

The Lake George Gem and Mineral Club -

Club News

June, 2018



Program for the month: Saturday June 9, 2018, 9:00AM.

Bob Carnein on “**Mineral Associations**”. No, this isn't a talk about mineral clubs or professional organizations. To find out what it IS about, **please read the article** at the end of this newsletter. After the talk, we will visit Joe Dorris's Smoky Hawk claim. Thanks, again, to Joe for inviting us to this very special place.

Note: from April through October, we meet at 9AM.

Do you have extra specimens that you don't want to banish to the “rock garden”, but also don't have room to store in your cabinet? Donate them to the **silent auction**, for the benefit of Club projects (such as the \$1500 that we just donated to Colorado School of Mines and Western Museum of Mining and Industry to support curatorial interns). This month's silent auction will feature at least one excellent fluorescent specimen, as well as more goodies from **Phil Rudd**. So, bring some CASH and be prepared for the fun!

✓ ✓ Here's a message President, **Robert Baker**:

FROM THE PRESIDENT

The annual RMFMS meeting will be held July 20-22 in Rapid City, SD. If you are planning to attend, please let me know. If our club has no representative at the meeting, we need to appoint a proxy from another club to vote for us. If we don't hear from a Club member by June 5, we will look for a proxy.

I am disappointed to announce that I received a complaint from a member that material was taken from their vehicle while on a field trip. We have been lax in leaving our vehicles open while we collect our great specimens, I guess we will have to be more diligent in locking up.

Cretaceous-Tertiary (K-T) Boundary

66 million years ago, 75% of all plants and animals were killed off in a mass extinction event. Many theories were proposed: massive volcanic activity in India (Deccan Traps) with an increase in CO₂; climate change; and multiple comet strikes. All were heavily debated while corroborating evidence was searched for.

Walter Alvarez, a geologist, was working in Italy on a limestone wall that spanned the Cretaceous-Paleogene boundary. A thin clay layer occurs right at the boundary. Below the layer, fossil evidence of dinosaurs, ammonites, and many other species is abundant, but above the layer those fossils are lacking. Luis Alvarez, Walter's father and a noted physicist, studied the clay layer, finding glass spheres, shocked quartz, and iridium. Iridium is rare on the surface of the Earth but is more common in comets and asteroids. In 1980, the Alvarizes proposed that a large asteroid impact was responsible for the Cretaceous extinction, but no corresponding crater could be located. The impact crater had actually been located in 1978, but was not identified as an asteroid impact. Off the Yucatan Peninsula, the site now known as Chicxulub was discovered by a petroleum exploration team. Many years later, the site was confirmed as an asteroid impact crater measuring 93 miles in diameter and 12 miles deep. Estimates of the size of the asteroid range from 6.2 to 9.3 miles in diameter. The resulting ejection of material covered huge areas of the Earth with a thin layer of a mixture of asteroid and terrestrial debris. This layer is now called the K-T Boundary and separates the Cretaceous from the Tertiary System. Alternatively, it is sometimes designated the K-PG boundary, for Cretaceous – Paleogene. "By dividing the Tertiary Period into two periods (Paleogene and Neogene), the periods are more closely comparable to the durations of the periods of the preceding Mesozoic and Paleozoic Eras."

Colorado has one of the premier viewing sites in the world for the K-T Boundary. Located within the Trinidad Lake State Park, this site is easily reached by a short, well maintained trail with interpretive signs. Park Rangers are available to talk about the site as well as other features of the canyon. Interested Club members will visit the site on June 20, on a field trip led by **Bob Baker**.

References:

Wikipedia – "Luis Walter Alvarez"

Encyclopaedia Britannica – "K-T Extinction"

Wikipedia – "Chicxulub Crater"

Wikipedia - "Paleogene"

UPCOMING PRESENTATIONS

July- **Loren Lowe**, Gold Panning in the Pikes Peak Region: "There's **GOLD** in them thar hills."
But where? And how do you get it?

August- **Bob Carnein**, Starting a Mineral Collection: How do you store and catalog specimens when your basement is full of rocks and you can't remember where you found them. Adding scientific and monetary value to your collection.

September- **Dave Alexander**, Prospecting in the Pikes Peak Region

October- Hoping for a "How to clean your mineral specimen" talk.

November-**Richard Kawamoto**, Mining Claims A review of what a claim is and how to file for a claim.

December- towel show, no presentation

Coming Events

✓ ✓ Several mineral, fossil, and geology clubs meet relatively nearby and encourage visitors. These include:

>**Cañon City Geology Club**, meets on the 2nd Monday of the month at 6PM in the United Methodist Church, Cañon City;

>**Colorado Springs Mineralogical Society**, meets on the 3rd Thursday of each month at 7PM in the Mt. Carmel Veteran's Service Center, 530 Communication Circle, Colorado Springs;

>**Columbine Gem & Mineral Society**, meets on the 2nd Thursday of each month, 6:30PM in the meeting room, Mt. Shavano Manor, 525 W. 16th (at J St.), Salida;

>**Pueblo Rockhounds**, meets on the 3rd Thursday of each month at 6:30PM in the Westminster Presbyterian Church, 10 University Circle, Pueblo.

