



# Flatirons Facets

Flatirons Mineral Club of Boulder County, Colorado

Volume 63, Number 4

July-August, 2020

## FMC Activities during COVID-19 Social Distancing

### Annual Club Picnic

At this time, the annual picnic is still on for **Saturday, August 15** at Harlow Platts Park, the same place as the last several years. The park is located just south of the South Boulder Recreation Center at 1360 Gillespie Drive, Boulder, 80305. The picnic starts at 11:00 am. Folks with last names beginning with A-M are asked to bring a covered dish and folks with last names beginning with N-Z should bring a dessert. BBQ sandwiches and beverages will be provided by the club.

#### In this newsletter

- Dorothy Horton, long-time club member passes away, page 3
- Prehistoric Road Trip and Rhodochrosite videos to watch, page 3 & 4
- Online offerings from Rock & Gem magazine, page 4
- Jr. Geologists activities, page 4
- Fluorescence, a Lifelong Hobby by Brian Walko, page 12
- What is this Mineral? An Online Key for Mineral Identification by Dennis Gertenbach, page 9
- Denver Gem & Mineral Show cancellation letter, page 14
- Fossils in the News, page 14
- Other rockhounding events and activities, page 16

After lunch, we will present several awards, including our Rockhound of the Year. We will also have special activities for the Jr. Geologists at the picnic.

Whether we hold the picnic this year depends on the social distancing requirements in Boulder. Watch for the August email blast for an update on the status of this year's annual picnic.

### Field Trips

Currently, the only scheduled club field trip at this time is the previously postponed **North Table Mountain Field Trip** August 29. Although this trip is currently filled, you can contact the trip leader to be placed on the waiting list. Other field trips will be announced, once the state's guidelines allow larger groups to meet.

### Denver Gem and Mineral Show

Regretfully, the Greater Denver Area Gem & Mineral Council and the Show Committee have determined that the only prudent course of action during this COVID-19 pandemic is to cancel the 2020 Denver Gem and Mineral Show. Please see the cancellation letter on page 14. Hopefully, 2021 will bring a breath of fresh air and complete change in the situation, so we will be able to have a 2021 show.



Great food at last year's picnic. Credit: Brian Walko

# Message from the Board

Hello FMCers!

I'm checking in with you from my retirement home in Arizona to make a happy announcement! I have been slowly receding into the FMC history book with Brian taking over as the club's president. And while I will stay on as webmaster we have a member who has stepped up to the challenge of Field Trip Coordinator!

Taneka Colon has volunteered to organize the club's summer field trips. While it's unfortunate that the pandemic has made organized group trips virtually impossible, it gives Taneka time to get comfortable in the role.

**The Flatirons Mineral Club** is a non-profit Organization which is dedicated to developing and maintaining interests in Earth science and associated hobbies. The purpose of this Club includes, but is not limited to, studying geology and Earth science, teaching others about our hobby, including young people, collecting gem, mineral and fossil specimens and learning lapidary skills.

The Flatirons Mineral Club is affiliated with the Rocky Mountain Federation of Mineralogical Societies, the American Federation of Mineralogical Societies, and the Greater Denver Area Council of Gem and Mineral Societies.



Please welcome her and thank her for volunteering to give her time to the club. And help her with her mission to put together fun field trip schedules in the future by making suggestions and volunteering to lead some of the trips.

Stay safe!  
Gabi Accatino  
Past FMC President

## Member Name Tags

Would you like a Flatirons Mineral Club name tag to wear at club events and field trips? The club places orders for name tags several times a year for members.

If you would like a name tag, please log onto our website and choose the "Request a Name Tag" link in the Members Area. Add your name to the list as you want it to appear on your name tag and it will be ordered for you. Your first name tag is free!



Example of a club name tag

## Write an Article for the Club Newsletter

One of the best features in each club newsletter are articles and other contributions by club members. Club members have a wide range of interests in earth science and rockhounding and are willing to share their interests with other members through articles, photos, poetry, and artwork.

Consider submitting an article, photo, poetry, or artwork for September's newsletter. We are looking for items from all age groups, including adults and Jr. Geologists. You can send your newsletter contribution to Dennis at [gertenbach1@gmail.com](mailto:gertenbach1@gmail.com).



If you need help with your contribution, please contact Dennis. All contributors can select a wulfenite sample from the Defiance Mine near Gleeson, Arizona.

## Dorothy Horton: Long-Time Club Member Passes Away

Dorothy Fay Horton passed away on June 15, 2020. Dorothy is survived by her loving husband Raymond, her son Stanley Horton, and her daughter Diana Lienemann. Dorothy and Ray have been club members for a long time. In younger days they were quite active, attending meetings, silent auctions, and field trips. Dorothy and Ray belonged to other local rock clubs and were active in them as well.

Dorothy lived most of her life in Valmont, Colorado, just east of Boulder and considered herself a "country girl" her whole life. Through the 8th grade she attended the historic Valmont School and graduated from Boulder High School in 1950. She took courses in Interior Design and Art at the University of Colorado and in the community.

Dorothy's Christian faith and her family were priorities in her life. Dorothy was involved in many activities in her church such as youth groups, Sunday school, Bible study, and others. She also served as a Deaconess. Dorothy participated in 4-H and the Boulder County Fair when her children were young. Dorothy had many interests and skills in addition to rockhounding, including oil painting, photography, pottery, jewelry, leatherwork, gardening, canning, and bird watching. Dorothy will be greatly missed by her family and friends.



A Celebration of Life for Dorothy will be announced at a later date.

## Prehistoric Road Trip Series



Hit the road with Emily Graslie in **Prehistoric Road Trip** as she travels across the western United States to examine our planet's history. As Emily ventures across ancient landscapes, the fossils and experts she encounters along the way bring the now-extinct world to life. With views from the sky, the highway, and the dirt, the show follows Emily as she uncovers the history and mystery of North American dinosaurs, ancient mammals, and other prehistoric creatures.

This three-part series aired last month on PBS. Episode 1, *Welcome to Fossil Country*, begins with fossils of 2.5 billion-year-old prehistoric bacteria, and encounters other early forms of life, from small fish to the soaring sauropod dinosaurs. In Episode 2, *We Dig Dinosaurs*, Emily cruises into the Cretaceous Period, where astonishing creatures like *T. rex* dominated the planet. But what happened to the dinosaurs and how did other life forms survive an apocalyptic asteroid that crashed into Earth 66 million years ago? See the latest scientific answers to these questions. Episode 3, *Tiny Teeth, Fearsome Beasts*, begins with the earliest mammals in North America up to the giant prehistoric mammals that roamed the planet. It ends with studies of ancient climate change, relating these discoveries to our own times.

