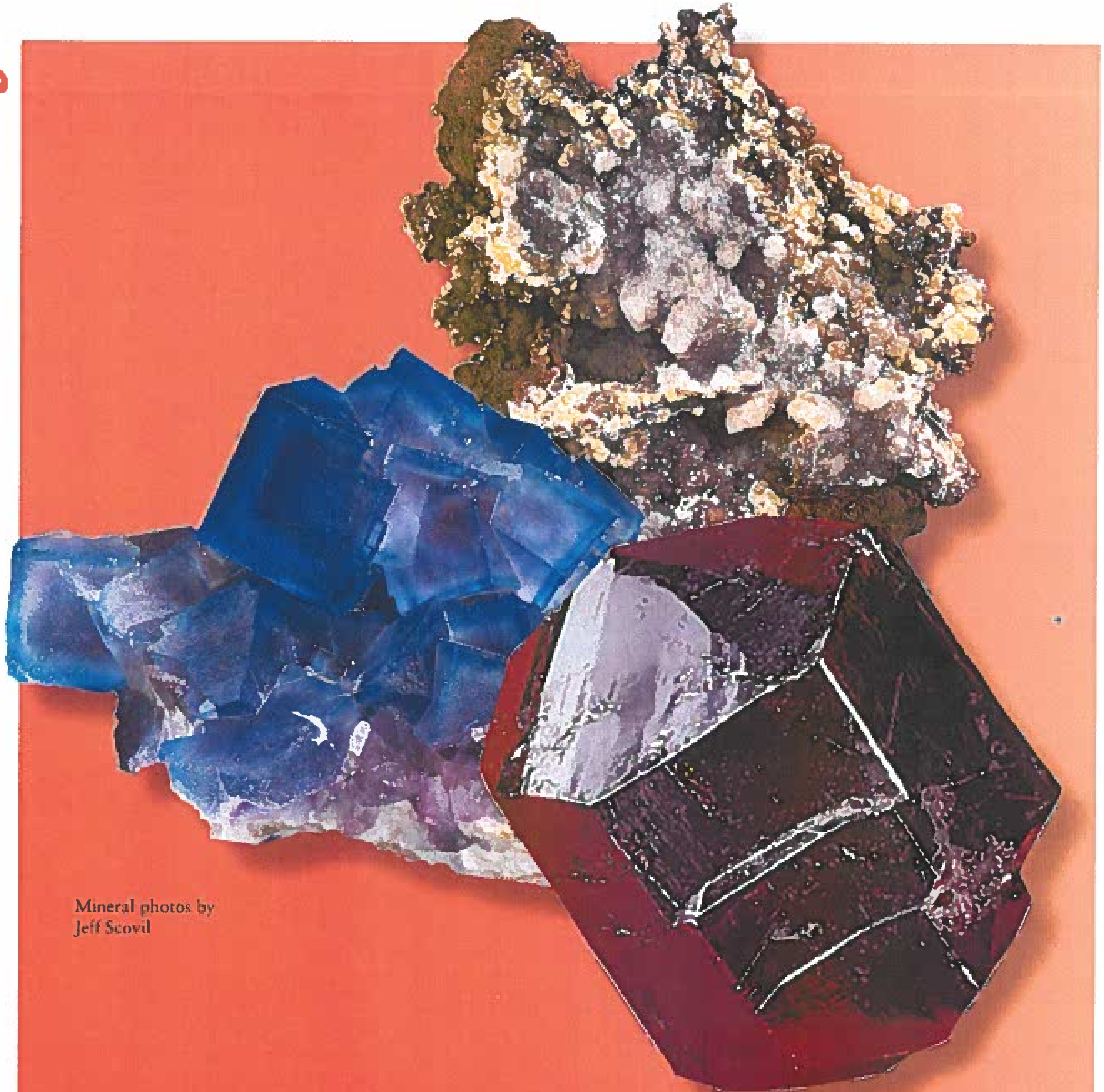
38th Annual New Mexico Mineral Symposium

November 11 & 12, 2017

Annual New Mexico Mineral Symposium



Mineral photos by Jeff Scovil

Program and Abstracts

Featured speaker: Robert Jones
The history of the Bristol, Connecticut Copper Mine

38th Annual
New Mexico Mineral Symposium

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New Mexico Bureau of Geology and Mineral Resources
A Division of New Mexico Institute of Mining and Technology

Socorro 2017

Welcome to

The 38th Annual New Mexico Mineral Symposium

November 11 & 12, 2017

Macey Center Auditorium
New Mexico Institute of Mining and Technology
Socorro, New Mexico

The Mineral Symposium is sponsored each year by the Mineral Museum at the New Mexico Bureau of Geology and Mineral Resources.

Additional sponsors this year include:

Albuquerque Gem and Mineral Club
Chaparral Rockhounds
Los Alamos Geological Society
New Mexico Geological Society Foundation
Grant County Rolling Stones
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Friends of Minerology-Colorado Chapter
City of Socorro

CITY OF SOCORRO

The New Mexico Mineral Symposium provides a forum for both professionals and amateurs interested in mineralogy. The meeting allows all to share their cumulative knowledge of mineral occurrences and provides stimulus for mineralogical studies and new mineral discoveries. In addition, the informal atmosphere allows for intimate discussions among all interested in mineralogy and associated fields.

New Mexico mineral photos on the cover by Jeff Scovil.

Cover image consists of (left to right, clockwise); Fluorite, Fishstick Claim, Hansonburg District, Socorro, Co., New Mexico. Smithsonite and Calcite, Jackson Tunnel, Cooke's Peak District, Luna Co., New Mexico; Rutile, Graves Mountain, Georgia.

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CONTENTS

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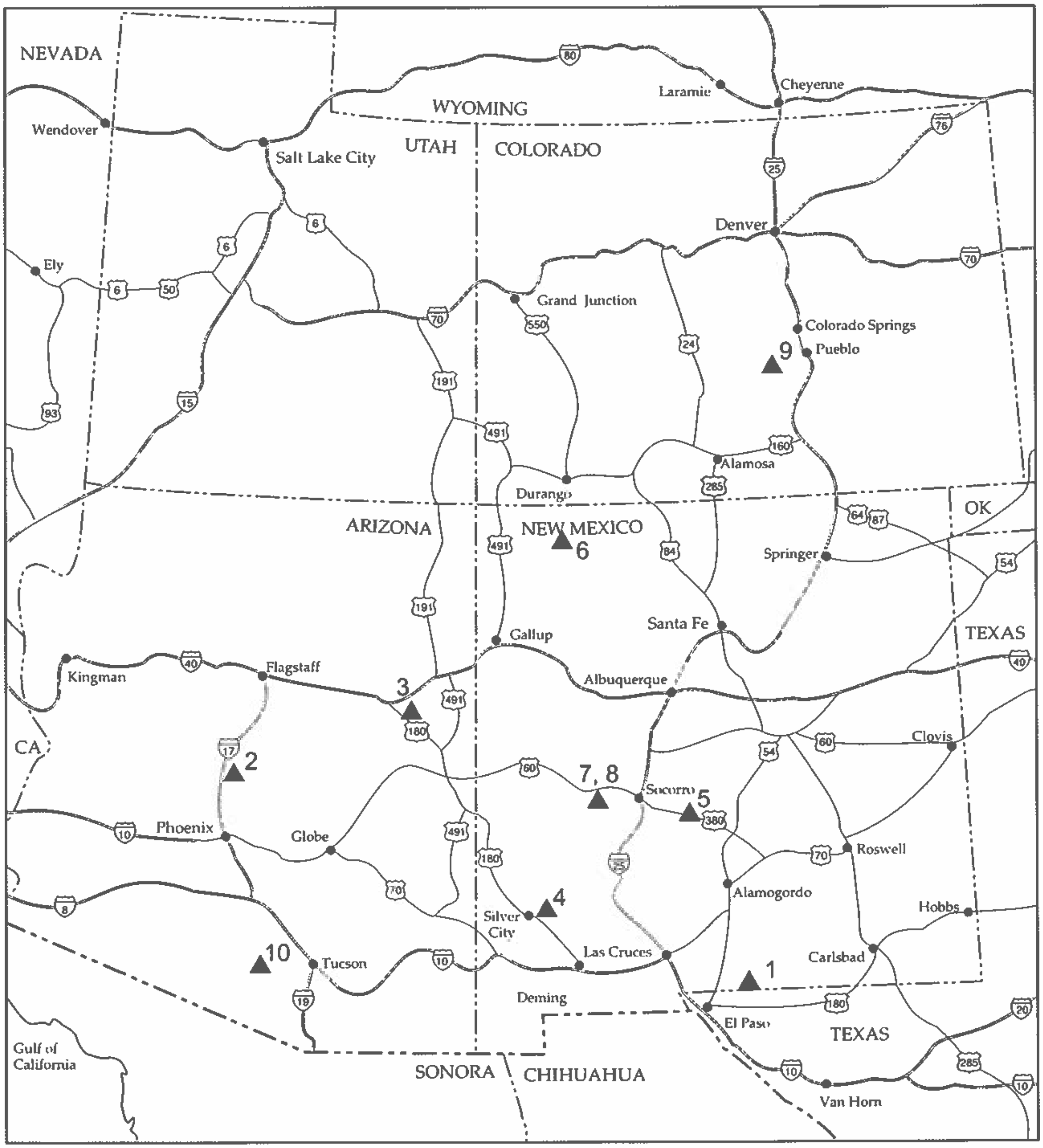
Geographic Index Map



