: Collector’s Edge, Inc.)





**Figure 4 (above): Location of the Sweet Home mine (red mine symbol at upper right) at the southern base of Mt. Bros, about 3.8 miles northwest of Alma, Park County, Colorado. (Image credit: MINDAT)**

## Introduction

The famous Sweet Home mine lies in the Alma Mining district on the eastern slope of central Colorado's rugged Mosquito Range. The Alma district, near the headwaters of the South Platte River, is one of North America's highest mining districts. The district includes steep terrain having several 14,000-foot peaks with most of its mines at or well above the 11,300-foot timberline. The Sweet Home is one of the district's lower elevation mines, with its portal at about 11,600 feet (3,536 meters), located near timberline in Buckskin Gulch on the southern slope of Mt. Bros. The mine is sandwiched between an area of silver-bearing mines flanking Mt. Bros to the north and gold-producing mines to the south. It is about 3.8 miles (6 km) northwest of Alma along county road 8, Park County, Colorado, and 80 miles (128 km) southwest of Denver. See Figure 4.

In 1871, prospectors discovered the mineralized silver-bearing outcrops on Mt. Bros, northwest of Alma, that would become the Sweet Home mine. The Sweet Home (first known as the "Home Sweet Home" mine) was staked in 1872. It holds two of the earliest U.S. mining patents - No. 106 and 107 - granted under the General Mining Law of the same year. The mine was operated intermittently for silver until about 1966 – almost 100 years. An extensive network of tunnels were driven trying to exploit the mine's silver resources. During much of that period, the mineral rhodochrosite was regarded as something of a nuisance, most of it having little value and much of it was discarded on the mine dumps.

However, some fine crystalline rhodochrosite specimens from the Sweet Home mine were reportedly collected and sold as early as the 1870's. But it was not until 1925 that a profitable silver stope was found, but more importantly, a major discovery of fine rhodochrosite was also made. After 1925, museum curators around the world recognized the Sweet Home mine as a leading source of fine rhodochrosite. Early specimens from the mine went to the Smithsonian Institution and major museums in England, Germany, Sweden and Switzerland.

"High-grading"- the illegal or unauthorized removal and sale of ore and/or mineral crystals - would play an unexpectedly prominent role in the Sweet Home's future. It was not a problem back in 1925, because folks of the day had yet to fully understand the quality or potential value of Sweet Home rhodochrosite. People caught on and so did high-grading, taking the mine's development and production down a different path from its silvery origins.

**The Sweet Home mine was at best, a marginal silver producer in Colorado. Its low silver output would have relegated it to the lengthy list of obscure and abandoned Colorado mines, had it not been for a quirk of geology that produced the finest rhodochrosite in the world.**



Figure 5 (above): Part of the astounding six-foot wall of beautiful, vivid-red rhodochrosite crystals on matrix reconstructed from actual plates of crystals from the Sweet Home mine. The wall is in the Coors Gems and Minerals Hall, Denver Museum of Nature & Science. Museum staff worked for over 12 months to recreate this amazing sight. (Image credit: Desert Winds Gems and Minerals website)

The value of rhodochrosite specimens produced at the Sweet Home mine and its sister operation the “Detroit City portal at the Sweet Home mine”, probably exceeds \$100 million. (Wenrich and Lees, 2022).

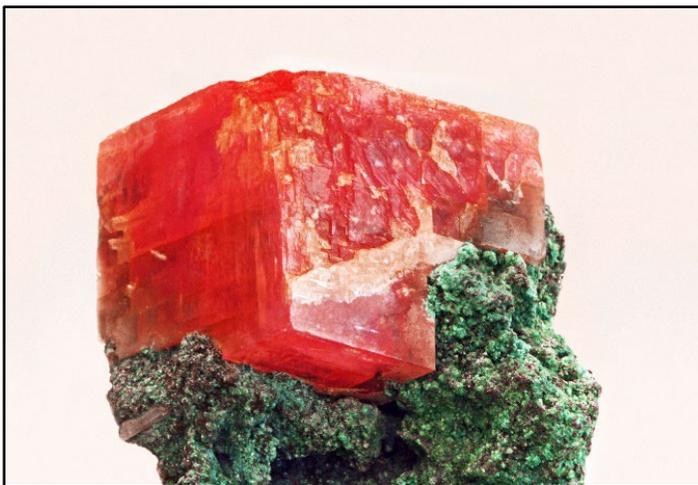


Figure 6 (above): Beautifully contrasting rhodochrosite on malachite. Sweet Home mine, Park County, Colorado. Dimensions 4.5 cm x 2.5 cm. CSM Museum of Earth Science collection, catalog #54083.

The Mines Museum of Earth Science spotlights the Sweet Home by having important mineral specimens from the mine on display for the education and enjoyment of visitors. See Figures 6, 7 and 8 below.

The world-famous suites of minerals from the Sweet Home mine are known for their fine crystals. In addition to beautiful rhodochrosite, other fine Sweet Home mineral specimens on display include: hubnerite, tetrahedrite-tennantite, fluorite (in aesthetic dodecahedral or cubic crystals of lavender or sky-blue color), pyrite, and the elusive goyazite/“svanbergite”.



Figure 7 (left): Gemmy rhodochrosite and tetrahedrite with quartz. Sweet Home mine, Park County, Colorado. Dimensions 12.5 cm x 14 cm. CSM Museum of Earth Science collection.

Figure 8 (below): Rhombohedral crystals of rhodochrosite on acicular quartz. Sweet Home mine, Park County, Colorado. Dimensions NA. CSM Museum of Earth Science collection.



## Rhodochrosite – To Many, the Most Beautiful of All Minerals

In 1813, rhodochrosite was first described by J. F. L. Hausmann, using specimens from Kapnik, Transylvania. Around 1834, Franz Mansfeld is credited with introducing North America and Europe to so-called "Inca Rose," the massive rhodochrosite found in large quantities in Argentina's Catamarca Province (Shaub, 1972). The area was reportedly once worked by the Incas for silver and copper (Webster, 1975). Mansfeld hoped to sell large quantities of Catamarca rhodochrosite to institutions of arts as a carving material. Although his efforts to integrate rhodochrosite into the arts were unsuccessful, he did popularize the massive form of the stone (Shaub, 1972).

Rhodochrosite, a manganese carbonate ( $Mn^{2+}CO_3$ ), is one of the most desirable mineral species by museums and collectors alike. Along with amazonite, it is one of the most recognized and coveted of Colorado minerals.

Rhodochrosite belongs to the calcite group of minerals, a group of related carbonates that are isomorphous with one another. They are similar in many physical properties, and may partially or fully replace one another, forming a solid solution series. (For example, with an increase in iron by isomorphous replacement of manganese in its structure, rhodochrosite becomes closer in composition to the calcite group mineral siderite.) All members of the calcite group crystallize in the trigonal system, have perfect rhombohedral cleavage, and exhibit strong double refraction.

**Rhodochrosite's name is of Greek origin and translates to rose color ("rhodos" being rose and "khros" being color). It is also known by names such as Manganese Spar, Raspberry Spar, and even Inca Rose (Rosinca and Rosa del Inca). It acquired this name as the Inca believe that the stones are the petrified blood of beloved ancient rulers.**

Rhodochrosite will crystallize mainly in rhombohedral and scalenohedral forms.