If you missed this series, you can stream it at <https://www.pbs.org/show/prehistoric-road-trip/> for a limited time.

## Rhodochrosite of Sweet Home Mine & Detroit City Portal - Blog/Video

Another interesting program to view online is the Arizona Geological Society's first virtual evening presentation. Geologist Philip Persson of Collector's Edge Minerals, Inc. tells the story of the origin and mining history of rhodochrosite and associated lead, silver, and zinc sulfides, tetrahedrite, and fluorite from Colorado's renowned Sweet Home Mine and the newly opened Detroit City Portal. This smash hit was ZOOMed by more than 100 people on May 5. You can watch this program at <https://www.youtube.com/watch?v=7Og8gERwEIU>

For background information, read this blog about one of the world's great rhodochrosite mines at <https://blog.azgs.arizona.edu/blog/2020-05/arizona-geological-society-virtual-presentation-sweet-home-mine-detroit-city-portal>



"The Searchlight," large red rhodochrosite from Sweet Home Mine, Alma, Colorado. Credit: Eric Hunt

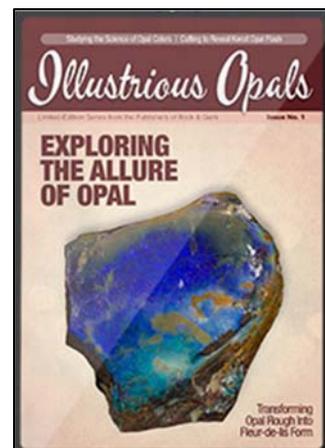


### Free from Rock & Gem Magazine

Since 1971, Rock & Gem has been the leading magazine for the lapidary and mineral hobbyist. It speaks to the average rockhound, providing just the right blend of entertainment and satisfying information. Rock & Gem is providing two free publications online for you to enjoy.

The July Rock & Gem features articles on newly discovered silver nuggets, rockhounding in the San Juan Mountains of Colorado, crystal twins, radioactive minerals, and much more. This edition is available to read for free at

[https://www.beckettmedia.com/flipbook/rock/RNG\\_July20/](https://www.beckettmedia.com/flipbook/rock/RNG_July20/).



Rock & Gem is also excited to announce the launch of the new limited-edition Illustrious Opals series. Each issue of Illustrious Opals features unique columns, articles, and special photographs. The Rock & Gem Illustrious Opals digital issue is available for free for a limited time. You can register for your online edition at

[https://www.beckettmedia.com/rockgem-illustriousopals?utm\\_source=Promotion&utm\\_medium=email&utm\\_campaign=RocknGem\\_OpalsDigital\\_July](https://www.beckettmedia.com/rockgem-illustriousopals?utm_source=Promotion&utm_medium=email&utm_campaign=RocknGem_OpalsDigital_July)

### Jr. Geologists Activities

Although the Jr. Geologists have not been able to meet, we continue to hold a mystery mineral contest each week. A picture of a mineral specimen is emailed out to all of the Jr. Geologists families, along with clues to help the juniors identify the mineral. If they successfully identify the mineral, they are entered into a drawing for the specimen. If they learn something special about the mineral, their name is entered a second time.

Here are the minerals the juniors have successfully identified, along with interesting things they learned about each mineral.



**Bornite** Several mentioned that bornite is a copper-iron sulfide mineral. It can be found in Colorado and is easily recognized by its iridescent shades of blue after it is exposed to air for a while. Another name for this mineral is erubescite. Crystals are cubic or octahedral.



**Native Sulfur** It is often in well-developed blocky crystals, or as a fine coating on volcanic rock. It is also found in sedimentary rock. Its chemical symbol is S. Its density is low at 2.1. It has a low melting point at 113 degrees Celsius (235 degrees Fahrenheit). Many sulfur compounds have a strong smell; the pure element is odorless.



**Native Copper** This mineral is heavy and malleable. Copper's symbol on the periodic table is Cu. Crystals of native copper are rare, occurring as cubic and octahedral crystals. Copper is used for wires and coins. It is also an essential element for human nutrition, critical for blood cell formation. It is found in lots of foods.



**Chrysocolla** This mineral forms under high temperatures. Although pure chrysocolla is soft, many times it contains quartz which makes it much harder. Because of this, the hardness of chrysocolla ranges from 2.5 to 7. The harder material is used for jewelry and is sometimes confused with turquoise.



**Gypsum** Several juniors found out that gypsum is used to make chalk. Dense gypsum is called alabaster and is used for artistic stone carvings. Another form of gypsum is called desert roses.

### Jr. Geologists Crystal Collecting Field Trip

Susanne Peach has arranged for a special field trip for Jr. Geologist families; an opportunity to visit a crystal-rich ranch in Conifer on Sunday, August 9.

The owner is bringing crystal-rich dirt down to a parking area at the edge of his ranch. Kids can go through this dirt, looking for clear and smoky quartz, tiny fluorite specimens, limonite, and hematite. Because the crystals from the ranch are the owner's main source of income, there is a charge of \$30 per family to attend. Due to several generous donations for Jr. Geologists programs, the club will pay half of this fee, so it will cost each family \$15.

All participants will wear masks and follow other social distancing guidelines.

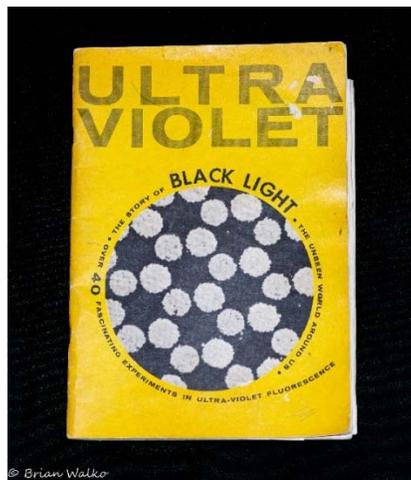
We are very limited in parking so there are only spots for 20 kids. Right now, the trip is full, but we have started a waiting list, in case there is a cancellation.

Thanks to Susanne for arraigning this trip. It should be a fun time to finally get out to do some collecting.