✓ ✓ **Pete Modreski** and others suggest the following upcoming events:

Sat., June 2, 10 a.m. – 5 p.m., “Garage Sale” of minerals by “**O’ Dark Thirty Boyz Mining**”, 9661 S. Johnson St., Littleton CO 80127. “Swing by and check out some minerals and talk rocks. We will have some food, wholesale flats, tumbling rough and mineral specimens.” All welcome; you may contact them (“them” includes Bob Hembree and John Schmidt) at ODarkthirtyboyzmining@gmail.com, 303-903-3663

Sat., June 2, CO-AIPG (Colorado Chapter, American Institute of Professional Geologists) is holding their annual geology field trip: “**Roadside faults, folds, fossils, crystals, and diamond pipes: Sampling the geologic diversity of northern Colorado**”, led by Dr. Barbara EchoHawk and Dr. Uwe Kackstaetter, Metropolitan State University, Denver, CO. The 2018 field trip will follow the route and stops for a field trip led by Drs. EchoHawk and Kackstaetter for the 2016 Annual Meeting of the Geological Society of America (GSA). The trip field guide was published as Chapter 11 in Volume 44 of the GSA Field Guide series, in Keller, S.M., and Morgan, M.L., eds., *Unfolding the Geology of the West: Geological Society of America, Field Guide Volume 44*, p. 247-266. The trip will meet at the parking lot of the Geological Society of America headquarters in Boulder, 3300 Penrose Place, at 8:00 a.m.; travel will be by carpooling.” Interested persons who are not members of CO-AIPG are invited to join them for this trip; if interested, you are asked to please contact Doug Peters of AIPG (dcpeters@tuveraexploration.com) by **May 25**. To receive the complete announcement of info about the trip, including how to order a copy of the 2016 GSA field guidebook at a discount price (\$20), please write to Doug, or to Pete Modreski at pmodreski@usgs.gov.

June 7-10, Fairplay Contin-Tail rock, gem, and mineral show, MiddleFork RV Resort, 255 Highway 285, Fairplay, CO; see www.facebook.com/ContinTail.

Three Florissant Scientific Society Field Trips, June 10, 24, & July 22

Sunday, June 10, 1:00 p.m., **Trip to examine transported boulders (alluvial or... glacial?) in the “Wind Gap” on Dinosaur Ridge**. “We will gather together at the Stegosaurus Parking Lot on the southeast corner of the I-70/Rt. 93/US 40 intersection. If that lot is full (it's not very big), folks can park over at the Woolly Mammoth lot on the northwest corner and carpool back to the Stegosaurus Lot. Meet at 1:00 p.m., no picnic.

“Bring equipment like notepad, pencils, measuring tape, and camera on your cell phone. We will hike up the west side of the Hogback on the Dakota Ridge trail and along the top to the wind gap. There we will map, identify, and measure the glacial[?] boulders and any orientation that we can see, that occur in the so-called U-shaped water gap. We will look for any other evidence of glaciation we can find. Dress for wind (it's called the wind gap for a reason). The hike is easy once you are on top of the Ridge - we will pause and rest on our way up to the top from the parking lot. After we think we've seen every glacial erratic there that can be found, we'll return to the parking lot. [P.S., the ?'s are added, mine; Beth believes that these boulders are a glacial deposit.]

Sunday, June 24, Central City Glacial[?] Gravels This FSS trip will be on the last Sunday instead of the 3rd Sunday (to avoid Father's Day the week before) and we will meet at the Central City Parkway roadcut at the top of the hill to map MORE glacial boulders. There we will take systematic samples and measure them. [Beth claims that...] “Pete [if he's here] will identify ALL of the rocks!” Please check with Beth to confirm the exact meeting time (probably 1 p.m.) and exact directions to this roadcut site: cloverknoll@comcast.net, 303-986-9693. The Colorado Scientific Society visited this location on their April 15 field trip.

Sunday, July 22, Bear Creek Lake Park, Fossil-bearing Cretaceous Marine Strata. This FSS trip will be in Bear Creek Lake Park, located at the Morrison Road (Rt. 8) exit off C-470. We will have lunch (12 noon) at the Skunk

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Hollow Pavilion, then hike along the creek to a nice outcrop of oyster and clam shells under the C-470 bridge, which Arthur Lakes mapped in 1877. Then we will return to the picnic area and drive down to his other site where he found a *Pachyrhizodus* jawbone and teeth. Lew Kleinhans, who is something of an expert on the local strata at this site deposited in the Western Interior Seaway, hopes to be along to add his comments and insights. No collecting if you find stuff (this is a Lakewood City Park). For entry, a day pass (\$10, or \$5 for seniors) or annual City of Lakewood-Bear Creek Lake Park Pass is required.

