33RD ANNUAL

MINERALS OF ARIZONA SYMPOSIUM

Southeast Regional Library

775 North Greenfield Road | Gilbert, Arizona

SATURDAY, MARCH 28, 2026

Chairperson
Les Presmyk

Co-Chairperson
Catie Sandoval

FLAGG MINERAL FOUNDATION

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Titles	Presenter(s)	Times		Page
Registration		7:30 AM	8:30 AM	
Opening Remarks	Les Presmyk	8:30 AM	8:40 AM	5
The Science of Carbonates	Stan Celestian	8:40 AM	9:25 AM	7
Calcite Twins – Double the Pleasure	Chuck Houser	9:25 AM	10:10 AM	9
Break and Mineral Sales		**10:10 AM**	**10:30 AM**	
Titanium Minerals in the area of the Santo Nino mine, Washington Camp, Arizona	David Joyce	10:30 AM	11:15 AM	11
Arizona Mineral Districts: Volume 5 Pinal County	Jan Rasmussen			15
Shades of Red: Rhodochrosite from the Kalahari Manganese Field	Hannah Brodhagen	11:15 AM	12:00 AM	17
Lunch and Mineral sales **Wayne Thompson book signing**		12:00 AM	1:30 AM	
Uncommon Calcite Habits	Anna Domitrovic	1:30 AM	2:15 AM	21
Glycolates and Geobacter - Arizona Case Site Binghamton – Copper Queen Mines Aqua Fria Mining District, Mayer Arizona	Brian Beck	2:15 PM	3:00 PM	23
Break and Mineral sales **Wayne Thompson book signing**		3:00 PM	3:30 PM	
Utah Calcite	Phil Richardson	3:30 PM	4:15 PM	27
Copper Chronicles: How the Bisbee Mining & Historical Museum Preserves a Community's Mining and Mineral Heritage	Annie Graeme Larkin	4:15 PM	5:00 PM	29
Closing Remarks and Adjournment		5:00 PM	5:05 PM	
Socializing and Mineral Sales		5:05 PM	6:00 PM	

The 33rd Flagg Mineral Symposium

Welcome to the 33rd Flagg Mineral Symposium. It does seem like a lifetime ago, and for some of this year's speakers more than a lifetime, that I attended the first symposium at the Arizona Mining and Mineral Museum in Phoenix. It was standing room only but the room could only accommodate about 75 people. This was our home until 2011 when the museum was closed to be repurposed as the Centennial Museum. Since that time the Symposium has been back at the museum, at the Flandrau Planetarium and the University of Arizona Alfie Norville Gem and Mineral Museum in Tucson, and the Southeast Regional Library in Gilbert. For the time being our new home will be the library in Gilbert.

The theme this year is carbonates. We start with Stan Celestian's presentation on the science of carbonates and then move into various subjects, mostly about the wonderful world of calcite, certainly the most common carbonate and the most collectable. We have put together a great list of speakers for you about calcite, including Chuck Hauser, Phil Richardson, and Anna Domitrovic. Brian Beck will speak on a small occurrence of aragonite he discovered in the Copper Queen mine at Mayer, Arizona where bacteria was the agent that formed this mineral. Our youngest presenter, Hannan Brodhagen, will talk about one of her favorite minerals, rhodochrosite. Dr. Jan Rasmussen will give a brief review of the latest in their series on Arizona mining districts, Pinal County. Rounding out the day will be David Joyce presenting on the titanium oxide minerals near the Santo Nino mine and, yes we know rutile is not a carbonate mineral, along with Annie Graeme Larkin, the executive director of the Bisbee Historical and Mining Museum.

We hope you enjoy the day and the dealers who are displaying at the Symposium. We have arranged for Wayne Thompson to attend to sign his latest book and he will have copies for sale. Jan will also have copies of her various county mining district books available, including the latest, Pinal County.

The effort to reopen the museum in Phoenix is moving forward with the support of Rep. Gail Griffin and Sen. David Gowan, the Advisory Council and the University of Arizona. More to follow in the upcoming months.

Les Presmyk

Les Presmyk, Chair

C. Sandoval

Catie Sandoval, Co-Chair

THE SCIENCE OF CARBONATES

by Stan Celestian

I. STRUCTURAL FRAMEWORK

A. THE CARBONATE ION ($[CO_3]^{2-}$) Establishing the trigonal, planar geometry and the covalent bonding in the CO_3

B. BONDING DYNAMICS - The ionic bonding between the CO_3 and the cations

C. COORDINATION NUMBERS - Why the size of the cation (Ca^{2+}, Mg^{2+}, Fe^{2+}, Zn^{2+}, Pb^{2+},) dictates the structure, e.g., 6-**fold** vs 9 fold coordination. (How to fit a square peg in a round hole.)