## Fluorescence, a Lifelong Hobby

Text and photos by Brian Walko

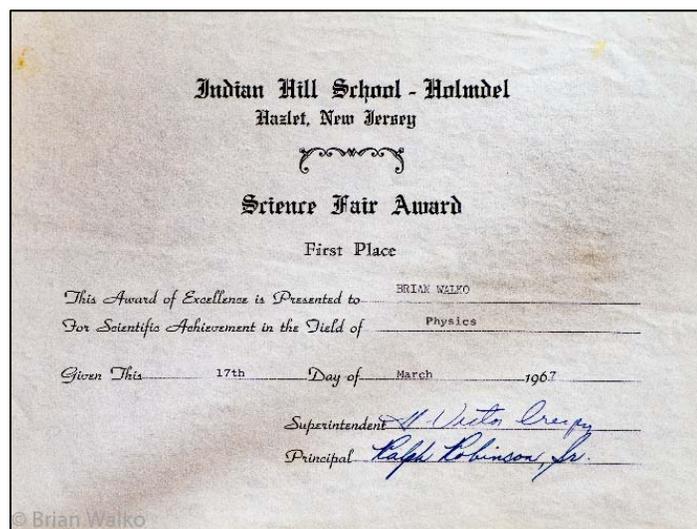
My interest in fluorescence started in elementary school. As a kid I always was interested in collecting rocks and fossils. While attending a local rock and mineral show, I saw a display of fluorescent minerals from the Franklin, New Jersey, area. That influenced me for life.



I saved my newspaper route money and purchased a black light kit from Edmund Scientifics. It included a longwave lamp, fluorescent paint, invisible ink, crayons, a piece of wernerite, chips of fluorite, and the book, "The Story of Black Light", which I still have.



Edmund Scientific's black light kit purchased in the 1960s



Studying this book helped me learn about ultraviolet (UV) fluorescence, the electromagnetic spectrum, and electron shells. The book also included experiments with filters, optical bleach, phosphorescence, tracer powder, and minerals.

In seventh grade I entered my school's science fair. I constructed a box lined with black cloth, a viewing window, and my best fluorescent material. It was illuminated by one seven-inch longwave lamp. The judges were scientists and engineers from the local Bell Labs. Besides viewing my project, the judges asked me questions. My effort paid off; I won first place in the physics category.

This was the catalyst to start building my fluorescent mineral collection. I purchased an electric longwave/shortwave (LW-SW) lamp. My parents drove me to the Franklin, New Jersey, mining dumps to collect specimens. The collecting fee was nominal by today's standards. I had to dig down through the dirt, find prospective minerals, carry them to a shed, plug in my lamp, keep the best and return the others. Hard work in the hot New Jersey summer.



While in college, I continued visiting the Sterling Hill dumps and brought back material to Colorado. My goal was to have enough material to build a fluorescent fireplace.



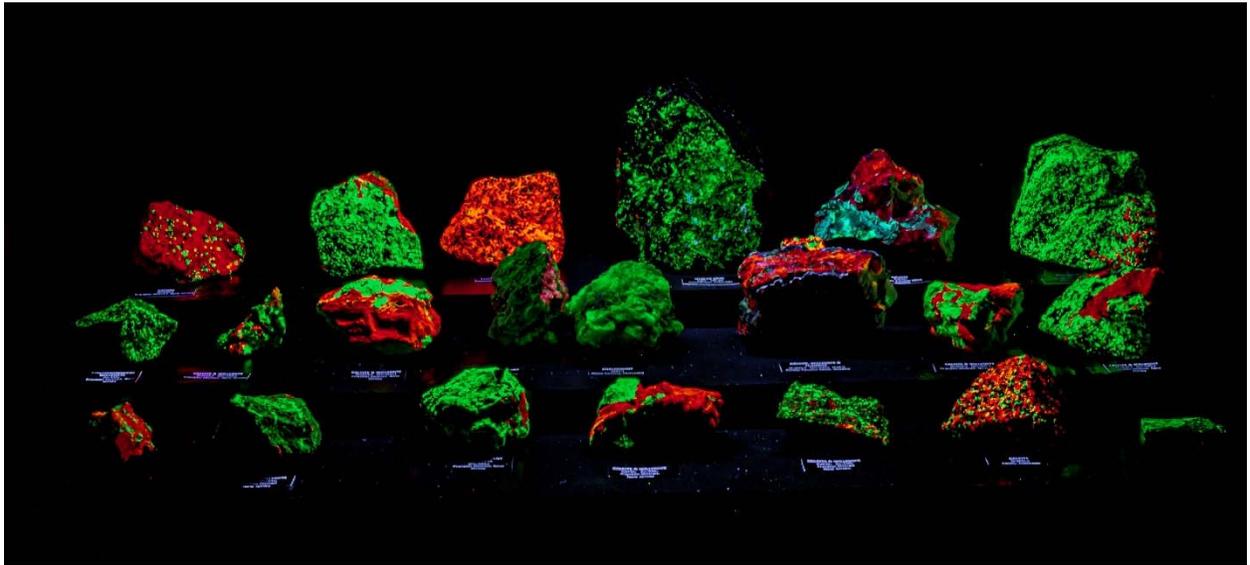
My first job out of college was teaching Earth Sciences in Chadron, Nebraska. The students loved the day when I demonstrated fluorescent minerals. Additionally, I collected local agates, chalcedony, and calcite checking for fluorescence. Then, I started selling my Franklin material to other collectors. While attending Chadron State College graduate school in geology, I taught a unit on UV radiation and fluorescent minerals for one of my professors.

Fast forward many years and I'm still collecting fluorescent minerals. The UV lamps are more powerful, portable, and battery powered. My field geology/prospecting skills have improved due to what I learned attending lectures at Colorado School of Mines. I participate in various Denver area mineral clubs and professional societies' field trips.

Modern, battery-powered UV lamps

I have ventured into the scientific world of fluorescent minerals by joining the Fluorescent Mineral Society (FMS) and have worked my way up to a FMS director. I am collaborating with some of the most knowledgeable people in the fluorescent mineral world. I have had opportunities to buy and trade spectacular minerals from around the world, but I hold true to my philosophy to only have self-collected minerals in my collection. Next year I will be helping the FMS at the Tucson Gem and Mineral Show® as a tour guide for the 75+ case Fluorescent Room. Additionally, with the help of Gerry Naugle, Flatirons Mineral Club (FMC), and Conrad North, FMS, we host the Fluorescent Room at the Denver Gem and Mineral Show. Plus, Gerry and I do the Fluorescent Room at our annual FMC Rock & Rails show.

Another way to show off my fluorescent minerals is to post photos of them on the internet. Photographing these minerals is almost as challenging as finding them. The art of making a digital representation look like the original is difficult. It is very tempting to use Photoshop to over enhance a mineral's color. I've been fortunate to photograph the past three Denver Gem and Mineral Show's Fluorescent Room cases and had the photos published.



