Abstracts

The Twenty-ninth Annual New Mexico Mineral Symposium was held November 8 and 9, 2008, at New Mexico Institute of Mining and Technology, Socorro. Following are abstracts from all talks given at the symposium.

A 2007 HERKIMER “DIAMOND” DIG AT MIDDLEVILLE, NEW YORK

Jeff Fast of East Haddam, Connecticut (JBF Mining, Socorro, NM), conducted a commercial dig at the Herkimer Diamond mines site in Middleville and extracted 38 pockets of quartz. In addition, the author’s father (John Medici) and brother (Brett Medici) visited in October and found four pockets in the fee digging area of the mine.

Collecting at this site usually involves removing 8 ft of overburden consisting of fairly tough limestone. Beneath the overburden is a 1–2-ft-thick layer known as the “table,” which is highly silicified dolostone (Ulrich 1989) and is extremely tough. The larger pockets are found in the center of this layer and vary from 1 to 6 ft in diameter. One pocket can contain thousands of crystals, from sand grain size to “goonies” the size of grapefruit. The most desirable crystals are in the 1–2 in range and almost perfectly clear. A good rule of thumb is that it takes as long to remove the overburden as it does to lift the table.

As commercial diggers, we dug in a private area of the mine with 4 ft of overburden, which was blasted before the dig. The blast was interrupted by an electrical storm and a curious neighbor in an ultralight flying over the blast area. An excavator removed the blast pile for us, leaving approximately 2 ft of overburden and the table. Our tools consisted of standard sledgehammers, chisels made from jackhammer tips, a hammerdrill (to help set chisels), and a diamond chainsaw for removing entire pockets. By contrast, the general public is limited to 12-lb hammers and lots of pockets. Recovered specimens were typical of Herkimer “diamonds,” with a few outstanding ones (see the cover of Rocks and Minerals, May/June 2008 for a skeletal group belonging to Jeff Fast). Late in the dig, Pocket #32 had an abundance of phantom quartzes, each of which had a black core overgrown with clear quartz, which was unusual for Middleville.

Four and a half matrix pockets were cut out during the dig, one of which is in the process of being put on display in the mine museum. This is the same locality where the Medici family found the pocket now in the Smithsonian. The author and Jeff Fast thank the owner of the mines, Renee Shevat, for the opportunity to collect and for her hospitality during the dig. Weather and time limited the dig to the end of November. Overall, it was an unusually long dig and covered quite a large area for this locality.

References


MICROMINERAL OCCURRENCES, STEEPLE ROCK DISTRICT, SUMMIT MOUNTAINS, GRANT COUNTY, NEW MEXICO, Robert E. Walstrom, walstromminerals@gilanet.com, P.O. Box 1978, Silver City, New Mexico 88062

In 1846 Lieutenant William H. Emory led a detachment of topographical engineers across an area southwest of Santa Fe for the purpose of establishing wagon roads. After visiting the Copper mines at Santa Rita, the group moved to the Gila River and down that waterway to camp at a point at what is now the border between New Mexico and Arizona. To the north the group observed a distinctive rock formation and by consensus named the edifice Steeple Rock. The name was duly noted in the margin of their survey map. It was not until the 1860s that mineralization was noted northwest of Steeple Rock. However, it was not until 1880, after the Indian threat had abated, that the Steeple Rock district was organized and mining begun. The district is located about 15 mi northeast of Duncan, Arizona, approximately 5 mi inside Grant County, New Mexico. The district, from 1880 to 1993, produced approximately 151,000 oz of Au, 3.4 million oz of Ag, 1.2 million lb of Cu, 5 million lb of Pb, 4 million lb of Zn in addition to commercial amounts of fluorite and manganese. At present the Summit mine is being prepared for commercial mining. Production is projected to start in early spring of 2009 with milling taking place at a locality near Lordsburg.
Rocks exposed in the Steeple Rock district are essentially a sequence of Tertiary units consisting of andesite, basalt, andesite, dacite lavas. Mineralized epithermal quartz veins are structurally associated with generally northwest-southeast trending faults. Vein matter consists of quartz as much as 10 ft wide with some reaching several miles long. Ore minerals include: gold, silver, acanthite, gold, willemite, chalcanthite, fluorite, cerussite, chalcopyrite, pyrite, and associated minerals. Published mineral species for the district include: acanthite, albite, alunite, augite, azurite, barite, biotite, calcite, chalocite, chalcopyrite, clinozoisite, chrysocolla, cuprite, digenite, dolomite, duftite, goethite, gypsum, libethenite, malachite, mimetite, mottramite, pyrosludite, siderite, smithsonite, vanadinite, and willemite.

<table>
<thead>
<tr>
<th>Mines</th>
<th>Significant microminerals</th>
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<tbody>
<tr>
<td>Alabama</td>
<td>acanthite, gold, desclozite, mottramite, silver</td>
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<tr>
<td>Bilali</td>
<td>gold</td>
</tr>
<tr>
<td>Carlisle</td>
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<tr>
<td>Copper</td>
<td>libethenite, copper, cuprite, brochantite</td>
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</tr>
<tr>
<td>East Camp</td>
<td>gold, fluorite, barite</td>
</tr>
<tr>
<td>Bluebell</td>
<td>azurite, chalcopyrite, malachite</td>
</tr>
<tr>
<td>Davenport</td>
<td>desclozite</td>
</tr>
<tr>
<td>East Camp</td>
<td>desclozite</td>
</tr>
<tr>
<td>Golden Nugget</td>
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</tr>
<tr>
<td>McDonald lode</td>
<td>desclozite</td>
</tr>
<tr>
<td>Hilltop</td>
<td>desclozite, chlorargyrite, mimetite</td>
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<tr>
<td>Hoover tunnel</td>
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</tr>
<tr>
<td>Jim Crow</td>
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<td>Imperial</td>
<td>acanthite, mottramite, desclozite, aurichalcite</td>
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<td>Laura</td>
<td>silver, desclozite, mottramite, chlorargyrite</td>
</tr>
<tr>
<td>Mohawk</td>
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<tr>
<td>Mount Royal</td>
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<td>fluorite</td>
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<tr>
<td>Ontario</td>
<td>fluorite, cerussite, chalcopyrite, azurite</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>fluorite, gold, smithsonite, azurite, cerussite</td>
</tr>
<tr>
<td>Summit</td>
<td>gold</td>
</tr>
</tbody>
</table>

Most of the larger mines have been patented or otherwise are located on private property, and permission to collect must be obtained for access. Roads are gravel or compact dirt and include Carlisle Road approaching from the southwest and Bitter Creek Road approaching from the northwest, both of which are well marked and county-maintained.