II. POLYMORPHISM AND STABILITY

A. THE POLYMORPH QUESTION - Identical chemical compositions but different structures, and physical characteristics, specifically the $CaCO_3$ system (calcite, aragonite and vaterite).

B. THERMODYNAMIC DRIVERS - How temperature and pressure influence the transition between these polymorphs.

III. MECHANICAL AND OPTICAL MINERALOGY

A. HARDNESS AND CLEAVAGE - Bond strength and structural stacking

B. TWINNING - E-twinning in calcites

C. BIREFRINGENCE AND **ANISOTROPY**

IV. GEOLOGIC FORMATION AND ENVIRONMENTS

A. THE CARBONATE FACTORY - The biological and chemical precipitation in marine environments.

B. DIAGENESIS - Post-depositional processes, recrystallization and dolomitization.

C. HYDROTHERMAL/METAMORPHIC CARBONATES - Carbonatites

D. SECONDARY SUPERGENE ENRICHMENTS AND CARBONATES - The oxidation of sulfides and the formation of azurite, malachite, smithsonite, cerussite, and perhaps others if time permits.

Calcite Twins - Double the Pleasure

by Chuck Houser

Abstract

While we might think of minerals as possessing a certain perfection, it is the imperfections, at an atomic level, that create an interesting, and desirable, phenomenon in crystallography: twinning. Several minerals are known for their tendency to produce twins including quartz, staurolite, gypsum, feldspar, and of course calcite. Yet in the twinning we see from imperfections lies a certain perfection as calcite, for example, exhibits perfection following precise twin laws.

Twinning occurs in two general types, polysynthetic and simple twinning. Polysynthetic twinning occurs at a molecular level and is discernable in thin sections under a microscope. Simple twinning creates those marvelous specimens we affectionately refer to using terms such as "heart," "fishtail," "butterfly," and "nest" twins. Calcite produces twins following four laws, each based on the angle between the twin members. Using the convention presented by R. Peter Richards in his article "The Four Twin Laws of Calcite and How to Recognize Them" (Rocks and Minerals, September/October 1999, Vol. 74, No. 5), these twin laws and the angle between the "C" axes of the twin members are:

- 00·1, 180°
- 01·2, 53°46'
- 10·4, 90°46'
- 01·8, 127°30'

While these laws (angles) are precise in determining which law a specific calcite twin follows, in reality hand specimens of calcite crystals often include modifications and details that prevent easy determination of a twin law. In short, the orientation of the "C" axis isn't always obvious, especially to collectors like myself who just "got by" during the discussions of Miller indices in my mineralogy class. However, calcite possesses a characteristic that may aid tremendously in the identification of the twin law. That characteristic is cleavage. Just as the orientation of the "C" axis precisely determines the twin law, so does the orientation of cleavage planes in calcite twins.

This talk will include the following discussions:

- The cause of twinning
- The four twin laws of calcite

- Determining characteristic: orientation of "C" axis AND cleavage planes
- Morphologies of calcite twins
- A window into the collecting style/obsession of one calcite collector

I encourage anyone to bring a calcite specimen you're curious about whether it is twinned and according to which law.

Biography:

I've been married to Cindy for nearly 40 years, with two daughters, 33 and 29, both married. My hobbies are fly fishing, flying (private pilot since 1977), photography, particularly interesting night sky stuff, and of course mineral collecting. I am a geologist with an environmental consulting firm and over 40 years experience in geosciences, and my career has been, by and large, truly pleasurable.

Me with a 22-inch rainbow trout I'd just landed on the Upper Owens River in fall 2024

Calcite twins I put in the Tucson show in 2011

Titanium Minerals in the area of Santo Nino Mine Washington Camp, Santa Cruz Co., Arizona

by David K. Joyce

The Santo Nino Mine area is best known of fine quartz specimens, particularly amethystine-headed scepters on colourless stems. Collecting has occurred at the site for several decades, off and on. A recent revival in collecting has resulted in a number of nice pockets of amethystine sceptre-headed quartz and colourless quartz being collected.

Collecting activities have also resulted in some specimens of several minerals containing titanium being recognized. Excellent specimens of rutile have been recovered, often associated with anatase and brookite.

Rutile, anatase and brookite minerals all have the chemical formula; TiO2. However, since they have different crystal structures, they are, in fact, polymorphs, and crystals appear radically different. Interestingly, all three polymorphs often occur on the same specimen.

Collecting and increased knowledge of the Santo Nino area occurrences, in future, will no doubt result in more excellent specimens being recovered.