UV display from the Denver Gem and Mineral Show

A new area of fluorescence I am investigating is bioluminescence. Living things, such as lichen, plants and insects, can also fluoresce. This past winter I was in a mine looking for minerals. I turned off my headlamp and turned on my Convoy longwave flashlight. There were lots of multicolored squiggly lines on floor. Turning on my headlamp I could not see any different mineralization that would indicate what could be fluorescing. During a snack break the answer poked its head out at me: a pack rat. These fluorescent lines were its urine tracks. This same technique can be used to find where your dog or cat has urinated on the carpet.

Field trips for fluorescent mineral collecting are thrilling. In the daytime I use a large dark BBQ grill cover to create semi darkness and search. However, I prefer to collect at night with a small group of people. One person in front scouts the area with a spotlight. Two people have UV lamps. Another person follows up the rear with a spotlight to ensure no critters are stalking us. Whatever method I use, I find it very rewarding to discover my own fluorescent minerals. I still feel the same excitement I did as a kid.



© Earth Extractions, LLC



© Earth Extractions, LLC

Crawford, Nebraska, fluorescent minerals, white and UV light

# What is This Mineral? An Online Key for Mineral Identification

Dennis Gertenbach

Many of us come home with a lovely mineral specimen from field trips, but have no idea what it is. So, how best to identify it? One obvious way is to bring it to the next club meeting to have one of the club's more experienced members identify it for you. Or, you could bring it to a rock and mineral show, which usually has someone identifying minerals for the public. Or, you could try your hand at identifying the mineral yourself. One way is to use an online key, along with a few simple tests, to pin down the identification of your mineral.

## Three Simple Tests

There are three simple tests to do on your specimen to help with identification. If I find a really nice specimen in the field, I try to pick up a few others for doing the tests. That way, my really nice specimen is not damaged by testing.

**Test 1: Determine the streak.** This is done by scraping the mineral across a piece of non-glazed porcelain and noting the color. A piece of bathroom tile, like the one to the left works well. Just use the unglazed back side of the tile. The streak of many minerals has a diagnostic color, like the one to the right.



**Test 2: Determine the hardness.** The Mohs hardness scale is used to specify how hard a mineral is. Ranging from 1 for the softest mineral (talc) to 10 for the hardest mineral (diamond), this test helps differentiate similar looking minerals. The chart below shows the hardness of the minerals that make up the hardness scale. A mineral with a higher number will scratch a mineral with a lower number.

Mohs Hardness Scale			
	Mineral Name	Scale Number	Common Object
↑ Increasing Hardness	 Diamond	10	
	 Corundum	9	 Masonry Drill Bit (8.5)
	 Topaz	8	
	 Quartz	7	 Steel Nail (6.5)
	 Orthoclase	6	
	 Apatite	5	 Knife/Glass Plate (5.5)
	 Fluorite	4	 Copper Penny (3.5)
	 Calcite	3	
	 Gypsum	2	 Fingernail (2.5)
	 Talc	1	

Mohs Hardness Scale. Credit: National Park Service/Wikimedia Commons

Using the common objects listed in the chart, you can determine a range of hardness for unknown mineral. Generally, I start in the middle and see if the mineral will scratch glass. If not, I know its hardness is less than 5.5. For this example, I drop down in the chart and see if the mineral will scratch a copper penny. If so, I know its hardness is greater than 3.5. Based on these tests, my mineral has a hardness between 3.5 and 5.5. Alternatively, you can try to scratch the mineral with glass and a copper penny. In this example, glass will scratch the mineral but the penny will not, and you come up with the same result. You can use a similar strategy to get a hardness range for any mineral.

**Test 3: Determine the luster.** Luster describes how light reflects from the surface of a mineral. First, determine if your mineral has a metallic or non-metallic luster. In other words, does it look like a metal? If your mineral has a non-metallic luster, you can further describe its luster with one of the following terms:

- Vitreous (glassy)
- Adamantine or brilliant (diamond-like)
- Resinous (resin-like shine)
- Silky
- Pearly
- Greasy
- Waxy
- Dull or earthy

Once you have the results, you are ready to identify your specimen.

### An Online Key

The internet has a number of online mineral identification keys. The one I like is available through the Mineralogical Society of America at [http://www.minsocam.org/msa/collectors\\_corner/id/mineral\\_id\\_keyq1.htm](http://www.minsocam.org/msa/collectors_corner/id/mineral_id_keyq1.htm). This key was prepared by Alan Plante, Donald Peck, and David Von Bargen, who state, "We wish to make this key available to one and all in the hope of correct identification of minerals in collections, rock gardens, and on windowsills everywhere."

The key takes you through a number of questions that will zero in a few possible identifications. The two examples below will show you how to use the key.



### Example 1

The unknown mineral to the left is gray with a shiny, metallic luster. It cannot be scratched with your fingernail, but is scratched with a penny, so its hardness is between 2.5 and 3.5. It has a black streak and cubic crystals.

When you bring up the online mineral identification key, you will get a screen that looks like this. It asks, "Is the Luster Metallic or Submetallic?"

A screenshot of the Mineral Identification Key website interface. The page features the Mineralogical Society of America logo on the left, the title "The Mineral Identification Key" in the center, and a small image of a mineral specimen on the right. Below the title, the text reads "Step 1: Is the Luster Metallic or Submetallic?" followed by two options: "YES - [Go to Section I: Metallic or Submetallic Luster Key, Step 2]" and "NO - [Go to Section II: Nonmetallic Luster Key (Soft), Step 4]". At the bottom, there are navigation links: "[Previous]", "[Table of Contents]", and "[Next]".

**The Mineral Identification Key**

Step 1: Is the Luster Metallic or Submetallic?

**YES** - [Go to Section I: Metallic or Submetallic Luster Key, Step 2]

**NO** - [Go to Section II: Nonmetallic Luster Key (Soft), Step 4]

[Luster](#)

[Previous] [Table of Contents] [Next]

In this case, click yes, as the unknown mineral has a metallic luster. The next screen asks the question, “Will the mineral leave a mark on paper? (Hardness less than 2½?)”



## The Mineral Identification Key



**Section I: Minerals with a Metallic or Submetallic Luster**

**Step 2:** Will the mineral leave a mark on paper? (Hardness less than 2½?)

**YES** - [\[Go to Table IA\]](#)

**NO** - [\[Go to Step 3\]](#)

[Step 1](#) [Hardness](#)

---

[\[Previous\]](#)   [\[Table of Contents\]](#)   [\[Next\]](#)

For this mineral, the answer is yes and you get a list of possible minerals. Looking at the minerals with a hardness between 2.5 and 3.5, here are the candidates.

