MINERALS

ISSUE #1 2010 NEWSPAPER FOR COLLECTORS

In this issue:

Collector interview: Jeff Scovil

In this first issue of our newspaper, we start a regular column – interviews with well known and interesting collectors. For our first interview – famous photographer and not very well known collector – Jeff Scovil !!

Tomasz Praszkier (Minerals): *Jeff - You are probably known to mineral collectors all over the world ...*

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1st International Mindat.org Conference in Poland 11-17 VII 2011

The First Mindat.org International Conference will be held in conjunction with the 14th Lwówek Śląski Crystal Days Festival, three days of mineral shows, events and live music, where the whole town comes out to celebrate the mineralogical heritage of the region. Visitors can enjoy both the Conference and the Crystal Days festival at the same time.

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Great new find:
Adelaide Mine 2010

Tomasz PRASZKIER & Adam WRIGHT

INTRODUCTION

The Adelaide Mine, located in Western Tasmania, is undoubtedly the world's most famous producer of crocoite specimens. Only a few great pockets with top quality specimens have been found in the history of the mine – in 1970's, 1990's and then again in 2010! The "2010 Pocket" produced a number of world-class specimens with great color and exceptional crystal size. Crocoites from this find are surely among the world's best. Following is the first written account of this recent find.

DUNDAS AREA – WORLD PRIME PRODUCER OF CROCOITE SPECIMENS

There are two crocoite producing regions in the Western Tasmania, the Heazlewood district, and the Dundas district.

The Dundas Ag-Zn-Pb mining field is located about 10 km east of Zeehan, and contains a number of mines. Two of them are especially productive in terms of crocoite specimens – Adelaide and Red Lead. The Adelaide mine however, produces much bigger quantities of high quality specimens, including occasional finds of great pockets filled with the world's best crocoite specimens.

HISTORY OF THE ADELAIDE MINE

The deposit mined recently at the Adelaide mine was discovered in 1887. The most important period of a large-scale mining for lead and silver took place there from 1890-1915. Crocoites

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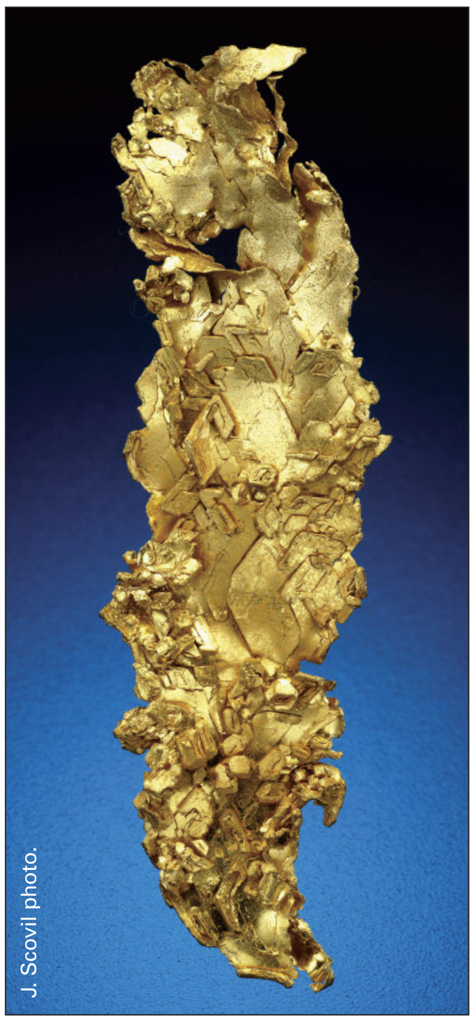
Crocoite from "2010 Pocket", 10.1 cm high. Gobin specimen.

Crystalline gold
from Round Mtn, USA

R. Scott WERSCHKY



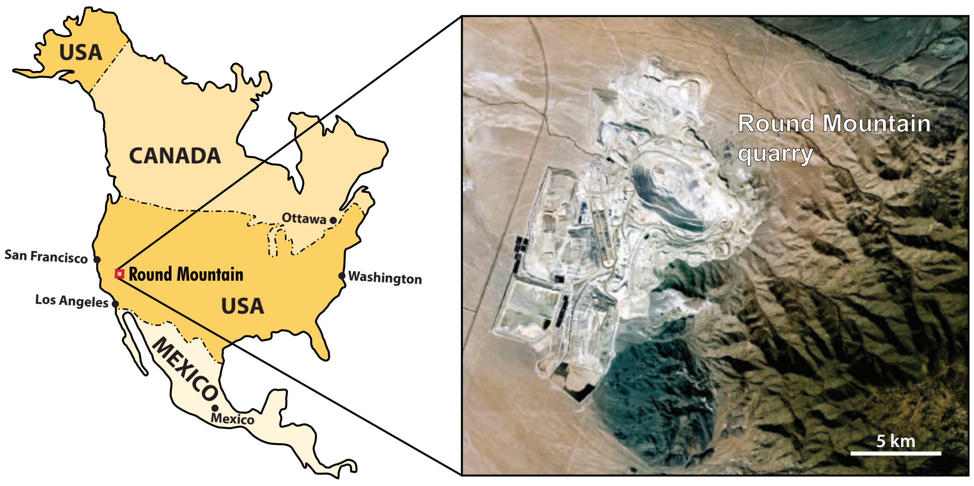
Crystalized gold from Round Mountain mine. Size 6.8 cm. Spirifer collection.

INTRODUCTION

Imagine going to the Tucson Gem and Mineral show, and seeing some new golds from a mine you have never heard of. They are leafy specimens with bright, shiny, yellow gold and hints of octahedral crystals on the edges. The specimens are pretty and inexpensive, and you have to have one. Then you return to Tucson the next year and see more golds from the same mine with even better crystals. Now do this for several years in a row, finding different crystal habits, bigger and better crystals, better luster, and larger specimens both on and off matrix! Is it a collectors dream, or nightmare? It is easy to justify having one good specimen from the mine, but does one really need ten pieces just because they are all different? This dilemma has many mineral collectors, and especially gold collectors, scratching their heads and then digging deep into the pocket books all because the Round Mountain mine went from being an obscure gold locality to being a world class specimen producer virtually overnight.

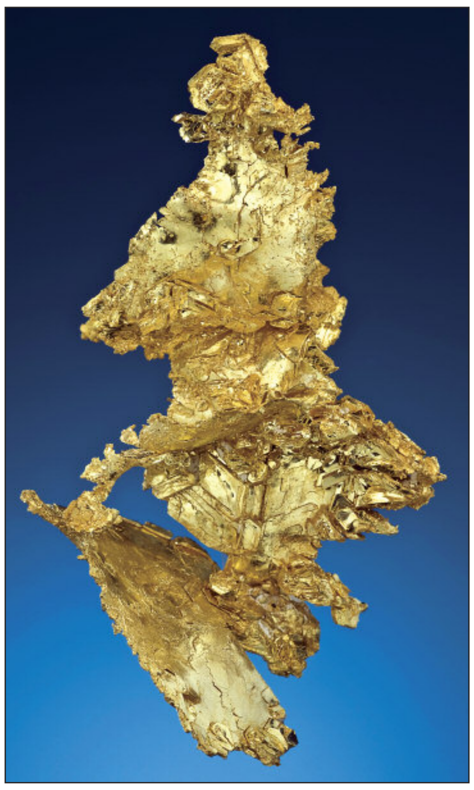
HISTORY

Nevada is known as the Silver State, stemming from the famous silver mines of the Comstock Lode discovered in 1859. Prospectors bound for the California



Map of North America with location of Round Mountain and aerial view of the open pit mine.

Mother Lode found placer gold near what is now Dayton, Nevada. Although looking for gold, they struck it rich with silver at Virginia City just a few kilometers north of Dayton. This success with silver dictated the exploration focus in Nevada for the next 40 years. The subsequent decline of the mines of the Comstock lead to renewed exploration efforts which resulted in several major gold rushes in Nevada starting around 1900. Many famous gold mines were found at this time, including Round Mountain which was discovered by Louis Gordon in 1906. In a very short time, there were thousands of miners living in tents and primitive wooden shacks. At the peak, Round Mountain was producing a lot of gold each year, especially considering the labor intensive mining methods of the era. The district produced more than 300 kg (10,000 troy ounces) of gold a year during early years. The heyday of mining lasted through the 1930's, and shut down completely with the onset of WWII. Round Mountain remained more or less dormant until the late 1960's when the Ordich Group picked up the claims. The present day Round Mountain mine was commissioned in 1977 with initial inferred (not proven) gold reserves of 18.6 metric tones, and a planned mine life of about 6 years. Through a series of mergers and buyouts, the mine is now a 50:50 joint venture between Barrick Gold and Kinross with Kinross acting as operator. The mine has been in continual operation since 1977, with peak gold production of over 22.7 metric tonnes (730,000 ounces) per year. Total production to date is nearly 373.2 tonnes (12 million ounces) plus the approximately 10.9 tonnes (350,000 ounces) mined before 1977. Current gold reserves are reported at 46.6 metric tonnes at a grade of 0.64 g/t, with an expected mine life of about 3 years. These figures are based on current gold prices, and future changes may extend the mine life especially if they elect to pursue underground mining. At a minimum, total gold production for the district will be a staggering 435.4 tonnes (14 million ounces) by the time it is mined out! Not bad for a mine that started out with hopes of producing less than 20 tonnes of gold!



Crystalized gold. Size 8 cm. A. Day coll. J. Scovil photo.

The first gold specimens found during modern mining operations were encountered around 1980 in the densely welded tuffs at the top of the caldera complex. While exciting to geologists, these unimpressive specimens were typified by very fine grained dissemination and/or supergene enrichments within silicified tuffs. There are probably only a few of these specimens in existence, likely well hidden by dust on some geologist's desk.

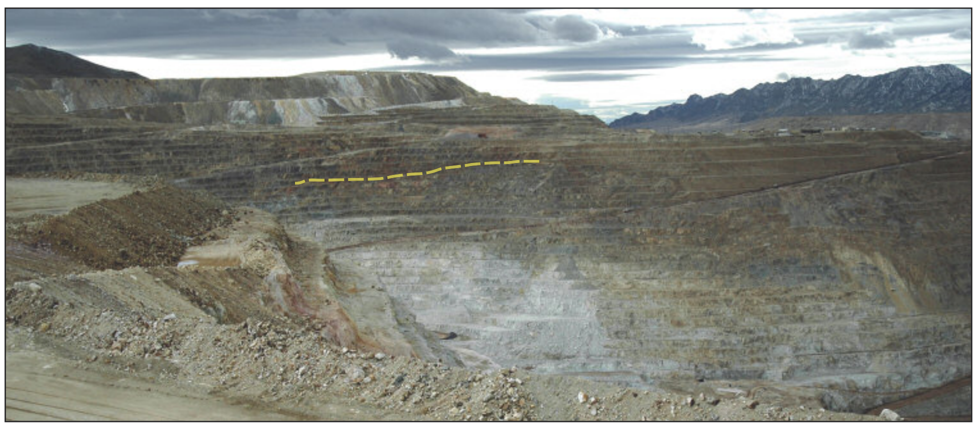
36 kg pile of gold from the high grade vein! Photo taken ca. 1992 by B. Veek.