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SCHEDULE

Friday, November 10, 2017

9:00–5:00	Field Trip to Bursum Mine, Socorro County, N.M.—Alan Perryman and Richard Overly, trip leaders.
5:00–7:00 pm	Friends of the Museum Reception—Headen Center (Bureau of Geology) atrium. Appetizers and Cash Bar
7:00 pm	Informal motel tailgating and social hour, individual rooms, Comfort Inn & Suites and other venues—**FREE**

Saturday, November 11, 2017

8:00 am	Registration, Macey Center; continental breakfast
8:50	*Opening remarks,* main auditorium
9:00	*Exploring the minerals of Wind Mountain: An alkaline laccolith near the border with Texas*—Michael Michayluk **(1)**
9:30	*Adventures of the Conglomerate Kid in the Michigan Copper Country*—Tom Rosemeyer
10:00	**Coffee and Burrito break**
11:00	*The Piedmont Mine: History, minerals, and myths*—Barbara Muntyan. **(2)**
11:30	*What I did on my summer vacation: The "Pet"rified Forest Project*—Alan Perryman **(3)**
12:00 pm	**Lunch & Museum Tour**
2:00	*Updated mineral lists for the Georgetown District, Grant County, New Mexico*—Robert Walstrom **(4)**
2:30	*Enchanted adventures: 30 years of field collecting in New Mexico*—Philip Simmons
3:00	**Coffee break**
3:30	*Caledonite and linarite from the Blanchard Mine, Bingham, New Mexico*—Ray DeMark and Tom Katonak **(5)**
4:00	*The history of the Bristol, Connecticut Copper Mine*—Bob Jones **(Featured Speaker)**
5:30	*Sarsaparilla and suds: cocktail hour, cash bar*—Fidel Center Ballrooms
6:30	Silent Auction and Dinner followed by a voice auction to benefit the New Mexico Mineral Symposium—Fidel Center Ballrooms

Sunday, November 12, 2017

8:00 am	**Morning social, coffee and donuts**
8:50	*Welcome to the second day of the symposium and follow-up remarks*
9:00	*The creation of the Sherman Dugan Museum of Geology at San Juan College, Farmington, New Mexico*—Donna Ware and Jeff Self **(6)**
9:30	*Kelly Mine mineral update*—Patrick Haynes **(7)**
10:00	**Coffee break**
10:30	*Micro and thumbnail treasures of the Graphic Mine, Magdalena District, Socorro County, New Mexico*—Allen Schmiedicke **(8)**
11:00	Cripple Creek—The Untold Stories—Steven Veatch, Ben Elick, and Jenna Salvat **(9)**
11:30	The Desert Museum's limestone caves and cave-like minerals—Anna Dometrovic **(10)**
12:00 pm	**Lunch**
1:15–3:00	Silent auction, upper lobby, Macey Center, sponsored by the Albuquerque Gem and Mineral Club for the benefit of the Mineral Museum **(FREE)**

Blanchard Mine Linarite and Caledonite

Ramon S. DeMark and Thomas Katonak

Linarite and caledonite are currently well known from the Blanchard mine in the Hansonburg mining district of New Mexico. These minerals however were not known or described from the district until the 1950s. For instance there was no mention of linarite or caledonite by Northrup (1942) at the Blanchard mine or Hansonburg district. At that time, these minerals were only reported in New Mexico from the Stevenson-Bennett mine in Doña Ana County. Interestingly, the caledonite specimen from the Stevenson-Bennett mine was found on the dump in 1896. That specimen was important because it was the third occurrence in North America and was used to determine that caledonite was orthorhombic (Northrop, 1942). The specimen was in the collection at the Field Museum in Chicago and was acquired by the New Mexico Bureau of Geology and Mineral Resources (NMBGMR) mineral museum in the late 1980s. Unfortunately, the crystal used in that determination was missing! The specimen, sans crystal, is now on display at the NMBGMR Mineral Museum.

Caledonite crystal group (FOV=9 mm) on quartz and cerussite from the Portales Tunnel. *Michael Michayluk photomicrograph.*

Robert H. Weber, from the NMBGMR, first reported Linarite from the Hansonburg district in 1952 (Northrop, 1959). An assumption could be made that prior to that time, the bright blue mineral occurring in the district was mistakenly thought to be azurite. Caledonite was first mentioned in print as being found in the district by Sun (1957), but Sun himself did not find any samples. Taggart, et.al (1989) mentioned that a specimen found by the senior author in the Sunshine #1 adit in May 1987 was "likely a legitimate occurrence but could not be verified." This occurrence was later to be confirmed. A single, large (6mm) caledonite was also found in this Sunshine #1 adit along with a number of smaller crystals. Between June–August 1991, a large number of caledonite specimens were recovered from the rib of a short drift on the south side of the Sunshine #3 adit. These crystals mostly occurred on quartz in association with linarite, but a single two cm barite crystal was coated with drusy caledonite crystals.

Linarite crystals (FOV = 9 mm) on cerussite from the Portales Tunnel. *Micheal Michayluk photomicrograph.*

Three particular occurrences of linarite at the Blanchard mine are noteworthy: First, in 1978, three New Mexico Tech students/collectors brought a couple of flats of galena crystals from the Blanchard mine to the Tucson Gem and Mineral Show. These crystals were altered to anglesite and cerussite with a final coating of bright blue linarite. They were an immediate hit with mineral enthusiasts. This type of linarite pseudomorph after galena had not previously been known from the Blanchard mine, and to our knowledge is unique. The second noteworthy occurrence took place in October 1979 when Brian Huntsman and an associate were looking for linarite in the Sunshine #1 adit when they came across what may be one of the world's finest linarite occurrences. They recovered perhaps four flats of stunning specimens; but alas, the joy of discovery was soon squelched. Following the "big strike", voices were heard in the adit! As it turned out, they were surreptitiously collecting in the middle of the night without authorization and were confronted by the caretaker and a deputy sheriff. All the specimens were confiscated and ultimately dispersed to collectors and museums worldwide. They remain some of the finest examples of the species.

A third exceptional occurrence in August 1989 was a one-of-a-kind find. A short, west-facing drift in the Sunshine #4 adit was the site of this singularly distinctive find. Linarite crystals up to 5.5 cm were coated/surficially altered to malachite. A very few of the crystals were not altered. Two of these spectacular specimens are now on display at the NMBGMR Mineral Museum; one collected by Brian Huntsman and one collected by Robert Dickie. The zone containing these remarkable specimens was soon depleted and no further specimens have been recovered.

