



Flatirons Facets

Flatirons Mineral Club of Boulder County, Colorado
Volume 60, Number 5

September-October, 2017

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.



Denver Gem and Mineral Show, September 15-17

In celebration of the show's 50th anniversary, the 2017 show theme will be Gold and Silver. You will not want to miss this year's show, which will not only feature fabulous gold and silver specimens from Colorado and around the world, but beautiful minerals, rocks, and fossils. See page 3 for more details about the activities at the show.



Gold (spinel-twinned), Mockingbird Mine, Mariposa County, California, miniature, 4.0 x 3.7 x 3.3 cm. Credit: Rob Lavinsky/iRocks.com

The Denver show is the second largest gem and mineral show in the country. The eight clubs along the Front Range, including the Flatirons Mineral Club, plan and run the show each year. **YOUR HELP IS NEEDED TO MAKE THIS SHOW A SUCCESS.** There are three ways you can help.

- Volunteer to spend two or more hours at the club table. It is an opportunity to interact with kids and adults interested in rocks, minerals, and fossils with fun games, plus talk about our club's activities. To help at the club table, please contact Dennis Gertenbach at gertenbach@comcast.net. **You get into the show free if you help for two or more hours.**
- Volunteer to spend two or more hours helping with the show. This can include setting up on Thursday, helping with security, selling grab bags, helping with admissions, and taking down on Sunday evening. You can contact Anita Colin at anitacoln@hotmail.com to sign up to help. See page 4 for more information about the show volunteer needs. **You get into the show free if you help for two or more hours.**
- Lend specimens you collected during club field trips this past year. We will have a case at the club table to show folks what we have found on our field trips. Please contact Dennis Gertenbach at gertenbach@comcast.net to make arrangements to pick up your specimens.

President's Message



Hello FMCers!

I hope that you have had a fun summer filled with rocks and minerals.

I must take this moment to thank Anita Colin and Don Mock for all of their volunteerism. August was truly their month. Don organized all the bagged minerals to a precise degree during the summer and then orchestrated the filling of 1.000 grab bags at our annual picnic perfectly.

Then they ran up to our Dino Quarry in Wyoming to welcome club members for a sleep-over the nights before the total solar eclipse. Camping above the quarry and overlooking the wonderful scenery was delightful. Folks got to collect belemnites, ammonites, agate, view the dinosaur tracks, and witness the excavation of fossil bones before driving up into the totality zone Monday morning. Thank you, Anita and Don!

Speaking of volunteerism, please, please, volunteer to help out at the Denver Gem & Mineral Show in September! We need your help more than ever this year – and it's a big anniversary year for the show – the 50th year of the only volunteer-run show in the U.S.! It's the golden anniversary and the show is all about GOLD AND SILVER this year. Please help us! It's fun and for two hours of volunteer time you get free admission for the entire weekend.

Thank, you everyone, for being part of this wonderful club, Gabi

Club Meetings

After our summer break, club meetings begin again in September on the second Tuesday of each month. Our speaker for September is Gerry Naugle with a special presentation. In October, Pete Modreski is coming to speak about starting your mineral collection.

The meetings will be in the North Community Room at Frasier Meadows, 350 Ponca Place, Boulder, CO 80303, starting at 7:00 pm. As you enter Frasier Meadows, just ask the receptionist for directions to our meeting room.

Big Thank You to This Summer's Field Trip Leaders

Please thank our members who volunteered to be field trip leaders this summer!

Dennis Gertenbach
John Schmidt
Jason Sullivan
Brian Walko

Damon Hauschultz
Tally O'Donnell
Anita Colin
Don Mock

Donald Layden
Gabi Accatino
Craig Hazelton

If you know of an interesting location for the club to collect, please consider being a field trip leader next year or contact Gabi Accatino with your ideas.

Unfortunately, Ed Raines' Mineralogy Course has been postponed. We will let everyone know when it is rescheduled.

Denver Gem and Mineral Show, September 15-17

Come and enjoy the 50th anniversary show featuring gold and silver. As in past years, the show will be at the Denver Mart, 451 E. 58th Avenue in Denver, just a few blocks east of I-25 at exit 215 (58th Ave). Show times are Friday 9 am to 6 pm, Saturday 10 am to 6 pm, and Sunday 10 am to 5 pm.



What is there to see and do at the show? Here are just a few of the activities and events to enjoy.

Exhibits and Exhibitors

Exhibits are at the heart of the Denver Gem & Mineral Show, providing local and international community members, groups, and institutions an opportunity to showcase their collections and share their stories. On the other side of the coin, exhibits provide visitors with perspectives and points of reference — touchstones for starting, advancing, or curating their own collections.

The nearly 100 competitive and noncompetitive exhibits feature the latest mineral and fossil finds from around the world as well as world-class specimens reflecting the show theme, Gold and Silver.

Dealers

The Denver Gem & Mineral Show is proud to host more than 150 mineral, gem, fossil, book, and jewelry dealers from across Colorado, the United States, and around the world. The diversity of dealers offers buyers a unique opportunity to find a broad selection of anything related to minerals, gems, fossils, or meteorites. From museum-quality specimens, to rough and tumbled stones, to inexpensive specimens to add to your collection, the dealers bring the world of minerals, gems, and fossils to Denver's door.