Biography

David Joyce has been a mineral collector since he was 12 years old, growing up in rock and mineral bereft Scarborough, Ontario, Canada. He left Scarborough at 19 years of age to attend the Haileybury School of Mines and upon graduation worked across Canada in the explosives and mining businesses. He later worked for mining and engineering contractors in the field of designing and building mining complexes, internationally, and most recently was Vice President, Business Development for SNC-Lavalin Engineers and Constructors. David was an adjunct Professor at the University of Toronto for eight years, teaching "Explosives and Fragmentation in Mining" in the engineering faculty.

Currently, David lives half of his life in AZ and has become a passionate Arizona mineral field collector. The other half of the year he lives in Ontario, Canada and collects Canadian minerals. He volunteers at both the Alfie Norville Gem and Mineral Museum, as well as the Royal Ontario Museum.

David Joyce has had a mineral business either full or part time for over 40 years and recently retired after many years as a full time mineral dealer. His son, Daniel, has happily taken over the mineral business, www.djoyceminerals.com. He has also been a director on the boards of several private and public corporations and several volunteer organizations.

Figure 1) Amethystine quartz, 5.4cm, Santo Nino Area, Washington Camp, Arizona

Figure 2) Rutile crystals on Quartz, 4.5cm, Santo Nino Area, Washington Camp, Arizona, R. Dewitt Collection

Figure 5) Rutile, ps ilmenite? Hematite?, Santo Nino Area, Washington Camp, Arizona, P. Simmons collection and Photo

Figure 3 & 4)) Reticulated rutile crystals on matrix, 9.5cm, plus close-up inset, 11mm cluster, Santo Nino Area, Washington Camp, Arizona

Figure 6) Rutile, ps titanite(?) , 12.5cm, Santo Nino Area, Washington Camp, Arizona

Figure 7) Anatase crystal, 1mm, Santo Nino area, Washington Camp, Arizona

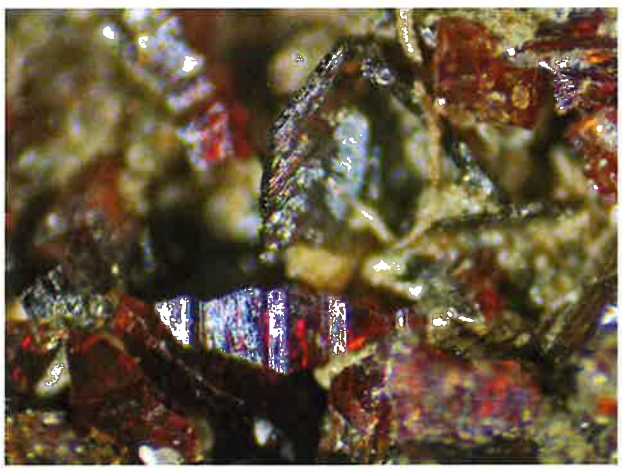


Figure 9) Brookite and Anatase, 2mm FOV, Santo Nino Area, Washington Camp, Arizona

Arizona Mineral Districts: Volume 5 Pinal County

by Jan C. Rasmussen and Stanley B. Keith

Abstract

The Pinal County volume "Arizona Mineral Districts v. 5 Pinal County" is a detailed reference work describing the geology, mineralogy, age dates, location and past production of mineral districts in the county. The book is dedicated to Ray Grant, who started the writing process with an invitation to produce county maps of the mineral districts for the Mineralogy of Arizona, 4th edition.

The book is profusely illustrated (435 figures) with 1:24,000-scale, historic topographic maps that show mine names, mineral photographs from the now-closed Arizona Mining and Mineral Museum, geologic maps, and diagrams of the mineral deposits.

New sections describe the tectonics, mineralogical characteristics and origins of two new types of economic deposits: peraluminous copper-oxide greisen deposits (chrysocolla-hematite deposits, such as Gunnison in the Little Dragoon Mountains) and Ultra-Deep Hydrothermal deposits (salt, anhydrite, gypsum, and diatomite deposits, such as the Picacho Basin salt deposit).

A 35-page long, color-coded table of the orogenies (mountain building periods) in Arizona is presented in Appendix A. The long table, from youngest at the beginning to oldest at the end, gives details of the geologic time period, numerical age, magma-metal series class, examples of magmatism, examples of resources, examples of mineral districts, and common minerals of each phase of the mountain building. A table summarizing the geologic history is early in the volume under Arizona Mineral Systems.

Shades of Red: Rhodochrosite from the Kalahari Manganese Field

by Hannah Brodhagen

Rhodochrosite is a captivating manganese carbonate mineral (formula $MnCO_3$) prized by collectors for its deep pink to rich red color and beautiful crystal forms. Rhodochrosite is often found in hydrothermal veins of silver, lead, and copper ores. It can also occur as a secondary mineral in manganese deposits.