Linarite has been found in all of the adits of the Blanchard mine group but specimens recovered from the Sunshine #1 adit are of particular note. Caledonite has only been found in the Sunshine #1 and #3 adits and two finds near the Portales adit. Given the rich history of spectacular finds in the district, we know that somewhere on the mountain lies the next great discovery!

References

Northrop, S.A., 1942, Minerals of New Mexico, University of New Mexico Bulletin 379, Geological Series v.6, issue 1, 387 pp., map.

Northrop, S.A., 1959, Minerals of New Mexico, Revised edition (ed. 2). University of New Mexico Press, Albuquerque, 665pp., map.

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Sun, M.S. 1957, Minerals of the Hansonburg mining district, Socorro County, New Mexico, Rocks and Minerals, 261:563–564.

Taggart, J.E., Rosenzweig, A. and Foord, E.E. 1989, The Hansonburg district, Bingham, New Mexico, Mineralogical Record, 20:31–46.

DeMark, R.S., 1987, Mining development and minerals of the Hansonburg mining district, Socorro County, New Mexico, 8th Annual New Mexico Mineral Symposium Proceedings Volume, p. 8–13.

The Desert Museum's limestone caves and cave-like minerals

Anna M. Domitrovic
Arizona-Sonora Desert Museum, Tucson, Arizona

In 1973, the Congdon Family donated a sum of money to the Arizona-Sonora Desert Museum, enough to establish the Earth Sciences Department and begin construction of the Stephen House Congdon Earth Sciences Center, in honor and memory of Steve who passed away in 1972. Steve was a geologist, practicing his trade in the Southwest, especially Arizona. How appropriate to remember him through the Desert Museum's nod to the geologic development of the Sonoran Desert.

Desert Museum co-founder Bill Carr long hoped for a vehicle to interpret the geology of the Sonoran Desert region of Arizona, the Baja Peninsula, Sea of Cortez and islands within and the state of Sonora, Mexico. Desert Museum director in the early 1970s, Merv Larson, decided that vehicle would be limestone caves.

Limestone caves are found throughout the Sonoran Desert region. The limestone rock they occur in is hundreds of millions of years old, formed from carbonate muds that settled to the bottom of the sea floors that covered what is now Arizona. The slow process of dissolving limestone with naturally-occurring weak carbonic acids to open underground passages and chambers takes millions of years in itself. That dissolved limestone is transported to other parts of the cavern system and re-deposited in the form of countless cave formations called speleothems. And that takes additional millions of years. But once started, the Desert Museum's caves took a mere two and a half to three years to take shape on the Museum grounds.

Ground breaking was in 1974. A place had to be made to accommodate four 2,000 square foot buildings for the offices and work space, wet and dry caves, and Earth history and mineral halls. That took some blasting and digging into layers of caliche bordering King Canyon on the western edge of the Museum grounds.

Limestone rock was recreated using cement and gunite that was applied through high pressure hoses over a framework of rebar, pencil rod, chicken wire, and metal lathe. It was then hand textured and painted, and finally sandblasted for that 300 million-year-old weathered look, and that was just the outside.

Inside, the wet cave was meant to look and feel like a "real" cave. Running water flowed in streams and waterfalls over cave formations of cement, gunite, and polyurethane foam. The cave formations were hand-carved, textured, painted and coated with an epoxy resin for a "wet" look, resulting in formations that look like the real thing. In some cases, plastic soda straws and pipe cleaners were dipped in epoxy resin to simulate soda straw stalactites and twisted helectites. Commercial and wild caves were visited and explored so that the Desert Museum's artificial caves would look and feel as natural as a real cave.

The dry cave was designed to show Museum guests the importance of caves to animals and humans alike. Exhibits draw attention to fossils of ancient marine life in the limestone, Ice Age ground sloths, and a 10,000 year old packrat nest, a midden. Finally, the human factor is brought into play with a Hohokam grotto fashioned after an actual find in a cave not too far from Tucson.

Here in the Desert Museum caves, guests are encouraged to get "close up and personal" with this simulated underground environment. Why? So that they can carry that experience with them when they visit a real cave. "I know what that feels and looks like because the Desert Museum let me experience it first hand in their artificial caves."

Finally, one exits the cave complex through a "time tunnel." 4.6 billion years of Earth history is condensed into a 67-foot-long time line, with each brick comprising about 33 million years and each group of bricks about 500 million years. The last half inch of the time line represents the presence of humans in this complex accounting of life on Earth.

The Desert Museum's caves are 40 years "young" this year, 2017. If you visited when they first opened decades ago, visit again. You'll understand why some guests, even today, say "how fortunate for the Desert Museum that they had these caves here for us to visit."

The Desert Museum makes a distinction between minerals found in caves and minerals found in mines. The caves and all they contain naturally are left as found. In some cases, during the course of mining for ore, caves are encountered. In such cases, since cave minerals have no measurable economic value, they are not "mined," but left intact. Two cases in point, Crystal Cave in the Southwest Mine in Bisbee remains as it was found. The cave is a showcase of crystalline calcite and aragonite. And, in a mine in Santa Eulalia, Chihuahua, Mexico, a cave whose walls were lined with fluorite crystals and whose floor was littered with selenite crystals up to three meters in length, was encountered and remains as it was found more than 30 years ago.

Many minerals extracted from mines tend to take on the look of cave formations called speleothems. Chalcanthite and malachite helictites, stalactites and stalagmites, goethite soda straw stalactites, selenite rams horns, post-mining azurite and malachite cave pearls sitting in a calcite bird's nest and azurite and hemimorphite crystallized in the horizontal and vertical lines of boxwork are all common formations that occur in working mines. These specimens, rather than minerals that have been robbed from caves, are all a part of the Desert Museum's Permanent Mineral Collection. The message of cave conservation and preservation is paramount to the Desert Museum's geologic interpretation. A mantra repeated by cave enthusiasts the world over is simple—take only pictures, leave only footprints, kill only time.

References

Arizona-Sonora Desert Museum Permanent Mineral Collection, 2017.

Anthony, J.W., Williams, S.A., Bideaux, R.A., and Grant, R.W., Mineralogy of Arizona, Third Edition, The University of Arizona Press, 1995.

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From the permanent mineral collection:

Species	Speleothems
aragonite	bird nest
aurichalcite	boxwork
azurite	cave flowers
calcite	cave needles
chalcanthite	cave pearls
goethite	coke table
gypsum	helictites
hemimorphite	rams horn
malachite	soda straw
psilomelane	spar
siderite	stalactite
silica	stalagmite
smithsonite	

Kelly Mine mineral update

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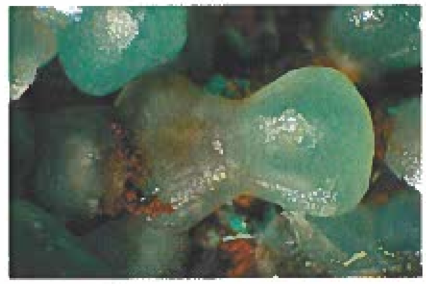
Within the past few years several previously unreported mineral species have been verified as occurring at the Kelly Mine. Several of these species are uncommon and seven of them are new for the Magdalena Mining District. This presentation's primary purpose is to add to the growing list of species from the Kelly Mine.