Hardness	Color	Streak	Cleavage	Name	System	Habit	SG	Notes
2 to 2½	Bright-red	Bright-red to Deep-red	One perfect direction	<a href="#">CRNNABAR</a> HgS	Trigonal	Usually in granular masses	8.1	Luster actually adamantine, sometimes appearing sub-metallic to metallic. May not mark paper.
2 to 2½	Brownish-red to Scarlet or Vermilion	Deep Ruby-red to Bright Ruby-red	One distinct direction	<a href="#">PYRRARGYRITE</a> <a href="#">PROUSTITE</a> Ag <sub>3</sub> (Sb,As)S <sub>3</sub> Ag <sub>3</sub> (As,Sb)S <sub>3</sub>	Trigonal	Prismatic, pyramidal, rhombohedral, and scalenohedral crystals, also massive, usually as complex intergrown crystal aggregates	5.57 to 5.58	Isostructural species difficult to distinguish, though pyrrargyrite is usually darker in color and more common than proustite. Rare.
2 to 2½	Silvery-white	Silvery-white with decidedly reddish tones	One perfect direction (basal), one good	<a href="#">BISMUTH</a> Bi	Trigonal	Usually in laminated granular masses, may be arborescent or reticulated, artificial crystals in pseudo-cubic "hopper" groups	9.8	Heavy. Rare. May not mark paper.
Hardness	Color	Streak	Cleavage	Name	System	Habit	SG	Notes
2½	Brass-yellow to Silvery-white	Yellowish- to Greenish-grey		<a href="#">CALAVERITE</a> AuTe <sub>2</sub>	Monoclinic	Usually granular, rarely in distinct elongated crystals	9.35	Very heavy, easily fusible in candle flame (leaving globules of gold). (May not mark paper.) Rare.
2½	Grey-black to Black	Bluish-black to Lead-grey	Perfect in three directions at 90° to each other	<a href="#">GALENA</a> PbS	Isometric	Usually in cubic crystals or masses exhibiting cubic cleavage, also in granular masses.	7.6	Sometimes won't mark paper
2 to 3	Black	Black	One imperfect direction	<a href="#">POLYBASITE</a> (Ag,Cu) <sub>16</sub> Sb <sub>2</sub> S <sub>11</sub>	Monoclinic, pseudo-hexagonal	Usually massive or in crude pseudo-hexagonal plates	6.1 to 6.2	Rare

Based on the gray color, black streak, and cubic crystals, the only mineral in this list with these properties is **galena**. By clicking GALENA on this screen, you will see pictures of galena specimens and more information about this mineral.

### Example 2

This pink mineral has a non-metallic luster, which can be described as vitreous or glassy. It scratches glass, but is scratched with a steel nail, so its hardness is between 5.5 and 6.5. Its streak is white. This mineral breaks in straight planes, a property known as cleavage.

So, for the first screen that asks about a metallic or submetallic luster, click no. You will then see this screen.



	<h2>The Mineral Identification Key</h2>	
<p><b>Section II: Minerals with a Non-Metallic Luster</b></p>		
<p><b>Step 4:</b> Does the mineral have a definitely colored streak? (Leaves a colored powder streak on unglazed porcelain?)</p>		
<p><b>YES</b> - <a href="#">[Go to Table IIA]</a></p>		
<p><b>NO</b> - <a href="#">[Go to Step 5]</a></p>		
<p><a href="#">Step 1</a>   <a href="#">Step 3</a>   <a href="#">Streak</a></p>		
<hr/> <p><a href="#">[Previous]</a>   <a href="#">[Table of Contents]</a>   <a href="#">[Next]</a></p>		

As the unknown mineral has a colorless (white) streak, click no. This screen will appear.

<h2>The Mineral Identification Key</h2>		
<p><b>Section II: Minerals with a Non-Metallic Luster</b></p>		
<p><b>Step 5:</b> Can the mineral be scratched by a fingernail? (Hardness less than 2½?)</p>		
<p><b>YES</b> - <a href="#">[Go to Step 6]</a></p>		
<p><b>NO</b> - <a href="#">[Go to Step 7]</a></p>		
<p><a href="#">Step 1</a>   <a href="#">Step 4</a>   <a href="#">Hardness</a></p>		
<hr/> <p><a href="#">[Previous]</a>   <a href="#">[Table of Contents]</a>   <a href="#">[Next]</a></p>		

This mineral is much harder than your fingernail, so click no.

The next screen asks if the mineral can be scratched with a copper penny, so click no again.

The next question asks if the mineral be scratched by a knife (hardness less than 5½). The unknown mineral is harder than a knife, so click no once again.

This screen asks, “Can the mineral be scratched by a sharp quartz point? (Hardness less than 7?)” As the preliminary tests determined that the hardness of the unknown mineral is between 5.5 and 6.5, answer yes. This screen appears.



## The Mineral Identification Key



### Section III: Minerals with a Non-Metallic Luster & Hardness Less than 7

Step 13 Does the mineral have a prominent cleavage?

**YES** - [\[Go to Table IIIA-1\]](#)

**NO** - [\[Go to Table IIIA-2\]](#)

[Step 12](#) [Cleavage](#)

[\[Previous\]](#) [\[Table of Contents\]](#) [\[Next\]](#)

As mentioned, this mineral forms cleavage planes when broken, so click yes. Here is the list of candidate minerals that appears.