The name, rhodochrosite, comes from the Greek *rhodochros*, meaning "rose-colored". It was first discovered and described in 1813 in Romania, and the type locality for rhodochrosite is Cavnic in northern Romania. Today, rhodochrosite is honored as the national gemstone of Argentina and is also the official state mineral of Colorado. Its combination of intense color and rarity has made rhodochrosite one of the most admired minerals globally among collectors and mineral enthusiasts.

There are over a hundred notable localities of rhodochrosite worldwide and a remarkably broad spectrum of colors. While rhodochrosite is typically a vivid red-pink, it can also occur in a range of colors from pale pink to cherry-red, and even yellowish, white, brown, or gray depending on impurities. Its luster is vitreous, and it can be translucent to transparent when of high quality. Rhodochrosite is a soft mineral with a hardness of only 3.5-4.0, and it has perfect cleavage in 3 directions.

Rhodochrosite is a member of the calcite group, forms in the trigonal sub-group of the hexagonal crystal system (exhibiting 3-fold symmetry) and crystallizes in rhombohedral and scalenohedral crystal forms.

Rhodochrosite exhibits a diverse range of crystal habits including prismatic, blocky, tabular, lenticular, trigonal, and wheatsheaf habits.

Groups of rhodochrosite crystals can form aggregates including botryoidal, mammillary, spherical, rosette, stalactitic, fan-shaped, and pinacoidal aggregates. Rhodochrosite can also form as casts, typically of calcite, as well as pseudomorphs (replacing other material like bivalve and gastropod fossils from the Kerch Peninsula, Ukraine). Twinning can be present in rhodochrosite crystals, like the ones from Mont Saint-Hilaire, Canada.

Additionally, rhodochrosite crystals can be etched or stepped. Etched crystals are formed either naturally or artificially when solutions dissolve parts of the crystal surface after growth, creating irregular surface features and occasionally pitting. Stepped crystals are formed by rapid growth of the edges of a crystal face and slower growth in the center of the face (or slower internal growth), creating tiny steplike features.

Following its discovery in the early 1800s rhodochrosite was largely an unremarkable mineral, appearing mostly in systematic mineral collections. This began to change with the appearance of rhodochrosites from the Wolf Mine in Rhineland-Palatinate, Germany around 1870; at the time, and for the next 100 years, these were considered the top mineral in all of Europe and the best rhodochrosite in the world. However, that fame toppled when, in 1977, the N'Chwaning I Mine in the Kalahari Manganese Field of South Africa, began turning up pockets of beautiful scalenohedral rhodochrosite crystals. Crystals from this find are, even to this day, regarded as some of the finest and highest quality rhodochrosites ever to be discovered, rivaling only the later find in Colorado. It should be mentioned that at the same time as this bonanza, the Pasto Bueno area of Peru began yielding beautiful rhombohedral crystals; however, these were quickly overshadowed by the Kalahari crystals. In the early 1990s, Colorado became the next focus for rhodochrosite mining, with the cherry-red rhombohedrons of the Sweet Home Mine rivaling the blood-red scalenohedrons of the N'Chwaning Mine. The world was now utterly captivated by these extraordinary crystals with claims emerging that they were the finest examples of any mineral species ever discovered, revolutionizing the world of mineral collecting.

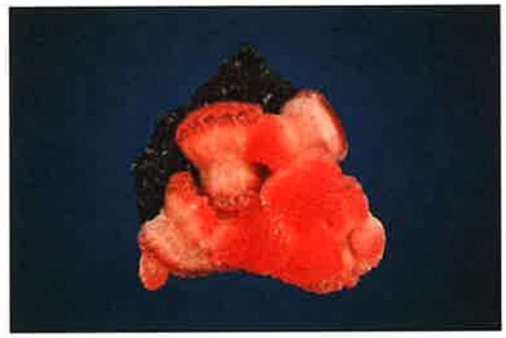
Kalahari Manganese Field

The Kalahari Manganese Field is the largest and richest manganese deposit in the world. It is situated in the Northern Cape province of South Africa, near the town of Hotazel.

Located within the KMF is the Hotazel Formation, a geologic formation known for its manganese-rich sedimentary rocks and banded iron formations. Within the Hotazel Formation there are about 22 mines, most of them inactive now. The rhodochrosite-producing mines are the Hotazel Mine, Wessels Mine, and N'Chwaning Mines. The N'Chwaning Mines consist of N'Chwaning I, and N'Chwaning II and III Mines, which are shafts leading from N'Chwaning I.

N'Chwaning rhodochrosites have stunned the mineral world with their deep red color and superb clarity. The N'Chwaning Mines have produced some of the gemmiest and most lustrous rhodochrosite crystals known, rivaling the best of the Sweet Home Mine. What makes N'Chwaning rhodochrosite unique is the great variety of crystal habits and hues. The most magnificent specimens to come out were large, blood-red scalenohedral crystals.