Throughout the Weekend

- Gold panning for kids by the Gold Prospectors of Colorado
- Fluorescent Room by the Fluorescent Mineral Society
- Mr. Bones, a big as life dinosaur skeleton puppet
- Mineral identification by the Friends of Mineralogy
- Activities for kids and adults at the club tables

Speakers during the Show

FRIDAY

- 11:00 Jeff Scovil – Photographic Album of Gold and Silver minerals
- 12:00 Mark Jacobson – Denver Gem & Mineral Show: 50th Anniversary History
- 1:00 Terry Wallace – Colorado Silver
- 2:00 Wayne Leicht - Gold
- 3:00 Ed Raines – Aspen Silver
- 4:00 Virgil Lueth – New Mexico Gold

SATURDAY

- 11:30 Evan Walsh – The Evolution of the Theropod Dinosaurs through the Late Cretaceous
- 12:00 Pikes Peak Pebble Pups: Ben Elick, Jenna Salvat, Jack Shimon, and Quentin Stanley
- 1:00 Pete Modreski – How to Start a Mineral Collection
- 2:00 Bryan Lees – The Gold Dragon
- 3:00 Scott Werschky – The Fire Creek Mine, Nevada: a new locality for exceptional crystalline gold specimens
- 4:00 John Warn – In the Pink, Himalaya Mine Tourmalines

SUNDAY

- 11:00 Les Presmyk – Silver & Gold in Arizona: History and Specimens
- 12:00 Mel King – Shipwreck Treasure, Pieces of Eight and Gold Doubloons
- 1:00 Penny Williamson – Australian Gold and Silver: Fact, Fiction & Forensics
- 2:00 Richard Hauck – Fluorescent Minerals
- 3:00 Bruce Geller – Tellurides

Special Activities on Saturday Evening, featuring live music from The Borscht Brothers starting at 5:30

5:30-7:30 **Cash Bar**

5:30-7:30 **Silent Auction** to benefit *mindat.org*

6:30-8:00 **Dinner** pre-purchased ticket required (\$1). Limited to the first 150 people. Ticket not required for *Silent Auction*.

7:30-8:00 **Auction checkout**

8:00-8:30 **Awards Presentation**

Denver Gem and Mineral Show Jobs We need help!! The following is a list of jobs that need volunteers. You will meet new people, plus receive free admission by volunteering. Please contact Anita Colin at anitacoln@hotmail.com to sign up for one of these activities.

- **SECURITY:** The main job is to patrol the show floor and the parking lots. Orange security vests and walkie-talkies are provided. Security volunteers do not attempt to apprehend suspected shoplifters, but radio back to the security head. Volunteers are asked for 4-hour shifts at a time. Other security at the show is provided by the Mart and contracted by the Show Committee.
- **CLERKS TO ASSIST JUDGING:** Clerks are needed to assist with judging during the show. These individuals must be willing to work with a team of judges throughout Friday and be able to neatly and accurately record judge's comments. This is a good place to learn firsthand the rules and protocol of judging.
- **HOSPITALITY:** Need volunteers every day to serve coffee and tea, donuts, and snacks to the volunteers and dealers.
- **GRAB BAGS, PINS, POSTERS SALES AREA:** This job is sales of grab bags, posters, and pins and is fun because you work mostly with kids. Many volunteers are needed on Friday morning when the school children are at the show.
- **ADMISSIONS:** These are sitting jobs for hand-stampers, ticket-takers and ticket-sellers (need cash handling experience making change and working fast when the crowds arrive).
- **EXHIBITS:** Volunteers are needed Thursday to assist the exhibitors as they register and set up their cases. Help is needed to clean the glass window in cases each day for fingerprints, etc.
- **DEALER CHECK IN:** Workers needed Thursday through Sunday. Minimal typing required.
- **VOLUNTEER CHECK IN:** Job is Wednesday through Sunday, keeping track of the volunteers and giving out badges. This is a sitting job.
- **SHOW SET UP:** Volunteers are needed to set up Wednesday from about 9:00 a.m. until the setup is finished. We will be cutting plastic, skirting tables, assembling exhibit cases, etc.
- **SHOW TAKE DOWN:** Volunteers are needed Sunday after 5 p.m. Strip tables, take down cases, pack away risers, cases, etc.

- **SCHOOLS:** Help with the school kids, give them a brief talk about the show, and guide them into the show entrance. Friday morning from about 8:30 a.m. to noon.

And, remember, show volunteers get into the show for free!



Gold on Quartz, 4.5 cm tall
Smuggler Union Mine, San Miguel Co., Colorado
Colorado School of Mines collection
Jeff Scovell photo

50th Anniversary

SEPT 15 – 17, 2017
DENVER MART
\$5,000 GOLD GIVEAWAY!*
DENVERSHOW.ORG

The Original
DENVER
GEM & MINERAL SHOW

The Greater Denver Area Gem & Mineral Council is a non-profit 501(c)(3) corp. organized exclusively for charitable, educational, and scientific purposes.
*Tokens found in the Gold Prospectors of Colorado panning tables can be exchanged for gold nuggets, which will be distributed at the sole discretion of the Greater Denver Area Gem and Mineral Council. Gold Panning is available exclusively to and is free for children 12 and under. Limit of one token/nugget per child. Tokens must be exchanged prior to the close of the show on Sunday, Sept 17, 2017. See website for details.