Until the late 1800's, most of the rhodochrosite produced in the world was generally a pink, opaque massive material, usually fashioned into cabochons, beads, or ornamental carvings. The world would see some different, strikingly beautiful types of rhodochrosite with the opening of Colorado's mining districts.

## Colorado's Contribution To The Rhodochrosite "Elite"

In contrast to rhodochrosite's common light-pink, massive gangue mineral occurrences, Colorado boasts some remarkable localities having pink to intense red crystals considered among the world's finest. Rhodochrosite is relatively common in a number of Colorado mining districts and occurred in large quantities in a few of these, particularly in the mines of the San Juan Mountains in the southwestern part of the state. In Colorado, it occurs primarily in gold- and silver-bearing sulfide veins associated with molybdenum, and in occasional replacement deposits.

Fine gem-quality, single-crystal rhombohedral or scalenohedral forms of rhodochrosite are relatively rare world-wide. Mining in Colorado ore deposits changed this. (See Figures 9 – 13 below.) In 1887, Dr. George F. Kunz of *Tiffany & Company* reported finding gem-quality rhodochrosite in Colorado, stating that it was "the first locality to yield crystals of such magnitude and transparency" (Kunz, 1887). In 1987, a specimen of Sweet Home rhodochrosite acquired by Bryan Lees of *Collectors' Edge Minerals, Inc.*, was accompanied by a label from the American Museum of Natural History that traced the crystal specimen back to a donation to the museum by Tiffany and Company during the 1890s.



Figure 9 (left): Gemmy, rhombohedral crystal of rose-colored rhodochrosite, from the 600 level, Climax mine, Climax-Alicante District, Lake County, Colorado. Dimensions 5.5 cm x 3.5 cm. CSM Museum of Earth Science collection, catalog #81.96

Figure 10 (left below): Vibrant pink, flattened rhodochrosite rhombohedra (almost discoidal in shape) from the Eagle mine, Gilman district. Eagle County, Colorado. Dimensions NA. CSM Museum of Earth Science collection, catalog #82.61.

Figure 11 (below): Fine specimen of rhodochrosite on green fluorite from the Eagle mine, Bonanza District, Saguache County, Colorado. Ex-CSM Museum of Earth Science collection. (This specimen was unfortunately stolen from a State Capital Building display several years ago and never recovered.)



By the late 1800's, Colorado had developed into a significant source of fine, crystalline rhodochrosite specimens for both museums and collectors. The Colorado Mineral Belt (COMB) – a large, elongated, and highly mineralized region traversing diagonally across the state from Boulder County in the northeast down to the San Juan Mountains in the southwest – was the heart of rhodochrosite country. Rhodochrosite specimens have been found in COMB's mining districts in crystals as large as six inches on edge. These crystals can be associated with quartz, galena, chalcopyrite, calcite, fluorite, sphalerite, and pyrite, as well as less common minerals like tetrahedrite, gypsum, and hubnerite (Kelley, 1946), (Muntyan, 1984 and 1990), (Muntyan and Muntyan, 1988 a-b), (Eckel et al, 1997).



Figure 12 (above): Rhodochrosite with large, deep rose-colored rhombohedral crystals from the Moose mine, Central City District, Gilpin County, Colorado. Dimensions 28.5 cm x 18 cm. CSM Museum of Earth Science collection, catalog #81.74.

Many of the best rhodochrosite specimens from the state were recovered many years ago during active mining operations in certain districts. (See the Appendix at the end of this article for a list of some of the more important Colorado localities for fine specimens of well-crystalized rhodochrosite.) Most of these mines are now closed and inaccessible. The exception being the rhodochrosite specimen mining operation by Bryan Lees and *Collector's Edge, Inc.*, presently working the Sweet Home mine at the "Detroit City portal at the Sweet Home mine".

The Sweet Home mine has been a prime producer of rhodochrosite in Colorado since 1895 (Jones, 1986). According to John Sinkankas (Sinkankas, 1997), the mine is "known worldwide for its unmatched crystals of transparent, vivid-red rhodochrosite. . . ."



Figure 13 (above): Beautiful deep-pink, rhombohedral crystal of rhodochrosite on druzy white quartz matrix. Sunnyside mine, Gladstone, Eureka District, San Juan County, Colorado. Crystal dimension about 1.5 cm on edge. CSM Museum of Earth Science collection, catalog # NA.

## Chronicle of the Sweet Home Mine: Silver "Failure" to Rhodochrosite Bonanza 1872 – 2022 (The Sweet Home's 150th Anniversary)

The Alma mining district was opened in 1861, when prospectors found placer gold in creeks of the headwaters of the South Platte River. Lode mining quickly became popular when miners learned that numerous thin, gold-bearing quartz veins were networked through the bedrock of Buckskin Gulch. Both the placer and quartz-vein gold deposits were rich and were quickly mined out. By 1864, the Alma mining district was largely abandoned.

In 1871, prospectors discovered silver mineralization in out-crops just below the summit of Mt. Bross and staked the Moose mine. More silver discoveries followed and soon the town of Alma was established as the district's trade center for mining supplies.

That same year, more silver out-crops were found just above Buckskin Gulch near the boulder field that formed the lower talus slope of Mt. Bross. The out-crops would become the Sweet Home mine. Ag-Pb mining began in 1872 (Wenrich and Lees, 2022). The initial claims of the mine – the Sweet Home and Pelaski lodes – measured a surprisingly narrow 50 feet by 3,000 feet. They were assigned patent numbers 106 and 107, respectively, making them among the earliest patents granted under the General Mining Law of 1872. See Figure 15 below.



Figure 14 (above): Hand-hewn arrastra in Buckskin Gulch, near Alma, Park County, Colorado. This arrastra is from the early days of lode-gold mining in area. An arrastra is a simple mill for grinding and pulverizing (typically) gold or silver ore. Its simplest form is two or more flat-bottomed drag stones placed in a circular pit paved with flat stones and connected to a center post by a long arm. With a horse, mule or human providing power at the other end of the arm, the stones were dragged slowly around in a circle, crushing the ore. Some early arrastras were powered by a water wheel. Image credit: Denver Public Library digital archives.