Although the Steeple Rock district did not appear to have many possibilities for collectable mineral specimens when researching the published data, on the ground searching of the dumps and mines turned up a surprising number of collectable items. However, only a cursory examination was conducted during the current study for some of the more than 60 significant mines around the district. Additional systematic examination is sure to turn up many more interesting minerals. As a reminder, this is an active mining area, and caution should be exercised to avoid mining activity on the haulage roads and mine sites. It should be additionally noted that several large rattlesnakes were encountered during this study, all in the southern part of the district.

Acknowledgments

Special thanks are extended to Dr. Anthony Kampf, Natural History Museum of Los Angeles County, and Dr. Robert Housela, Pasadena, California, for mineral specimens analyses, and to Leslie Billingsley and Richard Billingsley for allowing access to private property in the district.

References


NEW MEXICO’S CLASSIC MINERAL LOCALITIES

Peterson, P. J., 1994, Minerals of New Mexico, 3rd ed., pmodreski@usgs.gov, U.S. Geological Survey, MS 150, Box 25046, Federal Center, Denver, Colorado 80225-0046

The theme of the 2008 Tucson mineral show and the FM-TGMS-MSA mineral symposium there was “Classic U.S. Mineral Localities.” In a paper I presented at that symposium, “What is the ‘most important’ mineral locality in the U.S.?” I surveyed and compared prominent U.S. localities and attempted to answer my own question. As a follow-up to that presentation, here I will try to review New Mexico’s most famous localities in the same way and, in the process, see if there is an obvious answer to which of the state’s “classic” localities is the most renowned for mineral specimens.

To try to assess the most outstanding localities in a quantitative or “scientific” way, I had explored several methods of surveying the popular and scientific literature. These included searching for the number of times localities were mentioned in the Mineralogical Record’s cumulative index; and in GeoRef, the American Geological Institute’s comprehensive geoscience literature database; and the number of “hits” for locality names online on google.com.

There are, of course, a variety of criteria that one could consider as to what constitutes the “most important” locality: the quantity of specimens that have been produced from the locality, the number of different species known to occur, the number of type species described, the overall contribution of studies of the locality to the scientific literature, or the general accessibility and quantity of collectable specimens produced from the locality. In comparing localities, I have approached the problem of localities that differ in geographic extent—a single mine or field site, versus a group of nearby mines or district, versus broadly distributed “localities” that encompass an entire town, county, province, region, mountain range, or geologic formation. The localities included in this study are outstanding sources of one single mineral, versus localities known for a wide variety of uncommon species, but perhaps occurring only as small, sparse, micro, or indifferently crystalized specimens.

For the Tucson talk comparing U.S. localities, I decided to base my “conclusion” on a survey of the number of times specimens from each locality were pictured in a total of 10 popular books depicting “superb” mineral specimens—recognizing, of course, that this criterion would emphasize only localities that had produced the most exquisite, showy, and valuable specimens. The 10 books were:

- Smale, S., 2006, The Smale Collection, Beauty in Natural Crystals.

Illustrations from the 10 books amounted to a total of 400+ photographs from some 108 nationwide localities. (Having had access at the time to the table of contents but not a full copy of American Mineral Treasures, I was not able to tabulate the photos in it, so I simply tallied the localities represented therein without counting photographs.) I have to report, with regret, that in this survey, although a few New Mexico specimens were pictured in these source books, none of the New Mexico localities made it into the top nationwide localities, or even into the “top 25.” Those New Mexico localities from which specimens did manage to eke out an appearance in any of the above 10 books were:

- Kelly mine (two photos, as I counted them at the time; in fact, there were 11, because 10 photos actually appeared in American Mineral Treasures—all of Kelly smithsonite),
- Chino mine (two photos, both of crystallized native copper), and
- Grants uranium district (one photo, uranophane).

For those interested, the result of my survey of the U.S. localities was that the localities appearing most frequently in illustrations in the 10 named books were the California gold-producing region and the Keweenaw copper district of Michigan; recognizing, of course, that both of these are regions, not a single mine, with the California districts encompassing parts of some six counties. California gold specimens appeared in photographs 37 times and were the only locality or district pictured in every one of the 10 books; photographs of Keweenaw copper and associated minerals appeared 45 times, in nine out of the 10 books. The individual locality (still not strictly a single mine, but basically one deposit) ranking the highest was Bisbee, Arizona, with 17 photos appearing in nine out of 10 books. “Runners-up” were the Pala pegmatite district of California (24 photos in seven out of 10 books), the Sweet Home mine (13 photos in eight books), the Pikes Peak pegmatite district (10 photos in eight books), and the Red Cloud mine, Arizona (10 photos in eight books). Focusing the discussion back to New Mexico, localities that might rank as classic and which
MINERALS OF THE LESSER MINES OF THE SAN JUAN MOUNTAINS, Barbara L. Muntyan, 3500 S. Beryl Avenue, Tucson, Arizona 85735

(LOCATION 1 ON THE INDEX MAP.)

The San Juan mountain range is located in the southwest quadrant of Colorado at the end of the Colorado mineral belt. These mountains are relatively young by geologic standards, being about 15–20 m.y. old. With the exception of the Red Mountain mining district’s breccia pipes, massive quartz veins contain gold, silver, pyrite, galena, fluorite, barite, sphalerite, and other common species such as rhodochrosite, hübnerite, chalcopyrite, and tetrahedrite. These species commonly occur in large, well-formed crystals, generally as much as 2 m long, but sometimes found as long as 12 in.