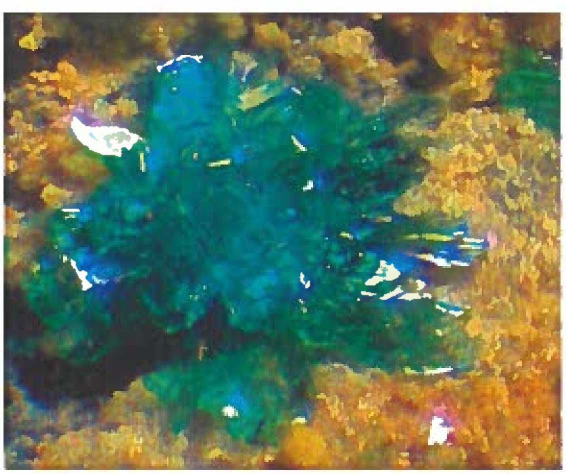


Smithsonite twin crystal (FOV=2 mm). *Patrick Haynes photomicrograph.*

The website, Mindat.org, lists 36 mineral species as occurring at the Kelly Mine. Within the past few years at least 4 species had been added to that list, all of which are on display at the New Mexico Bureau of Geology & Mineral Resources Mineral Museum: hemimorphite, linarite, pyrolusite and wulfenite. There are several species that are known to occur at the Kelly, which are not on the Mindat list, such as chalcanthite and gypsum.

Following are another 21 species, which have been verified by XRD unless stated otherwise: There are also 2 unknowns awaiting identification, whose initial results were inconclusive. All of the above species will be added to the Mindat list prior to the 2017 NM Mineral Symposium.

acanthite, visual , only 1 specimen found	gypsum	covellite, visual
aikinite, EDS and XRD (?) via Travis Olds	ktenasite	epsomite
anglesite, EDS (?) via Tony Kampf	plumbojarosite	gunningite
chalcanthite, visual	serpierite	hexahydrite
chlorite	andradite	neidermayrite
descloizite, visual, only 1 specimen found	aragonite, visual	posnjakite
goethite	chalcophanite	sulfur, visual



Neidermayerite (FOV=2.5 mm). *Patrick Haynes photomicrograph.*

Serpierite and malachite (FOV=4 mm). *Patrick Haynes photomicrograph.*

Collecting geode minerals in the American midwest

Terry E. Huizing

Minerals found in the carbonate rocks of the American Midwest are well crystallized, beautiful, and abundant. Spectacular crystals occur in a wide range of habits, color, and association with other minerals. Collectible minerals from the Midwest occur at mines located in Mississippi Valley-Type deposits, at limestone quarries, and within quartz geodes occurring only in rocks of Mississippian age.

The presentation will feature a great number of photos of the mineral species found at three important geode fields.

The history of the Bristol, Connecticut Copper Mine

Robert Jones

The Bristol Copper Mine was the first important copper deposit developed in America. It was first investigated in 1898 and was developed, beginning in 1800. The copper it produced resulting in two major industries developing in Connecticut–the clock and brass industries.

Located on property owned by the Yale family of University fame, it experienced two distinct productive time periods 1839–1847 and 1848–1857 and produced chalcocite specimens that rival those from Cornwall.

Several Yale professors were major investors in the property including Benjamin Silliman Sr. and Benjamin Silliman Jr. Professors Whitney and Woolsey were also investors. Important studies made by Alan Baterman of Yale in the 1920s was the first time chalcocite from here was proved to be a primary not secondary mineral.

Exploring the minerals of Wind Mountain: An alkaline intrusion near the border with Texas

Michael C. Michayluk

The Wind Mountain laccolith is one of several intrusive igneous bodies found in the Cornudas Mountains. The Cornudas are a small mountain range on the border of New Mexico and Texas which rises above the Diablo Plateau in Otero Co., New Mexico and Hudspeth Co., Texas. Several laccoliths and stocks, along with dikes, sills, and smaller igneous features of varying textures have intruded Permian limestone and other sedimentary rocks in the Cornudas Mountains area (McLemore et al. 1996).

Wind Mountain consists of different textural varieties of syenite porphyry attributed to crystal fractionation, volatile separation and cooling history, not to different pulses of magma (McLemore et al. 1996). These syenite bodies make up a majority of the exposed rock at Wind Mountain, and while most of it is barren of cavites, there are miaroles with nice crystallization to those patient enough to find them and persistent enough to extract them. In these vugs, one is sure to find aegirine, microcline, albite and analcime; one is likely to find thomsonite and natrolite; one will rarely find catapleiite, monazite, georgechaoite, and more. Phonolite dikes crosscut the syenite bodies in multiple places. From one of these dikes on the east side of the mountain, several specimens of bronze-yellow, radiating spherical aggregates of yofortierite were collected (XRD by New Mexico Bureau of Geology). Also, syenite dike-like bodies outcrop in the limestone near the base of the mountain (Boggs 1986). Here one will find the ubiquitous aegirine and albite but also eudialytes are fairly common. These vein-dikes also host heulandite, chabazite, gaidonnayite (possibly georgechaoite) and rarely epididymite. These vein-dikes have metamorphosed the adjacent limestone to a hornfels facies. The emplacement of the main intrusion between sedimentary units altered the country rock to hornfels as well, and one can find large boulders of it on the talus slopes. Small fluorapatite and biotite have been collected from the hornfels to date.

The Cornudas Mountains have been examined for potential economic deposits of gold, silver, beryllium, rare-earth elements, niobium, and uranium, but no production has occurred (McLemore et al. 1996).The nepheline syenite porphyry at Wind Mountain was being considered as raw material for use in dark-colored glass and ceramics. As a result of this prospect, an adit greater than 100 feet in length has been driven into the base of the mountain at the southern end. Wind Mountain is the type locality for the zirconium silicate georgechaoite (Boggs 1985).

Because of its geology, Wind Mountain has incredible potential for an eager mineralogist/collector to discover rare minerals, new minerals to New Mexico, and new minerals to science! This is likely one of the reasons Wind Mountain has historically drawn famous collectors and mineralogists from around the world, and is certainly one of the reasons that inspired the authors to take more than a dozen collecting trips to Wind Mountain. Despite all our time spent hammering, Wind Mountain remains relatively unexplored, and the potential for new mineral discoveries and beautiful mineral specimens remains high to those willing to brave the harsh desert conditions!

List of Minerals currently thought to occur at Wind Mountain (from mindat.org; **bold**=added by the author and/or Jerry Cone , *= EDS, += XRD)

Aegirine*
Aenigmatite
'Aeschynite'
Albite
Analcime*
Andradite
'Anorthoclase'
Arfvedsonite
Baryte*
'Bastnäsite'
'Biotite'
Brockite*
Calcite
Catapleiite*
'Chabazite'
'Chlorite Group'
Diopside
Elpidite*
Epididymite*
Epidote
Eudialyte*
Fayalite
'Fayalite-Forsterite Series'
Ferrokentbrooksite*
Fluorapatite*
Fluorite*
Gaidonnayite*
Georgechaoite (TL)*
Gonnardite
Hematite
Heulandite-Ca*
Hochelagaite*
'Hornblende'
Kentbrooksite
Labuntsovite Supergroup*
Låvenite*
Lemoynite*
Lovozerite*
Magnetite
'Manganoan calcite'*
Microcline
Miserite
Molybdenite*
Monazite-(Ce*)
Mosandrite-(Ce)
Muscovite
Narsarsukite
Natrolite*
Nepheline
Nordstrandite*
'Olivine'
Opal
Orthoclase
Parakeldyshite
Parisite-(Ce)*
Petarasite
'Phillipsite'*
Polylithionite*
Powellite*
Pyrite
Quartz
Reedmergnerite
Rhodochrosite
Riebeckite
Rosenbuschite
Siderite*
'Smectite Group'*
Sodalite
Sphalerite*
Thomsonite-Ca*+
Titanite*
Tuperssuatsiaite*
Vaterite
'Wad'*
'Wöhlerite Group'
Xenotime-(Y)
Yofortierite*+
Zircon*

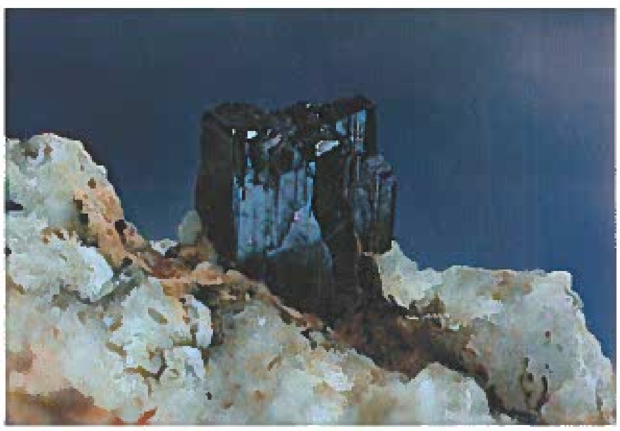


Figure 1. Aegirine (black, twinned) FOV 8 mm.