2017 FMC Picnic

On a beautiful day that started the exciting solar eclipse weekend, FMC had its annual picnic on Saturday, August 19. What a nice gathering we had!

Of course, we filled the 1,000 grab bags with 10 rock, mineral, and fossil specimens each, as we do every year. And that's such a nice time to chat and visit while making sure we don't mess up which specimens went in each bag. Thank you, Anita Colin and Don Mock, for overseeing the grab bags works.

Finally, we got to eat! Thank you to everyone who brought food.

It was so nice that this year's scholarship winner, Anna Todd, joined us. She accepted her scholarship letter and told us a little bit about herself. Anna is a sophomore at the University of Colorado Boulder, majoring in geology and anthropology. Currently, she is a research assistant in the Cosmogenic Isotope Laboratory at the University of Colorado and was a summer intern for the International Association for Geoscience Diversity. Her career goal is to be a geology professional with an emphasis on the preservation and curation of natural formations, fossils, and antiquities.

Trick Runion was also recognized at the picnic as FMC's Rockhound of the Year on the heels of having a new fossil crab he found named after him.



Gerry Naugle recognizing this year's FMC Scholarship recipient, Anna Todd



Trick Runions, FMC's Rockhound of the Year

FMC/Paul Ralston Memorial Scholarship Program

With the death of Paul Ralston this year, the Flatirons Mineral Club donated \$250 to the FMC/Paul Ralston Memorial Scholarship Program in Paul's name. In addition, fourteen individuals donated an additional \$880 in Paul's name to the program.

The scholarship program was a dream of Paul's and he was instrumental in its start in 1991. Because of Paul's leadership, the program continues to provide a scholarship each year to a Colorado university student studying the earth sciences.

Jr. Geologists Activities



The Jr. Geologists hunting for petrified wood

On Saturday, July 22, the Jr. Geologists families traveled to Elizabeth, Colorado, to collect petrified wood. The ranch owners welcomed the families to their ranch, showing them where to find fossilized wood on their property. Everyone found lots of specimens to take home, plus collected small pieces that we will polish at meetings this year. And, we got to pet the goats on the ranch. We want to thank the landowners for allowing us to collect on their property.



Digging out a large piece of petrified wood



Petting the goats at the ranch after collecting petrified wood

On Saturday and Sunday, September 9-10, we will be digging dinosaur bones from a quarry outside of Medicine Bow, Wyoming, under the guidance of Anita Colin. Although we will not be able to keep any of the dinosaur fossils, we will take a half mile hike to a location to collect belemnite and other fossils to add to our collections.

The Jr. Geologists will be visiting the Denver Gem and Mineral Show in September and then begin monthly meetings in October.

The Jr. Geologists program is open to all Flatirons Mineral Club families. Each month we learn about different aspects of geology, minerals, and fossils, plus earn badges for different earth science activities. For information about the Jr. Geologists program, please contact Dennis Gertenbach at gertenbach@comcast.net or 303-709-8218.

Photos by Dennis Gertenbach

Natural Stone Database

Damon Hauschulz



Wondering about your kitchen counter top? What is it and where did it come from? Is it really a granite? Check out the web site at: www.natural-stone-database.com/. You can search by trade name, type, or color. The database lists over 18,000 stone types from around the world.

As an example a search for Jurapana Columbo Gold (a popular counter top rock) turned up this picture plus a short description:

A fine- to coarse-grained, yellow-brown gneiss , strong banded.

Uses: Ornamental stone.

The database is by Abraxas, stone experts GmbH. They are located in Germany. The web site listed above is free but is

a stripped-down version of their more complete version. Cost is 260 Euros for the complete version.

On the other hand, a direct search in Google for “Jurparan Gold” gave many hits: One was from MISTONES (stone distributor?):

Juparana Colombo Gold or Juparana Gold is an exotic granite quarried in India. It's an extremely hard igneous stone. It presents large gray veins over a yellowish brown background with some rust. It can also have peachy areas.

Formed of molten stone under the intense heat and pressure of inner earth, the magma slowly cooled and crystallized, forming granite. Juparana Gold granite is durable, weather resistant and beautiful. One of the hardest of stones, Juparana Gold granite is excellent for stone cladding, curtain walls, water features, counter tops, furniture, and elevator panels.

Juparana Colombo Gold is quarried in a bedrock quarry formation near the town of Thagamalai in the state of Tamil Nadu, India. The size and color of each block is consistent between shipments. Upper layers of the quarry produce this stone, Juparana Colombo Gold, whereas the lower layers produce Juparana Colombo.

Now the trick is to sort out the incorrect information. MISTONES calls the rock an “exotic granite”, but since the rock is banded it is probably a gneiss, which is a metamorphic rock. On the other hand, MISTONES does indicate that the rock is quarried in India which is very helpful if one wants to know more.

Eclipse Field Trip

Anita Colin

Twenty club members came up to camp at the Carlin ranch in Wyoming, then went further north in the morning to see the eclipse and do some rockhounding! Here are photos from the trip.



Hunting belemnites near the dino quarry in Wyoming



Watching as the sun slowly disappears behind the moon



It's cold and dark here at the north end of Shirley Basin, Wyoming!

Trip to Joe Dorris' Smoky Hawk Claim

On Saturday, July 22. The club headed to Joe Dorris' Smoky Hawk Claim for amazonite and other goodies. Here are photos from the trip.