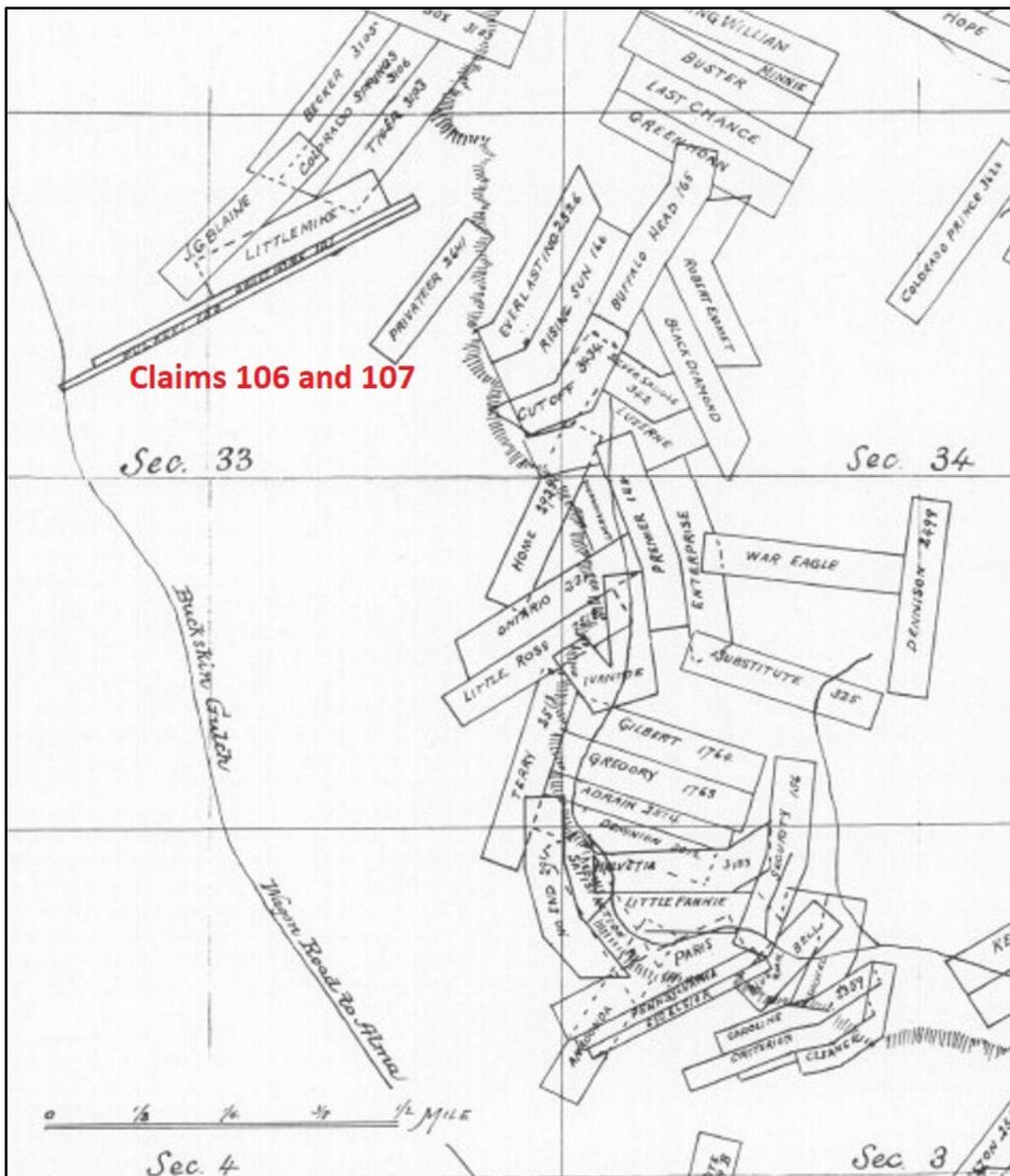


Figure 15 (left): Map of mining claims in the Alma district circa 1890. The early, silver-producing Sweet Home mine is represented by the long, narrow pair of claims (106 and 107) noted in red font. Note configurations of other claims as contrast. Image credit unknown.

Where veins of the Sweet Home claims had silver-mineralization, they were relatively rich, but also thin and erratic. Early development and production records are difficult to find. The Sweet Home mine was reported to be at best, a marginal producer of silver (Voynick, 1998).

### **Elusive, Attractive Crystals and Fragments of Rhodochrosite**

In spite of its unremarkable silver output, there appeared to be a “silver lining” of sorts. Miners did note an unusual presence of rhodochrosite as a gangue mineral, in both massive form and deeply colored, attractive euhedral crystals. The beautiful crystals drew attention from a federal mineralogical report in 1876, that stated: “Rhodochrosite, Sweet Home mine, Park County, very beautiful specimens” (Endlich, 1878).

It has been reported that Sweet Home rhodochrosite specimens were known, collected, and sold as early as the 1870’s. European and American museums own rhodochrosite specimens matching the mineralogy of Sweet Home specimens collected in its contemporary mining period. These early specimens are cited only as “Alma” or “Colorado”, but likely came from the Sweet Home (M. Rausch, personal communication with S. Voynick, 1995).

Mining in the Alma district was very challenging. Poor roads, tough winters, high elevations, and rugged topography, all combined to make mining difficult and dangerous. This didn’t seem to matter all that much and by 1878, mines high on Mount Bross and Mount Lincoln, like the Moose, Russia, and Dolly Varden mines, had produced more than \$3,000,000 in silver (Voynick, 1998).

But economic trouble was looming by the late 1880’s, as silver prices started to crater. A national silver glut was created by booming silver production in the western states, to which the Alma district contributed. Congress passed the Sherman Silver Purchase Act of 1890, which supplanted the Bland-Allison Act of 1878, to prop up tanking silver prices. Federal subsidies supported the price of silver at about \$1.00 per troy ounce. In 1893, the silver market collapsed to 60 cents per troy ounce when Congress repealed the Sherman Act. By then, most silver mines in western states had closed, including those in the Alma district.

By about 1893, after roughly twenty years of off-and-on operation, the Sweet Home mine closed. It reportedly had shipped an estimated \$185,000 in ores containing silver, lead, copper, and a small amount of gold. It is unlikely the mine ever earned a consistent profit on this ore, after accounting for mining, shipping, and smelting costs (Beeler, 1933).

Efficient management of early Sweet Home mining operations didn’t seem to be a high priority. Commenting on the nature of early mining in the Sweet Home and other Alma district mines, Beeler wrote in 1933: “That these ores were sometimes almost unbelievably rich, there can be no doubt. And there is no doubt as to the haphazard manner in which they were mined and the product scattered, often leaving no record except a local legend of what had been found.”

In 1912, a Colorado State Geological Survey Bulletin seems to confirm the early richness of Sweet Home ores. The report stated ice and caving prevented a complete survey of the mine, but four-silver ore samples taken from tailing dumps assayed between 43 and 193 ounces of silver per ton of ore. The report also stated the presence of “manganese spar” or rhodochrosite (Patton, Hoskin, and Butler, 1912).

In 1915, as World War I industrial demands increased base-metal prices, there was a mining revival in the western states, as well as in the Alma district. The Sweet Home mine reportedly was not one of the district’s metal producers during the war.

### **Edwin C. Spray Makes His Presence Felt**

Documentation of mining operations finally began in 1922 with a Denver businessman named Edwin C. Spray. He became a stockholder in the Sweet Home Gold and Silver Mining and Milling Company and would later become the owner of the Sweet Home claims group.

The Silver “Pittman Act” of 1922 restored the price of silver to \$1.00 per troy ounce and provided a stimulus to reopen the Sweet Home to exploration and development. (The federal Pittman Act required that the amount of silver dollars turned into bullion, would require an equal amount of new bullion be purchased from American silver mines. Silver purchased from American mines would be at the fixed price of \$1.00 per troy ounce, which was above market rate. This benefit to the American mine owners was essentially a federal government subsidy to the silver industry.) Limited metal production at the Sweet Home began in 1924 and continued intermittently through 1929. It was reported that miners conducted all mining work through a newly driven tunnel – the present Sweet Home tunnel or adit.