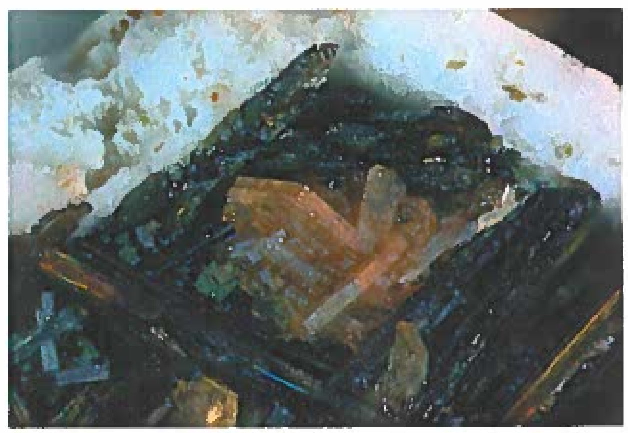


Figure 2. Catapleiite (tan, pseudo-hexagonal clusters) on aegirine. FOV 2 mm.

Figure 3. Eudialyte (pink). FOV 1.9 mm.

Figure 4. Yofortierite (Yellow-brown-bronze spherical aggregates of acicular crystals) w/natrolite. FOV 7.5 mm.

Figure 5. Aegirine, doubly terminated. FOV 2mm.

Figure 6. Natrolite, with shallow, pyramidal termination. FOV 1.8 mm.

Figure 7. Hochelagaite (yellow, acicular hemisphere) on albite. FOV 1 mm.

Photos by Michael C. Michayluk.

The Piedmont mine: History, minerals and myths

Barbara L. Muntyan
Tucson, Arizona

The Piedmont mine, near Bloody Basin in Yavapai County, Arizona, is one of the most intriguing, mythic, and peculiar mining properties in Arizona. And it is the source of the "Holy Grail" for many Arizona mineral collectors: spectacular pseudomorphs of malachite after blocky azurite crystals to 5 cm, pale to dark green and coated by quartz crystal druse or clear quartz points.

Map by William Besse.

Part of the Copper Creek mining district of Yavapai County, the original seven claims of the Piedmont mine were located in 1892. Situated in the Tonto National Forest, the Piedmont mine can be reached via an all-weather dirt road approximately 17 miles east of I-17's Bloody Basin exit. Throughout its existence, the Piedmont mine has been heavily promoted. A promotor during the 1940s attributed one of the Piedmont's name changes (to the "Arizona Copper Queen") to the purported involvement of Walter Douglas, son of James Douglas, the president of Phelps Dodge. The promotor was clearly trying to gain legitimacy for the property by implying it was connected to—or as good as—Bisbee's Copper Queen mine. But it is highly unlikely that Walter Douglas even knew of this property's existence. And like his prim father, Walter was too conservative to lend his name and reputation to a boondoogle.

During the years of promoting the Piedmont mine, some trappings of a promising operation were developed. There were reportedly four shafts sunk on the claims, if the prospectuses are true. The shafts were dug originally all to a depth of 300–350 ft. Then one shaft, the Piedmont, was sunk to a depth of 1,050 feet, and there was also reported drifting on two levels. However, the Piedmont Shaft collapsed at the collar, making any actual mining effort very difficult to prove. Evidence of only two of the four shafts was found, the Piedmont and the Sunshine to the southwest, both collapsed at the collars, when exploration geologist James McGlasson and I visited the site. Even more strangely, there are almost no dump piles surrounding the collars. Where is all the waste rock? Neither were any of the huge dikes reported by early analysts in evidence. When Wayne Thompson and his uncle of the same name visited the Piedmont in 1981, they also noted the lack of dumps, as well as the lack of significant quartz dikes. They even doubted the existence of any shafts, other than as shallow prospect pits.

Yet, despite having a new mining evaluation completed every ten years or so, and a string of names (the Piedmont, the Arizona Copper Queen, the Legal Tender, the Gold Flower, and the Copper Creek) none of the Piedmont's eventual 41 claims were ever patented by its various owners, and despite its heavy promotion, only one carload of ore was prepared for shipment during the entire 125-year history of the mine. Indeed, the Copper Creek District in Yavapai County as a whole never amounted to much. But as Mark Twain once quipped, the definition of a mine is "*a hole in the ground with a liar on top.*"

The Piedmont mine might have remained in quiet obscurity, except for an important find of specimens of quartz druses coating malachite pseudomorphs after blocky azurite crystals to 5 cm. The find was either made as a result of a tip given to Wayne Thompson, Sr. or as a result of a clandestine field trip to the locale in the early 1950s. The people involved were Evert Thompson and Wayne Thompson, Sr. (both uncles of collector/mineral dealer Wayne Thompson) and by Monnie Speck (who owned a rock shop in Phoenix with her husband). Wayne Thompson, Jr. says his uncle Wayne went up to the mine, possibly following a lead, and discovered a huge boulder alongside the road, containing pseudomorph specimens lining a narrow crack.

There are several differing stories of how the mineral find was made. According to a knowledgeable source, Arthur Flagg occasionally arranged "special" field trips for some privileged MSA members. The Thompsons and Specks all were members of the Mineral Society of Arizona (MSA), the mineral club founded and led by Arthur Flagg, Arizona's first State Geologist and a tireless advocate for collecting Arizona's minerals. And all three were part of this inner circle. Little hard evidence exists for these field trips. But the MSA files would surely not have publicized these events, which excluded many club members. And most people who knew the real story have long-since passed away. Whatever the true circumstances, the three collectors made a spectacular find at the Piedmont mine in 1951.

Here begins another set of myths, lies, and intrigue. The most commonly-heard story is that the three families were on a picnic outing, having driven all the way from Phoenix (a very long way, indeed, in 1951). The story goes that they found a huge, vug-filled quartz boulder and collected approximately 50 of these unique specimens in a fit of energy. A different version of the myth says that Wayne, Sr. found the huge boulder with a large vug near the top, but he was unable to budge the hard rock. He returned to Phoenix, recruited his brother-in-law Evert and their mineral mentor, Monnie Speck. Evert had been a miner in the Black Hills of South Dakota and knew how to use dynamite. After detonating the dynamite, the threesome then collected about fifty specimens. The saddest corollary to this tale is that the best specimen was a huge plate, some 30 cm (12 inches) in length. Since none of the three collecting partners would give up their claim to it, the specimen was summarily broken into three sections so that each of the collectors could have a piece.

It is unlikely, despite the myth, that all specimens originated in the same vug, since there are several habits and different matrices. The real story about this find will probably never be known, but several educated guesses can be made. First, it is highly unlikely that all the specimens came from one boulder. As any experienced field collector knows, the magmatic "porridge" which creates vugs tends to be chemically consistent over short distances. While there can certainly be minor variations, major differences in color, habit, size, or matrix strongly suggests that the vugs were spread over several boulders and at least situated at some distance apart.

Moreover, there is evidence that the collectors did not have big enough chisels and sledges (or maybe muscle power), and came back several times to get the specimens, finally resorting to a dynamite charge. Good field collectors—and these three were reputed to be among the best—would not have caused that degree of damage, even if the vugs were tight. While the use of dynamite does not have to cause damage, if one sets off a full stick, it will blow a big rock to pieces and the concussion will cause the carnage observed to otherwise pristine specimens. The evidence does not support the theory that the pieces were contacted by removal from tight vugs.