Getting ready to hunt for amazonite, smoky quartz, and other minerals. Photo by Charlotte Bourg





Microcline, amazonite, and shiny hematite after siderite. Photo by Kevin Notheis



Lovely microcline, amazonite, and smoky quartz collected at Joe Dorris' claim. Photo by Brennan Johnson

What Is It?

We have a mystery for you. Here is a picture of something Anita Landess found when the club was out at Yellow Cat over the Memorial Day weekend field trip this year. Can you identify it?

See page 16 for the answer.



Member Nametags

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

Please log onto our website and choose the "Request a Nametag" link in the Members Area. Add your name to the list and a name tag will be ordered for you. The cost is \$5 when you receive it.

Example of a club name tag



Club Show – December 8-10

The club show, held at the Boulder County Fairgrounds with the Boulder Model Railroad Club, is always a fun time. You can help to plan this year's show with the Show Committee. And volunteers are needed at the show to make help it run smoothly.

Club Show Committee

The Club Show is planned by the Show Committee, chaired by Ray Gilbert. You can help with the planning by attending the next Show Committee on November 7 at 7:00 pm at the Clover Building in the Boulder County Fairgrounds in Longmont. Contact Ray at hoss@q.com to find out where help is needed to put on another great show.

Help at the Club Show in December

Our annual December show will soon be upon us and so, too, will be the need for volunteers. It's our volunteers that make our show the success it is and will be in the future. Please consider sparing a few hours of your time during the show, December 8, 9, and 10, to help with security and the kids' area. We will also need people for the show set-up and take-down. Contact Charlotte Bourg at rckhnd4252@gmail.com for more information about what is needed and to sign up to help.



Ruth Sawdo

1932-2017



Ruth Sawdo with her husband Jordan

Ruth Sawdo, longtime member of the Flatirons Mineral Club and other local rockhounding clubs, died peacefully on Monday, August 14, 2017 in her home surrounded by her family. Ruth was born in Little Rock, Arkansas. She met her future husband, Jordan, in 1948 at West High School, where they became high school sweethearts. Ruth continued her education at Kalamazoo College and Denver University. Ruth and Jordan married in 1952 and have four children. Ruth and Jordan celebrated their 60th Anniversary in September 2012 and would have been married 65 years this September.

Ruth later returned to school, completing her teaching degree in 1972 at Metro. Ruth taught fourth grade at McElwain Elementary from 1972 to 1992. There she worked with her fourth graders to introduce the *Stegosaurus* as the Colorado State fossil as part of a unit teaching students how to pass a bill. They lobbied both houses, wrote numerous letters, and presented their bill before the legislature. After several years the *Stegosaurus* became the Colorado State Fossil by executive order of Governor Lamm.

After retirement Ruth continued teaching students at both the Denver Museum of Nature and Science and the Adams County Museum, where she was the weaving loom expert. She is survived by her husband Jordan, four children and their spouses, 5 grandchildren, and 3 great grandchildren. Ruth will be missed by all who knew her.

Fossils in the News

Dennis Gertenbach

Triceratops Skull and Skeleton Unearthed in Thornton

This month's column is about one of the most exciting fossil finds in the Denver area in a number of years. On September 1, Saunders Construction workers excavating the new public safety building in Thornton uncovered the skeleton and skull of a *Triceratops* dinosaur. Paleontologists and volunteers from the Denver Museum of Nature and Science continue to collect bones from the site under the direction of curator Joe Sertich. This is only the fourth *Triceratops* skull found along the Front Range, and has been dated to 66 million years ago. Sertich reported that this is the best *Triceratops* skull ever found in Colorado!

The site at East 132nd Avenue and Quebec Street, soon to be the new Thornton Fire and Police Substation. An attentive worker noticed one of the



The first Triceratops horn uncovered by construction workers in Thornton



Part of the Triceratops skull being cleaned by a DMNS volunteer

horns of the dinosaur and the Denver Museum of Nature and Science was notified of the find. Experts working to unearth the fossils give credit to those experienced construction workers who recognized the bones as fossils and called for the Museum.

To date, about 40% of the animal's skeleton has been unearthed. The bones are somewhat smaller than other *Triceratops* skeletons, suggesting that this may be from a young animal. Also recovered is the tooth of a *Tyrannosaurus Rex*, who was probably scavenging the dead *Triceratops*. Additional bones continue to be recovered from the site.

As the workers expose new bones, they are encased in protective plaster jackets and brought to the Museum to isolate and clean. You can see the paleontologists and volunteers working on these fossils in the Paleo Lab in the Prehistoric Journey exhibit at the Museum. Eventually, the Museum may permanently display the fossil

dinosaur.



Lower jaw of the Triceratops

Triceratops Quick Facts (from the Denver Museum of Nature and Science):

- *Triceratops* lived in the late Cretaceous, about 68-66 million years ago
- *Triceratops* means "three-horned face"

- *Triceratops* was an herbivore with teeth that acted like scissors, shearing low-growth plants like ferns, cycads, and palms
- 25-30 feet in length, 10 feet tall, 4 to 6 tons (13,000-26,000 pounds, comparable in size to an Africa elephant)

For updated information about the progress being made in collecting and cleaning this fossil, see <https://www.dmns.org/press-room/press-kits/thornton-triceratops/>.