Until the early 1990's, Round Mountain was considered to be a very low grade deposit that was remarkable only in the total lack of visibly interesting rock textures or veining. Things forever changed in March of 1992, when coarse gold was found in a blast hole. A routine ore control assay of blast hole cuttings came in at greater than 30 g/t, quite a divergence from the expected 0.6 g/t. Assuming there to be some sort of analytical error, geologists sampled drill cuttings piled up around the drill hole. Processing the cuttings with a gold pan yielded more than one kilogram of coarse grained gold from what turned out to be the discovery of the first modern day high-grade vein. Since this discovery, approximately 150 high grade veins have been encountered. Projection of the high grade vein trend up to the pre-mining surface on Stebbins Hill correlates with veins worked during early mining around 1910. Historical research showed that coarse gold was indeed known back then as evidenced by photos of large gold specimens displayed during a gold mining conference in Chicago, Illinois circa 1909.

Western portion of the Round Mountain pit with heap leach pads in middle distance, and Toiyabe Range in far distance. S. Werschky photo.

It is estimated that more than 9330 kg (300,000 ounces) of coarse gold have been recovered since 1992. Unfortunately, no records exist for historic production of specimen-grade gold.

After the discovery of the high grade vein in 1992, geologists at the mine convinced management to initiate a sales program in which all employees could buy a few pieces of gold at the prevailing world gold market price. The sale was done in December as an informal Christmas present to the miners. The gold sales to employees continued through 2006, after which management decided to terminate the program. In addition to sales to the employees, the mine has had two sales to mineral/gold dealers, one in 1992, and the last in 2006. The vast majority of specimens one sees on the market have come from individual miners who have sold their golds to mineral dealers.



Round Mountain pit with approximate location of original high grade vein. S. Werschky photo.

LOCATION

The Round Mountain mine is located on the western flank of the Toquima Range in central Nevada, approximately 240 km east-southeast of Carson City. It is in the heart of the Basin and Range Physiographic Province. For those familiar with the vast deserts and mountains of the Western United States, it might appear to be in "the middle of nowhere". For those lovers of crystalline gold, it is arguably "the center of the Universe" (at least temporarily). The original town site of Round Mountain still exists, and is adjacent to the present day open pit mine. Perhaps 40 people still live there, although the mining company is trying to convince them to relocate in order to expand the open pit mine to the northeast which would consume the town. Most of the miners live in the small town of Carvers or the company sponsored housing in what is known as the Hadley Subdivision.

Sign at the entrance to the Round Mountain mine. S. Werschky photo.

A rare specimen with gold included in, and on, a euhedral quartz crystal. Size 4.6 cm. Miner's Lunchbox coll. J. Scovil photo.

Round Mountain townsite – original home to miners during early history of the mine, today almost a ghost town. S. Werschky photo.

OPERATIONS

The gold deposit at Round Mountain is mined using conventional open pit mining methods. The pit is 2330 by 1700 m and 580 m deep from the top of the original mountain. Benches are drilled, blasted, and then mined on 10.7 m lifts using 136, 172, and 218 tonne haul trucks. Oxidized ore is placed on pads, and cyanide leached. Sulfide ore is crushed, and processed in a CIL mill circuit. Placer ore and high-grade coarse gold ore is processed in a gravity plant, with the tails subsequently processed in the mill or on the heap leach pads. The mine employs approximately 800 workers. There are presently an additional 200 contract personnel working on mine expansions. The mine controls almost 21,000 hectares of mineral rights including both patented and unpatented federal mining claims in addition to placer claims. The mining claims cover the area from Manhattan, 18 km to the south, to Gold Hill, 8 km north of the present pit. Gold Hill hosts a gold resource which will be mined by the company in the very near future.

Crystalized gold grading from spinel law twinned cuboctahedrons up into herringbones. Size 7.6 cm. Ex Miner's Lunchbox now in K&M Proctor coll. J. Scovil photo.

GEOLOGY

The Round Mountain mine is situated at the eastern edge of the Oligocene aged Round Mountain Caldera complex. The caldera has been dated at 26.5 ma, and is only 0.5 ma older than the mineralization. The volcanics are densely to poorly welded tuffs of rhyolitic composition. The volcanics were deposited on both a Cretaceous granite and the Paleozoic basement rocks into which the granite intruded. Paleozoic rocks are predominantly marine calcareous and clastic sediments which have been metamorphosed to argillites, phyllites, and quartzites adjacent to the intrusive. Caldera formation has structurally modified the area with ring and radial faulting in addition to the rafting of large blocks of basement rocks into the caldera along the ring faults. The region was then modified by north-trending Basin and Range faulting which down-dropped blocks westward to the valley. Quaternary gravels overlay the western portion of the deposit. Rich gold placers are found at the base of the gravel sequence.

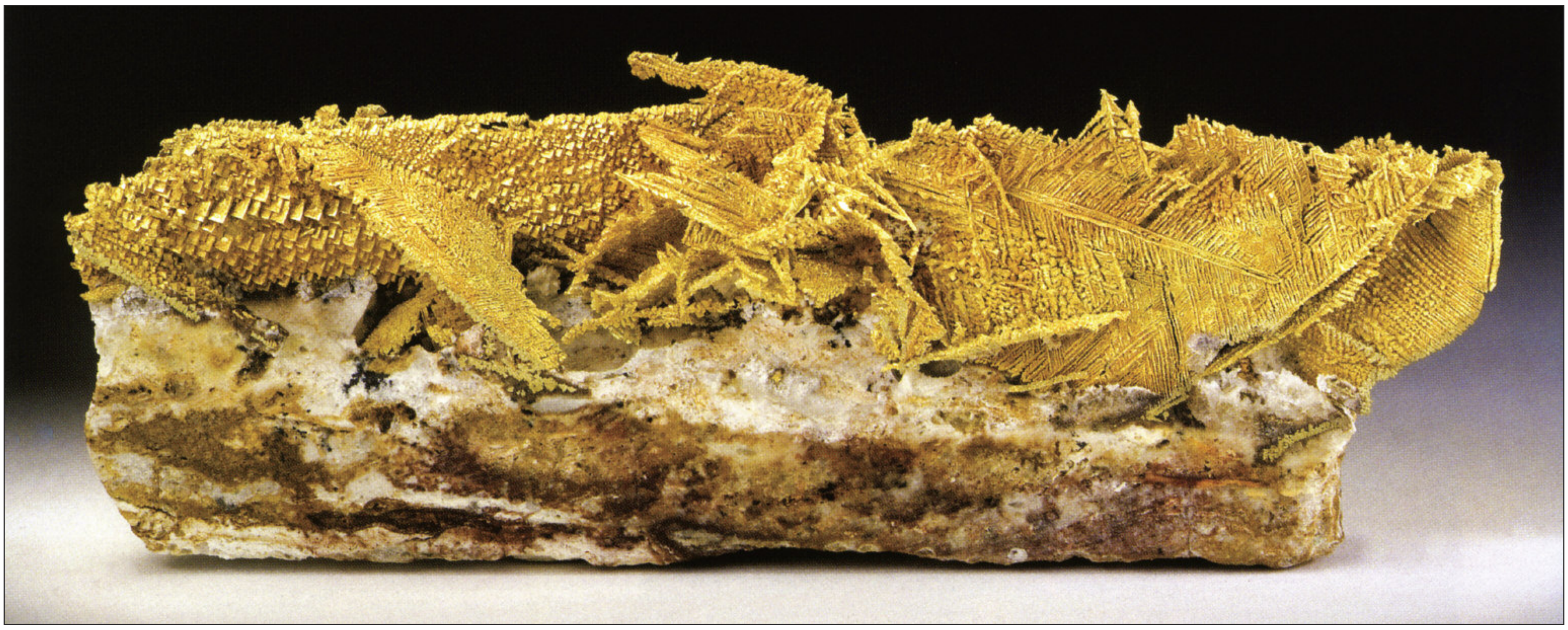
Gold ores at the Round Mountain mine can be separated into 5 distinct categories based on host rock lithology, alteration, and structure. Ore grade mineralization is found in all of the caldera related volcanics as well as the underlying Paleozoic sediments. Of these various ore types, only the veining is important to mineral specimen development. Vein development at Round Mountain is a function of fracture related open space. Fractures occur in many fashions including structural intersections, tensional gashes, rock density refraction, and dip deflections along structures and lithologic contacts. The fractures were then filled by quartz veins during the mineralizing event. The most important vein in the deposit occurs along the contact between a poorly welded tuff and a densely weld tuff. Changes in dip of the contact created dilatant zones that filled with quartz during mineralization. The quartz was quite gold rich in this vein, making it the largest high grade zone in the mine producing more than 4 tonnes of gold! Probably the next most important vein type occurs as vein fillings in tensional fractures in the Paleozoic rocks rafted into the caldera along radial structures. These tensional gashes are quite abundant, and are responsible for many of the gold specimens collected.

Crystalized gold. Size 3.1 cm. A. Day coll. J. Scovil photo.

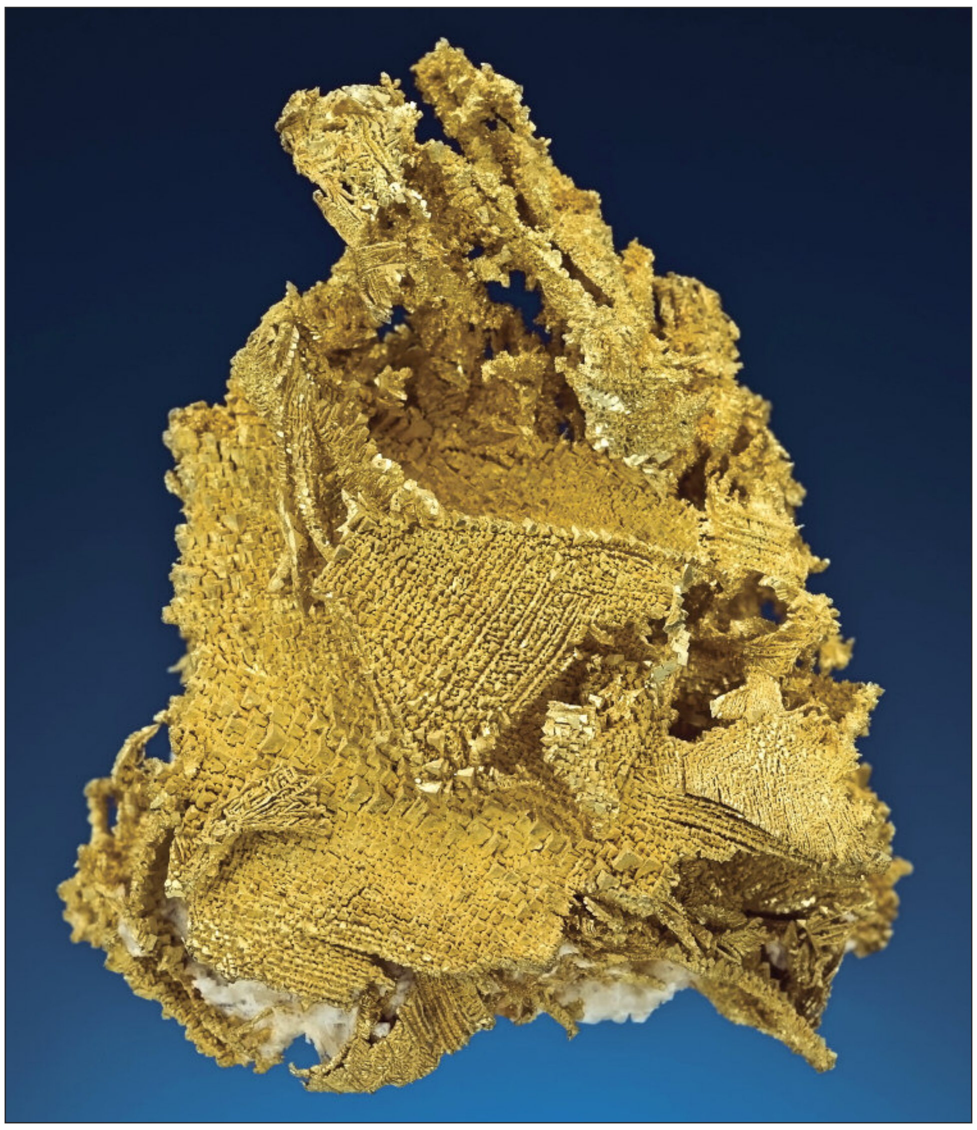
Crystallized gold in situ *after blasting. Kinross photo.*