Some examples of specimens collected from the 1951 find. Figure 2. Med grain. Medium-grained quartz druse over bright green malachite after blocky azurite on a matrix of drusy quartz. Approx. 5". Figure 3. Fine grain. Fine-grained pale green to white quartz druse over blocky malachite after azurite on matrix of doubly terminated quartz crystals. Approximately 3.5" across. Figure 4. Clear quartz. Clear quartz points over emerald-green malachite after azurite on matrix of quartz. Approx. 1.5" across.

There are reputed to have been about 50 pseudomorph specimens collected from the Piedmont on that mythic collecting foray. Most are now owned by a handful of major Arizona mineral collectors, as well as a few others. Monnie Speck's specimens went initially to Sandi Aston of Phoenix; this group of crystals was subsequently acquired by Mark Hay and Dick Morris, along with Keith Williams, about a decade ago. Wayne Thompson, Sr. sold two fine specimens in the early years. Ed Swoboda bought one in the 1980s, an important example for his pseudomorph collection, which later went first to Jim Minette and then to Les Presmyk. Rukin Jelks purchased another pseudomorph from Wayne, Sr. for the Arizona-Sonora Desert Museum when he served as one of ASDM's trustees. The Desert Museum later obtained the bulk of Wayne Thompson's specimens. Finally, Les Presmyk bought many of Evert Thompson's specimens in two purchase agreements a decade apart.

Were there other specimens, comparable to this big find, collected by others during the last 65 years? Were these the only habit of pseudomorphs collected? Were there other quality specimens from this strange mine? There are several specimens of bright green vermiform chains of malachite pseudomorphs after an unknown material. Dick Morris, Les Presmyk, Paul Matt, Jim McGlasson and I have such examples. There may be others.

Although all the immediate participants have passed away and the memories of others grow dim (and possibly inaccurate), answers must await further research. If one asks enough people enough questions, the truth eventually surfaces. We can only hope that this happens.

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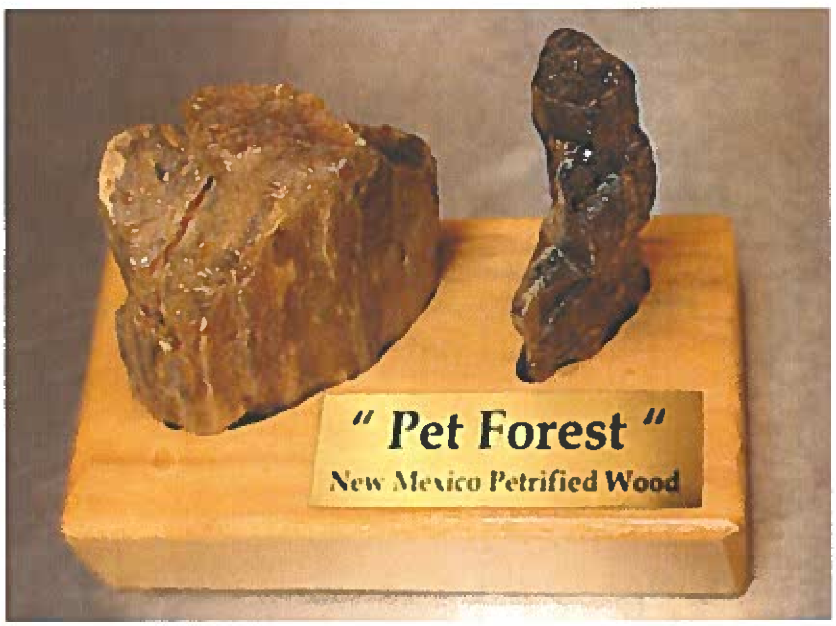
What I did on my summer vacation: The "Pet"rified Forest Project

Alan Perryman

Throughout the years, the colorful "Rainbow" Petrified Wood of northeastern Arizona has always been a favorite of collectors and museums. So much so that a national park was developed to protect it, for all to enjoy. Lapidary projects have also evolved enhancing the beauty of this most colorful petrified wood material. This presentation is about the inspiration, development and creation of a Petrified Wood "Petting Forest." Using 15 handpicked large petrified wood logs that are free-form sculptured and to be placed in the front courtyard of the New Mexico Bureau of Geology Mineral Museum. The sculptures feature highlighted polished surfaces that bring out the wide range of colors and patterns of this excellent petrified wood material.

Back in 2003 as my business partnership with Richard Overly and the Rio Grande Rock & Gems developed, we would sell at gem and mineral shows in New Mexico and Arizona. Richard and I had collected bucket loads of petrified wood from west of Los Lunas, New Mexico, in the Rio Puerco river valley. Now with all this material we needed a sales gimmick to utilize it for selling. Thus Richard Overlee came up with the idea of a "Pet Forest" featuring New Mexico petrified wood. Needless to say they didn't sell very well though.



During this time Richard Overley and I staked our goethite mining claim, which yielded both specimen and lapidary material. Richard developed his skills on cabochons and I started on free-form goethite sculptures, accenting the hematite banding, which was in the Bursum/US-60 mine botryoidal material.

Dr. Virgil Lueth initially nicknamed Richard and I; Crusty and Rusty. As some of you know Virgil has a unique sense of humor. As my skills developed over time, the free-form goethite sculptures were taking on a beauty of their own. At a symposium tailgate social, Virgil commented about my turd polishing abilities! Anyway I took that turd polishing moniker as a compliment, because if one actually polished a turd that would be a testament of their skills! So after a while the brown goethite material got old and I took to sculpturing chrysocolla, malachite and petrified wood.

In June of 2016, Virgil asked me to put a shine on a small log piece of Arizona petrified wood. During that time I worked also on another piece I had at the shop. It had a nice starburst pattern to it and I donated it along with the finished piece Virgil had. While working on these pieces the idea struck me. The mineral museum needed a petrified wood "Petting Forest!" I mulled over the idea for a few months and finally approached Virgil with the concept. He fell for it immediately! So the thought was to purchase 10 to 12 large log sections for $10,000 and make free-form sculptures of them. Coincidently, on October 15, 2016, the Albuquerque Gem & Mineral Club was going on a field trip to the Dobell Ranch, 9274 Old US Hwy 80, Holbrook, AZ. Frank and Rhonda Dobell were the hosts on their private property right outside the Petrified Wood National Park. They also donated three pieces of petrified wood for this project and have since become close friends. One of them "Rhonda's Rock" is in the below photo on the left.

So the 1,000s of photos taken during this year long project are for you enjoyment chronicling the effort of selecting, transporting, polishing and setting in place 15 free-form sculptured pieces of petrified wood to create the "Petting Forest."

The "Petting Forest" project is inspired by the natural human desire to rub a smooth polished surface. So my mission is to put a shine on the world one rock at a time.

Adventures of the Conglomerate Kid in the Michigan Copper Country

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For the last 15 years I have been spending about 6 months a year, from May through October, in the Michigan Copper Country. My time is spent exploring old mine sites and collecting minerals along with eating pasties. I was born and raised in "da UP" as us "Yoopers" call it and friends of mine ask me why I don't move back permanently. I tell them that I enjoy my 6 months in the Keweenaw but the winters are long and severe. At my age I don't like the cold weather and the overabundance of snow. I also don't like waking up in the morning and facing snow-blowing to get to my vehicle to go and get more beer. The weather can be very gloomy and depressing and you may not see the sun for a couple of weeks at a time. That is why I'm in Magdalena, New Mexico, in the winter months. I like to brag to people that Magdalena has 325 days of sunshine per year and the other 40 aren't too bad.