Rhodochrosite
N'Chwaning I Mine, Northern Cape, South Africa
Wally Mann Collection
Jeff Scovil Photo



Rhodochrosite
N'Chwaning I Mine, Northern Cape, South Africa
Richard Geiger Collection
Jeff Scovil Photo

Rhodochrosite
Wessels Mine, Northern Cape, South Africa
Desmond Sacco Collection
Bruce Cairncross Photo

Rhodochrosite
Hotazel Mine, Northern Cape, South Africa
Bruce Cairncross Collection
Bruce Cairncross Photo

Uncommon Calcite Habits

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

The outward appearance of a mineral is referred to as its habit or form. Sometimes, the habit is a reflection of the crystal itself when crystal faces are evident. Habits that are closely related to crystallography may be expressed as scalenohedral or rhombohedral. We use blocky when describing the crystal habit of fluorite or pyrite, and prismatic and pyramidal for the habit of a quartz crystal. But the majority of mineral habits fall into the realm of descriptive and include terms like arborescent, bladed, dendritic, tabular. Many of the habits assigned to a mineral are clues to its identification.


Photo No.1 ASDM#10741 Magma Mn Superior J. Scovil photo

Calcite is recognized in two familiar forms – dogtooth spar, resembling a canine's incisor and rhombs or lopsided blocks. These are the common and recognizable calcite habits but what about the uncommon ones? Consider a limestone cave environment. Calcite is the most common mineral that occurs in caves. Any of the speleological terms can be applied to calcite – soda straws, stalactites, helictites, coke tables. There are more than three hundred identified speleothems or cave formations. All can be considered habits or forms of calcite.


Photo No. 2 ASDM#1304 Southwest Mn Bisbee W. Panczner photo


Photo No. 4 ASDM#11088 Portland Mn Mojave Co. J. Scovil photo

Other uncommon habits included bladed, botryoidal, nail head, tabular or platy, to name a few. With so many habits to consider, how is one to identify calcite? There are at least three properties of calcite that help us identify the mineral. Calcite is relatively soft. It is 3 out of 10 on Mohs Hardness Scale. You can scratch the surface with your fingernail. It displays perfect cleavage in three directions. In other words, if you break it, the resulting break is predictable. And finally, calcite, chemically, is a calcium carbonate. It will react, effervesce, when coming in contact with a weak acid.


Photo No. 3 ASDM#9887 Southwest Mn Bisbee J. Broome photo

Glycolates and Geobacter - Arizona Case Site Binghamton – Copper Queen Mines Aqua Fria Mining District, Mayer Arizona

by Brian A. Beck, PG

The Binghamton and Copper Queen mines are located on the eastern limb of an upside-down syncline of the Yavapai schist that extends from the western slope of the Mingus Mountains southward to Lake Pleasant-approximately 50 miles. These mines are described as being proximal and distal expressions of a Volcanic Massive Sulfide (VMS) complex approximately 1.74GA.

During re-exploration of the Binghamton and Copper Queen mines (2011 to 2013) in the Aqua Fria Mining District in Yavapai County, Arizona, a series of adits and tunnels dating from the 1890's through the 1970's were reopened. In these underground workings, clay-like coatings were noted on the walls, ceiling and floors with striking color variations from a grayish brown mat to bright yellows, blues and greens.

For mapping of the geology of the mine workings, sections of the walls were washed. The wall coatings were clay like mats and upon closer inspections, numerous minerals were under and in the mats. The minerals in the coatings and mats did not extend into any of the rock surfaces, but were only found on open surfaces (fractures, voids, etc.).

This prompted a closer inspection of the rock surfaces before washing. These coatings under a microscope showed webbing and cellular textures – biological mats. Samples were sent off for verification of biological content and were identified as various Geobacters (metal and sulfide reducing bacterial forms). Geobacters are some of the oldest forms of life and are now known to be living in all of the extreme environments, such as hydrothermal vents and some of our oldest rock units.

Since the Geobacter mats were only found on the tunnel and adit exposed surfaces, their formation occurred after the mining activities stopped. Thickness and extent of the mats did not appear to be related to the age of the workings or the rock, but were related to the exposed, disseminated metallic mineral content in the wall rock.

Elemental sulfur was commonly found, where the sulfide mineral content were mostly Pyrrhotite and/or Pyrite. When surface moisture contents were more than 30%, numerous bacterial iron oxides stringers were observed. High carbonate zones developed Aragonites in various forms growing out from the sidewalls.