Photos by Dennis Gertenbach

Information for this article from the *Denver Post* and the Denver Museum of Nature and Science

Ancient Silver Coins Show How Power Shifted from Carthage to Rome



Image of a coin depicting Roman Emperor Severus Alexander (222 to 235 AD) Credit: Steve Chatfield

A study of Roman coins has shown how the defeat of Hannibal and the Carthaginian Empire led to coinage spreading across the Roman Empire from silver mines in Spain.

According to historical accounts, one of the most famous achievements of Hannibal, considered one of history's greatest generals, was marching an army of elephants from Iberia over the Pyrenees Mountains and the Alps into Italy during the Second Punic War. However the attack on Rome failed, and led to the conquest of the Iberian Peninsula by the Romans, who also gained control of the lucrative Spanish silver mines around 211 BC. Revenues from the mines, plus reparations from Carthage, helped fund the expansion of its territory.

Up to now there has been little physical proof of the importance of Spanish silver for the coinage of Rome, but that has changed thanks to scientists in Germany and Italy who analyzed 70 Roman coins from 310 to 101 BC using geochemical techniques, according to *The Telegraph*.

Using Mass Spectrometry, they were able to show that lead in the coins made after 209 BC has distinctive isotopic signatures which identified most of the later coins as presumably originating from Spanish sources.

After 209 BC, the lead isotope signatures mostly correspond to those of deposits in southeast and southwest Spain or to mixtures of metal extracted from these districts.

The results mean that before the Second Punic War, Roman silver came from mines in the Aegean region, but after 209 BC the silver coins were minted from mines in Spain.

"This massive influx of Iberian silver significantly changed Rome's economy, allowing it to become the superpower of its day," *The Telegraph* quotes study co-leader Dr. Katrin Westner of Goethe University in Frankfurt. "What our work shows is that the defeat of Hannibal and the rise of Rome are written in the coins of the Roman Empire."

From Mining.com, August 13, 2017

Dino-Killing Asteroid Could Have Thrust Earth into Two Years of Darkness

Tremendous amounts of soot, lofted into the air from global wildfires following a massive asteroid strike 66 million years ago, would have plunged Earth into darkness for nearly two years, new research finds. This would have shut down photosynthesis, drastically cooled the planet, and contributed to the mass extinction that marked the end of the age of dinosaurs.



An illustration of an asteroid impacting Earth Credit: Image courtesy NASA

These new details about how the climate could have dramatically changed following the impact of a 10-kilometer-wide asteroid was published August 21 in the *Proceedings of the National Academy of Sciences*. The study, led by the National Center for Atmospheric Research (NCAR) with support from NASA and the University of Colorado Boulder, used a world-class computer model to paint a rich picture of how Earth's conditions might have looked at the end of the Cretaceous Period, information that paleobiologists may be able to use to better understand why some species died, especially in the oceans, while others survived.

Scientists estimate that more than three-quarters of all species on Earth, including all non-avian dinosaurs, disappeared at the boundary of the Cretaceous-Paleogene periods, an event known as the K-Pg extinction. Evidence shows that the extinction occurred at the same time that a large asteroid hit Earth in what is now the Yucatán Peninsula. The collision would have triggered earthquakes, tsunamis, and even volcanic eruptions.

Scientists also calculate that the force of the impact would have launched vaporized rock high above Earth's surface, where it would have condensed into small particles known as spherules. As the spherules fell back to Earth, they would have been heated by friction to temperatures high enough to spark global fires and broil Earth's surface. A thin layer of spherules can be found worldwide in the geologic record.

"The extinction of many of the large animals on land could have been caused by the immediate aftermath of the impact, but animals that lived in the oceans or those that could burrow underground or slip underwater temporarily could have survived," said NCAR scientist Charles Bardeen, who led the study. "Our study picks up the story after the initial effects -- after the earthquakes and the tsunamis and the broiling. We wanted to look at the long-term consequences of the amount of soot we think was created and what those consequences might have meant for the animals that were left."

Other study co-authors are Rolando Garcia and Andrew Conley, both NCAR scientists, and Owen "Brian" Toon, a researcher at the University of Colorado Boulder.

A world without photosynthesis

In past studies, researchers have estimated the amount of soot that might have been produced by global wildfires by measuring soot deposits still preserved in the geologic record. For the new study, Bardeen and his colleagues used the NCAR-based Community Earth System Model (CESM) to simulate the effect of the soot on global climate going forward. They used the most recent estimates of the amount of fine soot found in the layer of rock left after the impact (15,000 million tons), as well as larger and smaller amounts, to quantify the climate's sensitivity to more or less extensive fires.

In the simulations, soot heated by the Sun was lofted higher and higher into the atmosphere, eventually forming a global barrier that blocked the vast majority of sunlight from reaching Earth's surface. "At first it would have been about as dark as a moonlit night," Toon said.

While the skies would have gradually brightened, photosynthesis would have been impossible for more than a year and a half, according to the simulations. Because many of the plants on land would have already been incinerated in the fires, the darkness would likely have had its greatest impact on phytoplankton, which underpin the ocean food chain. The loss of these tiny organisms would have had a ripple effect through the ocean, eventually devastating many species of marine life.