During the period 1924 – 1929, it was reported that miners extended the Sweet Home tunnel and several crosscuts by 1,626 feet. The operation shipped 360 tons of hand-cobbed ore having a value of about \$30,000 to a nearby mill and smelter in Leadville. Most of this production occurred during 1925, when a single stope produced about 16,000 troy ounces of silver (Voynick, 1998). This is the most silver production recorded from the mine.



The year 1925 should be noted not only for some silver production, but also for a major discovery of rhodochrosite. “Crosscut No. 1 was run east for a total of 442 feet, with three short drifts. The main interest of this work was the remarkable showing of rhodochrosite found at intervals” (Beeler, 1933). Miners recovered matrix plates with fine, gemmy rhodochrosite crystals. Beeler noted: “This material was specimen ore and much of it was sold to curio dealers and for museum exhibits, one lot in particular going to the Institute of Plant Research, at Yonkers, New York.”

Figure 16 (left): Mine crew at the Sweet Home portal with ore samples, circa 1922. Image credit unknown.

It was reported that owners of the Sweet Home sold at least two lots of fine rhodochrosite crystals from the 1925 find. (One of these lots sold for \$900 to Denver mineral dealer Arthur Pohndorf – about the price of a starter home at the time!) These lots included several large, 24-inch matrix plates with showy, gem-quality rhombohedrons of rhodochrosite on beds of clear acicular quartz. Some specimens went to the American Museum of Natural History (part of the Smithsonian) and were exhibited at the French Natural Museum in Paris by J. P. Morgan. After 1925, the Sweet Home mine was acknowledged by museum curators as a leading producer of fine rhodochrosite.

“High-grading” – the illegal or unauthorized removal and sale of valuable minerals – was a problem at Colorado gold mining operations. Not at the Sweet Home mine. In 1925, no one yet fully understood the potential value of rhodochrosite from the Sweet Home, but that would change.

After 1925, silver production cratered and the Sweet Home started losing money again. Mining operations remained active only because the owner Edwin Spray was an optimist, yet he was also considered a “pigeon” by local Park County miners. Spray continued to bank-roll its operation and miners, in spite of rarely visiting the mine.

**Fine rhodochrosite specimens from the 1925 discovery at the Sweet Home went to the American Museum of Natural History, as well as major museums in France, Switzerland, Germany, Great Britain, and Sweden.**

From 1922 to 1929, Spray progressed from the Sweet Home’s major shareholder to Vice President to sole owner. He did this by acquiring the Sweet Home Gold and Silver Mining and Milling Company, Inc., a piece at a time. In 1929, Spray gained full control by purchasing the few remaining outstanding shares through a sheriff’s sale at the Fairplay courthouse. In years following, Spray’s company acquired the adjacent Grover Cleveland, Niagara Lode, Winnie, and Bushwacker claims. This would bring the count to the current 195-acre plat of 19 claims. See Figure 17 below.

<i>Claim Name</i>	<i>U.S. Mineral Survey No.</i>	<i>Claim Name</i>	<i>U.S. Mineral Survey No.</i>
Sweet Home Lode	106	Kasel Lode	20,504
Pulaski	107	Silent Friend Lode	20,504
J. G. Blaine	766	Social Fund Lode	20,504
Magnet	6437	Spray Lode	20,504
Grover Cleveland Lode	7278	Wedge Lode	20,504
Winnie Lode	7288	Blue Bird Lode	20,507 A
Detroit City	8413	Daniel Lode	20,507 A
Enterprise	8413	Sweet Home Fraction	20,507 A
Crackerjack Lode	20,504	Bushwacker	20,591
		Niagara Lode	20,591

**Figure 17 (left):** List of mining claims representing the present-day Sweet Home mine property.

**Figure 18 (below):** Image of Sweet Home mine outbuildings (including one very bored dog in the foreground), circa 1933. Image credit unknown.



Production of Ag-Pb ore at the Sweet Home was small-scale and erratic during the 1940’s and 1950’s. The mine was reportedly closed during the first part of the World War II years. Ore shipments were made to the Resurrection Mill in Leadville in 1945. Lessees periodically shipped small amounts of hand-cobbed silver ore through on-and-off exploration and mining in 1948, 1955, 1960, and from a consequential lessee in 1963 (Holmes and Kennedy, 1983). Along the way, lessees would also collect rhodochrosite specimens and cleavage fragments, which they reportedly would trade for “adult beverages” in local Alma bars.

Douglas Brothers, a small mining development company, leased the mine in 1963. Mining activity would start to pick up. The company speculated the stope that had produced 16,000 troy ounces of silver back in 1925 (the stope had collapsed since that time), still had high-grade silver ore on the other side of the collapsed area.

A young, summer mine worker at the Sweet Home named Hershhal Ellyson, was the grandson of Clarence Douglas, one of the lessee company’s principals. Hershhal was a high school student with an interest in rhodochrosite and geology. He reportedly studied a Sweet Home mine map from the 1920’s that showed where a rich seam of rhodochrosite had been found but never recovered. Hershhal speculated there were additional seams or pockets containing rhodochrosite.

**F. Leonard Beach – Mining at the Sweet Home Was About To Change**

Meanwhile, mine ownership was changing. Clarence Douglas died in December 1964, while Edwin Spray died in February 1965. Spray willed the entire Sweet Home property to his widow Eleanor Spray, who in turn, passed the property to her nephew, F. Leonard Beach.

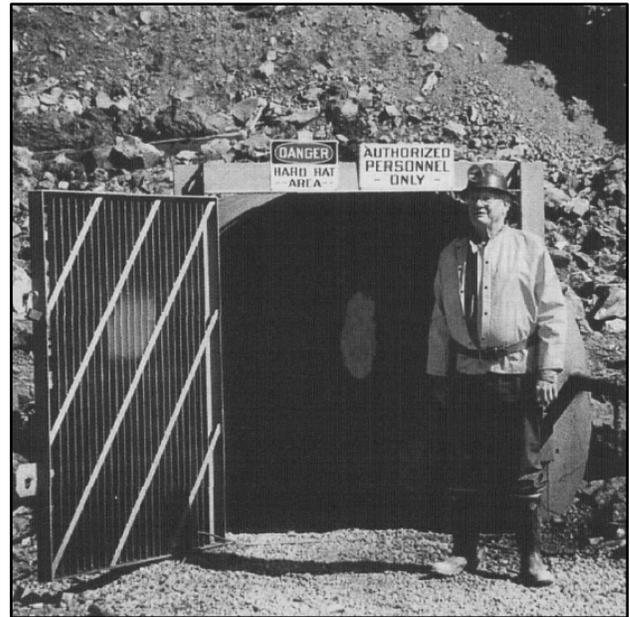
Remember the high-schooler Hershhal Ellyson and his theory about more rhodochrosite in the Sweet Home? A Texas contractor named John Soules did. Soules had dumped most of his savings into the Douglas Brothers’ silver lease venture at the Sweet Home. Following a failed exploration effort for silver, he decided to move to Alma to try and save his investment by looking for deposits of rhodochrosite crystals. He had become aware of both the increasing value of

specimen rhodochrosite and young Ellyson's theory that there was more valuable rhodochrosite to be found. Soules decided to roll the proverbial dice and gamble his remaining capital to test the theory and save his investment.