Three counties contain the San Juan Mountains: Ouray, San Juan, and San Miguel. There are approximately 10,000 patented and unpatented mining claims in each of these counties but only a handful of large mines. The Camp Bird, the Sunnyside, and the Ildarlo mining districts are the largest (and best-known) mines of the region, each employing more than 300 miners during their peak production years. But dozens of smaller mines employed anywhere between 5 and 50 miners, and many more were merely one-man operations. Many of these mines still had accessible workings during the last 30 yrs, including:

San Juan County

- Adams
- Bandora
- Ben Franklin
- Brooklyn
- Bullion King
- Esmeralda
- Eureka Gulch
- Galti Boy
- Genoa
- Gold Lakes
- Growler
- Hemitite Gulch

Ouray County

- Bachelor mine—Located in the Pacquin mining district north of Ouray, this blanket-type deposit contained some notable cream-colored scalenohedral calcite crystal groups found on a matrix of dark, silicified limestone, as much as 5 in wide, in vugs near rolls in the silver-bearing veins. 
- Black Girl—This mine is located in the Pacquin mining district, directly south of the Senora mine. Milk-white, tabular barite crystal clusters, in association with small, clear quartz druses, were recovered here. Also, in one zone in the main haulage tunnel, limonite-impregnated rhombohedra calcite crystals were found as “wheat-sheaf” doubly terminated rutilated crystals to 2 in on a near-black silicified limestone. Nice selenite clusters to 3 in wide have also been found.
- Boney Hensel—Located on the north end of the Pacquin mining district, this mine has produced clusters of white barite blades as large as 8 in on edge, some with inclusions of manganese oxide on one side, from a tube on the main haulage.
- Crystal Cave—This is a huge solution cavity in the Leadville limestone, perhaps 50 ft wide, along the north side of Canyon Creek. Scalenohedral, gray to light-brown calcite crystals as much 2 in long are found covered with a druse of clear quartz crystals. Some larger water-clear quartz crystals to one-half inch are found as sceptered crystals.
- Daniel Bonanza—This mine is located high above the west side of the Uncompahgre Gorge. It is reached via a precarious trail blocked by fallen timber and slide rocks. Rose-pink rhodochrosite crystals to 1 in, covered with a druse of gemmy quartz crystals in groups as much as 5 in wide, were found at the bottom of one shaft, as well as a few on the mine’s dumps.
- Gertrude—Located at the north end of Ironon Park on the west side of Red Mountain Creek, this small mine has produced fine quartz-coated octahedral fluorite crystals to 3 in on edge from the two adits.
- Goodfro #2—In an exploration shaft, large groups to 12 in wide of chocolate-brown scalenohedral calcite crystals (looking like furry hedgehogs) were recovered. One vug in this shaft had cream-colored calcite crystals of the same habit. Another nearby vug contained smooth calcenohedral of calcite coated on one side with brown sheen.
- Grizzly Bear—The original claims for this mine were located in 1875 along Bear Creek, now in a wilderness area. There was a tunnel driven from outside of Ouray to intersect the old workings of this gold/silver mine in recent years. The mine’s vein system is similar to that of the Sunnyside mine, and the specimen material is also comparable. Fine rhodochrosite rhombs to 4 in on edge, green octahedral fluorite clusters implanted on large, barrel-shaped white quartz crystals in plates to 18 in wide, dark resin color to black sphalerite crystals to 1 in diameter, light-brown calcite scalenohedra, and small chalcopyrite and hübnerite crystal groups have come from the Grizzly Bear.
- Longfellow—Located on the most southerly breccia pipe in the Red Mountain mining district, this mine is notable for fine large enargite crystals to almost 1 inch in plates as much as 5 in wide. It also produced hopper-terminated white quartz crystals to approximately 2 in.
- Mineral Farm—One of the earliest mines near Ouray, it was so-named because the mineral-rich veins copped out along the surface and could be extracted using a hoe, rather than harvesting potatoes. It produced blocky, cream-colored barite crystals to 2 in on edge, as well as very fine pseudomorphs of quartz after scalenohedral calcite crystals to 3 in, implanted on gemmy quartz point clusters.
- Morning Star—Located near the better-known Mother Cline mine, this mine contains nice groups of gemmy quartz crystals to approximately 1 in long.
- Mother Cline—Named for the wife of Ouray’s first mayor, the mine is located on the south mountainside above Engineer Pass. It has produced white barite crystals commonly edged with a gemmy quartz druze. Also large clear quartz crystals to 3 in wide were found, and also nice clusters of bone-white quartz crystals as much as 3 in long.
- Mountain Monarch (Mickey Breen)—This mine is located approximately 1 mi from the mouth of Engineer Pass. Lovely rose-red rhodochrosite rhombs to 2 in wide sometimes coated with a fine-grained quartz druse and dotted with small chalcopyrite crystals have been found implanted on white quartz crystals. Some specimens recovered in the 1980s were labeled from the “Mickey Breen” mine, which is the name of one of the dozen patented and unpatented claims of this mine.
- News Boy—Located north of the Bachelor mine, this mine produced clusters to 5 in wide of white barite crystals to 1.5 in on edge with tiny, gemmy quartz crystals growing on one side of each barite.
- Ohio—A large solution-cavity cave in the Leadville limestone on the east side of Ouray, this mine is located just below Ohio Park, a lovely meadow in the Amphitheater. Large, milk-white barite crystals as long as 12 in are found in double turnover sprays. Most groups that have been recovered have been found under large limestone slabs that have sloughed off the ceiling. A few quartz casts after calcite have also been found.
- Ores and Metals—This mine is reached via a punishing cross-country trek on the east side of Canyon Creek. Nicely formed, clear quartz scepter crystals to 2 in are found sprinkled with small, perfect blue-black anatase crystals at this mine.
- Pony Express—Located just north of Ouray, this large silver mine has produced plates to 12 in wide of metallic brown scalenohedra of calcite, as well as white barite bladed groups to 4 in near the main portal.
- Some Sets—Located just north of the large circle known as the Amphitheatre just east of Ouray, this mine has produced clear quartz groups, white quartz
scepters, pale amethyst crystal clusters, and outstanding lime-green spalerite crystals dotted with small pyrite crystals perched on thin plates of calcite.

**Senorita**—One of the better-known mines in the Pacquin mining district north of Ouray, the Senorita contains excellent milk-white, complex barite crystals on dark limestone covered with quartz druses. Micro-crystals of azurite and malachite, the result of decomposition of chalcopyrite, have been found on the mine’s dumps.