Cleavage	Hardness	Color	Luster	Name	System	Habit	SG	Notes
Perfect in one direction, distinct in the second	6	White to Colorless, Cream to Tan	Vitreous to sub-vitreous, may be pearly on cleavage	<a href="#">SANIDINE</a> (Feldspar Group) $K(Al,Si)_4O_8$	Monoclinic	Usually as tabular crystals (phenocrysts) in rhyolites and other felsic extrusive volcanic rocks and as spherulites in obsidian	2.56 to 2.62	Association with rhyolites and other extrusive igneous rocks is distinctive. Carlsbad twins - mirrored inter-penetration twins exhibiting two terminations at each end - are common.
Perfect in one direction, good in the second	6 to 6½	White to Colorless, Cream to Tan and Pale-yellow, Salmon-pink to Red, Green to Blue-green ("Amazonite")	Vitreous to sub-vitreous, may exhibit opalescence ("adularia")	<a href="#">MICROCLINE</a> (Feldspar Group) $KAlSi_3O_8$	Triclinic	Usually as coarsely crystalline rock-forming masses or macro-crystals in the 1 meter to 10s of meters range, smaller crystals usually short-prismatic to blocky, often twinned	2.54 to 2.57	Microcline and orthoclase are actually polytypes of a single species, and are extremely difficult to tell apart without subtle crystallographic observations. The best bet for these is site-specific knowledge about what is found there.
Perfect in one direction, imperfect in the second	6 to 6½	White to Colorless, Cream to Tan to Pale-yellow, Pink to Brownish-red	Vitreous to sub-vitreous, may be dull in granular masses, may exhibit pale blue to white opalescence ("moonstone")	<a href="#">ORTHOCLASE</a> (Feldspar Group) $KAlSi_3O_8$	Monoclinic	Usually massive, coarsely crystalline to granular, crystals usually short prismatic, blocky, often twinned	2.55 to 2.63	Microcline and orthoclase are actually polytypes of a single species, and are extremely difficult to tell apart without subtle crystallographic observations. The best bet for these is site-specific knowledge about what is found there.
Cleavage	Hardness	Color	Luster	Name	System	Habit	SG	Notes
Perfect in one direction, good in the second	6 to 6½	White to Light-grey and Colorless, in albite, may be tinged Blue or Green, darkening to Dark-grey to Black in anorthite, intermediate members Medium to Darker greys (rarer than end members)	Vitreous, labradorite exhibits opalescence/ "labradorescence"	<a href="#">ALBITE/ ANORTHITE</a> (Plagioclase Series) $NaAlSi_3O_8$ $CaAl_2Si_2O_8$	Triclinic	Usually massive, coarsely crystalline, platy lamellar habit in albite ("cleavandite"), more randomly oriented and smaller grains in anorthite end of the series, including labradorite, crystals usually tabular and usually twinned in albite, usually short-prismatic and twinned in anorthite, euhedral crystals rare except for albite	2.60 to 2.65 (albite) 2.63 to 2.66 (oligoclase) 2.66 to 2.68 (andesine) 2.68 to 2.74 (labradorite) 2.72 to 2.75 (bytownite) 2.74 to 2.76 (anorthite)	S.G. increases with replacement of Na by Ca and addition of Al, members to the albite end of the series most easily distinguished from other feldspars by fine, closely-spaced striations on the (001) cleavage plane, members towards the anorthite end of the series by their dark color and randomly oriented grains in massive materials. Intermediate members usually difficult to distinguish from one another.
Perfect in one direction (prismatic), good in the other (pinacoidal)	5½ to 6½	Pink to Rose-red to Brownish-red, may also be Orangish-red in some weathered material	Vitreous to sub-vitreous, may be dull in massive material	<a href="#">RHODONITE</a> (Mn,Fe,Mg,Ca) $SiO_3$	Triclinic	Usually massive, coarse to fine granular, crystals tabular to equant, rare	3.55 to 3.76	Often coated and/or veined with black Mn-oxides due to chemical weathering ("spider-web" veining).

The pink color, hardness range, cleavage in two directions, crystal shape in the photos, and its Colorado location pinpoint this mineral as **monocline**. Again, if you click on MONOCLINE in this table, you will see photos and other information about this mineral.

Break out some of those unknown minerals you have collected and see if you can identify them. Then, bring them to a club meeting and find out how well you did. Do not be too discouraged if you get some of them wrong. As they say, “practice makes perfect,” and you will get better at identifying minerals with practice.

## **Denver Gem and Mineral Show Canceled**

To the Member Clubs of the Greater Denver Area Gem and Mineral Council:

On Tuesday, June 2, the Denver Gem and Mineral Show Committee, with considerable regret, unanimously agreed that it was prudent to cancel the 2020 Denver Gem and Mineral Show. The Greater Denver Area Gem and Mineral Council subsequently approved this measure; thereby making official the cancellation of our 2020 Show.

Our decision was driven by the need to follow state and local restrictions currently banning gatherings in excess of 10 people. While we see some loosening of closures at this time, functions deemed “large gatherings” (especially indoors) are likely to be prohibited for the foreseeable future.

Those conditions aside, our primary concern was the well-being of our visitors, dealers, exhibitors, and volunteer staff. We could see no way to attempt a show format, even remotely resembling our norm, that could satisfy social distancing, ensure adequate sanitation, and conform with whatever crowd size limitations were in place at the time.

Club volunteers are the power that drives our show. Without them there could be no show. Realistically, the Council was especially concerned for those club volunteers, and there are many of you (and us) who fall in the COVID-19 high-risk category. Had we persisted in staging a show, we could have experienced a shortfall in the needed number of volunteers.

We hope that next year you will join us again as we carry over our Fabulous Fluorite theme. Your participation and camaraderie in 2021 will help us all forget the disappointments of 2020.

On behalf of the Greater Denver Area Gem and Mineral Council, may you, your family, and friends stay safe and well until we gather again in 2021.

Sincerely,  
Larry Havens, Secretary, GDAGMC

## **Fossils in the News**

Dennis Gertenbach

### **Ancient Crocodiles Walked on Two Legs**

Multiple, well-preserved trackways made by large crocodylomorphs, extinct ancestors of modern-day crocodiles, between 110 and 120 million years ago (Cretaceous period) have been found near Sacheon City in South Korea. Surprisingly, the trackways never include handprints and indicate exclusively bipedal walking (walking on two legs),

never seen before from fossil crocodylomorph trackways. The tracks are between 7 and 9 inches (18 and 24 centimeters) long, indicating trackmaker body lengths over 10 feet (3 meters).

University of Queensland’s Dr. Anthony Romilio states, “The footprints were initially thought to be made by a giant bipedal pterosaur walking on the mudflat. We now understand that these were bipedal crocodile prints.” The researchers named the new tracks *Batrachopus grandis*, emphasizing their large size in comparison with much older and smaller 1 inch (2 to 3 cm) tracks commonly found in the Jurassic of North America.



Bipedal crocodylomorph trackmakers. Credit: Anthony Romilio

Information and graphic from <http://www.sci-news.com/paleontology/batrachopus-grandis-08528.html>.



Life restoration of *Kongonaphon kely*, a newly described ancestor of both dinosaurs and pterosaurs. Credit: Alex Boersma

### “Tiny Bug Slayer” Was Dino Forerunner

We tend to picture dinosaurs as towering, thundering animals like the super predator *Tyrannosaurus rex*. But new research suggests that dinosaurs—and their pterosaur relatives—evolved from extremely small ancestors. A newly described reptile species from Madagascar, named *Kongonaphon kely*, or “tiny bug slayer,” lived around 237 million years ago and would have stood about 4 inches (10 centimeters) tall, about the size of a cell phone. The study, published in the journal *Proceedings of the National Academy of Sciences*, indicates that these small reptiles were ancestors to both dinosaurs and flying pterodactyls and other pterosaurs.

Wear on the teeth of *Kongonaphon*, along with its small body size, suggests it ate insects. This shift to an insect diet may have helped these creatures survive by occupying a niche different from their mostly meat-eating relatives, such as crocodiles and other reptiles.