**Figure 19 (right): Leonard Beach at the portal of the Sweet Home mine in 1992. Image credit: Moore, Lees, Wenrich et al, 1998.**

Soules and a contract miner named Warren Good explored the area where the miners credited with the 1925 silver discovery had stopped. They found a small crystal-filled pocket. In this pocket, they recovered a dozen fine rhodochrosite crystals. The best of which was a showy two-inch gemmy rhombohedron associated with blue-fluorite crystals. Of course, they wanted more.

In the fall of 1965, after John Soules took a trip to Texas, events at the Sweet Home become muddled due to lack of information. Soules left the Sweet Home operation inactive, or so he thought. When Soules returned to Alma on a weekend trip six weeks later, apparently Good had been free-lancing and found a new, spectacular rhodochrosite pocket. Can you say "high-grader"?



Evidently, only Soules and a few others ever saw this pocket. Leonard Beach - the mine owner at the time - said that Soules described it as seven-feet high, four-feet deep, and two-feet wide. Said Soules, "Boy, there were some beautiful crystals in there. Talk about a beautiful sight. The way I was looking in, they looked as thick as could be. There could have been hundreds of rhodochrosite crystals in there. Some of them very large. The entire cavity was just studded with crystals" (Voynick, 1998).

In early 1966, Soules headed back to Texas and six weeks later returned again to Alma. He learned that Good had cleaned out this entire pocket in a three-week period. Good claimed he decided to market the specimens himself and later divide the revenue with Soules (Jones, 1993). Beach stated that Soules never received a payment and that Good had high-graded the entire pocket (Beach, unpublished prospectus, 1988).

This high-graded pocket was reportedly the location of the world-famous rhodochrosite specimen later named the "Alma Queen" by Dr. Peter Bancroft. In 1973, Bancroft authored the book titled "The World's Finest Minerals and Crystals", a pictorial collection of 78 minerals selected by a distinguished panel of mineral experts as the best of their species. The book's cover featured none other than the Alma Queen, also known then as the "Bancroft Rhodochrosite".

### **The Ultimate In High-Grading – The Alma Queen**



**Figure 20 (left): The venerable Alma Queen rhodochrosite (main crystal measures 10 cm) was found in 1966 by John Soules and Warren Good at the Sweet Home Mine. The specimen played the role of nomad by being in numerous different collections. In 1986, it found its way to the Houston Museum of Natural Science. It was apparently damaged while being moved in the museum, but luckily for mineral aficionados everywhere, it was able to be repaired. The Alma Queen was estimated to have had a value of \$250,000 back in 1990 (Wenrich and Lees, 2022). Now? Image credit: Fine Mineral Gallery.**

**John Patrick, one of the world's premier mineral collectors of the time, described the "Alma Queen" as the finest mineral specimen in the world.**

One of the first individuals to find out about Warren Good's rhodochrosite was "unconventional" mineral dealer Ed McDole. McDole used the trunk of his Lincoln Continental as a mineral showroom of sorts, dealt only in cash, and followed a loose circuit around the country visiting mineral shows and dealers. McDole's persona was unmistakable, as described by friend Robert Eveleth (Eveleth, 2011)... "His trademark long-sleeved white shirt with rolled cuffs, black pants, a permanent cigar firmly lodged in one side of his mouth (in contrast to his pronounced bushy eyebrows) and set off by a rolex complete with gold nuggets laid in the watchband." He is believed to have purchased numerous fine rhodochrosite specimens recovered in 1966 by Good (Voynick, 1998). McDole displayed some of them to dealers in his flamboyant fashion, drawing more attention to the Sweet Home mine.

There seems to be at least two conflicting accounts about how the Alma Queen was initially acquired and started its circulation in the mineral world...

- Denzel Wiggins, Denver rock-shop owner, got wind of a superb rhodochrosite found by Soules/Good - the later named Alma Queen - and reported to Denver mineral dealers George Robertson and Merle Reid that it was available for purchase. They immediately drove to Alma on a Saturday afternoon and bought the prize from Good for \$2,500 in cash (Voynick, 1998).
- A miner from the Sweet Home was visiting a local bar and sold a group of fine rhodochrosite specimens to Willard "Bill" Roberts, at the time, curator of the South Dakota School of Mines Museum. One of these specimens was later acquired by Dr. Peter Bancroft and became known as the "Bancroft Rhodochrosite" and Alma Queen (Muntyan, 2000).

For now, let's go with the first account. Warren Good, after selling the Alma Queen and now flush with cash, reportedly said good-bye to his wife and family. Accompanied by his girlfriend, Good left Alma and was never seen again.

The first public viewing of the Alma Queen was a legendary event at the 1967 Las Vegas Gem & Mineral Show. The piece attracted the attention of such top mineral collectors as John Patrick, Rock Currier, and Dave Wilber. A very impressed Patrick described the Alma Queen as "the finest mineral specimen in the world".

Several months later, Peter Bancroft came to Denver to examine the Alma Queen. Bancroft was determined to own it. He worked out a trade with dealers Robertson and Reid, taking the Queen in return for specimens of Bolivian phosphophyllite, a mineral species that was at the time, more desirable than rhodochrosite. The value of the trade was estimated at \$6,500 (Voynick, 1998). Bancroft then named the fabulous rhodochrosite specimen the "Alma Queen".

Over the following ten years, the Alma Queen would change hands several times. Dave Wilber purchased a large part of the Bancroft Collection, primarily to acquire the Alma Queen. In 1979, Wilber then sold it to Ed Swoboda in a cash-trade deal that involved \$185,000 and a Rolls-Royce. In 1982, Swoboda sold the Queen to Texas oilman Perkins Sams. Unfortunately for Sams, oil prices had begun collapsing in 1981 and Sams was forced to liquidate his material assets. In 1984, he sold his entire mineral collection, including the Alma Queen, to the Houston Museum of Natural Science. It remains a prominent part of the Houston Museum of Natural Science collection.

### **Meanwhile...Back at the Sweet Home**

With the exceptional rhodochrosite specimens coming on the mineral market in 1966, the Sweet Home was marked as the world's leader in production of fine rhodochrosite. Was the mine still a silver mine, or should it be operated as a specimen mine for rhodochrosite?

**It is not surprising that some consider the mining, recovery, and sale of the 1966 Sweet Home rhodochrosites, including the legendary Alma Queen, as one of the more famous (or infamous) cases of high-grading in mining history.**

**Richard Kosnar was the first to operate the Sweet Home mine specifically for finding rhodochrosite, not silver ore.**

This acclaim attracted the attention of new types of high-graders. Most were "rockhounds", content to scour the Sweet Home mine dumps for small iron-stained, abraded matrix specimens and cleavage fragments. Some high-graders, however, were considerably more ambitious and found their way underground to explore and mine for specimens.

In 1977, Beach leased the Sweet Home to mineral dealer Richard Kosnar, who had partnered with John Saul, to form the Intercontinental Mining Corporation (Sinkankas, 1997). They found abundant mineralization, including massive rhodochrosite and several productive pockets of rhodochrosite crystals. It was reported that Kosnar bought back numerous Sweet Home specimens from high-graders, including 1-cm tetrahedrite crystals, ruby-red to dark brown hubnerite crystals, twinned stromeyerite, and attractive crystals of blue fluorite, and orange goyazite (Bancroft, 1984).