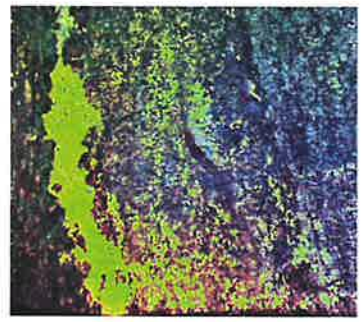
Minerals of various copper sulfates were found in areas with pH's under 5, moisture contents near liquid states with the presents of Chalcopyrite. Copper arsenate minerals were found in association with Bornite and Arsenopyrite. In Bornite rich zones without Arsenopyrite, Gold was found in rounded masses on the surface exposures.

Surface mapping and re-examination of the previously described Azurite and Malachite exposures found that most of these exposures were copper arsenates with similar mode of occurrences as observed underground.

This presents mineral formation occurring at surface temperatures and pressures and in periods less than 50 years. Also, this makes another case for supergene minerals by bacterial actions.

Geobacter sulfurreducens

Bacterial Aragonite



Short-wave UV

Special Note:
Geobacter sulfurreducens is a rod-shaped microbe. Geobacters are known as a type of bacteria that is able to produce electricity, and the species *G.sulfurreducens* is also known as "electricigens" due to their ability to create an electric current. A study by Daniel Bond and Derek Lovley in 2003 showed that because of *G.sulfurreducens'* ability to conduct electricity, there was a possibility of creating an effective and long lasting microbial fuel cell (MFC).

Kingdom:	Bacteria
Identified Phylum:	Proteobacteria
Class:	Deltaproteobacteria
Order:	Desulfuromonadales
Family:	Geobacteraceae
Genus:	***Geobacter***

Identified Geobacters at the Binghamton and Copper Queen Mines
G. bremensis *G. chapellei* *G. grbiciae* *G. hydrogenophilus* *G. metallireducens*
G. sulfurreducens *G. thiogenes*

References:
Resource Search: Geobacter, Rock-eating Bacteria, Bioleaching, BioSigma, Metal-loving Microbes.

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Indian Journal of Microbiology, 2011, Geobacter: The Electric Microbe! Efficient Microbial Fuel Cells to Generate Clean Cheap Electricity.
Gebiology, 2020, DOI: 10.1111/gbi.12434, A late Paleoproterozoic (1.74) deep-sea, low temperature, iron-oxidizing microbial hydrothermal vent community from Arizona, USA

Brian Beck, CPG, RG

Mr. Beck has wandered for more than 50 years across most of the southwest, being paid to hike across the hills and pick-up rocks. Of course, it has to do with geological work related to mineral resources and environmental nit-picking (the act of excessively focusing on, or criticizing, minor and trivial details). He has worked both underground and still aboveground, mostly. He still works with paper maps, a Brunton, a paper notebook and a hand-lens (the lens has gone from 8x to 50x).

Aragonite Puffs

Geobacter with Epsomite

Aragonite Collected

Sulfur Stringers

Utah Calcite

Phil Richardson studied geology and engineering in college, graduating from the University of Utah in 1984. His first job upon graduation was working as a geological field technician in the Kennecott Open Pit Copper mine, at Bingham Canyon, southwest of Salt Lake City, Utah. There he did pit mapping, a rock quality study, and oriented drill core logging. All the while being introduced to the operations of an active mine. Today, Phil pursues structural engineering, as a Registered Professional Engineer, where he designs precast concrete buildings and structures.

In college, his mineral collecting hobby solidified as he began to actively field collect all over Utah. As such, he started to assemble a Utah reference collection, attempting to visit a majority of the vast mineral locations and mines of the State. In this presentation, Phil will take us on a tour throughout Utah and show us a representation of the contemporaneously available calcite specimens, as well as several historically important occurrences. To further support this Utah mineral resource effort, He was the organizer, and coauthor of several articles, in the Rocks & Minerals Utah Special Issue, Volume 68, Issue 6, Nov./Dec. 1993.

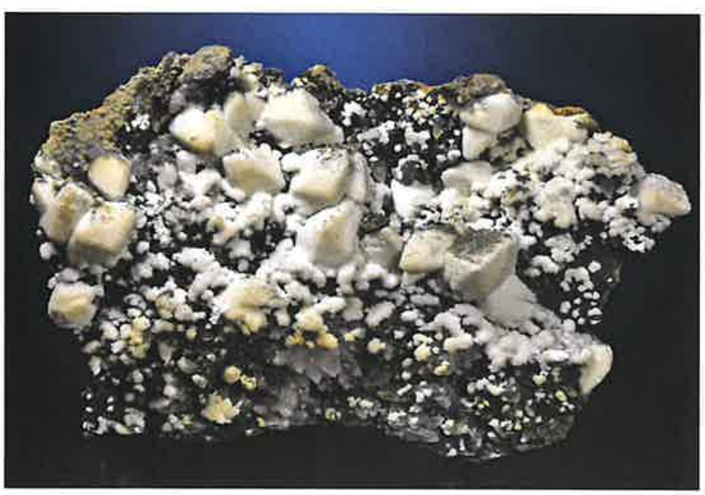
Grey double terminated scalenohedron on matrix, Cliff mine, Ophir Canyon, Oquirrh Mountains, Tooele County, Utah.