Information and graphic from <https://www.amnh.org/explore/news-blogs/research-posts/tiny-reptile-dinosaur-relative>

### First Dinosaur Eggs Were Soft Like a Turtle’s

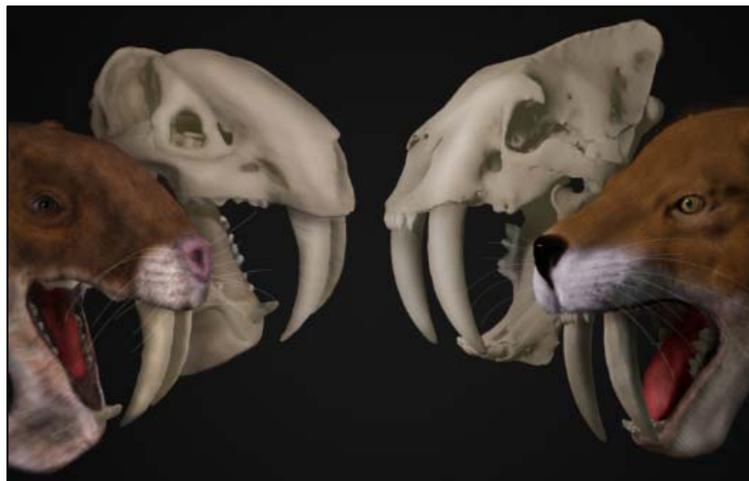
A new study led by the American Museum of Natural History and Yale University, and published in *Nature*, has found that the first dinosaurs laid soft-shelled eggs that resembled those of a turtle. This contradicts the long-held thought that dinosaur eggs were always hard-shelled. Most fossil dinosaur eggs were hard-shelled, but these are mostly theropods (like *T. rex* and modern birds), hadrosaurs (duck-bill dinosaurs), and advanced sauropods (long-necked dinosaurs). But, as Mark Norell, lead author on this study, says, “At the same time, we’ve found thousands of skeletal remains of ceratopsian dinosaurs, but almost none of their eggs. So why weren’t their eggs preserved? My guess—and what we ended up proving through this study—is that they were soft-shelled.”



Clutch of fossilized *Protoceratops* eggs and embryos examined in this study. Credit: M. Ellison /AMNH

The researchers studied embryo-containing fossil eggs belonging to two species of dinosaur: *Protoceratops*, a sheep-sized plant-eating dinosaur that lived in what is now Mongolia between about 75 and 71 million years ago, and *Mussaurus*, a long-necked, plant-eating dinosaur that grew to 20 feet in length and lived between 227 and 208 million years ago in what is now Argentina. Chemical analysis of the egg-shaped halo around the embryo skeletons indicated that these were most similar to soft shells, like turtles, rather than hard shells, like birds.

Information and graphic from <https://www.amnh.org/explore/news-blogs/research-posts/first-dinosaur-eggs-were-soft-like-a-turtle-s>



Skulls and life reconstructions of the marsupial saber-tooth *Thylacosmilus atrox* (left) and the saber-tooth cat *Smilodon fatalis* (right) Credit: Stephan Lautenschlager

### Not All Saber-Tooths Were Fearsome Predators

Saber-tooth cats, such as the North American species *Smilodon fatalis*, have the reputation for being fierce predators. However, saber-tooths came in all shapes and sizes and nearly a hundred different saber-tooths are known to science so far. One of these is *Thylacosmilus atrox* (which means ‘terrible pouched knife’), an animal that lived around 5 million years ago in Argentina. A jaguar-sized marsupial, it is popularly known as the ‘marsupial saber-tooth.’ This is a classic case of convergent evolution, where very different animals evolved a similar feature.

It has long been assumed that *Thylacosmilus*, with its huge canines, was also a fierce predator. However, a new study published by an international team of researchers came to a different conclusion. Their research, published in the Journal *PeerJ*, found from a

study of its skull and teeth that *Thylacosmilus*’ skull and canines were weaker in a stabbing action than those of *Smilodon*, but were stronger in a ‘pull-back’ type of action. This suggests that *Thylacosmilus* was not using its canines to kill, but perhaps instead to open carcasses. It was also short-legged, stiff-backed, and lacked retractile claws, so it would have had difficulties pursuing its prey, pouncing on it and holding on to it. This suggests that this animal was some sort of specialized scavenger.

Information and graphic from <http://www.bristol.ac.uk/news/2020/june/saber-tooth.html>.

## Other Rockhounding Events and Activities in the Area

As of now, here is the status of these summer activities. If you plan to attend any of these that have not been canceled, please check their websites for the latest updates before you go.

- **Thursday-Sunday, July 23-26**, the **Fairplay Contin-Tail Gem, Mineral, and Jewelry Show** at Fairplay River Park is **CANCELED**.
- **Saturday, August 1** from 6-9 pm is the Western Saloon Night fundraiser for the Western Museum of Mining and Industry in Colorado Springs. Sample local Colorado whiskey, beer and wine. Enjoy dinner from Bourbon Brothers and live music from “Scott Slay and the Rail.” The Gold Canyon Gunfighters and Poker



Annie will be here with authentic Old West games and stories. Plus, of course a silent auction with something for everyone. <https://www.wmmi.org/western-saloon-night-fundraiser>

- **Thursday-Sunday, August 6-9**, the **2020 Buena Vista Contin-Tail** outdoor gem and mineral show at Buena Vista Rodeo Grounds is **CANCELED**.
- **Friday-Sunday, August 14-16**, the **Lake George Gem and Mineral Show** is **CANCELED**
- **Thursday-Sunday, August 15-18**, the **Woodland Park Rock, Gem and Jewelry Show** is **CANCELED**
- **Saturday, August 29**, is the rescheduled Dinosaur Ridge Boy Scout Day. The event will be from 9 am to 3 pm at the Visitors Center, which is located at 16831 W. Alameda Pkwy in Morrison, just east of the Hogback. See <https://dinoridge.org/>.
- **September 11-19** is the Fall Colorado Mineral and Fossil Show at the Hotel Crowne Plaza, DIA Hotel and Convention Center, 15500 E 40th Ave Denver, CO 80239. See the information to the right and their website at <https://www.coloradomineralandfossilshows.com/colorado-mineral-and-fossil-shows-2020.html>.



## Open Museums

Although many activities remain closed, due to the coronavirus, several area museums have opened. Here is the status of these museums.

**Denver Museum of Nature and Science** is open for visitors. Guests are strongly encouraged to purchase tickets in advance online where they will receive a special \$2 discount per ticket. Members are encouraged to obtain their free admission ticket online, too. All guests must follow social distancing measures. See <https://www.dmns.org/>

**Colorado School of Mines Museum of Earth Science** is closed.

**Dinosaur Ridge** is welcoming visitors to safely wander and wonder, explore and experience. The main Visitor Center grounds and doors are open to the community, where you can safely roam and run, learn and debate, and enjoy a National Natural Landmark in Denver's backyard. See <https://dinoridge.org/>.