In 2001, I had a full-length article titled "The Copper-Bearing Conglomerate Lodes of the Michigan Copper District" that appeared in the May/June issue of Rocks & Minerals. In researching for the article, I became very interested in the copper-bearing conglomerate lodes which have only increased over the years. I started to study the physical makeup of the conglomerate beds along with alteration patterns and mineralogy. This led me to collect larger specimens of conglomerate, some up to a couple of hundred pounds in weight, for study and photography. I started to haul more and more chunks of conglomerate home to preserve before the mine dump was crushed. Other collectors noticed my strange collecting habits and started called me the "Conglomerate Kid" along with other names... In 2016, I purchased a 36-inch diamond slab saw for cutting the larger chunks and this has opened up a whole new world. Some of the chunks I have collected run as much as 40–50% copper and are quite stunning when cut.

For the last 5 years, collecting in the Copper Country has been on the downswing due mainly to more "No Trespassing" signs being posted on properties due to liability concerns. Mine dumps are being crushed at an alarming rate for county road repair and construction of roads in the wilderness for the logging industry. On the positive side, this supplies fresh material but once it is gone, that is it.

Still, there are new finds made every year. These finds include "float" copper and copper-beating conglomerate that are recovered with the use of metal detectors. There have also been a few spectacular finds of crystallized native silver and copper along with some stunning micro crystals of various minerals. These and other mineralogical topics of interest will be discussed in this presentation.

Treasures of the Graphic Mine

Allen R. Schmiedicke

While the Graphic Mine in Magdalena, New Mexico has been closed for decades, the dump is still capable of producing good, quality specimens. I have collected over most of the dump, finding specimens ranging from micro- to cabinet-sized. The majority of the specimens however, are in the thumbnail to micro range. The thumbnails and micro have come from 2 locations on the dump. One location has produced more smithsonite specimens then other minerals and has also produced sections of smithsonite stalactites. The second location has produced an extraordinary number thumbnail, micro specimens and even fossils. From surface scrounging to dirty digging, specimens are there for the finding if one is willing to put in the effort. In this talk, I will review the process I used for collecting and preparation of the thumbnails and micro mounts.

Specimens from A to W have been collected.

Allophane	Anglesite	Aurichalcite	Azurite
Barite	Calcite	Cerussite	Chrysocolla
Copper	Christobalite	Cuprite	Galena
Goethite	Gypsum	Hematite	Hemimorphite
Hydrohaeterolite	Limonite	Malachite	Mangenese Oxide
Obsidian	Quartz	Ramsdellite	Rosasite
Silver	Smithsonite	Wulfenite	Fossils

Enchanted adventures: 30 years of field collecting in New Mexico

Philip Simmons

New Mexico is in my blood. I started collecting in New Mexico at the tender age of 3, the product of being the son of an outstanding and dedicated field collector, Jerry Simmons. Even at a young age I remember the awe of looking at mesmerizing crystals in my dad's display case at home and longing for the next adventure in search of these hidden treasures.

I don't remember too much from my early collecting years apart from the fact that I was my father's "gopher." By this, I mean that if there were parts of a pocket my dad could not reach, I was dutifully employed to wiggle back into the cramped confines and root out the treasures only a small boy could reach. I didn't mind because it gave me the opportunity to hold these beautiful crystals in my hands before passing them out for wrapping and safekeeping. In fact, I distinctly remember being upset that I couldn't collect the wonderful smoky quartz crystals from Sierra Blanca until my dad agreed to take me just before my seventh birthday! Looking back, I am surprised my dad took me collecting there at such an early age, considering the strenuous hike and precipitous nature of the collecting area.

My dad was a teacher for most of my early life, and as such we had summers to travel to mines and mountains throughout New Mexico. Early memories consist of collecting at Sierra Blanca, Blanchard, the Harding Mine, the San Pedro mine, the Judith Lynn claim, Hondo Canyon, the Juanita mine, and the Gila Fluorspar mines as well as many other localities. My most memorable moments include experiencing bouncing lightning and hail while collecting "porcupine" quartz at Sierra Blanca, sleeping on the cold, hard floor of the San Pedro mine after collecting chalcopyrite and calcite clusters with my dad, Ray DeMark and Mike Sanders, hiking many miles back into the Gila wilderness in search of zeolites, digging azurite and allophane in the dumps of the Juanita mine as a thick blanket of snow accumulated on the ground and collecting azurite "balls" from the Nacimiento mine that my dad had originally discovered.

My teenage years were spent collecting all over the state, and at this point I had started to refine my collecting skills and had realized that mineral collecting would always be a major part of my life. In these years I continued to learn from my dad the importance of perseverance and how to spot telltale signs of pockets not yet exposed, along with learning to recognize surface float and following it to its uphill source. I progressed from using a two pound sledge hammer to a four pound sledge hammer or twelve pound sledge hammer where space allowed. Gone were my "gopher" days, replaced by the ability to read rock and open up pockets in a way to extract specimens with as little damage as possible. My interest in geology increased, and I started contemplating a mining-related career. My dad and I continued to collect frequently, resulting in memorable finds of amethyst scepters at the San Pedro mine, sky-blue fluorite at the Sunshine #1 mine, pyrite "logs" along Bosque Draw, bluish-green fluorite from the Frustration mine and amethystine scepters near Mule Creek.

Following my teenage years, I honed my field collecting acumen and really started to apply a scientific understanding to mineral formation. I graduated with degrees in Mining Engineering and Geology from New Mexico Tech and started taking trips with other collectors when my dad moved to Kansas. My trips now involved great field collectors such as Chris Cowan, Mike Sanders, Pat Haynes, Ray DeMark, Fred Ortega, etc. I continue to learn much from these wonderful people. It has been during this period that many notable finds have been uncovered: blue halite, aphthitalite and langbeinite from Carlsbad, fluorite from Cookes Peak, vanadinite (endlichite) from the Macy mine, fluorite from the Nakaye mine, smoky quartz twins from Mina Tiro Estrella, amethyst from near Las Cruces and a whole slew of minerals from the Magdalena district.

Throughout my entire time field collecting in New Mexico, I have realized that I love two things most of all about this great hobby: the thrill of opening a pocket nobody has ever seen before and the wonderful camaraderie of the many people with which I have had the pleasure of collecting. Being able to share these experiences with the whole spectrum of mineral collectors is something I will always treasure. Ultimately, my experiences and discoveries have led me to start up a mineral collecting business called Enchanted Minerals in which I hope to continue educating worldwide mineral collectors about the "diamond in the rough" that is New Mexico.

Cripple Creek high grading: The untold stories

Steven Wade Veatch, Ben Elick, Jenna Salvat

Cripple Creek, with its legendary geology, mines, and minerals, is Colorado's famous gold camp and holds a special place in the mining history of America. One of the stories of the gold camp that stays largely in the shadows is high-grading, or theft of ore containing high values of gold by miners who worked in Cripple Creek's gold mines. These miners were called "high-graders," and they sneaked out small pieces of rich ore in their hair, clothes, boots, and lunch pails. Their efforts were as constant as a lighthouse.

High-grading emerged as a large part of the economy of Cripple Creek during the boom years. Although knowledge of this practice was common, high-grading remained hidden and was seldom talked about in public. The gold miners, working in rich, underground gold veins, yielded to the intense temptation to carry out some of the ore in what they called "lunch bucket shipments" (Hunter, 2006).

By taking out a few small pieces of ore each day, a miner doubled or tripled his daily wage by selling it for half the price of gold at $20.67 per ounce. Some miners stole only enough ore to pay their bar tabs. Others considered it a "fringe benefit" of a dangerous job and carried out as much ore as they could conceal (Hunter, 2006).

There is no way to estimate the amount of gold leaving in the endless rain of larceny, but one estimate places the dollar amount of the plunder around one to two million dollars in gold annually (Sprague, 1953). Everyone was involved—delivery boys, assayers, merchants, and bank tellers.

High-grading required several accomplices for it to work. First, there was the miner, who squirreled the gold out of the mine. Second, saloon bartenders and other merchants accepted the high-graded ore as payment, which became an important source of income. Third, most of the stolen ore ultimately ended up in the offices of assayers, who separated the gold from the rock in their small labs.