Phil was a past chairman of the Flagg Mineral Foundation, and is an active Lifetime Member of the Mineralogical Society of Arizona. He stays active with the Mineral Collectors of Utah. A hobby group which arose back in the early 1980's, and is still going today. He is also a co-manager of the Utah Minerals Facebook Community which has over 2,700 followers. More Utah calcite specimens can be seen on the Utah Minerals' pages and also on the Calcite Collectors Facebook Members' pages. Please enjoy seeing this calcite presentation, a mineral species not immediately associated with the state of Utah.

White rhombs with minor aragonite, Cave mine, Mineral Mountains, Beaver county, Utah.

Clear modified rhombs on glassy tan rhombs, Green River area, base of the Book Cliffs, Emery County, Utah.

Nail head crystals on quartz, Ophir Hill mine, Ophir Canyon, Oquirrh Mountains, Tooele County, Utah.



White rhombs with minor aragonite, Cave mine, Mineral Mountains, Beaver county, Utah.

All calcite photographs above by Stan Celestian.

Scalenohedrons with internal malachite inclusions, Tintic District, East Tintic Mountains, Juab County, Utah.

Glassy circular crystals pagoda stacked on internal crystals, US mine, Lark, Oquirrh Mountains, Salt Lake County, Utah.

Two white scalenohedrons, Barrick Gold mine open pit, Mercur, Mercur Canyon, Oquirrh Mountains, Tooele County, Utah.

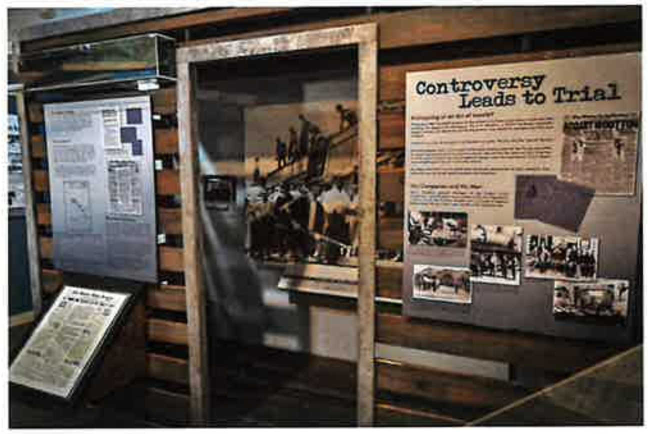
Copper Chronicles: How the Bisbee Mining & Historical Museum Preserves a Community's Mining and Mineral Heritage