**Silver Mountain**—Located on the slopes of Brown Mountain, this mine contains light-green tetrahexahedra of fluorite coating clusters of large, white quartz crystals. Small selenite crystals less than one-half inch long, the result of post-mining water seeps, are found on some fluorite groups.

**Silver Point**—Located high on the east side of the Uncompahgre Gorge’s Ruby Cliffs north of Engiernear Pass, the mine is owned by Benjy Kuehling of Ouray, well-known field collector and mineral dealer. The mine’s lower working contains extraordinary, large groups of small, gemmy quartz crystals forming incrustation pseudomorphs after barite, with purple-red hematite dusting on the inner sides of the casts. Groups more than 12 in wide were lowered from the mine to Highway 550 on ropes and pulleys. The upper workings contain larger individual quartz crystals and rough galena cubes approximately one-half inch wide.

**Thistledown**—Located above timberline on the east side of Canyon Creek, this mine was operated as recently as World War II for its fluorite. A very few grass-green fluorite octahedral perched on clusters of etched, crystalline quartz have been recovered. One 4 in octahedron on matrix, one of the largest fluorite crystals known from Ouray County is in the speaker’s collection.

**Topexa**—Located on Brown Mountain just above the Silverton Mine, this one has produced fine, complex fluorite crystals to 1 in on edge of a nice dark-green color.

**San Juan County**

**Adams**—Located above the American tunnel of the Sunnyside mine, this property is well-known for large sprays, 3–4 in long, of hübnerite crystals on quartz matrix. Most groups have been etched out of quartz, but a few have been found growing free in vugs.

**Bandra**—Located along South Mineral Creek outside of Silverton, the mine’s Little Todd vein contains spectacular chalcopyrite crystals to 1 in, perched on matrix quartz crystals, often associated with fine one-half inch black spalerite crystals, small bladed barite crystals, and small galena cubes. The lower mine workings contain small azurite, wulfenite, cerussite, and linarite crystals, all formed as a result of decomposition of chalcopyrite in this wet mine.

**Ben Franklin**—Found in Eureka Gulch, an outcrop near the road contained well-developed, clear quartz crystals to 6 in long, with a pronounced trigonal cross section, caused by over-development of alternating prism faces.

**Brooklyn**—Located along Highway 550’s of Chattanooga turn, this mine has had a checkered history of altered geologic reports, stock scams, and dashed hopes. Nice pyrite cubes to one-half inch on edge, bladed rhodochrosite coating chalcopyrite and spalerite, and a few native gold wires growing on spalerite have all been found at this mine.

**Bullion King**—Located in Pophry Basin north of Chattanooga, this mine is well known for fine, large milk-white quartz crystals to 3 in (some spected), waxy-lustered spalerite crystals, and sharp cubes 1 in long.

**Esmeralda**—Located nearly at the end of Minnie Gulch, white quartz crystals to 3 in have been found coated on one side with mounds of black-brown siderite.

**Eureka Gulch**—At the very end of Eureka Gulch, above the original workings of the Sunnyside mine is a wide vein of rhodonite. Small sprays of hübnerite in quartz veins, intermixed with the rhodonite, have been found there.

**Galty Boy**—Found near the trail to Lark Basin, this mine contains lustrous bladed black hübnerite crystals to 1.5 in, quartz druse pseudomorphs of fluorite cubes to 1 in on edge, and beautiful mounds, as much as 4 in wide, of quartz crystal points colored light brown by inclusions of micro-hübnerite.

**Genoa**—Found just off the Animas River road on the path to Arrastra Basin, this small prospect produced wonderful plates of white quartz encrustation pseudomorphs after green fluorite, and a few octahedral uncoated, apple-green fluorite crystals to 2 in on edge, as well as pseudomorphs after tabular barite.

**Gold Lakes**—Little Giant Basin is reached from a trail off Arrastra Gulch and was the site of some of the earliest gold workings in the region. The Gold Lakes mine can be found high above timberline in a hanging valley with spectacular views and wild flowers, as well as two small lakes fed from glacial runoff. In various dumps and outcrops can be found large amethyst scepters to 6 in, groups of clear reverse scepters, quartz pseudomorphs after rhombic calcite, and quartz pseudomorphs after tabular barite to 2 in.

**Growler**—This small mine is found just north of the Brooklyn mine. Resin-colored spalerite crystals to 2 in perched on pyrite pyritohedra have been collected here.

**Hematite Gulch**—The locale is found on the west side of the Animas River, opposite the mouth of Cunningham Gulch. Large, somewhat rounded, tabular white barite crystals to 2.5 in, coating and filling the small veins, have been found in a short adit halfway up the gulch.

**Highland Mary**—Located high above the end of Cunningham Gulch, the gold from this mine was pinpointed (supposedly) with the aid of a psychic. Nice calcite clusters, both as scalenohedra and as hemispheres of tan color, have been found here.

**Keystone**—Located near the mouth of Cunningham Gulch, this mine has produced fine amethyst crystal clusters to 5 in wide and fine-grained drusy quartz pseudomorphs after elongated barite crystals, some 2 in long.

**Kittimack**—Found at the end of Maggie Gulch, this mine contained small, reddish hübnerite sprays to approximately one-half inch long on a matrix of massive dark brown siderite.

**Little Dora**—A small mine just outside Silverton along Highway 550. Small hübnerite sprays, implanted on pale-green to colorless fluorite cubes, have come from this mine.

**Maggie Gulch**—About one-half mile from the mouth of this gulch, a small ridge topped with many cavities containing quartz pseudomorphs after barite, some as large as 4 in long.

**Osceola**—A large mine located in Cunningham Gulch, near the turnoff to Stony Pass. This mine has produced specimen material for many years. Clear quartz crystal sprays have been found in association with black spalerite crystals to .75 in, cream-colored calcite sprays, and small chalcopyrite crystals. In a lower drainage tunnel very fine calcite scalenohedra in groups to 1 in long have filled cavities.

**Pride-of-the-West**—Located next to the Osceola mine, these mines may exploit the same vein system. Similar specimen material comes from both mines.