The **Florissant Scientific Society** is an informal group that meets once a month for a field trip or lecture, most anywhere in or beyond east-central Colorado. Usually, the group meets at noon for a potluck lunch (indoors or outdoors depending on the location, season, and weather) and, then has the talk or field trip. There are no dues or formal membership list; anyone interested is always welcome, and to be on the FSS mailing list, write to Beth Simmons, cloverknoll@comcast.net, 303-986-9693.

Tues., June 12, WMMI (Western Museum of Mining & Industry) Speakers' Bureau Lecture, "**An Introduction to Ore Microscopy**" by Dan Kile (USGS, retired). The lecture will begin at 7:00 pm (doors open at 6:30 pm). \$5 per person, free for museum members. Please RSVP to 719-488-0880 or email rsvp@wmmi.org. At 225 North Gate Blvd., Colorado Springs.

Thurs., June 14, 4:00 p.m., "**History of the Creede Mining Site**", the first in a series of "**EDTalks**", in the Boettcher Room at the CSM Arthur Lakes Library (1400 Illinois Street, Golden, Colorado). "Ed Raines, Collections Manager at the CSM Geology Museum and recognized expert on Colorado minerals and mining history, will present a series of talks with an in-depth look at important mining districts of Colorado focusing on their history and geology. All are welcome. The full schedule of talks will be:

June 14, 4 p.m., History of the Creede Mining Site

June 21, 4 p.m., Geology of Creede, Colorado

August 2, 4 p.m., History of the Gilman mines

August 9, 4 p.m., Geology of Gilman, Colorado

June 15-17, Victor, CO Gem and Mineral Show, Victor, CO; see <http://victorcolorado.com>.

Sat., June 16, "**Dinosaur Ridge Brontos and Brews Festival**". "Colorado Brewers, Music & Dinosaurs; Guinness World Record Attempt & Family-Friendly Carnival", 10 a.m. – 4 p.m. [Striving for "The Most People Dressed in Dinosaur Costumes"]. See <http://www.dinoridge.org/brontosbrew.html> for more info.

Fri.-Sat.-Sun., June 29-July 1, San Juan County Gem & Mineral Show, hosted by the San Juan County [N.M.] Gem and Mineral Society. McGee Park, Farmington, NM. Free admission; 10-6 Fri. & Sat., 10-5 Sun.

July 6-8, Four Corners Gem & Mineral Show, La Plata County Fair Grounds, Durango, CO, sponsored by the Four Corners Gem & Mineral Club. 10 a.m. – 6 p.m. daily.

Tues., July 10, WMMI (Western Museum of Mining & Industry) Speakers' Bureau Lecture, "**Colorado Fuel & Iron**", by Victoria Miller. The lecture will begin at 7:00 pm (doors open at 6:30 pm). \$5 per person, free for museum members. Please RSVP to 719-488-0880 or email rsvp@wmmi.org. At 225 North Gate Blvd., Colorado Springs.

July 12-15, 9 a.m. – 5 p.m. daily, there will be a "**Home Rock Show (Sale)**" by John Haney, 4242 Thompson Court, Denver CO. 80216 (south of I-70, east of York St. & west of Steele St.). "Rough rock, slabs, cabs, fossils, amber, turquoise, minerals, crystals, gemstone bowls & boxes, lapidary equipment & supplies; discounts for lapidary students." Contact, rocksisme@comcast.net, 303-296-8268.

Aug. 3-5, Creede Rock & Mineral Show, at the Creede Underground Mining Museum and Community Center, Creede, Mineral County, CO. 10 a.m. – 5 p.m. daily; see <http://creederocks.com/>.

Sat.-Sun., Aug. 4-5, 2018, A symposium on **Minerals from the Metallic Ore Deposits of the American Southwest**, sponsored by the Friends of Mineralogy, Colorado Chapter, and the Friends of the Colorado School of Mines Geology Museum. To be held on the CSM campus. It will include at least 1½ days of presentations, a welcoming party and/or evening banquet, and probably one or more field trips. Presentations are invited! To offer to give a presentation, please write to fmccpresident@gmail.com. I'll share more information about this symposium as soon as it is available.