High-grading was a regular business with a network of collection routes. Miners delivered ore to pick-up points that spanned the Cripple Creek Mining District, which included saloons, laundries, grocery stores, cigar stores, haberdashers, and boardinghouses (Hunter, 2006). Runners, hired by the fence assay offices, made scheduled rounds to pick up the bags of high grade. Gold ore even showed up in church collection plates (Taylor, 1966). Assayers processed the high-graded ore and sold it to a smelter. The assayers kept 50 percent of the gold value of the purloined ore for their part.

Since most mines had internal assay services, the substantial number of private assayers was unreasonable. The considerable number of assayers, some say as high as 50 of them, is a testament to the degree of high-grading going on in the district. Their primary purpose was to buy high grade from the miners, process it, and ship it to a smelter. Most of these assayers made significant profits acting as fences for the stolen ore.

Miners in the district were a five-fingered, resourceful lot and had worked high-grading into an art. Taking a chunk of gold ore home in a lunch bucket was the standard method. The metal lunch bucket handle was strengthened with a shoulder strap to keep its handle from pulling off the bucket from the weight of the ore (Sprague, 1953). Some miners had hollowed out sections in the wooden handles of their picks where they concealed ore. Miners also ground ore to a powder, and in the dark recesses of the mine, they rolled around on it and then left at the end of their shift covered with gold-bearing dust. Miners stuffed their clothes and boots with ore or used a pocket belt from six to ten inches wide, made of canvas lined with claxton flannel, to stash ore (Ore Stealing in Cripple Creek, 1903). These belts, usually provided by assayers, allowed the miner to bring out a good amount of high-grade ore without it showing.

High-grading, through the early 1900s, was not considered a crime and there was no law against it, and seemed tolerable if it was not done openly or in large quantities. The risk of jail was minimal if a miner was caught and taken to court. Juries were composed of miners (who were high-graders) and merchants who traded with high-graders for the additional business high-grading brought in (Taylor, 1966). These juries were reluctant to convict (Brown, 1991).

Mine owners realized their losses through high-grading were growing. Stung by high-grading, mine owners were forced to act and hired Pinkerton detectives to check on men suspected of high-grading. In September 1900, the Independence Mine started the "change room" policy. This order required the miners coming out of the mine to strip off their clothes in one room, hand their lunch bucket to a guard to inspect, and then walk naked, while a guard observed, into another room where they put on their street clothes (Newton, 1928). The change room policy at the Independence Mine spread to other mines in the district.

Despite the efforts of the mine owners, high-grading continued. The cost of stolen ore to the mines was mounting, and there were more than 50 assayers in the district whose sole business was buying stolen ore (Teller County Assay Offices, 1902). These dishonest assayers made powerful enemies, and on February 24, 1902, at two o'clock in the morning eight of these crooked assayers were targeted with powerful blasts from dynamite (Grimstad and Drake, 1893). It is commonly believed that the attacks on the assay office were an effort by the mine owners to send a message to all those who were purchasing high-graded ore.

Mine owners took additional steps to stop the flow of stolen ore out of the mines. Owners protected discoveries of rich ore by posting armed guards and by allowing only the most reliable miners to work the area. Some mines used employment cards that a shift boss would void if he suspected high-grading, making the miner no longer employable in the district (Hunter, 2006).

Miners reacted with inventive counter methods for sneaking out ore through electricians and maintenance workers who brought ore to the surface with their tools and materials (Hunter, 2006). These workers did not undergo searches. Workers, when coming to the surface for support timbers, would secretly bring ore up with them and hide it somewhere on the surface, and then take it home after their shift or come back at night to get it (Ore Stealing in Cripple Creek, 1903).

As the years passed and Cripple Creek's mines went deeper, and the veins narrowed, the gold values decreased. High-grade ore became scarce. Although this reduced the high-grading of ore, it continued (Hunter, 2006). In 2006, law enforcement officers arrested three employees of the Cripple Creek & Victor Gold Mining Company for stealing more than $1.7 million in unprocessed gold and silver over a six-year period (Rappold, 2007). Starting in 1999, these employees used a homemade recovery device to extract gold from a gold-saturated fluid in the gold recovery plant of the mine (Emery, 2006). An investigation revealed two additional employees participated in the theft ring.

Cripple Creek's gold is seemingly inexhaustible and its veins are still mined today. Pieces of stolen ore survived the smelter and the passage of ten decades or more, and are found today as prized specimens in museum and private collections.

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Updated mineral lists for the Georgetown District Grant County, New Mexico

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Mineral collectors utilize any number of resources for information when researching field localities. Online sites containing locality mineral lists are one of the more common and available of those tools. However, only a portion of these lists should be considered comprehensive. When uploading species information to lists (especially lesser-known localities) only collectable species or economic ore minerals tend to be listed. The associated species are often neglected. The author chose the Georgetown District, located in Grant County, New Mexico, east of Silver City to illustrate this trend. The District contains the area associated with three drainages: Shingle Canyon, Georgetown Canyon and Lampbright Draw, all tributary to the Mimbres River. Selected localities were visited one or more times and systematically sampled. The results are presented below.

Alhambra: Online minerals listed: Bromargyrite, cerussite, hemimorphite, Jarosite, plattnerite, vanadinite, wulfenite. New species for locality: Calcite, dolomite, descloizite, goethite, hydroniumjarosite, malachite, pyrolusite, quartz, willemite.

Barringer Incline: Online: No minerals listed. New species for locality: Cerussite, galena, goethite, hetaerolite, pyrite, quartz, smithsonite, sphalerite.

Edith Mine: Online minerals listed: Vanadinite. New species for locality: Calcite, goethite, hemimorphite, quartz.

Forgotten Group Shaft: Online minerals listed: Descloizite, hemimorphite, plattnerite, rosasite, willemite. New species for locality: Aurichalcite, calcite, cerussite, chrysocolla, dolomite, goethite, hydroniumjarosite, jarosite. Highway 152 Roadcut: Online: Locality not listed. New species for locality: Calcite, dolomite, limonite, quartz.

Leadville Mine: Online: Locality not listed. New species for locality: Anglesite, aragonite calcite, cerussite, dolomite, galena, minium, pyrite, quartz, vanadinite.

Maggie Shaft: Online: No minerals listed. New species for locality: Calcite, galena, goethite, hetaerolite, pyrite, quartz, smithsonite, sphalerite.

McNulty Mine: Online minerals listed: Vanadinite. New species for locality: Bromargyrite, calcite, cerussite, chrysocolla, galena, goethite, hemimorphite, quartz, willemite.

Naiad Queen Mine: Online minerals listed: Descloizite, hemimorphite, vanadinite. New species for locality: Bromargyrite, calcite, cerussite, chlorargyrite var: bromian, chrysocolla, dolomite, galena, hydroniumjarosite, jarosite, malachite, quartz, willemite, wulfenite.

Redbird Prospect: Online minerals listed: Vanadinite. New species for locality: Calcite, goethite, hemimorphite, quartz.

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The creation of the Sherman Dugan Museum of Geology at San Juan College, Farmington, New Mexico

Donna Ware and Jeff Self, curators

September 15th, 2015 was a historic day for the San Juan College in Farmington, New Mexico. This was the grand opening and dedication of the School of Energy's new building and the Sherman Dugan Museum of Geology housed inside.

Through the support of San Juan College, The Dugan family as well as individual and corporate sponsors, Farmington has a wonderful addition to the community.

The museum features quality minerals and fossils from around the world and includes mining artifacts, educational exhibits, a fluorescent display, and an augmented reality sandbox. During the school year we average more than 200 K–12 school children passing through our doors each week and the numbers keep growing.

This presentation will cover the project from ground breaking through grand opening and to the present day, including the unseen details, obstacles and triumphs of building a new geology museum.

Notes