**Promontory**—The lower portal to this mine was found just above the ruins of the Sunnyside mill near the mouth of Eureka Gulch but has now been deliberately caved and contoured to discourage mineral collecting. Wonderful octahedrons as much as 4 in on edge and cubo-octahedra to approximately 1 in of water-clear, pale-green fluorite crystals perched on white, barrel-shaped quartz crystal plates have been found here. They were found in a huge vein that spanned the entire width of the tunnel, rising down an incline to a depth below an unknown depth. When collecting, one was standing on sloughed quartz plates that jammed the lower opening.

**Rochester**—Located on the west side of the Animas River just north of Hematite Gulch, this mine contains sharp quartz pseudomorphs after tabular barite crystals to 4 in long.

**Ruby**—Located about halfway up Maggie Gulch, this mine produced fine, ruby-red hübnerite crystals to about .33 in long, densely coating quartz plate. Some pale-green fluorite crystals have been found on the dump.

**Yukon**—Located on Cement Creek about a mile below the American tunnel, this mine contained green cubo-octahedra of fluorite to 1.5 in with rust-brown hübnerite sprays.

**REMEMBRING DR. ROBERT H. WEBER:**

**FEB. 1919–FEB. 2008,** Robert W. Ewelth, New Mexico Bureau of Geology and Mineral Resources, New Mexico Institute of Mining and Technology, 801 Leroy Place, Socorro, New Mexico 87801

Robert Harrison Weber was born and raised in the relatively small town of Wauseon in northwestern Ohio. Beginning at a very early age he displayed a fascination with all things relative to the earth and the archaeological artifacts left behind by prehistoric peoples. A bicycle provided the means to visit every quarry, sand pit, and rock outcrop within a 25-mi radius and also quick access to the local Carnegie Public Library where, as family legend has it, he devoured every book he could find on exploration, natural history, and geology. His collection of rocks, fossils, and archaeological materials grew to a size such that his father fretted over the space required to store the collection even then. Time would serve only to convert Bob from an amateur pack rat into a professional one!

Bob graduated from Wauseon High School in 1937 and followed up with a Bachelor of Science with distinction from The Ohio State University in 1941. Pearl Harbor, as it did for so many Americans, put Bob’s educational plans on hold, and it wasn’t until January 1946 that he was back on track at the University of Arizona where, in June 1950, he was awarded a Ph.D. in geology with minors in both mining and metallurgical engineering. Doctor Eugene Callaghan recognized his many talents and brought him to the New Mexico Bureau of Mines and Mineral Resources in Socorro where he embarked upon a multi-faceted and remarkable career spanning 35 yrs. Hardly a phase of the earth sciences evaded his inquisitive mind. This tribute will examine them in some detail.

**GYPSUM CRYSTAL MORPHOLOGIES AND DIVERSE ACCUMULATIONS OF GYPSUM AND OTHER EVAPORITES IN THE TULAROSA BASIN,** Dave W. Love dave@gis.nmt.edu, Bruce D. Allen, New Mexico Bureau of Geology and Mineral Resources, New Mexico Institute of Mining and Technology, 801 Leroy Place, Socorro, New Mexico 87801; and Robert G. Myers, U.S. Army, IMWE-WSM-PW-E, White Sands Missile Range, New Mexico 88002 (Location 3 on the index map.)

Many varieties of evaporite sulfate and halide minerals occur in the Tularosa Basin, and other

Vanadinite is a rare mineral and is found primarily in the southwestern United States, particularly in New Mexico. It is named after the mineral Vanadinite, which was first described by Benjamin Silliman in 1882, and is the main source of vanadium for the chemical industry. Vanadinite is considered one of the world’s finest known specimens and has been collected in several localities in New Mexico, including the Lake Valley area.

References
## New Mexico Vanadinite Locations

**Doña Ana County**
- Bear Canyon district:
  - Fairview mine

**Organ district**
- Memphis mine

**Black Mountain district***
- Stephenson-Bennett mine

**Grant County**
- Central district
  - Betty Jo mine
  - Ground Hog mine
  - Lion #2 mine

- Commerical mine
  - McNulty mine
  - Naiad Queen mine

- Commerical mine
  - "Mimbres" mine
  - Redbird prospect

- Satisfaction mine

**Steeple Rock district**

**Hidalgo County**
- Steins Pass district
  - North Star claim

- Bluebird Draw prospect
  - Randal prospect
  - Roadside prospect

**Lincoln County**
- Gallinas Mountain district
  - Buckhorn mine
  - Red Cloud copper mine

**Santa Fe County**
- Cerrillos district***

**Sierra County**
- Black Range tin district
  - Billiken mine
  - Gladys mine
  - Red Top mine

- Dewey mine
  - Owl mine
  - Red Top annex
  - White Swan mine

**North Magdalena district**
- Jack Frost group
  - Night Hawk group
  - Pleasant View group

**Taos County**
- Harding Mine district
  - Harding mine

**SOME HIGHLIGHTS OF 45 YEARS OF MEDICI FAMILY FIELD COLLECTING, John Medici, 5280 Stover Road, Ostrander, Ohio 43061**

In writing a two-part article on our family for *Lapidary Journal* (April and May issues, 1990), Dorothy Stripp titled it “Mineral odyssey.” I had never thought of my mineral collecting, which has always emphasized collecting in the field, in this way. I had been too busy with three boys in the family, a full time job, and occasional competition in triathlons and swimming, besides mineral and fossil collecting, but on looking back, it has been sort of an odyssey.

Having lived in New Jersey for many years, South Carolina for one year, Baltimore, Maryland, for three years, and Ohio from 1968 to date, I have had many opportunities for field collecting and meeting other collectors and have occasionally found myself involved in bonanza type finds. I was a geology major at Middlebury College in Vermont for about half a year, but never took a geology course. An extensive aptitude test led the college to strongly recommend a 3/2 yr plan with MIT for engineering. I chose not to do that because I wanted to be more involved in a liberal arts education, with some skiing and ice hockey, etc., instead of keeping my nose to the grindstone for five years for two equivalent degrees (BA/BS). I still kept a latent interest in geology, which had been kindled with family trips to the American Museum of Natural History gem hall in...
New York, along with such gifts as the book Getting Acquainted with Minerals and a fluorescent mineral set, I became a mineral and rock collector. My major years led to graduate school at Rutgers University in New Jersey, and an interest in competitive swimming, which started in my last year at Middlebury and continued at the Ridgewood YMCA in New Jersey and Rutgers and that led to daily workouts of more than 3 mi (sometimes more than 5 mi) of swimming. After graduating in 1964, I became a righthander that a swimmer friend’s father, who was a rock collector in New Jersey, gave me a Herkimer “diamond” and suggested some places where I could expend some pent up energy; those places included Stirling Brook (for carnelian) in New Jersey and Middletown, New York for quartz.