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Aug. 9-12, Contin-Tail rock & mineral show, Buena Vista Rodeo Grounds, Buena Vista, CO;
see www.facebook.com/ContinTail

Aug. 16-19, Woodland Park Rock, Gem, & Jewelry Show, Woodland Park, CO;
see <https://www.facebook.com/woodlandparkrockandgemshow/>

Aug. 17-19, Lake George Gem & Mineral Show, sponsored by the Lake George Gem and Mineral Club, Lake George, CO. See <http://www.lggmclub.org/>

Sep. 7-15, Colorado Mineral and Fossil Fall Show, Crowne Plaza Hotel - Airport, 15500 E. 40th Ave. Denver, CO.

Sep. 8-16, Denver Coliseum Mineral, Fossil, and Gem Show, Denver Coliseum; see <http://www.coliseumshow.com/>

Sep. 12-15, Denver Fine Mineral Show, Denver Marriott West, 1717 Denver West Blvd.;
see <http://finemineralshow.com/denver/>

Sep. 14-16, 51st annual Denver Gem and Mineral Show, Denver Mart, 451 E 58th Ave., Denver, CO. **Minerals of Mexico** is the 2018 show theme. See <http://denvershow.org>

✓ ✓ Vice President **John Rakowski** reports that, after a long and difficult bureaucratic struggle, we finally have final approval for our show in August. Thanks, again, to John for his tireless efforts.

✓ ✓ At the May meeting, Club members voted to fund curatorial internships at the Colorado School of Mines Geology Museum and the Western Museum of Mining and Industry. Our first curatorial interns will be **Erin Morrison** and **Leland Spangler**, both at CSM, and **Ben Elick** at WMMI. Our congratulations go out to these three worthy candidates.

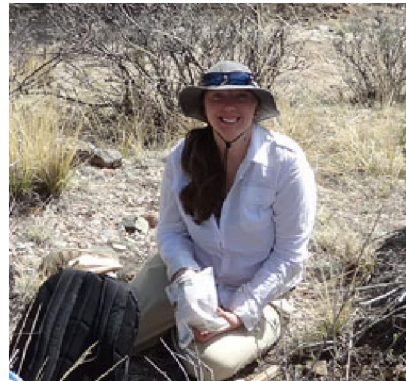
✓ ✓ Also at the May meeting, we heard an interesting talk about the “Bone Wars” from **Paul Combs**, after which many members visited the Gold City mine, near Round Mountain campground (I can’t be more specific than that). See the photos below. Minerals found include the following; there are probably more that haven’t been identified yet:

Biotite	diopside	microcline	sillimanite
Calcite	epidote	muscovite	vesuvianite
Chrysocolla	grossular	powellite	wollastonite
Clinozoisite	hornblende	quartz	

Powellite (which closely resembles quartz) fluoresces buttery yellow (SW only); the wollastonite, which is white, fluoresces orangey tan (SW) and greenish yellow (LW); microcline fluoresces red. Several people found well formed, gemmy (but small; up to 1 cm or so) olive-brown vesuvianite crystals, and a few also found well formed crystals of pale reddish brown grossular (?) garnet.

This was the Club’s first visit to this locality, and we appreciate the claim owner’s invitation for the Club to collect there. The locality is a skarn formed where the Silver Plume Granite (1.4 billion years old) intruded impure marble of the Idaho Springs Fm. (1.7 billion years). About a dozen similar prospects/small mines occur north of US 24 and west of Lake George. They were explored for tungsten in the mid-20th century, when the federal government offered incentives for locating deposits of strategic minerals (most of our tungsten is imported). This particular one is unusual in that it has a capped shaft reputed to be several tens of feet deep.

Billy Bell sent these photos of the trip:



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✓ ✓ Field-trip coordinator **Billy Bell** is working on a great schedule of trips for this spring and summer. So far:

5	April 28 - Sat	Harvey Blue Barite Mine			Easy	Linda W
6	May 2 - Wed	Baculite Mesa - Fossils			Easy/Med	Billy B
7	May 12 - Sat	Tourmaline - Mothers Day Weekend			Easy	
8	May 16 - Wed	Shelf Road			Easy	Paul
9	May 19/20 - Sat/Sun	Patience/Piety - Smky Qtz/Flourite - OVERNIGHT TRIP			Easy	John S / BB ??
10	May 23 - Wed	Harvey Blue Barite Mine			Easy	Linda W
11	May 26 - Sat	Bob Carnein Florissant Fossil Beds Tour/Fossil Quarry Dig (\$17.00)			Easy	Bob C
12	June 6 - Wed	Badger Flats - Magnetite/Fluorite/Barite/Malachite			Easy/Med	Linda W
13	June 9 - Sat	Smoky Hawk Claim - Amazonite/Smky Qtz (Dorris Claim)			Med/Hard	Linda W
14	June 16 - Sat	Blue Moon - Smoky Quartz/Amazonite - (Karen Vogl claim)			???	Linda W
15	June 20 - Wed	Trinidad Lake State Park - \$7.00 Entrance Fee - (K-T Boundary)			Easy	Bob B
16	June 23 - Sat	Texas Creek - Meteorites			Easy/Med	Richard W / Billy B
17	June 27 - Wed	St. Peters Dome - Flourite/??			Easy	Linda W
18	June 30 - Sat	McGraw Park Bailey/ ????			Easy	Linda W
19	July 7 - Sat	Eureka mine - Fluorescent Zircon/Riebeckite/Astrophyllite			Easy/Med	Dick L / Billy B
20	July 14 - Sat	Topaz Mountain - Topaz/Smoky Quartz) - (Dorris claim)			Easy	
21	July 21 - Sat	Gold Panning - Gold			Easy	Loren L / Bob B
22	July 25 - Wed	Houselog Creek - Geodes			Easy	Paul H
23	July 28 - Sat	Midway Springs - Banded Aragonite/Actinolite/Peacock/Opal			Easy	Billy B / ??
24	Aug 4 - Sat	Leadville Co - Galena/Pyrite/Peacock/Silver			Easy	
25	Aug 11 - Sat	Badger Flats - Magnetite/Fluorite/Barite/Malachite			Easy/Med	Linda W
26	Aug 15 - Wed	Spruce Grove - Topaz (moderate hike at 9000 ft.)			Med	
27	Aug 18 - Sat	Sedalia Copper mine - Almandine Garnet/other minerals			Steep	Steep
28	Aug 24/26 - Fri-Sun	Creede Co - Silver/Sowbelly Agate/Barite/Pyrite/Galena			Easy/Med	Easy/Med
29	Aug 29 - Wed	Petrified Wood - Tallahassee Rd Area??				
30	Aug 31 - Sept 2	Great Salt Plains - Gypsum Crystals) - Oklahoma - OVERNIGHT TRIP			Easy	
31	Sept 15 - Sat	Calumet mine - Epidote/Quartz xls./Magnetite/Corundum			???	Easy
32	Sept 22/24 - Fri-Sun	Grand Junction - Barite/Calcite/Amethyst			Easy	???
33						Easy
34	*****	Red = Setup Trip		*****		
35	*****	Black = Still Working on Permissions or Locations				

✓ ✓ **Don't forget to carry your Club membership card when you're out collecting. Recently, someone was arrested at Devil's Head.** Also, a reminder from **Dan Alfrey**: ✎ *Current members can visit the LGGMC Club Claim at any time. **After your visit**, you MUST submit the 'Required Reporting' via text or email (**which Date and approx. Hours**). Thank-You and Enjoy. ✎ Please see the Club Website for detailed Guidelines at www.LGGMclub.org*

✓ ✓ Here's an article about an upcoming program by **Steve Veatch**:

LGGMC MEMBER TO SPEAK AT PIKES PEAK HISTORICAL SOCIETY

By Chase Alexander

Steven Veatch, LGGMC member and National Rockhound Hall of Famer, will present the acclaimed program, *From Mineral Strike to Meteor Strike: Guffey and the Freshwater Mining District* at the June 19 Pikes Peak Historical Society Chautauqua. Veatch will present his program **June 24 at 2:00 pm** at the Florissant Public Library, 334 Circle Drive, Florissant, CO 80816. There is no cost to attend this hour-long program.

Discover the geological, historical, and cultural wonders of Guffey, the quiet Park County hamlet that sits at the foot of a nest of ancient volcanoes. Learn about prehistoric eruptions of molten lava, hissing springs, and

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spewing vents. Enjoy a breathtaking virtual tour of old mines, secret hollows, and sweeping landscapes. Hear the story about the town's namesake and his oil company. See photos of the picturesque buildings that remain today. Top off the afternoon by leaning about Guffey's forgotten meteor strike. Come and discover Guffey while you enjoy this image-rich lecture that will stay with you long after the day is over.

Bio: Steven Veatch was born in Denver and grew up in the Pikes Peak region. His family came to Cripple Creek in the 1890s from England and worked in the district's mines for over 40 years. The other side of the family established a ranch in the wilderness near Boulder in 1865. Veatch serves the Cripple Creek City Council as a member of its Historic Preservation Commission. He is also a member of the Board of Trustees for the Western Museum of Mining and Industry in Colorado Springs.

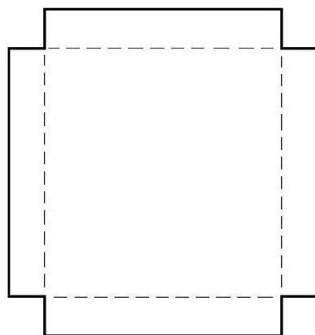
✓ ✓ And here is the latest installment of “**Bench Tips**” by **Brad Smith** (www.BradSmithJewelry.com):

REVOLVING SOLDER PAD

Often when we're soldering we have multiple pieces on the pad or a single piece and would like to work on several sides of it during the same heat. One of the ways to deal with this is to put your solder pad onto a turntable. That way you can rotate each piece into position when you need to or can rotate the pad to reach another side of a larger piece.