MINERALIZATION

Mineralogy of the deposit is quite simple. The Eocene volcanics are rhyolitic in composition, made up of quartz, biotite, plagioclase, and sanidine. Underlying the volcanics are the Paleozoic calcareous and clastic sediments. Given the eruptive nature of the volcanics, and the fine grained sedimentary nature of the Paleozics, there are no specimen quality minerals found in the host rocks. Hydrothermal mineralization, hosted by the volcanics, and to a lesser degree the Paleozoic sediments, consists of quartz veining with adularia (orthoclase), calcite, pyrite, gold, and silver. The only specimen grade minerals found in the mine to date occur in the veins and are limited to gold with minor amounts of quartz. Pyrite crystals are always tiny,



Crystalized gold showing classic herringbone formation and spinel law twinning of cubic crystals. Size 12 cm. K&M Proctor coll. J. Scovil photo.



Cubic spinel law twinned gold crystals forming herringbones. Size 4.2 cm. N. Prenn collection. J. Scovil photo.

and frozen in quartz or in altered rock. The calcite seems to have filled all spaces not already filled in by quartz. Hydrothermal alteration of the host rocks and veins is characterized by argillic, sericitic, and chloritic zones as evidenced by fine grained minerals such as illite, smectite, sericite, and chlorite. Even though the alteration assemblages do not produce nice mineral specimens, they are very important to mineral collecting in that the clays replaced both quartz and adularia, frequently leaving beautifully crystalline gold surrounded by soft clays which can be easily cleaned off by simple washing.

Exceptionally large octahedral spinel law twins forming lustrous leaf. Size 6.7 cm. K&M Proctor coll. J. Scovil photo.

While gold is the principal ore mineral of the deposit, trace amounts of native silver as well as silver sulfosalts, sulfides, and tellurides have been encountered such as mckinstryite, stromeyerite, and pyrargyrite. Unfortunately, no published data is yet available detailing this mineralogy.

Gold in the Round Mountain deposit is silver-rich. The average gold specimen from Round Mountain is 63.5% gold and 37.5% silver. This ratio appears to be consistent throughout the deposit. Amazingly, there is no vertical zonation or variations in the silver content at the mine. This is highly unusual for epithermal gold systems. Additionally, geologists at the mine say that there is less than 2% difference in the silver content above the water table where oxidation can preferentially leach out silver from the rock.

GOLD MORPHOLOGY

A key feature of the Round Mountain mine is the great diversity of gold habits and styles. The early specimens were massive and/or leafy in nature, and were not particularly interesting to mineral collectors. In fact, there were great difficulties selling golds from Round Mountain in the early years. The gold was not crystalline enough for collectors, and not rounded enough or yellow enough to interest the nugget collecting market. In 2001, the first fine crystals were encountered, and several different habits are noteworthy. While there are many different habits of gold in the deposit, Round Mountain gold does have an overall look that is quite distinctive. Select pieces can resemble golds from Breckenridge (Colorado, USA), Verespatak (Romania), Eagles Nest (California, USA), and even Liberty (Washington, USA). However, the combination of form and color is readily recognizable to one familiar with gold specimens. Following is a brief summary of the gold styles from Round Mountain.

Massive gold

The massive gold is texturally unremarkable as expected from the classification. Large masses have been found to more than 6 kg. These masses are typically less than 3 cm thick, but are known to reach sizes to 20 cm long and 8 cm thick. The masses mimic the shapes of veins which are typically less than 10 cm in width.

Wire gold

Wire gold is rarely seen at Round Mountain. In fact, only a handful of specimens with well formed wires are known. This is to be expected, as wires are the rarest form of gold in nature. The wires can be striated, and are arcuate to tightly curved or coiled. They occur both as isolated single strands and dense masses with hundreds of tiny wires. All of the specimens seen to date are small (less than 8 cm). Most of the individual wires are less than 2 mm thick and <1 to 2 cm long, although one wire was more than 40 mm long by 3 mm thick.

Ribbon gold

Ribbon gold at Round Mountain occurs as thin leaves less than 1 mm thick, 2 or 3 mm wide, and 5 to 20 mm long. The specimens form in groups of hundreds of the ribbons tightly packed just like the wire gold. The ribbons vary from flat and straight to tightly curved or curly. Only a few such pieces have been identified to date. Ribbon gold can be considered intermediate between wire and leaf gold.

Leaf gold

The most common form of gold in the Round Mountain deposit is leaf gold. Leaves can be very tiny to quite large.

Cubic spinel twins on an cubooctahedral spinel twin! Size 5 cm. K&M Proctor specimen. J. Scovil photo.

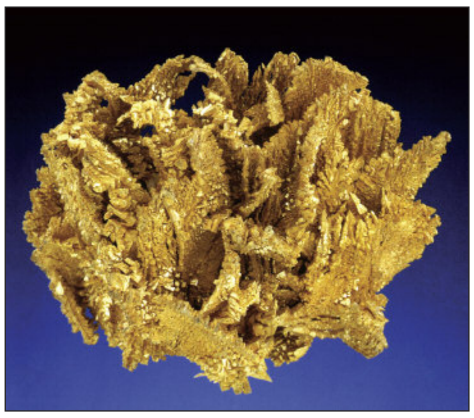
Fine specimens with leaves to 15x5 cm have been found. The leaves are typically very thin and are often delicate like foil. Stout leaves thicker than 1 or 2 mm are the exception. Although leaf gold is actually crystalline, the leaves do not always have nice crystal faces at the mar-

Spinel law twinned crystals of gold. Size 5.7 cm. Miner's Lunchbox specimen now in K&M Proctor coll. J. Scovil photo.

One of the finest golds from Round Mountain. Textbook example of cubic crystal spinel law twinning on herringbone leaves. Size 11 cm. Miner's Lunchbox specimen now in P. Weiss coll. J. Scovil photo.

One of the best known gold wires from Round Mountain. Size 5.9 cm. Miner's Lunchbox Specimen. J. Scovil photo.

gins. Certainly, the best leaf specimens have beautiful octahedral or cuboctahedral crystals (typically flattened) at the edges. Leaf gold can vary from a dull, matte finish to extremely lustrous gold. The best pieces exhibit almost mirror like luster.



Twinned gold crystals forming casts after calcite. Size 5 cm. Ex Miner's Lunchbox, now in private collection. J. Scovil photo.

Cubic crystals

Gold being in the isometric system might be expected to form as nice cubes. Unfortunately, in nature, cubic crystals are exceedingly rare. The presence of abundant cubic crystals at Round Mountain is what makes the gold so unique and desirable. Most of the cubic crystals are in the 1-2 mm range, but cubes to nearly 1 cm have been recovered! Often, cubes form in groups, sometimes as large as several centimeters across. The cubes are mostly solid crystals, although hoppered-growth crystals similar to those seen in Venezuela are found.

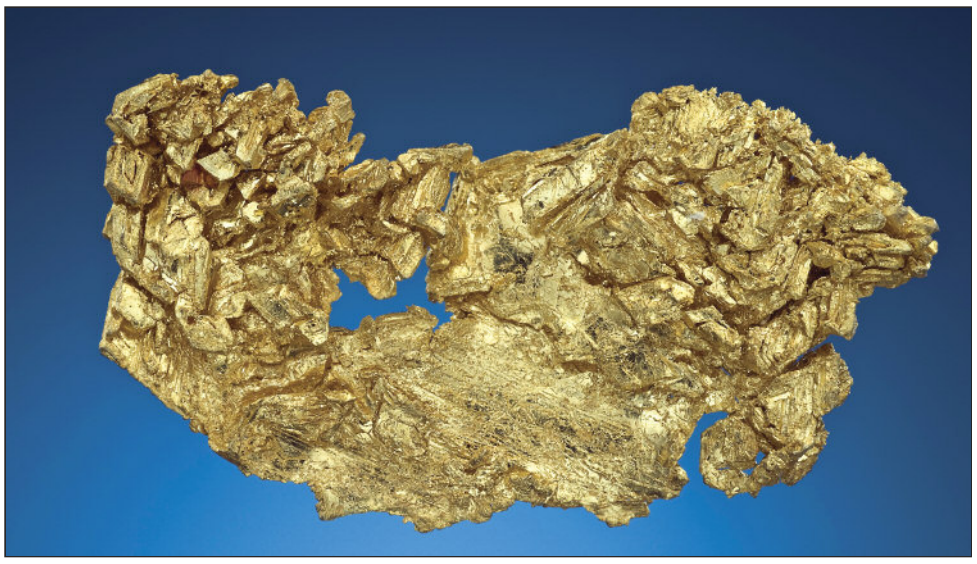
Octahedral and more complex crystals

Octahedral and cuboctahedral crystals are abundant, while more complex crystal faces are less common in the golds from Round Mountain. The most common place to see the octahedrons is at the edges of leaves as discussed above. The octahedrons are typically flattened, parallel to the leaf structure. They can be less than 1 mm to greater than 20 mm. The best specimens have perfect luster, although differences in luster of adjoining crystal faces are common. Most of the octahedral crystals show hoppering or skeletal growth, a feature common to gold crystals all over the world. The smaller crystals, especially those with higher order crystal faces tend to exhibit more solid crystal growth. While most crystals tend to form at the margins of leaves, one pocket was encountered consisting of large masses of intergrown octahedrons and spinel law twins. Specimens to 15 cm were recovered with numerous 1-2 cm octahedrons present in a mass of smaller octahedral and elongate spinel law twins. These specimens were sold by the mine in the year that had size limits on pieces bought by the miners. It appears that all of the pieces may actually have been from a single specimen greatly exceeding the 150 gram limit imposed by management. It has been hypothesized that the piece was broken up to accommodate the size restrictions, and still allow some truly great pieces to make it to the market.