A move to South Carolina the next year led to exposure to rutile, amethyst, and other localities in the southeastern states, including the Foote lithium mine in North Carolina. A move to Baltimore the next year led me to jump with both feet into mineral and and organizing trips and geocaching for Darryl MacFarlane (Grenville Minerals) at the time, are responsible for suggestions on and George Robinson, who was still a student in Montreal. Frank, and eventually Mike Ridgewood YMCA in New Jersey, gave me a Herkimer “diamond” and suggested some places where I could expend some pent up energy; those places included Stirling Brook (for carnelian) in New Jersey and Middletown, New York for quartz.

Reflecting on our Baltimore times, I realize that the salt beds of the Tularosa Basin, has been off limits to mineral collectors ever since. The Alamogordo Bombing Range (ABR) was created on what is roughly 3,200 mi² of southwestern New Mexico. On July 16, 1945, the White Sands Missile Range (WSMR) was established on what was the ABR, and on July 16 the first atomic bomb was detonated at the Trinity Site, near Mockingbird Gap. The entire San Andres Mountain chain, from San Agustin Pass (near Organ) to Mockingbird Gap, is included in the WSMR. This highly mineralized area, including the salt beds of the Tularosa Basin, has been off limits to mineral collectors ever since.

The San Andres Mountains are a horst block running roughly down the center of the Rio Grande rift. The mountains are composed of a number of distinctive rock types, including granite, gneiss, and schist. These rocks are thought to have been formed during a period of mountain building called the New Madrid-Ozark uplift, which occurred about 60 million years ago. The uplift resulted in the formation of the San Andres Mountains, which were then eroded by the forces of erosion and the movement of the landmass. This process has continued to this day, with the mountains gradually being worn down to their current state.

Our move to Ohio in 1968 made for easier access to the fluorescent, calcite, celestine, and pyrite localities and trilobites and other Devonian and Ordovician fossils of Ohio and Michigan and the Hills of Ohio. Although fairly new to the area, I visited both New England (e.g., Eden Mills for garnets) and Canada continued sporadically also. Exceptional luck involved our family in both of the major finds of celestine at Portage, Ohio, (1985 and 2000–2002), and a number of fluorescent finds at the Auguiza quarry at Junction, Ohio have been associated with a sixth sense that I can't completely explain. In 1972 a short workmen leading to a national masters swim meet, and a warm-up for one of my races in the same lane with Buster Crabbe, gave me incentive to get into top shape for the championships the next year in Chicago, with the help of John Bruce, retired Ohio State University (OSU) coach, to see what I could do, with great success. That same year, on a hint from OSU, I found parts of a mastodon, including a skull (which I found with a probe) and a task approximately 10 ft long (in pieces however). The next year, we opened What on Earth, a natural items shop in Columbus, Ohio, and in 1977 tried a professional field trip to the Spruce Peak area in the North Cascades area of Washington. A pyrite and quartz specimen, which our group found in the breccia pipe there rejuvenated that area as a collecting site, and it has been worked since then to date (Medici et al. 1978; Lapis International 1996). This digging experience was quite eventful, including the burning of a large propane tank and the cabins next to it and a helicopter crash and burning.

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In 1978 after my aunt moved to Carlsbad, New Mexico, my sons and I occasionally visited her and collected smokey quartz at Sierra Blanca. Our first trip there was the most memorable. Within a half hour, Eric and I removed a little dirt near small roots of a tree and opened an obvious pocket. The quartz is more often barren than not, but good finds separated often by years, and my visits have sometimes been many months apart but lucky much more often than would be expected. In 1969-1971, visits to the tri-state area (Oklahoma-Kansas-Missouri) to hunt in the old lead-zinc mines with Chuck Enders and other friends and other collection ever since. In the late 1970s a short workmen leading to a national masters swim meet, and a warm-up for one of my races in the same lane with Buster Crabbe, gave me incentive to get into top shape for the championships the next year in Chicago, with the help of John Bruce, retired Ohio State University (OSU) coach, to see what I could do, with great success. That same year, on a hint from OSU, I found parts of a mastodon, including a skull (which I found with a probe) and a task approximately 10 ft long (in pieces however). The next year, we opened What on Earth, a natural items shop in Columbus, Ohio, and in 1977 tried a professional field trip to the Spruce Peak area in the North Cascades area of Washington. A pyrite and quartz specimen, which our group found in the breccia pipe there rejuvenated that area as a collecting site, and it has been worked since then to date (Medici et al. 1978; Lapis International 1996). This digging experience was quite eventful, including the burning of a large propane tank and the cabins next to it and a helicopter crash and burning.

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mainly of westward-dipping Paleozoic limestones that rest on crystalline Proterozoic intrusive and metamorphic rocks. Two significant Tertiary intrusions are present in the range. The largest is the Organ batholith on the south-ern margin, and another large sill-like intrusion can be found at Salinas Peak. The most mineralized area is around the Organ batholith, although significant mineralization is known around Salinas Peak. Metal mineralization, not necessarily related to Tertiary volcanism, is also found at Salinas Peak. Metal mineralization, not necessarily related to Tertiary volcanism, is also documented in the Proterozoic rocks along the entire length of the range. The diversity of geology present in the San Andres Mountains, and adjacent Tularsosa Basin, suggests a high probability of a large number of mineral species that are quite collectable.