The research team also found that photosynthesis would have been temporarily blocked even at much lower levels of soot. For example, in a simulation using only 5,000 million tons of soot -- about a third of the best estimate from measurements -- photosynthesis would still have been impossible for an entire year.

In the simulations, the loss of sunlight caused a steep decline in average temperatures at Earth's surface, with a drop of 50 degrees Fahrenheit (28 degrees Celsius) over land and 20 degrees Fahrenheit (11 degrees Celsius) over the oceans.

While Earth's surface cooled in the study scenarios, the atmosphere higher up in the stratosphere actually became much warmer as the soot absorbed light from the Sun. The warmer temperatures caused ozone destruction and allowed for large quantities of water vapor to be stored in the upper atmosphere. The water vapor then chemically reacted in the stratosphere to produce hydrogen compounds that led to further ozone destruction. The resulting ozone loss would have allowed damaging doses of ultraviolet light to reach Earth's surface after the soot cleared.

The large reservoir of water in the upper atmosphere formed in the simulations also caused the layer of sunlight-blocking soot to be removed abruptly after lingering for years, a finding that surprised the research team. As the soot began to settle out of the stratosphere, the air began to cool. This cooling, in turn, caused water vapor to condense into ice particles, which washed even more soot out of the atmosphere. As a result of this feedback loop -- cooling causing precipitation that caused more cooling -- the thinning soot layer disappeared in just a few months.

Challenging the model

While the scientists think the new study gives a robust picture of how large injections of soot into the atmosphere can affect the climate, they also caution that the study has limitations.

For example, the simulations were run in a model of modern-day Earth, not a model representing what Earth looked like during the Cretaceous Period, when the continents were in slightly different locations. The atmosphere 66 million years ago also contained somewhat different concentrations of gases, including higher levels of carbon dioxide.

Additionally, the simulations did not try to account for volcanic eruptions or sulfur released from the Earth's crust at the site of the asteroid impact, which would have resulted in an increase in light-reflecting sulfate aerosols in the atmosphere.

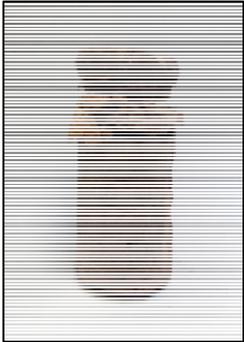
The study also challenged the limits of the computer model's atmospheric component, known as the Whole Atmosphere Community Climate Model (WACCM).

"An asteroid collision is a very large perturbation -- not something you would normally see when modeling future climate scenarios," Bardeen said. "So the model was not designed to handle this and, as we went along, we had to adjust the model so it could handle some of the event's impacts, such as warming of the stratosphere by over 200 degrees Celsius."

These improvements to WACCM could be useful for other types of studies, including modeling a "nuclear winter" scenario. Like global wildfires millions of years ago, the explosion of nuclear weapons could also inject large amounts of soot into the atmosphere, which could lead to a temporary global cooling.

"The amount of soot created by nuclear warfare would be much less than we saw during the K-Pg extinction," Bardeen said. "But the soot would still alter the climate in similar ways, cooling the surface and heating the upper atmosphere, with potentially devastating effects."

From *Science Daily*, August 21, 2017.



What Is It?

On page 10, the question was asked, what is the object in this picture? It's a "fossilized" battery found near a mine site at Yellow Cat.

Other Rockhounding Events and Activities in the Area

Here is a list of rockhounding-related activities in the area for both adults and juniors that you might be interested in. Thanks to Pete Modreski of the USGS for providing many of these notices.

In conjunction with the Denver Gem in Mineral Show, September 15-17, several other shows and activities are taking place this week.

- **Sept. 8-16, Colorado Mineral and Fossil Fall Show**, Crowne Plaza Hotel - Airport, 15500 E. 40th Ave. Denver, CO. Free lecture series from experts in their fields, including Tuesday September 12, 2017
 - 11:00 AM - John Curchin "Meteorites: Fossils of Rocks, Gems and Minerals From Outer Space"
 - 1:00 PM - Paul Melville - "Rum Jungle" Australia
 - 3:00 PM - Stanley L. Korzeb - "Silver mineralization of the Oro Fino Mining District, Deer Lodge County, Montana"Wednesday September 13, 2017
 - 11:00 AM - Mel King - "Sunken Treasures"
 - 1:00 PM - Scott Kleine "Silver and Gold from Nevada"
 - 3:00 PM - Neil Larson - "Ammonites *Shell Shocked!* the story of ammonite predation and survival in the Cretaceous"

Colorado Mineral & Fossil Fall Show
NEW LOCATION
Crowne Plaza Hotel & Convention Center
15500 E. 40th Avenue, Denver, CO 80239
(I-70 & Chambers Rd.)
September 8 - 16, 2017
Monday thru Saturday 9AM - 6PM, Sunday 10AM - 5PM



Rhodochrosite & Quartz, American Tunnel, Silverton, Colorado
Photo by Jeff Scovil

Minerals, Fossils, Jewelry & More
Over 160 Retail & Wholesale Vendors
Free Show - Free Parking - Mineral Drawings
\$500 Show Dealer Voucher Giveaways
on Opening Day at 12:00PM - 4:00PM
(Need to be present to win)