Twinning

The feature that most significantly sets the Round Mountain golds apart from other localities is twinning. Spinel law twinning (more accurately twinning on the 111 crystal plane) is extremely common in the deposit, and almost every specimen with well developed crystals has at least a few twins. Like most gold deposits in the world, the most common morphology of twinned crystals is octahedral (a direct result of gold preferring to crystallize in octahedral form). Spinel law twinning of two octahedral crystals produces a form resembling flattened octahedrons visible at the leaf edges. The triangular steps that one can see on the flat surfaces of gold leaves (the feature gold collectors call "trigons"), are also spinel law twins. The propensity of gold to twin in octahedral crystals is so strong that we rarely observe simple complete octahedrons (hence the elevated price of good octahedrons). Crystals exhibiting the spinel law twinning of octahedral (or cuboctahedral) crystals at Round Mountain are typically less than 5 mm. Exceptions to this occur where the crystals are elongated. Elongated twins to 3 cm are known, and at least 3 specimens have been identified with elongated twins to 5 cm. One gigantic gold crystal was found with a single hexagonal shaped spinel law twin weighing 200 g! Unfortunately,

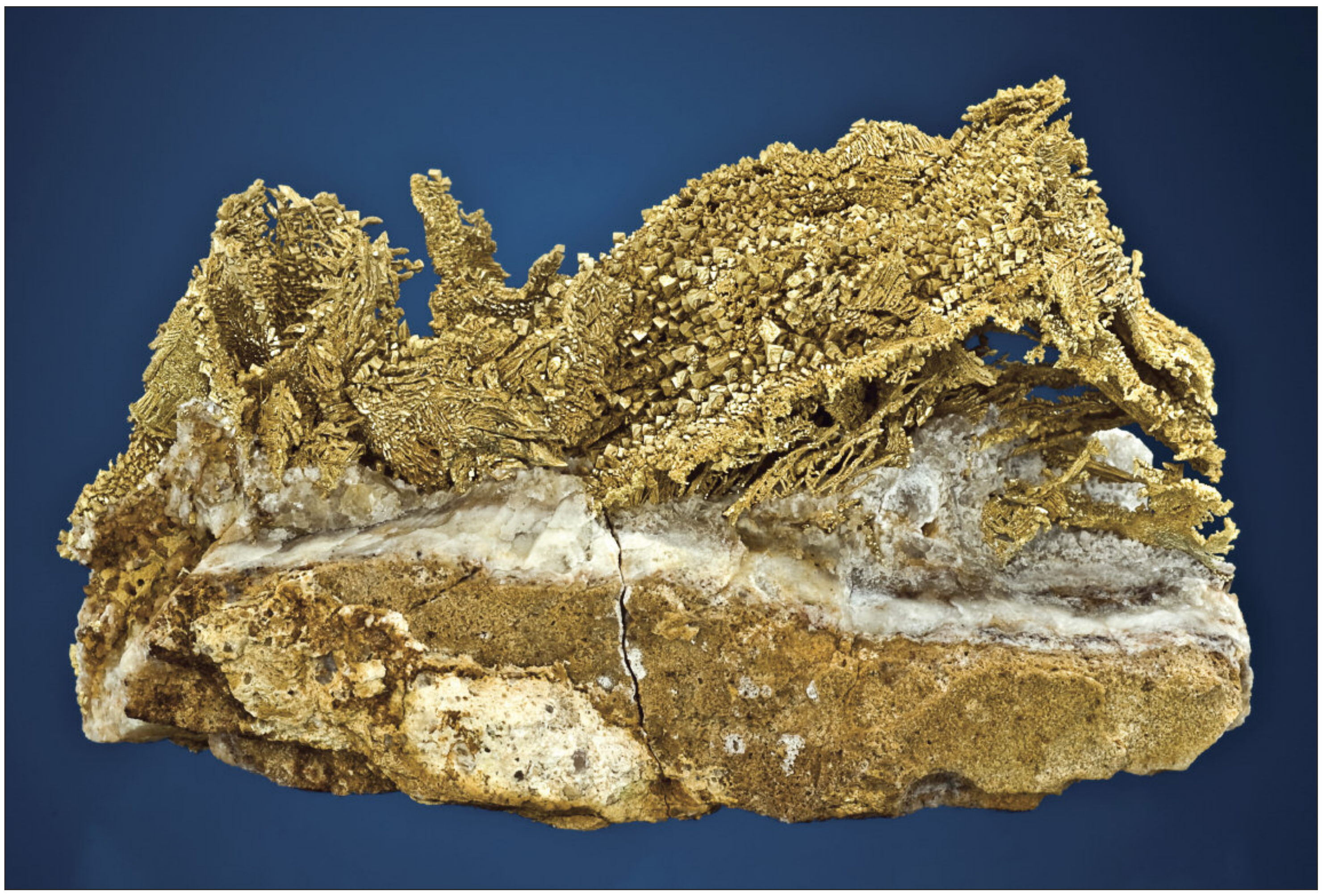
Herringbone leaves of gold. Size 7 cm. Private coll. J. Scovil photo.



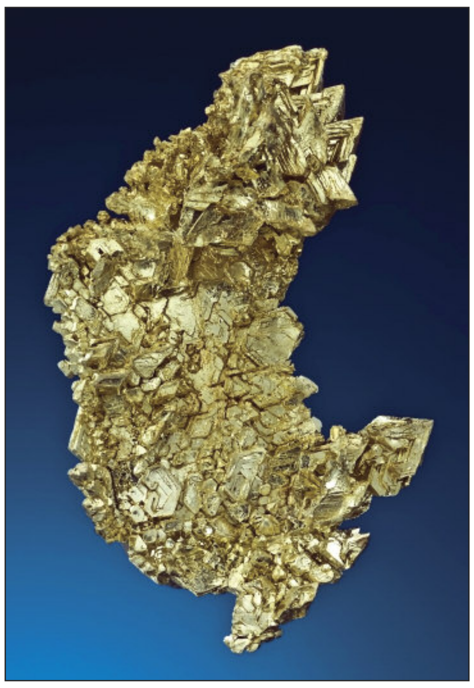
Massive leaf grading into large spinel twinned cuboctahedral crystals. Size 6.5 cm. Mineral Exploration Services coll. J. Scovil photo.

it had some poorly formed crystals overgrowing the twin so as to make it aesthetically challenged.

Much less commonly, gold will form spinel law twins in cubic crystals. A favorite gold habit at the Round Mountain mine occurs where an entire leaf twins so that the surface is covered with small cubic crystals, all perched up in the same orientation (the so-called homo-epitaxy). This growth can be further modified by having the cubic crystals growing in twinned orientation out of the primary octahedral twins giving the appearance of cubes perched on the hexagonal plates. The twins of cubic gold crystals



Twinned gold crystals on herringbone leaves slightly folded by tectonic faulting. Size 8.5 cm. S. Werschky coll. J. Scovil photo.



Octahedral spinel law twinned crystals of gold showing silver-rich color typical for unoxidized rock. Size 4.1 cm. N. Prenn coll. J. Scovil photo.

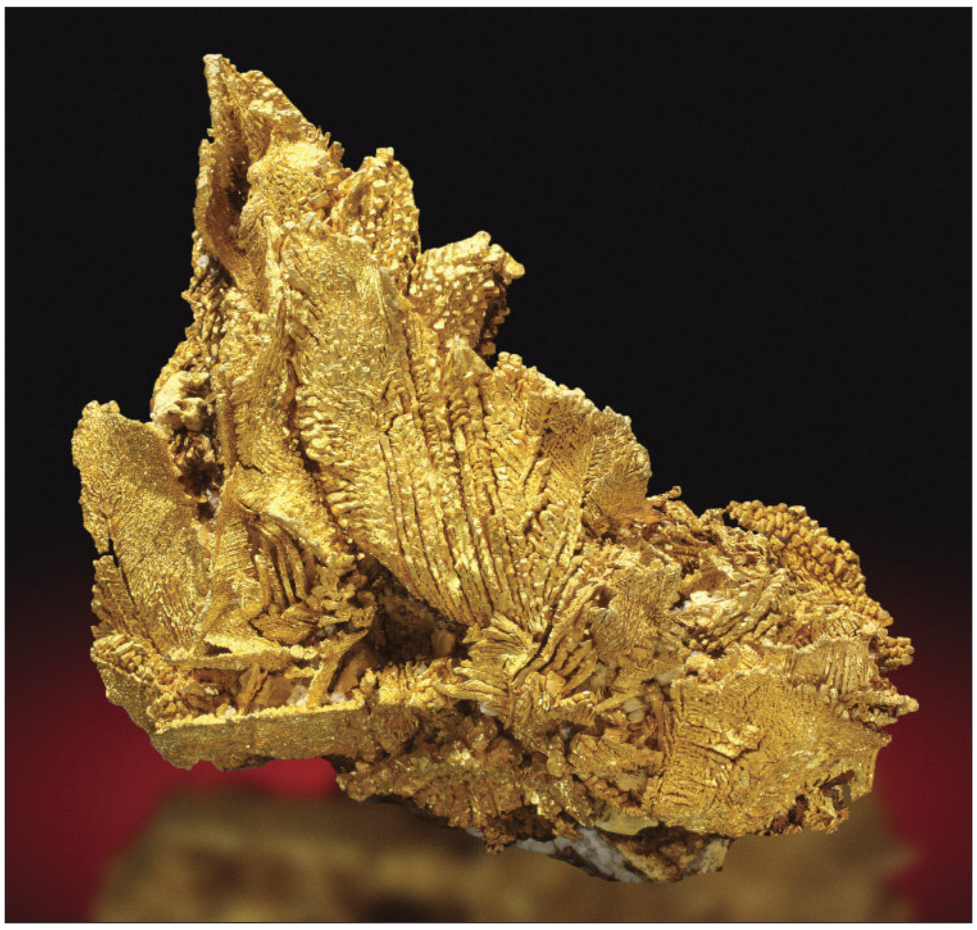
also form on the herringbone leaves, which are a type of skeletal growth. Spectacular specimens form with parallel rows of flattened gold crystals connected by a second set of parallel crystals at 30° to the first set. On top of the two sets of parallel crystals there are rows of twinned cubic crystals all perched at an angle. The herringbone leaves often show folding or bending due to tectonic deformations that occured after mineralization giving the effect of undulating rows of cubes, which reflect incrementally as the specimen is rotated under light. A truly fantastic and beautiful thing!

Color variations

Gold from the Round Mountain mine exhibits two distinct colors. To date, about half of the specimens sold by the company have a nice, rich buttery yellow color. Contrasting this, the other specimens are lighter yellow color typified by high-silver content gold. The two look very different, and one would assume have grossly different compositions. In reality, the only difference is surfacial. All of the more yellow colored golds were mined from oxidized rock above the water table, where acid produced from the oxidation of pyrite preferentially leaches the silver from the surface of the gold. Since gold is not porous, this removal of silver occurs only at the very outermost part of the specimen (likely only penetrating a few angstroms down into the gold). The leaching of silver leaves a surface relatively enriched in gold, hence the better color. Below the water table, there is no oxidation, and the gold has the lighter silver color that can be considered normal for the deposit.

SUMMARY

The Round Mountain mine has truly become one of the premier gold localities in the world. The size and quality of crystals rival golds from anywhere in the world. The variety of crystal habits, morphology, and color set the mine apart from other localities that typically exhibit only one or two styles of gold. Round Mountain has produced top quality pieces for all types of collectors from micromounters to those who love large cabinet pieces. Although the mine has not been selling gold for the last few years, they are still finding good crystals. Let's hope that mining continues to produce more crystals as they get deeper in the system, and that management once again elects to sell specimens to the employees.