A review of Stuart Northrop’s book, Minerals of New Mexico, reveals over eight localities (Fig. 1) that have produced “museum quality” mineral specimens that are now isolated on the WSMR (Northrop 1959). He also lists more than 16 mineral species that occur in the range as “outstanding.” More recently, escorted visits to the WSMR are quite collectable. This paper focuses on the geology, mineralogy, and mining history of the Guffey region. For the purpose of this study, the Guffey region defined by Bevier (1953) will be used: “[A]n area of about 125 square miles in north-central Fremont County and southeast Park County in the Front Range of central Colorado. Its center is 34 miles by road northwest of Cañon City.” The town of Guffey is located 35 mi northwest of Cañon City near Cañon Creek in Park County, Colorado. The town of Guffey and the surrounding Freshwater mining district are central to this discussion.

The first people thought to occupy the Guffey area, based on lithics they left behind, were Early Paleo-Indians (before 5000 b.c.). Spear and arrow points, reflective of the Archaic Period (5000 b.c. to A.D. 500) and the early part of the Late Prehistori-c Period (A.D. 500~1500), were discovered in the Guffey area.

Plaked stone debris (“chips”), or debitage, was found in various locations and represents Ute camping areas in the Guffey area. In addition to the debitage, there are culturally pooled trees in the Guffey area that record Ute harvesting of the cecum layer during late spring. The Utes harvested sweet-smelling bark from the ponderosa while on their way to summer camping areas, such as the fringes of South Park (A. Kane, pers. comm. 2008).

The Guffey area was explored by John C. Fremont when he was returning from California in 1844 (McConnell 1966). A few early settlers began to arrive in the vicinity in the late 1870s. The town of Guffey and the Freshwater mining district are situated in a very scenic area near the base of three ancient volcanoes that have been deeply eroded. These volcanoes erupted 34 m.y. ago, sending lahars flowing down their flanks, burying large redwood trees, and damming the river in the valley below. This dam created Lake Florissant, where a large deposit of Eocene plant and insect fossils formed.

The Guffey area is underlain primarily by Precambrian igneous and metamorphic rocks, which have been covered to the north, east, and west by post-Laramide extrusive rocks, forming the Guffey volcanic center. The Guffey volcanic center is part of the Thirtynine Mile volcanic area, the largest remnant of the Central Colorado volcanic field. The Guffey volcanic center—the largest volcanic center within the Thirtynine Mile volcanic area—is characterized by shallow plu-tonic rocks, ranging in composition from basalt to rhyolite, that form a central complex of domes near the town of Guffey (Mcintosh and Chapin 2004; Wobus and Kroeger 1994). Students of the Keck Geology Consortium (Venzke 1988) have characterized the rocks of the Guffey volcanic center as lattites, trachytes, and quartz trachytes, covered by a thick series of trachybasalt, shoshoni-fic flows, and lahars. The area is intruded by dikes and small mafic plutons.

One mile south of Guffey there are two mineral springs, Iron Spring and Yellow Soda Spring. Sediment from Yellow Soda Spring has formed a large mound more than 50 ft in diameter and more than 20 ft high. Spring waters bubble in the center of the apex of the cone. Anecdotal records mention that spring water once gushed out in a column 8 ft above the top of the cone. This phenomenon ended when several cowboys threw stones in the spring and obstructed the force of the flow. The water of Yellow Soda Spring at the apex of the cone was analyzed by the authors. The temperature was 63°F, had a pH of 7.1, and a salinity of ~4,000 ppm. Using standard testing procedures, a Geomix Scintilometer obtained the readings listed in Table 1. The highest readings were obtained over the pool of bubbling water (thought to be radon gas).

Today, Guffey is an unincorporated town with a post office. Guffey has a population of about 26 and is famous for electing various animals as the mayors. A cat named Monster was elected as the mayor of Guffey in 1998.

Guffey was founded by prospectors on a chance there might be another rich gold strike like the one in the nearby mining camp of Cripple Creek. The town was originally called Idaville and then Freshwater. Because there was another Freshwater in California, the town was then named after James McClurg Guffey (1839–1930), who was an
TABLE 1—Scintilometer readings at Yellow Soda Spring, Guffey, Colorado. November 2008, Volume 30, Number 4

Guffey, Colorado.

TABLE 2—Selected mineralogy of the Guffey area.

<table>
<thead>
<tr>
<th>Mineral</th>
<th>Texture and Form</th>
<th>Location</th>
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<tbody>
<tr>
<td>Euxenite</td>
<td>This rare radioactive mineral occurs as bladed crystals as much 1 in long in the core margin unit of a zoned pegmatite near the Mac Gulch drainage, approximately 3 mi southeast of Guffey. Associated minerals include biotite, magnetite, and tantalite.</td>
<td></td>
</tr>
</tbody>
</table>
| Monazite         | Small crystals of monazite were found approximately 2,000 tons feldspar and 175 tons mica were produced. Until 1934, when Colorado Feldspar Company located several pegmatites and in production from 1904 to 1907 (Hanley et al., 1983). The Feldspar Company in the Freshwater mining district. The company owned 10 lode claims and held 160 acres of placer claims. The Denver Times reported in 1896 that more than 1,200 ft of development work was done in the claims and considerable ore had been exposed. Located southeast of Guffey is the Micanite pegmatite district. This district, covering approximately 4 mi², is dominated by metamorphic rocks, mostly biotite-cordierite-sillimanite gneiss and schist (Wobus et al. 1979). In 1902 the United States Mica Company located several pegmatites and was in production from 1904 to 1907 (Hanley et al., 1983). The Feldspar Company operated the Betty mine was powered by a burro walking around in circles. Mr. Thiebold, the mine geologist in those early days, examined the mine’s rocks in an ore house. Although enormous gold discoveries were forecasted, it was the mining of other minerals that kept the small town going. Nearby cattle ranches and lumber operations sustained the small community during periods when mining brought little money. The Freshwater mining district was in the general area of Guffey. Production from the Freshwater mining district had not been recorded until the 1945 Minerals Yearbook reported production of 64 tons from two mines that yielded one ounce of gold, 83 oz of silver, 5,600 lb of copper, 100 lb of lead, and 2,600 lb of zinc (Vanderwilt, 1947). The Precambrian rocks in this district are host to the copper-tungsten-gold-zinc-lead occurrences of the Guffey district. A variety of ore and other minerals occur in the area (Table 2). Minerals of ore deposits.
| Scheelite         | Milky-white scheelite occurs as disseminated grains and crystals one-quarter mile northeast of the West ranch, which is at the junction of Colorado State Highway 9 and the Guffey road. The centers of the crystals fluoresce blue-white whereas the margins exhibit a yellow fluorescent color (Bever 1953). |
| Gold              | A small amount of native gold was found at the Carbonate King mine. |
| Minerals at the Betty mine | Malachite, azurite, chalcopyrite, pyrite, bornite, galena, and sphalerite are present, along with minor amounts of covellite. Spinel is also present. |
| Minerals of the Rose Dawn, Star Girl, Rosemont, and Claxton mines | Beryl, muscovite, and schorl (black tourmaline), pink microcline masses as much as 10 ft wide, cordierite, white albite, biotite, apatite, and rose quartz occur in the mines of the Micanite pegmatite district. Meyers Ranch | Niobium (columbium), muscovite, feldspar, rose quartz and are from this area. Trace amounts of tantalum, bismuth, thorium, titanium, uranium, and tin. |
| Magnetite         | Individual magnetite octahedrals are as large as 1.25 inches in the Micanite district and near the margins of other pegmatites in the Guffey area. |