**Morrison Museum of Natural History** is a natural history museum located in Morrison, Colorado. The exhibits include several dinosaur fossils that were found nearby. Hands-on exhibits are designed to appeal to both children and adults, scientists and non-scientists. Call 303-697-1873 for current hours.

**University of Colorado Natural History Museum** is closed.

**Nederland Mining Museum** is closed.

**Western Museum of Mining and Industry** Celebrate our country's history by experiencing this incredible museum! Enjoy the Colorado blue sky and sunshine — bring a picnic, relax on their 27-acre campus. You can purchase tickets for the museum in advance or at the door. Tours are modified to meet current guidelines and social distancing. If you have questions, please don't hesitate to call 719-488-0880. <https://www.wmmi.org/>

## Officers, Directors, and Other Volunteers

---

### President

Brian Walko, 303-931-4283  
[earthextractions@gmail.com](mailto:earthextractions@gmail.com)

### 1<sup>st</sup> Vice president: Program Chair

Jean Orr  
[jporr@mindspring.com](mailto:jporr@mindspring.com)

### 2<sup>nd</sup> Vice President: Field Trip Chair

Taneka Colon  
[taneka\\_ringo@hotmail.com](mailto:taneka_ringo@hotmail.com)

### 3<sup>rd</sup> Vice President: Annual Show Chair

Brian Walko, 303-931-4283  
[earthextractions@gmail.com](mailto:earthextractions@gmail.com)

### Past President

Gabi Accatino, 303-809-4666  
[accatino@colorado.edu](mailto:accatino@colorado.edu)

### Secretary

Eileen Fitzgerald, 303 666-1399  
[elfitz891@hotmail.com](mailto:elfitz891@hotmail.com)

### Treasurer

Gerry Naugle, 303-591-2830  
[gnaugle@earthlink.net](mailto:gnaugle@earthlink.net)

### Board of Directors

Term expires in 2020  
Tally O'Donnell, 303-494-6061  
[phantom@indra.com](mailto:phantom@indra.com)  
Anita Colin, 720-556-9889  
[anitacoln@hotmail.com](mailto:anitacoln@hotmail.com)  
Dennis Gertenbach, 303-709-8218  
[gertenbach1@gmail.com](mailto:gertenbach1@gmail.com)  
Term expires in 2021  
Brad Willkomm, 303 249-8877  
[bpwillkomm@yahoo.com](mailto:bpwillkomm@yahoo.com)  
Andrew MacGregor, 720-988-3259  
[andrew.d.macgregor@gmail.com](mailto:andrew.d.macgregor@gmail.com)  
Charlotte Bourg, 970-278-0975  
[Rckhnd4252@gmail.com](mailto:Rckhnd4252@gmail.com)

### Membership

Gerry Naugle, 303-591-2830  
[gnaugle@earthlink.net](mailto:gnaugle@earthlink.net)

### Newsletter Editor

Dennis Gertenbach, 303-709-8218  
[gertenbach1@gmail.com](mailto:gertenbach1@gmail.com)

### Web Master

Gabi Accatino, 303-809-4666  
[accatino@colorado.edu](mailto:accatino@colorado.edu)

### Scholarship

Gerry Naugle, 303-591-2830  
[gnaugle@earthlink.net](mailto:gnaugle@earthlink.net)

### Junior Geologists

Dennis Gertenbach, 303-709-8218  
[gertenbach1@gmail.com](mailto:gertenbach1@gmail.com)

### Denver Show & Council Rep

Tally O'Donnell, 303-494-6061  
[phantom@indra.com](mailto:phantom@indra.com)

### Field Trip Advisory Committee

Members are needed!

### Club Hospitality Chair

open

### Facebook Chair

Anita Colin, 720-556-9889  
[anitacoln@hotmail.com](mailto:anitacoln@hotmail.com)

### Meeting Door Prize Chair

Brad Willkomm, 303 249-8877  
[bpwillkomm@yahoo.com](mailto:bpwillkomm@yahoo.com)

### Grab Bags

Anita Colin, 720-556-9889  
[anitacoln@hotmail.com](mailto:anitacoln@hotmail.com)  
Charlotte Bourg, 970-278-0975  
[rckhnd4252@gmail.com](mailto:rckhnd4252@gmail.com)

### Mineral Specimens for Grab Bags

Don Mock  
[donmock@hotmail.com](mailto:donmock@hotmail.com)

### Club Show Committee Members

#### Show Chair

Brian Walko, 303-931-4283  
[earthextractions@gmail.com](mailto:earthextractions@gmail.com)

#### Past Show Chair

Ray Gilbert 303-774-8468  
[Hoss@q.com](mailto:Hoss@q.com)

#### Volunteer Chair

Charlotte Bourg, 970-278-0975  
[rckhnd4252@gmail.com](mailto:rckhnd4252@gmail.com)

#### Program Chair

Open

#### Dealer Chair

Andrew MacGregor, 720-988-3259  
[andrew.d.macgregor@gmail.com](mailto:andrew.d.macgregor@gmail.com)

#### Show Advertising and Admissions

Gerry Naugle, 303-591-2830  
[gnaugle@earthlink.net](mailto:gnaugle@earthlink.net)

#### Kid's Corner Chair

Charlotte Bourg, 970-278-0975  
[rckhnd4252@gmail.com](mailto:rckhnd4252@gmail.com)  
Eileen Fitzgerald, 303 666-1399  
[elfitz891@hotmail.com](mailto:elfitz891@hotmail.com)

#### Other Show Committee Members

Gabi Accatino, 303-809-4666  
[accatino@colorado.edu](mailto:accatino@colorado.edu)

### Denver Show Club Table

open

**Practice social distancing**  
**Wear a mask in public**  
**Be Safe**  
**Stay Healthy!**



Flatirons Facets  
P.O. Box 3331  
Boulder, CO 80307-3331

## First Class Mail

### *Upcoming Events*

---

Sunday, August 9	Jr. Geologists field trip to collect crystals, see page 5	Conifer area
Saturday, August 15	Annual Club Picnic, see page 1	Harlow Platts Park, just south of the South Boulder Recreation Center at 1360 Gillespie Drive, Boulder, 80305.
Saturday, August 29	Rescheduled field trip to North Table Mountain to collect zeolites and other minerals, see page 1	Golden

Please check the club's website at <https://flatironsmineralclub.org/> for the status of these activities, as they may be canceled because of safe COVID-19 guidelines.