All you need to make one of these is a piece of aluminum sheet and an inexpensive turntable assembly. A good hardware store will have both, although you can usually find the aluminum in the scrap pile of a local sheet metal shop.

To build a turntable for my 6 inch solder pad, I used a seven-inch-square piece of aluminum sheet and cut out ½-inch notches from each corner. Then I used a bench vise to bend the sides along the dotted lines to form a tray that cradles the solder pad. I attached the tray to the turntable assembly with a couple small flat-head machine screws and nuts.



NEW BENCH TIPS BOOK

For those who enjoy these bench tips, I'm happy to announce a second volume is now available on Amazon. "More Bench Tips" includes 86 additional ways to save time, avoid frustration or improve quality at the bench. These new tips cover problems in fabrication, stone setting, casting, soldering, and polishing. Browse through a couple of the new ones at <https://amazon.com/dp/B07D4B45JJ/>

QUENCHING

Do you hear that little hiss when some jewelers drop a hot piece from soldering directly into the pickle? That hiss sends small droplets of acid into the air that can rust nearby tools and can't be all that good to breathe. To

avoid this, I keep a coffee cup of water at the solder station to cool a soldered piece before dumping it into the pickle. It's also useful for annealing metals and for cooling off tweezers.

Pick Up a Few New Jewelry Skills With Brad's "How To Do It" Books

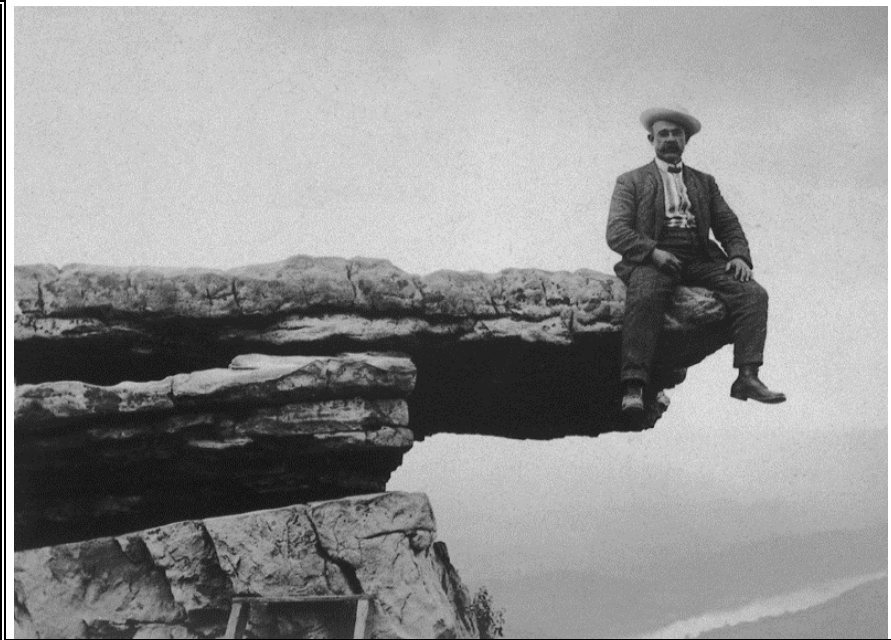
<http://amazon.com/author/bradfordsmith>

Notes from the Editor

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If you're wondering what June's program is about, here's an article that should help to answer your questions.

Mineral Associations

by Bob Carnein

Currently, professional mineralogists recognize about 5400 valid terrestrial mineral species. Hazen (2015) estimates that the total may eventually reach about 6500. As a collector, you may wonder how you can ever deal with the huge diversity of minerals, many of which have similar properties and are hard to distinguish without the aid of expensive and sophisticated analytical equipment. However, some resources are available to anyone who has the patience to learn how to use them.

You should start by remembering that only 20 or 30 common minerals make up over 99 percent of Earth's crust. (Challenge yourself by trying to name them.) If you learn to recognize the physical properties of those minerals, you're well on your way to becoming a competent amateur mineralogist. Honing your skills in the use of physical properties should be your number one goal. But this can still leave you with several possibilities when dealing with an unknown mineral. So, what can you do?

You can look at pictures of minerals (currently, there are 870,000 or so at Mindat.org; I kid you not), or ask an "expert" (John Rakowski and I are always glad to take a look). But there are too many photographs to process, and experts aren't always handy.



mindat.org

I consider myself to be better than average at sight identification of minerals. So, what's my "secret"? My first step is to ask where an unknown sample came from. Knowing that, I can go to Mindat.org, Eckel (1997), or other resources and see which minerals have already been found at that locality. Although this is not always the case, chances are that the unknown has already been identified, described, and photographed by someone else. If not, one of my most powerful tools, which I have developed over a long history of mineral collecting and teaching, is a knowledge of ***mineral associations***.