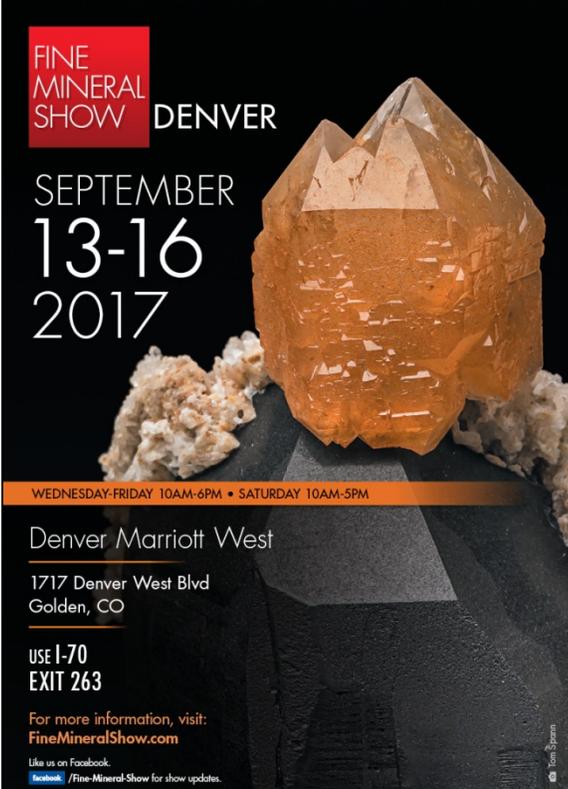
Hosted by Rocky Mountain Gems & Minerals
GO TO WWW.ROCKYGEMS.COM

- **Sept. 9-17, Denver Coliseum Mineral, Fossil, and Gem Show**, Denver Coliseum and National Western Complex. Four shows, including the **Denver Coliseum Show**, the **Denver Expo Gem Show**, the **Denver Mineral Show**, and the **Miner's Co-Op Show**. Together, these four shows comprise the Coliseum Show where everyone can buy fine mineral specimens, fossils, dinosaurs, gems, gemstones, lapidary, cabochons, artisan and antique jewelry, beads, crystals, meteorites, metaphysical, gold, silver, turquoise, Native American items, interior decor, metal art, miner's rough, tools, supplies, and so much, MUCH more! Plus, there will be several special presentations listed below. See <http://www.coliseumshow.com/>.

 **“HEAR IT FROM THE EXPERTS”**
JOIN US FOR SPECIAL PRESENTATIONS EACH DAY IN THE 'VAIL' ROOM ON THE FIRST FLOOR

WEDNESDAY SEPT 13 2PM	 Philip Persson Unusual Minerals of the Pikes Peak Batholith and other Colorado Pegmatite Localities	THURSDAY SEPT 14 2PM	 Mark Jacobson Emerald and Hiddenite Localities, Hiddenite, Alexander County, North Carolina
FRIDAY SEPT 15 2PM	 Dr. James Hagadorn Curator, Denver Museum of Nature and Science Colorado's Poisonous Minerals	SATURDAY SEPT 16 2PM	 Gail and Jim Spann The Spann's "Tour de France"

- **Sept. 13-16, Denver Fine Mineral Show**, Denver Marriott West, 1717 Denver West Blvd. We will continue our tradition of bringing you some of the finest mineral dealers in the world – all in one location. So when you come out to Denver in September, make sure to stop by the Denver Marriott West and check out the Fine Mineral Show: Denver. See you there! See <http://finemineralshow.com/denver/>
- **Wed., Sept. 13, Annual Open House at the Colorado School of Mines Geology Museum** (approx. 6 to 9 p.m.). All are invited to come to see new exhibits at the Museum, and to meet the Museum Director Bruce Geller, the student and volunteer staff, and visiting curators and mineralogists from around the world.
- **Thurs., Sept. 14, 7:30 p.m., Friends of Mineralogy September meeting**; a tour of the new mineral collection archives at the Denver Museum of Nature & Science, led by Dr. James Hagadorn, Geology Curator. Members of FM (anyone is most welcome to join the society!), and visiting mineralogists and curators who belong to the SMMP (Society of Mineral Museum Professionals) who are here to attend the Denver Gem and Mineral Show, are invited to come.



FINE MINERAL SHOW DENVER

SEPTEMBER 13-16 2017

WEDNESDAY-FRIDAY 10AM-6PM • SATURDAY 10AM-5PM

Denver Marriott West
 1717 Denver West Blvd
 Golden, CO

USE I-70
 EXIT 263

For more information, visit:
FineMineralShow.com

Like us on Facebook.
 Facebook /Fine-Mineral-Show for show updates.

Tom Spann

- **Thurs., Sept. 14**, “Join the Western Museum of Mining & Industry [Colorado Springs] the evening of Thursday September 14, 2017 as we celebrate the opening of a new exhibit called “**The Disappearing Mining Landscape of Grant County [New Mexico]**”! The exhibit will run from September 14th – December 9th. To celebrate the new exhibit, we will be having a special Heritage Lecture. Ann McMahon and Andrew Lindlow will speak with guests about their experience gathering the necessary information for this exhibit and the importance of preserving the history of mining in Grant County. They will talk about how they utilized photographs with geological samples to document the districts.
The lecture will begin at 7:00 pm September 14, 2017 with light refreshments served at 6:00pm. Seats fill up quickly so we ask that those interested in attending please RSVP by calling 719-488-0880 or respond by e-mail to rsvp@wmmi.org. If you would like to learn more about the lecture or about the new exhibit, please visit www.wmmi.org/events or email info@wmmi.org with any questions.