Herringbone leaves of gold. Size 5 cm. Miner's Lunchbox specimen. J. Callen photo.

ACKNOWLEDGEMENTS

I would like to thank the management and geologic staff of Round Mountain Gold for making this paper possible – without the golds, there would be no paper. Thanks also to Allan Young for editing, Bruce Veek for historical photos, background, and geology, Jeff Scovil for photography, and Aleksander Recnik for his help in understanding crystallography.

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1st International Mindat.org Conference in Poland

Calcite on cavansite, 2 cm high. J. Gajowniczek coll. J. Scovil photo.

1st International Mindat.org Conference

hosted by the 14th Lwówek Crystal Days

Lwówek Śląski, Lower Silesia, Poland, 10-17 July 2011

The First Mindat.org International Conference will be held in conjunction with the 14th Lwówek Śląski Crystal Days Festival, three days of mineral shows, events and live music, where the whole town comes out to celebrate the mineralogical heritage of the region. Visitors can enjoy both the Conference and the Crystal Days festival at the same time.

11-13TH JULY – FIELD TRIPS

Agates of Pogórze Kaczawskie – 3 localities – Lubiechowa, Płóczki Górne, Nowy Kościół; visit local collectors who will cut and polish your agates.

Strzegom pegmatites – visit to 3-4 granite quarries in this classic mineralogical area.

Lubin copper mines – tour these famous underground copper mines, over 1000 m deep!

Evening Entertainment – every evening, for those not too tired by the daytime activities, there will be a full programme of parties and other activities!

14TH JULY – CONFERENCE, DAY 1

Talks: "Mindat.org – past, present and future" (Jolyon Ralph), "Agates from Kaczawskie Mts, Poland" (Jacek Bogdański), "The Yaogangxian Tungsten deposit, China" (Berthold Ottens), "Pegmatite minerals from Strzegom granitic massif, Poland", (Tomasz Praszkier), "Vulcano - Minerals from La Fossa crater, Italy" (Marco E. Ciriotti), "New Minerals and the IMA" (Chris Stanley), "Theories of Agate formation" (Brian Jackson), "The Rogerly mine" (Jesse Fisher), "Native gold from Round Mt, USA" (Scott Werschky).

Session for Young Collectors – slideshows and presentations by young collectors for young collectors".

Granite quarry in Strzegom – area famous for pegmatites. G. Bijak photo.

Slideshows with beer: "Madagascar trip" (Tomasz Praszkier), "Traveling through Peru" (Scott Werschky).

15TH JULY – CONFERENCE, DAY 2

Talks: "The cavitiy minerals from the spilite basalts in Mumbai, India" (Berthold Ottens), "Minerals from burning dumps of coal mines" (Łukasz Kruszewski), "Exploring classic Japanese mineralogical sites" (Alfredo Petrov), "Melanophlogite: a weird phase of silica?" (Chris Mavris), "Chrysoprase from Poland" (Michał Sachanbiński), "Apatites from Sapo, Brazil" (Luiz Menezes), "Minerals of the lead-zinc mine Mežica, Slovenia" (Aleksander Recnik), "Granite Pegmatite Minerals from Maine, USA" (Van King).

Opening ceremony of Town Center Mineral Show of **Lwówek Crystal Days**, Parade of Trasure Hunters and official opening ceremony of Lwówek Crystal Days.

Slideshows with beer: "What's hot in minerals in 2010-2011" (Jeffrey Scovil), "Colleting in the Kola Peninsula, Russia" (Agata Leszczuk).

16TH JULY – PRESENTATIONS AND WORKSHOP, DAY 1

Short presentations (15 minutes each) for formal mineralogical papers and poster presentations.

Workshops: "Photographing minerals – equipment, techniques" by Jeffrey Scovil and "Mindat.org workshop. Contributing, Editing, Improving the site" by Jolyon Ralph.

"**Big Party**" with Polish collectors.

17TH JULY - WORKSHOP, DAY 2 AND CLOSING CEREMONIES

Workshops: "Photographing minerals – practical workshop" by Jeffrey Scovil and "Mindat.org workshop – Advanced Techiques" by Jolyon Ralph.

Live music in town center – Lwówek Śląski Crystal Days.

Closing ceremony and fireworks of Lwówek Crystal Days.

MINERAL SHOWS

There are two mineral shows during the conference period in the town.

Town Center Mineral Show at the Lwówek Śląski Crystal Days Festival takes over the full town center, and contains rock, gem, jewellery and mineral dealers, selling mostly inexpensive local minerals.

Mindat Conference Mineral Show – dealers, including international dealers with a wider range of quality minerals for sale.

For the detailed programme and to register for the conference visit www.mindatconference.org, write to: conference@mindat.org, call +48 507 038 876 (Poland), or meet us at major mineral shows.

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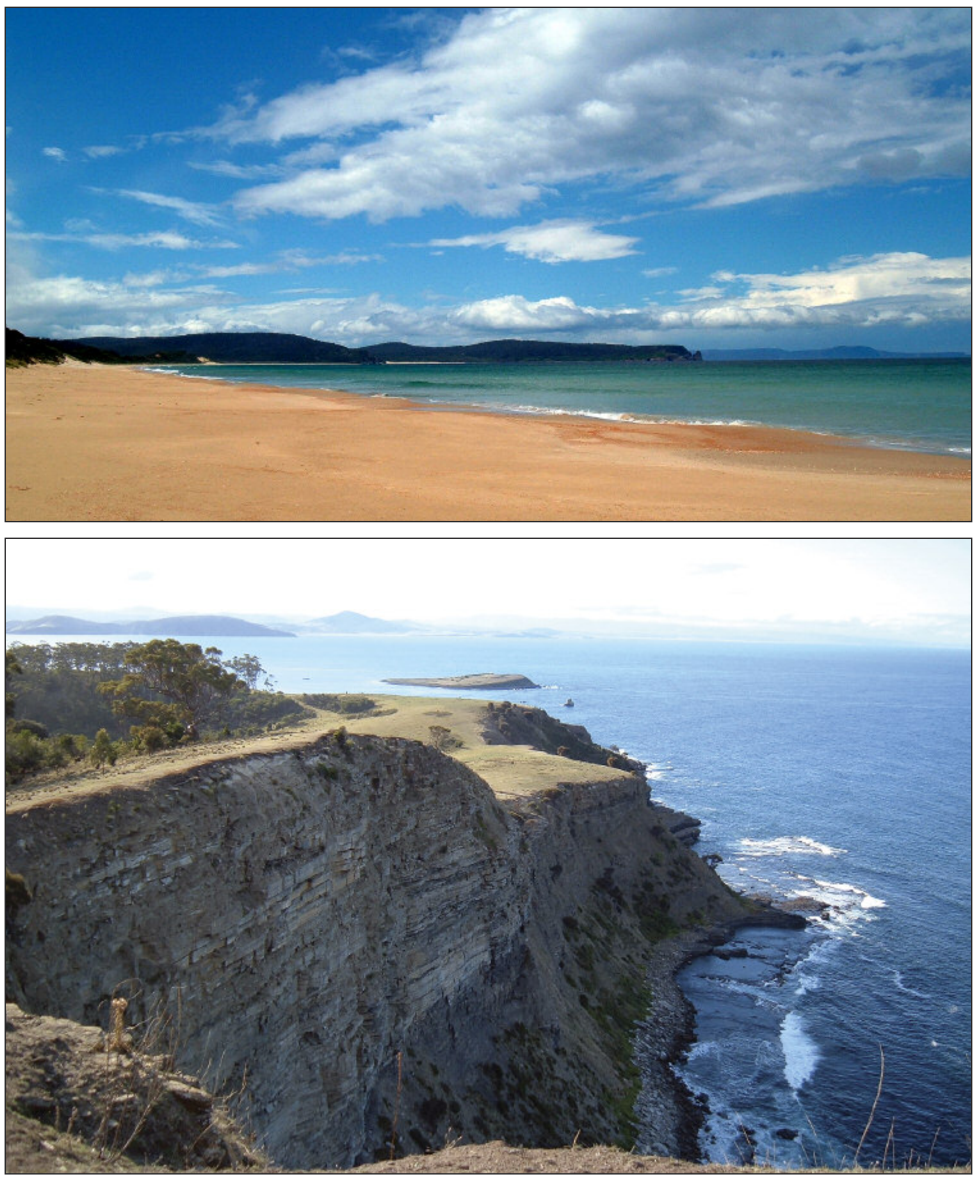
District of Lwówek Śląski

"Spirifer" Geological Society

Great new find of crocoites in Adelaide Mine – 2010 Pocket

Tomasz PRASZKIER & Adam WRIGHT

Logo of The Adelaide Mining Company.



Tasmania landscapes - The Neck Beach, Bruny Island (upper photo) and Maria Island (lower photo). E. Aheimer photos.

Continued from page 1

1880's. It is interesting to note that the first workings specifically targeting crocoite specimens were mined in 1899! After a long period of inactivity, the mine was reopened in 1957 exclusively for specimens. The first owners did not have much luck mining for crocoite. Fortune changed when the mine was acquired by Frank Mihajlowits.

For more than 30 years (beginning in 1973), the Adelaide Mine was owned by Frank Mihajlowits. His dedicated collecting brought to the world some of the very best crocoite specimens. In July 2004, The Adelaide Mining Company Pty. Ltd. (TAMC) purchased the Adelaide Mine lease and a new specimen mining program commenced.

The small-scale exploitation of the mine is handled by only a few miners. TAMC has a rule that at least two people have to be present on the mine lease whenever there is any underground work being done.

TAMC started working in 2004 and found their first good pocket (the Premiere Pocket) two years later in July, 2006. Since then, they have found only one small pocket (Kurt's Pocket) late in 2009 and there has been nothing else. The majority of mining until now has been hard work with no great return.

One of mine tunnels in Adelaide mine. A. Wright photo.

GENERAL GEOLOGY OF THE DUNDAS AREA

The geology of Western Tasmania is very complex. The region is underlain by rocks dating from Mid Proterozoic to Cenozoic age. Throughout this time, this part of Australia has been very active geologically. The rocks in Dundas area have been subjected to metamorphism, orogenic movements, intrusions, faulting, and mineralization.

Pb-Zn-Ag vein deposits at Dundas are associated with a Devonian intrusive event that emplaced granites into the host Cambrian serpentinites and sedimentary rocks, and to a lesser degree Precambrian slates. These veins are the primary ores for the metals in the Adelaide mine. The host rocks have been altered due to the hydrothermal activity related to the granitic intrusions and vein mineralization. Such alteration of sheared ultramafics is manifested by Fe-Ca-Mn carbonates, quartz, and chromian muscovite in an unusual rock type called listwanite. Close to the present day surface, the ore veins are strongly altered due to the deep Cenozoic weathering. Ca-Fe-Mn carbonates frequently dissolved during the process of weathering and were replaced by gossans. The gossans formed during oxidation are very porous with numerous open spaces, which are great places for the growth of crocoite and other secondary minerals.