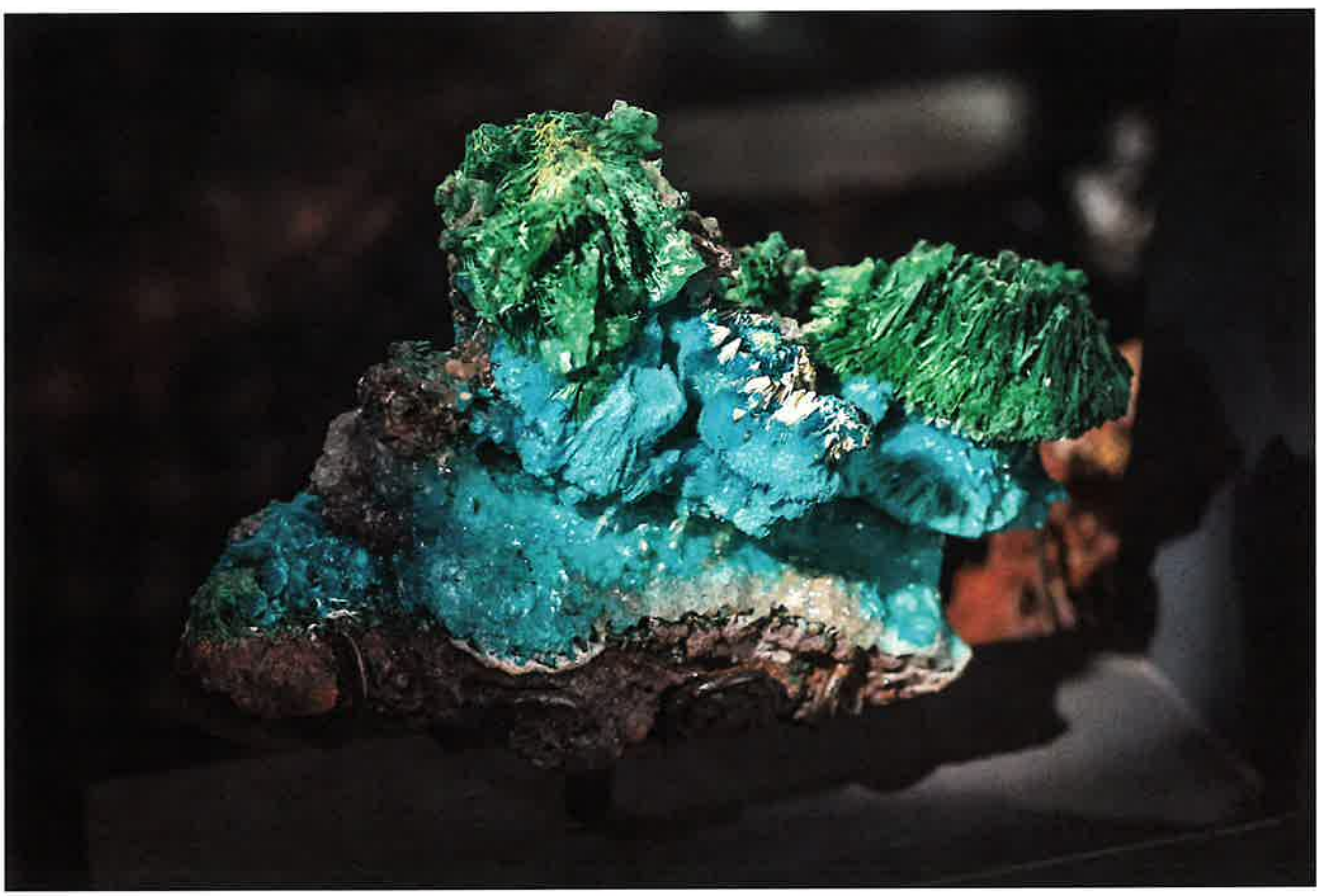
by Annie Graeme Larkin, Executive Director
Bisbee Mining & Historical Museum

The Bisbee Mining & Historical Museum, located in Bisbee, Arizona, is dedicated to showcasing the region's rich cultural history and the town's mining and mineral heritage. Established to honor the legacy of one of the most significant mineral localities in the American Southwest, the museum offers visitors an immersive experience into the social, economic, and technological aspects that shaped Bisbee from an isolated mining camp in the late 19th century into a modern community.

Copper mining is Bisbee's history. Mining in the district was directly responsible for the area's habitation and the city's growth and prosperity. The museum's extensive collection includes minerals, artifacts, photographs, and documents used in interpretive and interactive exhibits. These displays chronicle the district's mineralogy, development of mining techniques, labor movements, and daily life in a mining town. Through exploring these exhibits, visitors gain insight not only into the copper camp's mining operations but also into the lives of miners and the minerals they discovered.

The Bisbee Mining & Historical Museum plays a crucial role in safeguarding the legacy of one of Arizona's most significant mineral localities and mining camps, promoting greater knowledge and understanding of the region's extraordinary mineralogy. The museum not only honors those who shaped the town but strives to inspire future generations to appreciate and learn from this unique chapter in American industrial history.


Controversy
Leads to Trial



Dealers

Shannon Family Minerals
Michael and Pat Shannon – 480.225.1972
michael@shannonsminerals.com
https://www.shannonsminerals.com

Headframe Minerals
Don Boushelle – 602.618.4631
wehound@gmail.com

El Cucuy Minerals
Dan Fortunato – 206.304.1983
fordan27@gmail.com
Website address: Instagram @el_cucuy_minerals and @arizona_minerals_only

ASE Minerals LLC
Kenneth W Elliott, Anna Seedhill – 480.440.8305
ASEMinerals@gmail.com
www.Etsy.com/shop/ASEMineralsLLC

Boris Dimov
Borussia Minerals
623.547.9550
borussiaminerals@gmail.com

Jan Rasmussen
Jan C. Rasmussen, Ph.D.
Registered Geologist
P. O. 36971 – Tucson, AZ 85740
520.603.7656 cell
www.janrasmussen.com

Wonder Rocks & Minerals
Cameron Reichert – 602.334.7599
Cameron@wonderrockshop.com
Wonderrockshop.com

Atmosphere Minerals
Michael & Christine Kobzeff – 520.528.3221
PO Box 90495 – Tucson, AZ. 85752
www.Atmosphereminerals.com
AtmosphereMinerals@gmail.com

Barking Gecko Enterprises
Stan & Sue Celestian
602.361.0739
azgeology@gmail.com