In 1980, the Sweet Home was leased to AMAX Exploration, the exploration branch of the mining giant AMAX Inc., for molybdenum exploration. Buoyed by high molybdenum prices, AMAX was aggressively seeking molybdenum properties, including the Alma district. Property acquisition, possibly followed by large-scale mining would have destroyed the Sweet Home mine. The reprieve for yet undiscovered, fine rhodochrosite specimens came in late 1981. After the price of molybdenum cratered, AMAX allowed the Sweet Home lease to expire.

For Leonard Beach, owning the Sweet Home mine meant dreaming of rhodochrosite as its financial savior - the "pot at the end of rainbow". He had maintained for many years that the Sweet Home had many fine rhodochrosite specimens just waiting to be found. Since the mid-1960's, by distributing a mining prospectus and giving lectures, Beach had kept his dream alive.

The mine had also become a real-world education for Beach. As old portal timbers collapsed, the tunnels were not repaired in hopes of curtailing the constant high-grading. In 1977, Beach started learning the basics of hard-rock mining in the Kosnar operation and started to see a future for the mine not linked to molybdenum or silver ore. In the 1980's, when it was becoming obvious that specimen mining for rhodochrosite was the Sweet Home's future, Beach learned mineralogy and mineral collecting basics.

#### **Bryan and Kathryn Lees, Marty Zinn, Gene Meieran et al, and *Sweet Home Rhodo, Inc.***

In 1987, Beach began to earnestly market the Sweet Home property as a stand-alone specimen mining operation, not as a silver mine. In 1991, *Sweet Home Rhodo, Inc.* - a consortium of investors led by Bryan and Kathryn Lees of *Collector's Edge Minerals, Inc.*, in Golden, Colorado, and including Marty Zinn, Gene Meieran and John Lucking - were intrigued by Beach's concept of stand-alone specimen mining, so they agreed to lease the property.

**Figure 21 (right):** The largest rhodochrosite crystal ever found at the Sweet Home mine – the Alma King, was found in 1992. The specimen measures 66 cm tall and the main crystal is over 14 cm on edge. The matrix is acicular quartz sprinkled with purple fluorite. The piece took three months of work to prepare for display. It currently resides at the Denver Museum of Nature & Science. Image credit: Hardrock Summit 2021.



The consortium invested a reported \$300,000 to lease and rehabilitate old mine infrastructure to start production (Wenrich and Lees, 2022). Specimen mining for cherry-red, gemmy rhodochrosite was the objective. Mining is a tough proposition and *Sweet Home Rhodo, Inc.*, ran out of money after about 18 months. By borrowing more money, they were able to continue mining and found pockets with “museum-grade” rhodochrosite, along with beautiful fluorite, tetrahedrite-tennantite, sphalerite, pyrite and hubnerite.

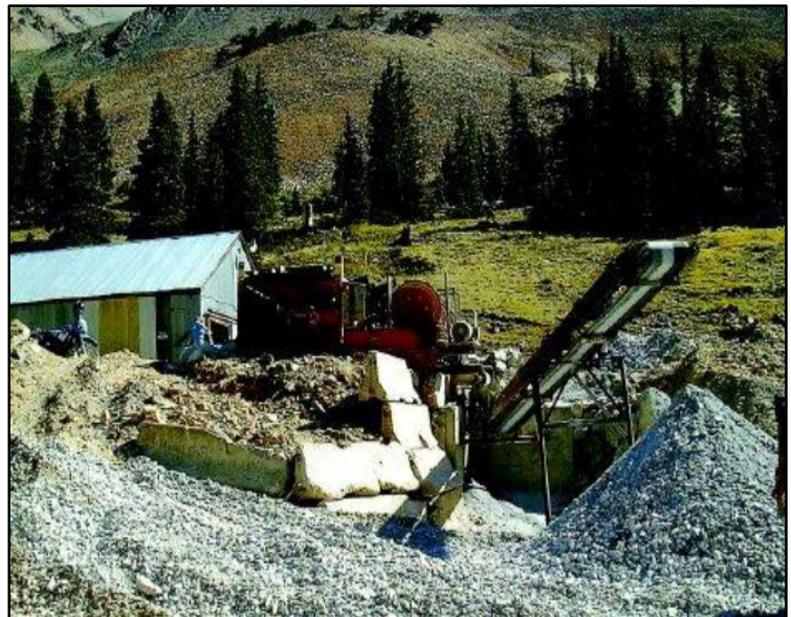
Persistence pays! In 1992, the Sweet Home produced the largest rhodochrosite single crystal specimen known from the mine – the legendary Alma King, a jaw-dropping 14.25 cm (almost 6 inches) on a side. The Alma King is perched on an acicular quartz matrix 66 cm (more than 2 feet) in length, sprinkled with purple fluorite crystals. (See Figure 21 above.) The Coors Foundation later bought the Alma King and donated it to the Denver Museum of Nature & Science for display.

In 1998, just before the death of Sweet Home mine owner Leonard Beach, Lees negotiated the purchase of the mine (Muntyan, 2000). Production from Lees’ rhodochrosite operation would come from two projects: the old Sweet Home mine workings and its later extension called the “Detroit City portal at the Sweet Home mine”. The bulk of the specimens were recovered through the old Sweet Home workings from 1991 through its closure in 2004. From 2016 to the present, a smaller amount of quality rhodochrosite would be found through the Detroit City portal.

**Figure 22 (right): Sweet Home mine operation in 2002. Image credit: Summit Daily newspaper, 2002.**

### **The Detroit City Portal at the Sweet Home Mine**

The Detroit City project was launched in 2016, based on geologic research by staff of the Sweet Home. The research suggested that the intersection of multiple faults created a zone which was likely to contain rhodochrosite-bearing pockets directly above and behind the old Sweet Home mine ‘main raise’ workings. *Collector’s Edge Minerals, Inc.*, decided to undertake this new specimen mining venture by driving a tunnel 200 vertical feet above the old Sweet Home mine portal. The new tunnel would target the Sweet Home Main Vein that had hosted so many beautiful pockets of rhodochrosite and associated minerals.



There were geological reasons to believe that the quality, color, and size of rhodochrosite crystals found in the Detroit City portal would be similar to those found at the old Sweet Home mine. However, admittedly there was always the possibility that different types and quality of crystallized rhodochrosite or other minerals would be encountered. Some beautiful rhodochrosite specimens were indeed found early on, but since 2019, most of the rhodochrosite has occurred as massive material in veins lacking vuggy openings for the growth of crystals (Wenrich and Lees, 2022).

The old Sweet Home mine operation generally produced higher quality rhodochrosite specimens than the newer Detroit City Portal project. The suitability of matrix for rhodochrosite crystal growth was an important difference between the two mining operations. In the old Sweet Home mine, most rhodochrosite crystals were attached to quartz in open areas of veins, forming a conducive matrix for spectacular crystal growth. In contrast, much of the Detroit City’s rhodochrosite is situated on sulfides (Wenrich and Lees, 2022). This tends to crumble, leaving crystals with little, or even the absence of good matrix for growth.



Figure 23 (left): Pyrite and pink rhodochrosite from the Detroit City Portal at the Sweet Home Mine in 2020. An example of Portal rhodochrosite situated in sulfides. Image credit: Collector's Edge Minerals, Inc., website.