GEOLOGY AND MINERALOGY OF THE DEPOSIT

The ore vein worked at the Adelaide mine is hosted by listwanite. The vein strikes NNW, dipping 50-60°NE, and is 13 m wide by 130 m long. The zone of oxidation reaches over 100 m in depth. The primary ore consisting of galena, sphalerite, pyrite, and jamesonite occurs below the oxidation zone and is surrounded by carbonates (predominantly Mn-siderite and dolomite) and serpentinite.

From the collectors' point of view, the most important mineralization occurs in gossans within the oxidation zone. The gossans host a number of minerals including, but not limited to crocoite, cerussite, dundasite (type locality), mimetite, coronadite, bindheimite, goethite, gibbsite, and philipsbornite. Of these minerals, only four are the subject of collector's interest.

Cerussite
Yellow crystals of cerussite forming quite big clusters, were found mainly in the 70's. Greenish cerussite crystals are also known from the locality. Presently, cerussite in macroscopic form is rarely found. It is however, known from a number of

Main adit to Adelaide mine. A. Wright photo.

different mines in the region where it occurs as spectacular specimens with complex twinning. At the moment, the mine is approaching the zone where there is again a chance to find cerussite.

Dundasite
Although not forming in spectacular specimens, dundasite is highly valued

Adam collecting specimens in the area of 2010 Pocket, note dirt on his clothes. B. Stark photo.

Footwall pocket found before the discovery of 2010 Pocket. Intense weathering caused specimens to fall apart, leaving mostly single crystals. A. Wright photo.

from the Adelaide mine as it is the type locality for this mineral. Locally abundant, it occurs as small, spheroidal clusters built of acicular crystals. The spheroids can reach 1 cm in diameter, but are typically much smaller. The dundasite crystals are usually white, but

One of the best specimens collected from 2010 Pocket before and after cleaning; crystals up to 13.5 cm. A. Wright photo.

more rarely are blue-green. Dundasite can occur with other minerals, occasionally forming a characteristic thin crust on crocoite crystals.

Mimetite
Mimetite crystals as large as 1 cm do occur, but are typically less than a few millimeters long. Mimetite is mostly light yellow-green in color, although rarely occurring in orange-red or red colors. The crystals of mimetite form classic habits for the species from tabular to prismatic. Occasionally they are found with highly distorted and etched forms.

CROCOITE AND ITS ORIGIN

Crocoite is a rare mineral that was first discovered in Russia and has since only been found in a few other locations around the world. Its most notable occurrence is in the Dundas region on Tasmania's West Coast. The Dundas area has produced the world's largest and best quality crocoite crystals in great abundance. Crocoite specimens from the Adelaide mine are renowned, with pieces displayed in museums, private collections, and educational institutions worldwide. In recognition of the significant crocoite deposits within the state, it was officially proclaimed the Mineral Emblem of Tasmania in 2000.

Crocoite crystals from the Adelaide mine usually exhibit hollow, "straw"-like or hoppered forms, and more rarely form chisel pointed crystals (especially in the smaller crystals). Color varies from deep red to pale orange-red. The luster can be variable from highly lustrous to dull. The crocoite crystals are usually covered with the mixture of gibbsite, Fe-manganese oxides, and sometimes white, or pale green dundasite. The size of crystals reach up to 15 cm, but are usually 2-5 cm.

The development of crystallized crocoite specimens is a function of very special circumstances and conditions. The most important among them is the surrounding rocks rich in Cr and Pb, and resultant re-mobilization of those minerals during shearing and later oxidizing conditions.

In the specific case of the Dundas region, we have two basic sources of Cr – firstly the ultramafic ophiolite complex (with chromites), and secondly, other Cr-rich rocks (such as listwanites rich in Cr-muscovite). There are also metalliferous veins with galena (source of Pb) occurring in the area. The coincidental co-occurrence of Cr and Pb is perfect for possible later crystallization of a special mineral like crocoite.

Thanks to deep oxidation (over 100 m!) by the acidic ground waters in the tropical paleoclimate (probably pH of water was <4 during this process), extensive alteration and weathering of primary rocks took place. During the alteration of serpentine, listwanites, and ore minerals (from the veins), lead, chromium and other metals were released into solution. The remobilized metals, along with oxygen, recrystallized in gossanous cavities, forming free growing crystals of crocoite and associated minerals. Because the remobilization of Cr is not so easy over large distances, the crocoites usually grow in the immediate vicinity of mineralized veins. It is worthy of mention that crocoite is stable in low pH conditions, so continued oxidation and weathering has not adversely affected crystal quality.

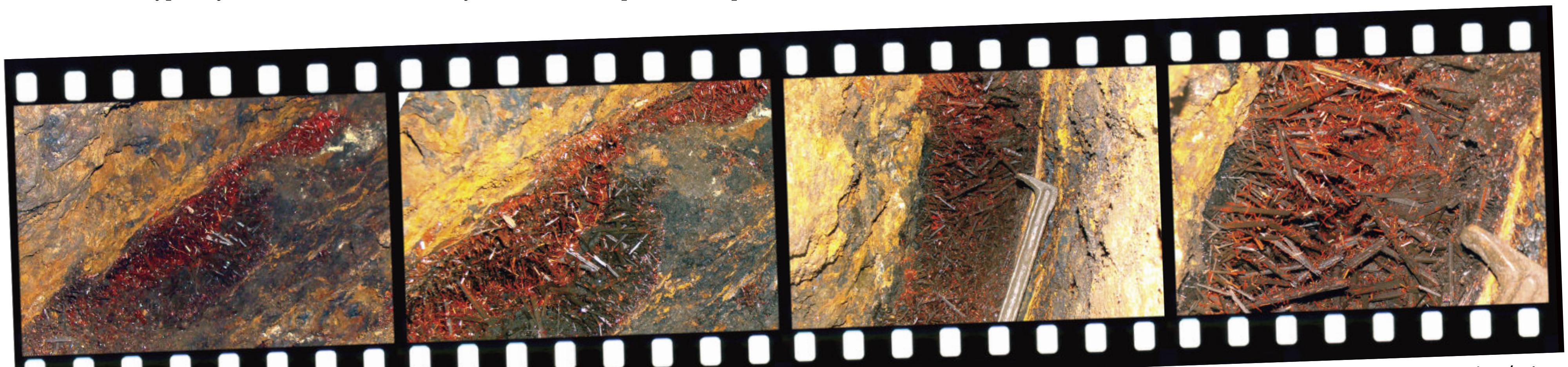
Additional elements released in the same weathering process were deposited in other minerals. The silver concentrated in chlorargyrite, zinc was diffused into numerous minerals, and lead into anglesite, cerussite, pyromorphite and coronadite as well as crocoite.

Fragment of 2010 Pocket with deep red crystals of crocoite still in situ, view about 15 cm. A. Wright photo.

Adam Wright – co-owner of Adelaide mine – after day of working in the mine. A. Wright photo.

FAMOUS POCKETS

The first of the famous Adelaide mine crocoite pockets for which we have recorded history, was found in the early 1970's. It was followed twenty years later by the much larger pocket of the early 1990's. No accurate records were kept on the size of the 1970's pocket but several verbal accounts detail it as being a pipe which travelled upwards for several meters in length.



Photos of different parts of 2010 Pocket, size of crystals up to 13.5 cm. A Wright photo.

Crocoite, 8.7 cm high. Gobin specimen. J. Scovil photo.

It has been reported that only around 20% of this pocket was actually recovered intact and the rest was destroyed during the process of extraction. It is unknown exactly how many specimens this pocket produced but it would probably be in the hundreds rather than the thousands. Of those produced only a very small percentage were in the upper echelon of mineral specimens.

The "1990's Pocket" was the biggest by far at up to 1 meter wide, 14 meters long and 10 meters deep. This pocket produced thousands of good specimens over the roughly 10 years it took to mine. Although there were many more specimens recovered from this pocket than others, it still only yielded a very small percentage of top quality specimens.

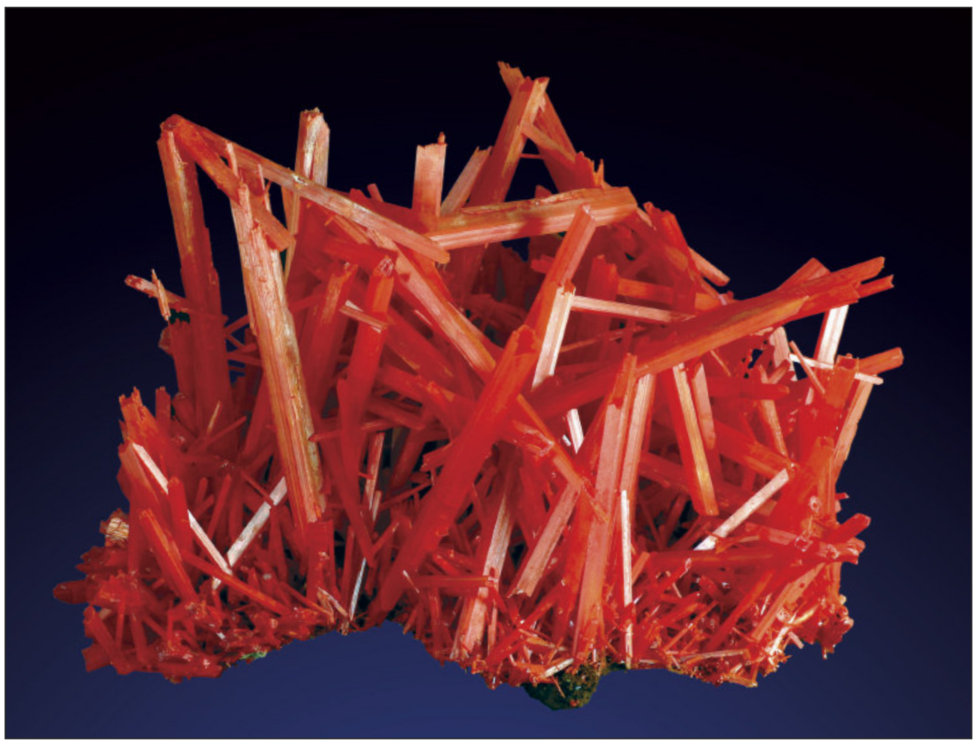
The small percentage of top pieces might be related to the method used to clean the crocoites. Anyone who visited the mine in the 1990's might recall seeing a garden hose with a high pressure nozzle perched on a tree stump, blasting water at crocoite set on an adjacent tree stump. Any specimen not broken to pieces eventually made it onto some collector's shelf. The heaps of orange crystals around the tree stump were testament to the fragility of the matrix pieces!

The trend of a twenty year interval between big finds seems to have continued to the present, as another great pocket was found by TAMC in 2010.

PROGRESS OF MINING IN 2010

The mining in 2010 commenced with completion work on the raise started in 2009, and development of a new level from the top of the raise. The new drive followed the vein, going farther into the hill, with the intention of intersecting the cavity at the top of the Premiere Pocket. The vein continued to widen slightly as mining progressed both in, and up along the structure. The amount of visible crocoite began slowly increasing, and the vein walls became more and more cavity-rich. Mining continued, ramping upwards a little following encouraging signs of mineralization and softer ground. The crocoite continued to improve as mining progressed further, although at this stage there was still very little specimen quality material. Crocoite always looks very nice *in situ* underground, but much of it has a matrix of loose dirt or is not held together at all, making much of it nearly impossible to recover complete. It was at this point in development that the vein ahead seemed to be getting a bit narrower, and the walls getting a bit harder, so drifting was detoured up a bit higher to avoid this restriction. It was at this point, while clearing out muck from the back a thick solid seam of crocoite about 10 cm wide was exposed... the discovery of the 2010 Pocket.