Mineral occurrences associated with metamorphic rocks.

Cordierite | Blue-violet cordierite was found in the Climax pegmatite of the Micanite area. Selected boulders contain small crystals of glassy gray-violet cordierite. The gemstone variety of cordierite is called iolite. |
| Kayanite | Small blue blades of kyanite are located on the north bank of Dicks Gulch approximately 2 mi west of Currant Creek. |
| Sillimanite | Sillimanite occurs in various locations throughout the area. |

Mineral occurrences associated with pegmatites.

Euxenite | This rare radioactive mineral occurs as bladed crystals as much 1 in long in the core margin unit of a zoned pegmatite near the Mac Gulch drainage, approximately 3 mi southeast of Guffey. Associated minerals include biotite, magnetite, and tantalite. |
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| Kayanite | Small blue blades of kyanite are located on the north bank of Dicks Gulch approximately 2 mi west of Currant Creek. |
| Sillimanite | Sillimanite occurs in various locations throughout the area. |

Mineral occurrences associated with metamorphic rocks.

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were J. T. Witcher, a Guffey-area rancher, and Robert L. Pope of Cañon City. In fact, what they had found was a 682-lb iron meteorite.

This meteorite was eventually purchased by the American Museum of Natural History in New York (AMNH), but its exact path to that destination remains somewhat unclear. AMNH curator Robert L. Pope of Cañon City. In fact, what they were J. T. Witcher, a Guffey-area rancher, and states that the finders removed the meteorite from the mountains of Cripple Creek (Hovey 1909). However, a front page article from the *Fairplay Flume* (January 22, 1908), states that the meteorite was displayed for several days in front of Tanner’s Grocery (presumably in Fairplay). It was then shipped (for $60) to the museum in New York. The AMNH records the purchase price as $1,500 (about $30,000 in 2008 dollars; today this meteorite would have a value of at least several hundred thousand dollars). The Guffey Meteorite remains prominently displayed in the AMNH Meteorite Hall.

In entering the meteorite into the AMNH collection, Hovey (1909) described it as a siderite, a “wholly metallic meteorite 36.5 inches long, 15 inches in maximum height and 8 inches wide.” He gave its weight as 682 lb. The first published analysis of the meteorite was by William P. Haedden, professor of chemistry at the Agricultural College of Fort Collins. Haedden identified the body as containing 89.8% iron, 10% nickel, and trace amounts of cobalt, manganese, chromium, copper, phosphorus, calcium oxide, and magnesium oxide (Haedden 1908). Hovey entered a similar analysis into the AMNH records.

In the modern nomenclature, the Guffey meteorite is classified as an ungrouped iron, meaning it does not fit well into any defined category. It is sometimes considered an ataxite, an iron with high nickel content and not showing Widmanstätten patterns (Murphy 1999). This represents a rare type of meteorite. The Guffey is the largest meteorite that has been found in the state of Colorado.

At least 79 meteorites have been documented in Colorado. This is exceeded only by three other states: Texas, Kansas, and New Mexico (Matthews et al. 2003).

It took a special kind of person with strong determination and self-reliance to survive the boom and bust of mining and to make a living in Guffey and the Freshwater mining district area. Today this quiet little mountain community has fewer than 30 residents. The people still living there today reflect this pioneering spirit of independence. And Monster the cat is still serving as “Mayor.”

**References**


**MINERALS OF THE GOLD HILL MINE, Patrick E. Haynes, Tooele County, Utah**

(Location 6 on the index map.)

The Gold Hill mining district was discovered in 1857, and the Gold Hill mine itself was producing ore by 1871. Metals recovered from the district include gold, silver, copper, lead, zinc, tungsten, arsenic, bismuth, antimony, vanadium, tin, and molybdenum. In 1892 a mill was constructed to process ores from the Alvarado, Cane Springs, and Gold Hill mines. From 1892 to 1895, the mill produced $208,000 in gold. During WWI production peaked. Mining activity was inconsistent and the last ore produced was in 1945.

The mine has been “discovered” by collectors of mineral specimens. It has been one of the most popular field collecting sites in the American West. The Gold Hill mine’s various pits, adits, and intermediate levels have produced many colorful secondary arsenate minerals, for which the mine is famous.

Currently, www.mindat.org lists approximately 91 minerals from the mine, although some species have not been listed on the Web site, such as vesuvianite from the main dumps, pharmacosiderite from the 150-ft level, and segnitite from the 110-ft level.

It is the type location for two minerals; austinite, CaZn(AsO₄)(OH), and juanitaite, (Cu,Ca,Fe)₂Bi(AsO₄)₃(OH)₂H₂O. It can be considered as the co-type locality for barahonaite-(Al), (Ca,Cu,Na,Fe⁺³Al)₁₂Au₂(AsO₄)₃(OH,Cl)₃nH₂O, which was recently published.

In 2007 the Utah Mined Land Reclamation Program closed off holes located within the Gold Hill mining district, including the Gold Hill mine. The Gold Hill mine’s underground workings are now inaccessible, but the mine’s open pits and dumps can still produce nice specimens.

**References**