It may sound strange to hear this, but minerals are a lot like plants, in that they commonly occur in groups that formed in similar environments. We call these *associations* (or some references talk about *modes of occurrence*). You don't expect to find magnolia trees or rhododendrons growing with Douglas firs and aspen trees in the Colorado Front Range—the environment here doesn't allow that. Nor should you expect to find olivine or galena in the pegmatites of the Pikes Peak or Silver Plume Granite. Neither of these minerals typically forms in the conditions that prevailed when the local granite pegmatites formed. They also form under such different conditions that they aren't likely to occur together in any rock.

One thing you'll learn from experience is that some minerals occur in many more geologic environments than others. These are like dandelions in botanical associations—they don't tell you much about what you're likely to find associated with them. For example, if you have been collecting for a while, you know that fluorite occurs at several central Colorado localities that are quite different, in terms of their geology. Other "mineral weeds" include the micas (muscovite and biotite), quartz, microcline feldspar, goethite, and hematite.

However, the presence of even these very widespread minerals can provide important information that eliminates the likelihood of finding others. For example, quartz and olivine are mutually exclusive—if you think you've found them together, you're probably wrong. The presence of muscovite tells you that you aren't in the Pikes Peak Granite. Hematite or goethite suggests the former presence of some other iron mineral that has been altered or weathered at some time in the past.

Although books and websites can help, learning associations is something one picks up gradually, from experience. The more field trips you go on, the more it will be clear to you that some minerals commonly occur together while others do not. Although this takes time, knowledge of associations is often the key difference between a sophisticated mineral collector and a rockhound who finds (fool's) gold and smoky "topaz" everywhere they go. Learning common associations provides a powerful tool that will greatly improve your ID skills.

Note: Something very important has occurred in the mineral world over the last decade. Two enormous databases—Mindat.org and the RRUFF database—bring together enormous amounts of information about hundreds of thousands of mineral occurrences, world-wide. These searchable databases allow comparison of mineral associations nearly anywhere on Earth. Soon, it will be possible to look up a few minerals and find lists of minerals that are *likely* to occur with them. So, if you can accurately identify a few minerals at your collecting site, the search engine will soon be able to tell you the probability of what else you can expect to find, based on comparison with all other occurrences in the database.



Robert M. Hazen. Credit: Hazen.carnegiescience.edu

This can be done now by an expert with experience and access to a good library. However, the new system will make you an “expert”, even though you have none of this information “in storage”. This has already begun—Dr. Robert M. Hazen (Carnegie Institution of Washington, DC) and his colleagues have recently published ground-breaking papers on this subject. Hazen is now doing a “star turn” on the lecture circuit—he recently appeared on NOVA and at the Colorado School of Mines and the Dallas Mineral Symposium. I believe his ideas will be assimilated quickly. They would not have been possible without the groundwork laid by Jolyon Ralph at Mindat.org or the many contributors to the RRUFF database.



Credit: Callan Bentley, Earthmagazine.org

Some Important Associations: Here are some mineral associations you are likely to encounter in central Colorado. Realize that these lists aren't intended to be complete; many other, less common minerals may also occur.

Pikes Peak Granite (Crystal Peak pegmatites): quartz +microcline feldspar +albite +biotite +hornblende +goethite +fluorite +topaz +magnetite

Silver Plume Granite; Cripple Creek Granite (pegmatites west of Lake George; Gold City claims; Pipe Springs campground): quartz +microcline feldspar +muscovite +biotite +magnetite +schorl (tourmaline) +spessartine garnet

Skarn deposits (e.g. Pulver Gulch, Gold City claims): calcite +grossular garnet +wollastonite +diopside +vesuvianite +tremolite +epidote +scheelite/powellite

Hydrothermal veins (e.g. baryte vein near Tarryall): quartz +fluorite +pyrite +chalcopyrite +galena +sphalerite +calcite +malachite +azurite +cerussite +anglesite +smithsonite +goethite +hematite +baryte

Idaho Springs Formation (schists, gneisses e.g. Arroya Gulch; Sedalia mine; Cripple Creek area): chlorite +biotite +muscovite +almandine garnet +sillimanite +hornblende +quartz +microcline feldspar +magnetite

References Cited:

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Hazen, R.M., 2015, Mineral evolution: the great oxidation event and the rise of colorful minerals: The Mineralogical Record, vol. 46, no. 6, p. 805-812, 834.