Adam Wright with the best specimens from 2010 Pocket after cleaning, note size of crystals and intesity of color. E. Aheimer photo.



High quality crocoite specimens recovered from 2010 Pocket; size of specimen 16 cm, crystals up to 9.5 cm. A. Wright photo.

One of the best crocoite specimens recovered from 2010 Pocket; size of specimen 16,5 cm, crystals up to 10 cm. A. Wright photo.

2010 POCKET

The new pocket, cleverly named the "2010 Pocket", turned out to be very good indeed. It was about 2 meters long by 1 meter high and up to 45 centimeters wide. The pocket took a bit over two months to extract, working roughly four days every second week. The mining was very hard, dirty work, and after four days a break was necessary to recover.

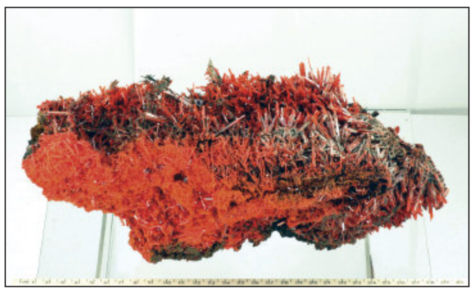
The crystals growing off the pocket footwall mainly formed in radiating sprays and were better supported on matrix, so more of the crystals survived. The crystals which had grown on the hanging wall had their weight and physics working against them so more of them seem to have fallen, leaving mainly smaller crystals and only those bigger crystals which had grown in more gravity friendly positions. Piles were found at the bottom of pocket containing large numbers of loose crystals and detritus. It seems likely that while the first generation crocoite crystals were growing bigger and heavier, the matrix to which they were attached got softer and weaker until some of them could no longer be supported and they fell to the bottom of the pocket.

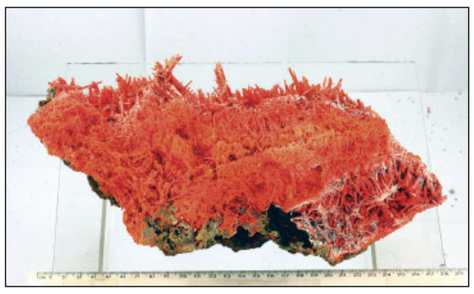
At some point after crystal growth, the large crocoite crystals were coated by ferro-manganese oxides. The coating, even though it at first glance may seem to spoil the aesthetics of specimens, may have interrupted crystal growth and stopped the crystals from spanning the whole space and becoming a solid seam

Another top quality crocoite specimen from 2010 Pocket with crystals up to 9.5 cm. A. Wright photo.

instead of remaining an open pocket. Over time more detritus dropped down and this accumulated mostly onto the higher sides of the footwall's radiating clusters. A thin coating of dundasite and gibbsite was then deposited, mainly over the exposed upper surfaces of the crocoite crystals. After that, additional ferro-manganese oxides appear to have been added. The final stage was the growth of another generation of crocoite crystals, being the small bright red crys-

Fragment of 2010 Pocket with clean crystals of crocoite and part where crystals are covered by coating of black Fe-Mn oxides. A. Wright photo.





One of the first specimens collected from 2010 pocket, before and after some cleaning; size 29 cm, the longest crystals up to 5 cm. A. Wright photo.

tals coated over the top. When this last growth of crocoite occurred it also had the affect of rehealing many of the broken ends on the fallen crystals and their stumps by creating multiple small terminations on their large ends.

SPECIMENS FROM 2010 POCKET

There were around 350 collector grade specimens recovered from the 2010 Pocket, not counting the many loose single crystals found in the detritus at the bottom of the pocket. These specimens range in size from thumbnail to very large cabinet. The color of the crocoite from the 2010 Pocket was quite variable, and covers the spectrum from intensely bright orange through very deep red. The largest crystals from the 2010 Pocket are 14 cm in length, probably some of the longest known that are not contacted or broken.

As previously discussed, a large percentage of specimens come out with a dull black coating over the larger crocoite crystals. These are bathed in several different chemicals to remove the ferro manganese oxides, gibbsite, and dundasite coatings from the crystals. This process reveals the bright color and shiny luster which was hidden underneath.

COMPARING 2010 POCKET WITH OTHER FAMOUS POCKETS

The 2010 Pocket was similar in size to the 1970's pocket and thus not the largest, but many of the specimens from this latest find rival those of the two earlier finds in terms of their quality. Most probably, the large crystal size and color intensity of the 2010 material has only ever been matched by a very small number of the 1970's specimens. The more typical and well known material from the 1970's is the radiating sprays of gemmy red, sharply terminated crystals, however it seems that there was also a small amount of material recovered back then which was very similar to the new 2010 Pocket specimens. There were apparently so few pieces of this style and quality in the 1970's material that they are seldom seen or even heard of.

CONCLUSION

The 2010 crocoite pocket is one of the best, or perhaps simply "the best" pocket in Adelaide mine history. Looking to the cyclical 20 year interval between finds, we will probably have to wait until 2030 to see another great find! Let us hope this is not the case and that more great material is found a lot sooner! To this end, we wish Adelaide Mine crew Gluck Auf!

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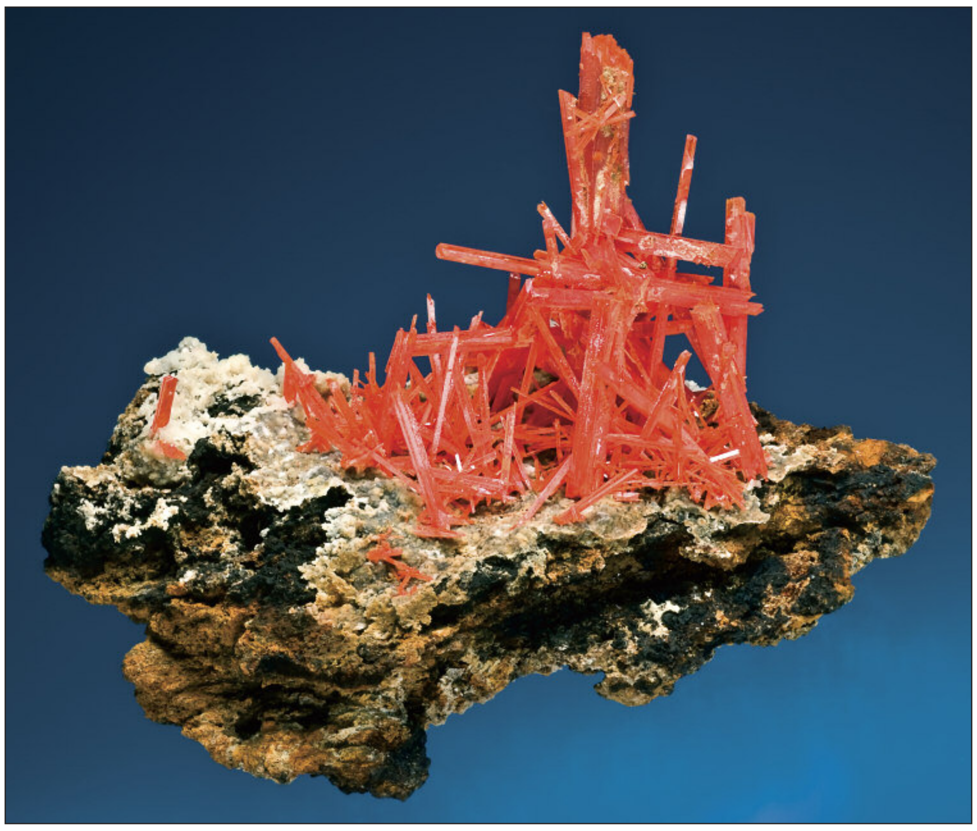
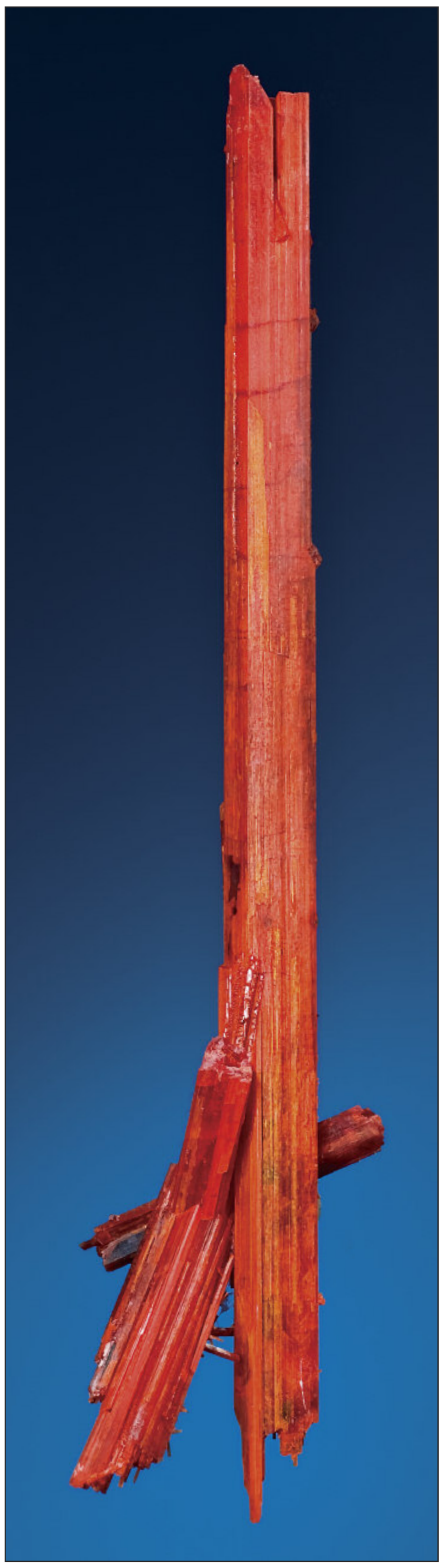
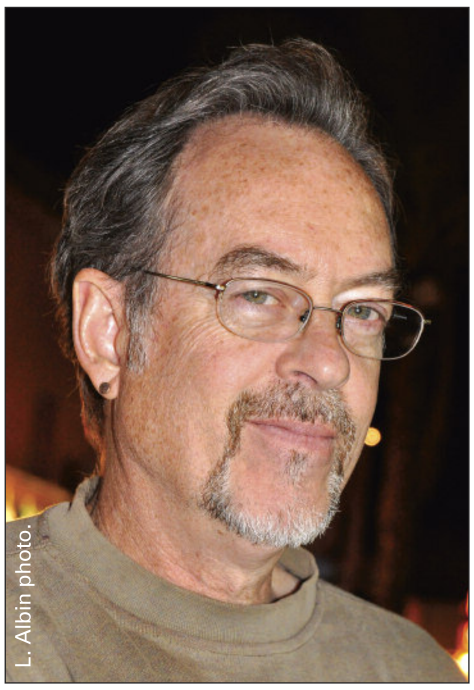


Group of red-orange crystals of crocoite on matrix, 9.6 cm wide. Gobin specimen. J. Scovil photo.