What about the cumulative value of all that superb rhodochrosite mined at both Sweet Home operations? To date, this probably exceeds \$100 million dollars (Wenrich and Lees, 2022). The mine is clearly the world's finest source of rhodochrosite. That's not half-bad for a "failed" silver mine!

## Quirk Of Geology And The Stunning Colors of Sweet Home Rhodochrosite

### Geologic "Quick Read"

The Climax-Alma area has probably been Colorado's most productive for quality and quantity of specimen rhodochrosite. The region is comprised of Precambrian granite and granitic gneiss, intruded by Tertiary monzonite porphyry. The region was intruded by magmas about 30 million years ago, which formed significant amounts of minerals and ore deposits, including the renowned Climax porphyry molybdenum system (Moore et al, 1998).

The Sweet Home deposit is situated on top of another porphyry-molybdenum system about 8 km southeast of the Climax system. The Sweet Home system is slightly younger than Climax by one to two million years.

The veins in the Sweet Home mine are polymetallic - generally containing silver, lead, zinc, and copper - and follow a northeasterly trend typical of much of the Colorado Mineral Belt. Rhodochrosite occurs as a gangue mineral in the veins.

### Origin of Mineralization at the Sweet Home Mine (Including the Detroit City Portal)

A quick "cram session" on geologic terms, for those of us a little hazy on our undergrad geology...

- A geological contact structure is a boundary which separates one rock body from another. A contact can be formed during deposition, by the intrusion of magma, or through faulting or other deformation of rock beds that brings distinct rock bodies into contact.
- Meteoric waters – rain and snowfall – flowing along the earth's surface or infiltrating to shallow depths will oxidize/dissolve many materials along their path.

The primary silver ore mineral at the Sweet Home was once thought by early miners to be argentiferous galena, but later electron analyses indicated very little Ag is found in the galena. Instead, silver reportedly occurs in small crystals of stromeyerite, and in other copper sulfides like bornite, digenite and jalpaite (Wenrich and Lees, 2022).

- Phyllic alteration is a hydrothermal alteration zone in a permeable rock that has been affected by circulation of hydrothermal fluids.
- Greisen is a highly altered granitic rock or pegmatite.

Studies suggest that mineralization at the Sweet Home formed from magmatic fluids and meteoric waters mixing over time. The Sweet Home mineralization occurred in two primary phases: a) Early-Stage – greisen veins, greisen/phyllic alteration; and b) Main Sulfide-Stage (Stoltnow et al, 2022).

a) The Early-Stage: Hot magmatic-hydrothermal fluids moved along a contact structure mixing at various proportions with meteoric waters during their rise to the site of mineralization. This mixing caused the cooling of fluids and dilution of magmatic fluids. It also facilitated the deposition of selective mineralization in veins and phyllic alteration in permeable rock affected by the circulation of these fluids. This is believed to have occurred at temperatures above 350 degrees Celsius. (See Figure 25 on page 17 for sequence and types of minerals deposited.)

b) The Main Sulfide-Stage: The generation of heat over time led to convection of meteoric waters and leaching of sulfur and metals from rocks in the crust. Continued mixing of fluids led to a meteoric water dominated ore fluid, with further cooling and dilution. This resulted in polymetallic vein mineralization of the main sulfide-stage (generally containing silver, lead, zinc, and copper), which included rhodochrosite, forming at temperatures generally less than 350 degrees Celsius. Rhodochrosite formed in two phases: 1) At about 325 degrees Celsius – the earliest phase – the result was a gemmy, cherry-red product; 2) At less than 200 degrees Celsius – a later phase – the rhodochrosite’s quality tended to be murky and pink-colored due to more impurities incorporated during crystallization. (See Figure 25 on page 17 for sequence and types of minerals deposited.)

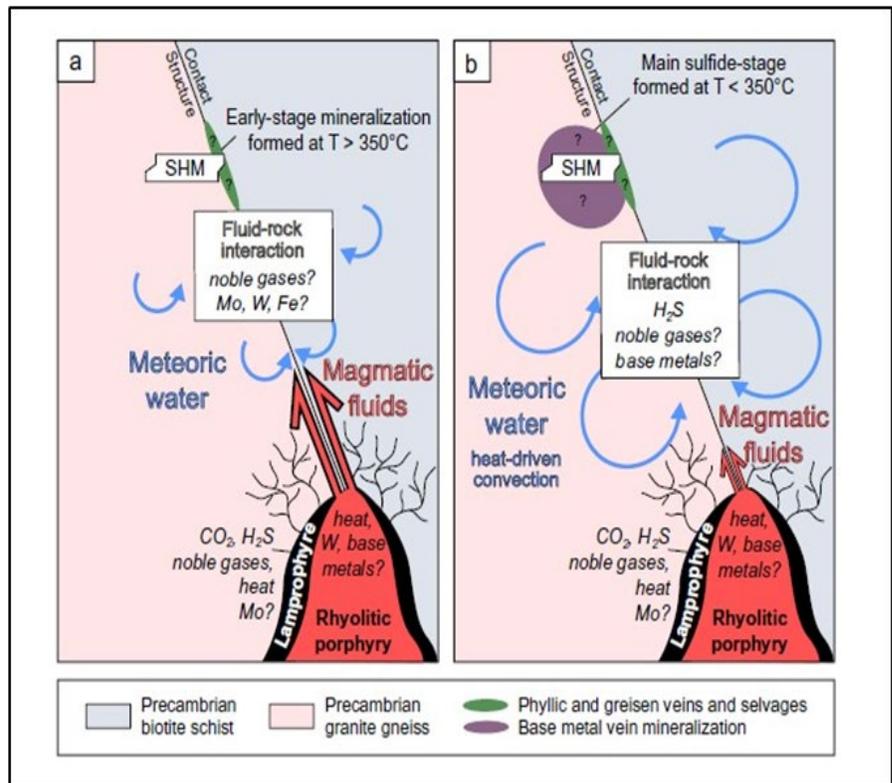
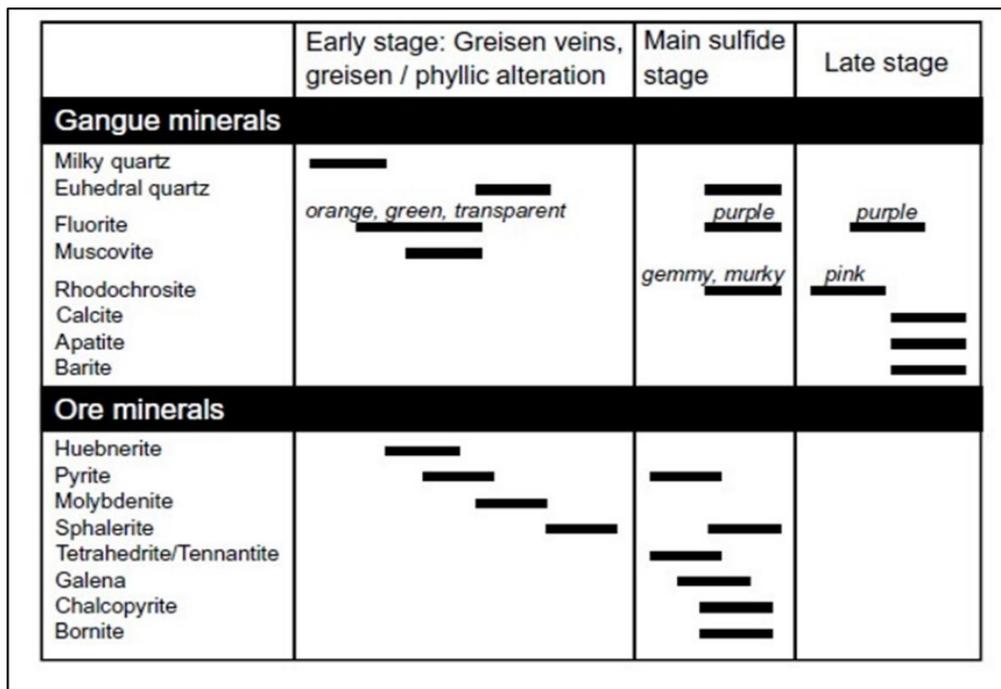