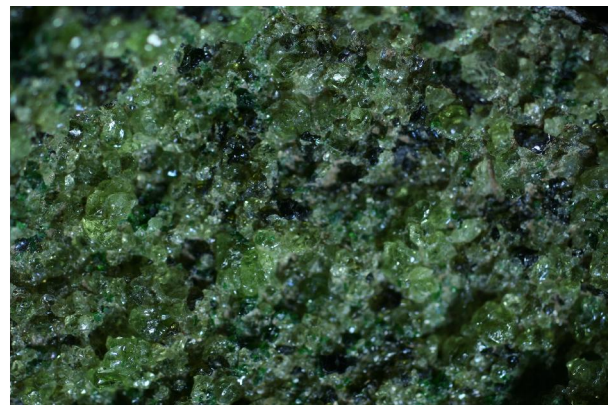
Monthly Mineral Quiz

Answer to last month's quiz: Baryte (aka Barite) Baryte, BaSO₄, occurs at many Colorado localities. Dave Harvey's claim near Hartsel has produced excellent specimens up to tens of pounds (check out the one in the Pikes Peak Historical Society Museum), as has the baryte "dike" near Tarryall, from which the specimen in last month's quiz was collected. An interesting fact about Colorado baryte is that, although it generally occurs in simple orthorhombic crystals, baryte from each locality has its own distinctive character—collectors can recognize the source at a glance.

Although neither Dave Harvey's claim nor the Taryall "dike" is currently of commercial interest, baryte is an important industrial mineral. When ground to a powder and added to bentonite (an altered volcanic ash), baryte forms the basis for drilling muds used in the oil and gas industries. Because of its high specific gravity, baryte adds "weight" to the mud circulated in a well during drilling, allowing it to substitute its density for that of the rock removed from the drill hole and thus preventing the kinds of blow-outs seen in old movies. It also helps to lift the broken rock cuttings as the well is deepened, allowing the on-site geologist (aka a mud logger) to examine and plot samples as the mud delivers them to the surface.

For those of you who have had the pleasure, a barium enema uses a suspension of barium sulfate, which is opaque to X-rays.

This month's unknown: Here's a common mineral that often occurs in basaltic lavas, generally as small, equidimensional grains and only rarely as well formed crystals. Granular masses occur in the rare rock peridotite. Although it has a good cleavage and conchoidal fracture, its hardness of 6.5 to 7 makes this mineral an attractive and relatively durable gemstone. Its relatively high specific gravity of 3.27 to 3.37 means that it sometimes accumulates in placers, especially on beaches. However, because it is a high temperature mineral, it rapidly alters to other, softer minerals that are of little interest to lapidarists. This mineral occurs at several localities in South Park, where it weathers out from volcanic rocks of the Thirteenth Mile volcanic series. What is it?



This month's unknown: (left) a fine crystal from Pakistan; (middle and right) granular aggregate from Arizona. (Carnein collection and photos)

Pikes Peak Gem, Mineral, & Jewelry Show

Featured Mineral: Fluorite

Fri. & Sat., June 1-2, 2018, 10:00-5:00
Sun., June 3, 2018, 10:00-4:00

Adults \$5.00 / 3-Days \$8.00
12 & Under FREE

NORRIS-PENROSE EVENT CENTER
1045 Lower Gold Camp Road



Featured Exhibit: American Woman Sculpture

PikesPeakGemShow.com

6th Annual
**VICTOR
GEM MINERAL SHOW**

A large, faceted purple amethyst crystal cluster. The crystals are numerous and sharp, with a range of purple hues from deep violet to lighter lavender. The base of the cluster is a lighter, more crystalline material.

June 15-17, 2018
Historic Victor, Colorado

Lake George Gem & Mineral Club
PO Bo 171
Lake George, CO 80827



The Lake George Gem and Mineral Club is a group of people interested in rocks and minerals, fossils, geography and history of the Pikes Peak/South Park area, Indian artifacts, and the great outdoors. The Club's informational programs and field trips provide opportunities to learn about Earth science, rocks and minerals, lapidary work and jewelry making, and to share information and experiences with other members. Guests are welcome to attend, to see what we are about!

The Club is geared primarily to amateur collectors and artisans, with programs of interest both to beginners and serious amateurs. The Club meets on the second Saturday of each month at the Lake George Community Center, located on the north side of US Highway 24 on the east edge of town, sharing a building with the county highway shops. **In the winter, we meet at 10:00AM. From April through October, we meet at 9:00AM, to allow more time for our field trips.**

Our organization is incorporated under Colorado law as a nonprofit educational organization, and is a member of the Colorado, Rocky Mountain, and American Federations of Mineralogical Societies. We also sponsor an annual Gem and Mineral Show at Lake George, where collectors and others may purchase or sell rocks, minerals, fossils, gems, or jewelry. Annual membership dues (Jan. 1 through Dec. 31) are \$15.00 for an individual (18 and over), and \$25.00 for a family (parents plus dependents under age 18).

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