Crocoite, 10.7 cm high. Spirifer specimen. J. Scovil photo.

Collector interview: Jeff Scovil



Jeff Scovil – world famous mineral photographer and not so famous collector.

In this first issue of our newspaper, we start a regular column – interviews with well known and interesting collectors. For our first interview – famous photographer and not very well known collector – Jeff Scovil !!


Calcite on dolomite, 6.5 cm high. Shangbao, Hunan, China. Collection and photo J. Scovil.

Tomasz Praszkier (Minerals): *Jeff - You are probably known to mineral collectors all over the world - your photos of mineral specimens and jewelry are recognized as some of the best in the world, but I think that not many people know that you are also a mineral collector. Please tell us how you began your mineral collecting.*

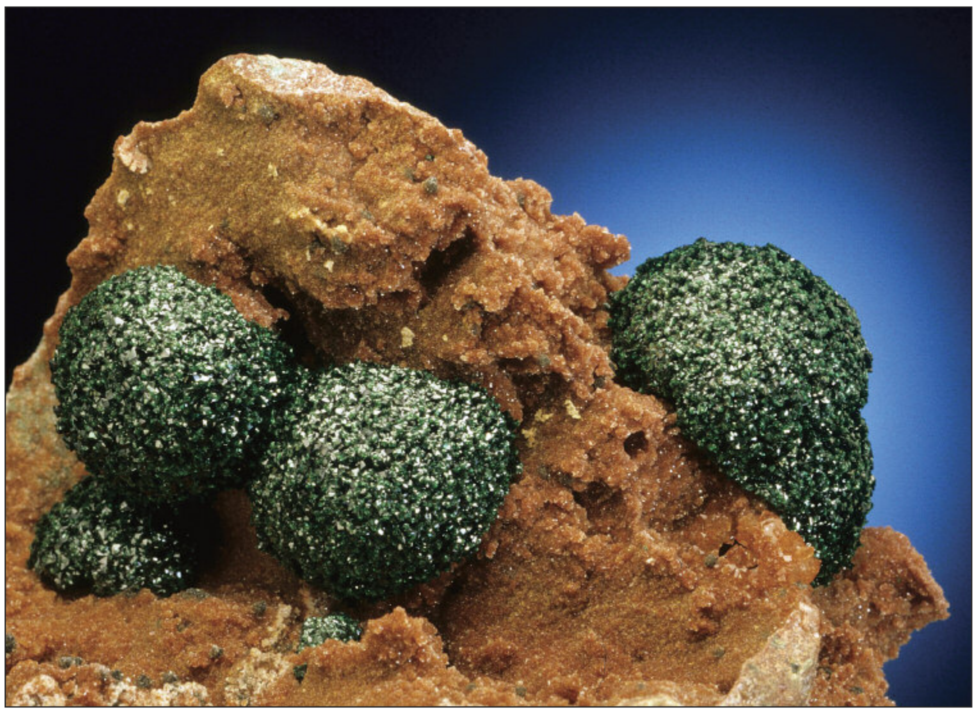
Jeff Scovil: I probably have my father to blame for my mineral collecting. He was an oil geologist, and although he did not stick with it, I remember that he had a small collection of rock samples and he always kept his geologist's pick. These things probably first caused me to have an interest in the earth sciences. I was about eight years old when I started collecting minerals. Later in junior high school, I took my first class in geology and also joined the junior staff at a local natural history museum for children (the Mid-Fairfield County Youth Museum in Westport, Connecticut). There I worked on displays and curating the collection. This was followed by the geology club in high school, and of course lots more field collecting once I got my driver's license.

TP: *What are your favorite minerals and why?*

JS: My favorite minerals are tourmaline and fluorite. Minerals of the tourmaline group come in such a wide variety of colors and wonderful associations. It is a group I became familiar with and could collect in Connecticut where I grew up. Fluorite also comes in a wide range of colors and a much wider range of crystal forms and occurrences. It also helps that it is much less expensive than tourmaline.

TP: *What do you value most in mineral specimens?*

JS: What characteristics do I value most in minerals? That is a tough question. Unlike many collectors today, I am actually interested in mineralogy. I find associations, paragenesis and morphology particularly fascinating. I will buy an inexpensive quartz or calcite for strange forms or an odd locality just as quickly as a beautiful specimen from a classic locality.


Malachite clusters to 1.4 cm. Kalatala mine, Katanga, Democratic Republic of Congo. Collection and photo J. Scovil.

TP: *What type of specimens do you collect and how big is your collection?*

JS: I collect a little bit of everything. I prefer small cabinet size (ca. 10 cm) but if I like a piece and it is within my budget I will buy it even if it is not my preferred

Jeff showing photography to children of the Bara tribe in Mandrosonoro, Madagascar.

size. I do have a soft spot for minerals from Connecticut where I grew up and Arizona where I have lived for the last 34 years. I probably have about 2,000 pieces in my collection which is definitely in need of thinning out.

TP: *How do you obtain specimens for your collection? Are they self-collected, bought at the minerals shows or from miners?*

JS: I used to do a lot of field collecting and enjoyed it very much. Now that I travel so much, I have little time to field collect anymore and so I collect mostly by purchase. Many are bought at mineral shows and a few are gifts from friends in the business. I have even traded specimens for my photographic services. I have never bought a specimen via the internet. On a few of my trips I have bought directly from the miners.

TP: *Which of your self-collected specimens do you consider to be the best ?*

JS: It is difficult to say which of my self collected specimens is the best or favorite. When I was able to collect at the Gillette Quarry in Haddam Neck, Connecticut in the early '70s I hit one good pocket with one good green elbaite that has a blue cap. That holds a special place in my collection. I also collected a pretty good group of barites from the Book Cliffs near Grand Junction, Colorado. When I was in undergraduate school in the early '70s I also collected a fine though small, highly modified, color zoned fluorite crystal from the Old Tungsten Mine, in Trumbull, Connecticut. Not too many collectors would think it is all that great but a self collected specimen is always more special to me than a purchased specimen.

TP: *I know that you travel a lot visiting mineral localities all over the world - please tell us which countries you have visited and which localities you liked the most ? Also, which collecting trip was the most exciting for you ?*

JS: There is a difference between field collecting and mineral tourism. I think that the most exciting collecting I have done was a series of trips I did to a road cut in New Britain, Connecticut. I wrote about it in an article in Rocks and Minerals magazine in the spring of 2009. My favorite mineral tourism trip was the one I took in the summer of 2009 to Madagascar with you, Tomek! We visited mostly pegmatite localities and bought


Lorenzenite crystal 3.1 cm long, from Lovozero, Kola Peninsula, Russia. Collection and photo J. Scovil.

Wavellite, 2.5 cm high. Mauldin Mountain, Arkansas, USA. Collection and photo J. Scovil.

specimens from the miners as well as in town markets and from the mineral venders who always seem to find you at your hotel or restaurant.

Smoky quartz with spessartine garnet. Tongbei, Yunxiao County, Fujian, China; size 5.5 cm. Collection and photo J. Scovil.

I think I have the best job in the world because I get to handle and photograph amazing things, go behind the scenes and know so many of the people in this business. I also get to travel to many exotic and classic localities. I have been to the silver mines in Kongsberg, Norway, many localities in Hunan, China, pegmatites in Minas Gerais, Brazil, and mines in Bulgaria, Canada, England, France, Kosovo, Morocco, Poland, Romania and Spain.

Schorl, crystal size 1.2 cm long. Timm's Hill, Haddam, Connecticut, USA. Self collected and photographed by J. Scovil.

TP: *Where else are you planning to go to see the minerals in situ in the outcrops?*

JS: I look forward to going to India and Australia some day.

TP: *Do you photograph your own specimens ? How many photos of them do you have ?*

JS: I don't often photograph my own specimens because I have the opportunity to shoot so many much finer specimens in other collections. Through the years I have shot around 200 of my own specimens.

TP: *Being the photographer who takes pictures of the best specimens in the world, do you ever get the feeling that it is pointless to collect just the specimens of "normal quality" How do you deal with that ?*

JS: Years ago I used to get a little depressed when comparing my own sad collection to the very fine collections that I photograph on a near daily basis. I felt that I should just shovel my collection into the trash. I did get over feeling that way and realized that you cannot compare your own collection to other's and continue to collect on your own. When you collect for yourself you collect because you love the specimens and they are special to you – that is enough. You should only compare your specimens to what you have collected in the past and how you will upgrade them in the future.

TP: *Now a few questions about the photography that is your profession. How many photos do you have in your library ?*

JS: I have been photographing minerals professionally now for over 20 years and as an amateur for 15 years before that. I have about 60,000 35 mm slides, around 12,000 digital images and about 7,000 4x5 inch transparencies in my library.

Jeff and his girlfriend Leslie on camels in Moroccan desert.

TP: *How do you select the specimens for photography ? Who decides which specimen is going to be photographed?*

JS: The choice of specimens varies. Sometimes the owner has very set ideas on what he wants photographed and other times I make the decisions. A very fine specimen is not always terribly photogenic and I usually have a better knowledge of that difference than the owner. The usage of the photographs will usually determine the choice of specimens. Owners will usually be very familiar with their own specimens and which sides are the best and where there are less desirable aspects that should not be emphasized. The choice of specimens and the view of them is usually a joint effort between myself and the owner.

TP: *What should a collector do if he/she wants to have you photograph their minerals?*

JS: If a collector is interested in having me photograph their specimens, they can contact me by email, phone or just show up at one of the shows were I set up my studio. I photograph at several mineral shows in the U.S. and in Europe – Tucson, Arizona; the Rochester (N.Y.) Mineral Symposium; Cincinnati, Ohio; Sainte-Marie-aux-Mines, France; Springfield, Massachusetts, USA; Denver, Colorado, USA; and Munich, Germany. I often photograph at people's homes, places of business or at museums when I am in the area on one of my trips or by special arrangement if the number of specimens warrants it.

Jeff in Southern Madagascar with two chameleons.

TP: *Thank you for the interview. We wish you many great adventures!*

Interview: November 2010

Jeff crawling in tight workings, with flashlight in his mounth, inside an almandine garnet-rich pegmatite, Central Madagscar.

Jeff's mineral cabinet in his house in Phoenix, Arizona, USA. J. Scovil photo.

Jeff in Kosovska Mitrovica (Kosovo) with museum size specimen from Trepca mine. T. Praszkier photo.

Wavellite/variscite on quartz, 4.5 cm wide. Wiśniówka Wielka, Świętokrzyskie Mts, Poland. Collection and photo J. Scovil.

Jeff with Spirifer team-members Tomasz Praszkier and Andrzej Grzesiuk at the Trepca mine main adit.

Jeff with Tomasz Praszkier and Joanna Gajowniczek (both from Spirifer team) in Tsingy Bemaraha National Park, Western Madagascar.

"Master" at work during a photography workshop in Lwówek Śląski, Poland. D. Antosik photo.

Cerussite on baryte, 8.1 cm wide. Mibladen, Morocco. Collection and photo J. Scovil.