Figure 24 (above, right): Schematic model of the formation of mineralization at the Sweet Home Mine (SHM), including the Detroit City portal. Key to stages: a = early-stage mineralization formed at T > 350 degrees Celsius; b = main sulfide-stage formed at T < 350 degrees Celsius. Figure credit: Stoltnow et al, 2022.

Rhodochrosite ( $Mn^{2+}CO_3$ ) was deposited from hydrothermal solutions containing carbon, oxygen, metal ions (including manganese) and other elements. The solutions made their way upward through the porphyry-molybdenum system through fissures or cracks. When geochemical conditions (temperature, pressure, etc.) were suitable, the hydrothermal solutions deposited minerals along walls of vuggy openings in the rocks. The sequence of crystallization was dependent on the relative solubilities of different mineral species at specific temperatures. At Sweet Home, quartz was the first mineral to crystallize and is thought to have formed between 350 – 375 degrees Celsius, while rhodochrosite formed in the temperature range starting at about 325 degrees Celsius, down to less than 200 degrees Celsius.



- For detailed information about the geology and geochemistry, interested readers are referred to the following references: Moore, T., Lees, B.K., Wenrich, K.J., et al (1998); Stoltnow, M., Luders, V., de Graf, S., and Niedermann, S., (2022).

- For detailed information about mineralogy, readers are referred to the following reference: Moore, T., Lees, B.K., Wenrich, K.J., et al (1998).

Figure 25 (above): Paragenetic sequence, or the dominant set of minerals which were formed together at the Sweet Home mine, including the Detroit City portal. Note that the earliest forming minerals include quartz, fluorite, pyrite, and hubnerite. Fluorite, rhodochrosite, pyrite and sphalerite appear to have formed over longer periods of time than most other minerals. The early-stage minerals are thought to form above 350 degrees Celsius, while the main sulfide-stage minerals formed below 350 degrees Celsius. Please note: This figure does not depict all minerals known to occur in the Sweet Home deposit. Figure credit: Stoltnow et al, 2022.

### What Caused Those Intense, Beautiful Colors of Rhodochrosite?

The renowned cherry-red rhodochrosite ( $Mn^{2+}CO_3$ ) from the Sweet Home mine results from the lowest known iron, magnesium, and calcium content of any rhodochrosite in the world. Iron ( $Fe^{+2}$ ), magnesium (Mg), and calcium (Ca) can substitute for manganese (Mn) in rhodochrosite chemical structure. Iron is the primary “polluter” of specimen quality, while the effects of Mg and Ca are generally minor. The more substitution by Fe, Mg, and Ca ions for Mn, the more the reduction in specimen aesthetics and corresponding value. Relatively pure “rosy or cherry-red rhodochrosite” rarely occurs in nature. Rhodochrosite from the Sweet Home can contain exceedingly low levels of impurities such as calcium (as low as 0.03%) and iron (as low as 0.14%) (Moore, Lees, Wenrich, et al, 1998). The intense red colors of Sweet Home specimens are a result of higher-temperature formation with relatively pure  $Mn^{2+}$  solutions. In contrast, the “taffy-colored” ferroan rhodochrosite from Leadville, Colorado, contains as much as 20.3% iron. It is no surprise that the Sweet Home mine has produced the most gemmy, cherry-red rhodochrosite in the world.

The range of colors in rhodochrosite (cherry-red to pale pink) is significantly impacted by temperature of formation (Moore, Lees, Wenrich, et al, 1998; Muntyan, 2000). The acclaimed cherry-red rhodochrosite from the Sweet Home was deposited from higher temperature fluids rich in manganese (Mn). These fluids were different from the later, lower temperature fluids rich in

**The almost impossibly beautiful, vivid-red colors of Sweet Home rhodochrosite are the result of geologic formation at higher-temperatures with relatively pure  $Mn^{2+}$  solutions. “Contamination” from Fe, Mg, and Ca ions that typically substitute for Mn is the lowest in the world among rhodochrosite localities.**

manganese (Mn), but also iron (Fe<sup>2+</sup>), calcium (Ca), and magnesium (Mg) that deposited the mine's murkier, pinker-colored rhodochrosite. In fact, in contrast to Sweet Home's cherry-red specimens, the pale pink rhodochrosites at various mines in the Colorado San Juan Mountains can also be attributed to lower-temperature fluids with larger amounts of substitution by Fe<sup>2+</sup>, Ca, and Mg ions.

This geochemical phenomenon was also used as a valuable exploration tool at the Sweet Home. Geologic structures containing lower-temperature, non-gemmy rhodochrosite were avoided. Areas within the mine that consistently demonstrated the low Fe, Mg, and Ca signatures, were more likely to have had the higher-temperature formation resulting in the higher-value, vivid-red hued rhodochrosite.



**Figure 26 (left): Beautiful cherry-red, 21.94 carat faceted rhodochrosite from the Sweet Home mine. Faceted gems from the Sweet Home are usually deep, intense pink to red, many times modified by orange, and completely transparent. Faceting rhodochrosite requires a great deal of skill and experience. Not only is rhodochrosite a soft material, but it also has perfect cleavage in three directions – these planes must be avoided during cutting. Properly worked, rhodochrosite can be made into outstanding pins, pendants, and necklaces. Image credit: Heritage auction site.**

## **Appendix: Important Rhodochrosite Localities in Colorado (Muntyan, 2000)**

- Sunnyside mine group/American Tunnel (San Juan Mountains, Eureka district, San Juan County)
- Climax Molybdenum mine (Climax district, Lake County)
- Urad and Henderson mines (Dailey district, Clear Creek County)
- John Reed mine (Alicante district, Lake County) (see Jones, 1993)
- Eagle mine (Gilman district, Eagle County)
- Moose mine (Central City district, Gilpin County)
- Eagle mine (Bonanza district, Saguache County)
- Champion mine (San Juan Mountains, near Lake City, Hinsdale County)
- Daniel Bonanza mine (San Juan Mountains, Ouray County)
- Mickey Breen mine (San Juan Mountains, Uncompahgre Mining district, Ouray County)
- Mountain Monarch mine (San Juan Mountains, Ouray County)
- Grizzly Bear mine (San Juan Mountains, Ouray County)

Rhodochrosite specimens from these Colorado localities are many times distinctive, especially in their associated minerals.

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