Other activities coming this fall.

- **Mon., Oct. 9**, Graham Young (Manitoba Museum), **Tropical fossils from the edge of the Arctic**. Denver Museum of Nature & Science Earth Science Colloquium Series; VIP Room, DMNS.
- **Oct. 8-14** is **Earth Science Week**, sponsored by the American Geoscience Institute and many cooperators (including the USGS). See more about it at <http://www.earthsciweek.org/>, including public activities taking place in many towns throughout the U.S. One of these will be a **Geology Hike** to be held in the Golden-Morrison-Lakewood area, led by USGS Geologist Pete Modreski, probably to take place on Sunday afternoon, October 8; details will be available later.
- **Sat., Oct. 14, Dinosaur Discovery Day**, public tour day at Dinosaur Ridge, featuring **Girl Scout Day/National Fossil Day**, 10 a.m. – 2 p.m. “Girl Scouts of all levels can earn badge requirements. Girl Scout registration information will be posted as soon as the event is finalized. We’ll also be celebrating National Fossil Day with the National Park Service and many other special guests! Hands-on activities at the Visitor Center for all ages, and scientists will be along the Ridge interpreting fossils and geology for all attendees. Public welcome!” Contact: Erin LaCount at tours@dinoridge.org.
- **Sat., Oct. 14**, 8 a.m. – 5 p.m., **Bighorn Sheep Canyon Geology Bus Tour, Arkansas River between Salida & Cañon City**. Arkansas Headwaters Recreation Area (AHRA) Volunteer Geologist Bob Hickey will narrate an all-day bus tour on the geology of Bighorn Sheep Canyon between Salida and Cañon City on Saturday, October 14, 2017. The bus will depart Cañon City at 8:00 AM on US-50 and travel up the Arkansas River to the Salida East Recreation Site, then begin a slow return trip that will include a narrative description of the canyon’s unique geologic features as well as several stops where tour participants may get off the bus to view the geology up-close. A Public-Address system will be used and a printed tour-guide provided to aid in understanding. The event, part of Fremont Fall Heritage Days, is sponsored by the Fremont County Historical Society (FCHS) with cooperation from the Arkansas Headwaters Recreation Area (AHRA) and the support of Raft Masters, who is providing the bus. Registration fee for the tour is \$40, which may be paid by check to FCHS, PO Box 965, Cañon City, CO 81215. Lunch will be available but it is priced separately. The tour is limited to 43 participants. This is a Hold-the-Date announcement while final arrangements are being made. Registration information, itinerary, tour details and additional information will be available soon at <https://www.fremontheritage.com/>. Look for the Bighorn Sheep Canyon Geology Bus Tour under Events. Further information is available from FCHS and (719) 285-8284.
- **Nov. 11-12, 38th annual New Mexico Mineral Symposium**, at New Mexico Institute of Mining & Technology, Socorro, NM; see <https://geoinfo.nmt.edu/museum/minsymp/home.cfml>
- **Nov. 17-19, Denver Area Mineral Dealers Show**, Jefferson County Fairgrounds, Golden CO.

Denver Gem & Mineral Show Mini Report September 2017

50th Anniversary Show

The Denver Gem & Mineral Show is only a few short weeks away. The dates are September 15th - 17th. The theme is **GOLD AND SILVER**, in honor of this being the 50th anniversary show. The location is the usual Denver Mart, 451 E. 58th Avenue (exit 215 on I-25). The Show Chair is Lesley Sebol, 720-999-1372 or lesleysebol@gmail.com.

We hope that club members are making final plans for the show. There is so much to plan for. If you are exhibiting, perhaps you are putting the final touches on that display. Are you entering a specimen found this last year for the Prospector Trophy? Are you helping with your club's display for the show? Have you decided on the specimen you are entering in the Species competition? Have you selected the specimen type you will search for at the show to complete your collection? Perhaps you will comb the dealers' booths for a specimen worthy of competition but yet in your price range. So much to think about.

Don't forget the Silent Auction is returning to the Saturday night dinner and awards ceremony. The auction will be organized and operated by Mindat.org, a non-profit organization. Proceeds from the auction will benefit Mindat.org. The Saturday night event is open to the public and is free. However, if you wish to enjoy the Western Barbecue buffet, you will need to purchase a \$1 ticket at the Information Desk in the front lobby of the Mart. Only 150 tickets will be sold. Buy your tickets early.

We hope that every club member is volunteering for the show in some way. The Show Committee has several open positions at this time. These are Signs, Show Pin, Ribbons, and Tear Down. Some persons have stepped up to cover these positions for this year but a more permanent chair is needed. Ron Snelling is assuming the Buildings and Grounds responsibility, Nick North is covering Ribbons, Dan Wray will be the lead for Tear Down, Katherine Brannan along with Nick North and Bruce Sales will handle Signs. Mike Dempsey is in charge of the Public Sector. George Daggett, a member of the Guild, is now the Grab Bag Chair. Anita Colin, a Flatirons member, is now the Volunteers Chair. All of these persons could use our help. We thank them for volunteering for these responsibilities. Everyone should know that the show is an all-volunteer event. Yes, it is a little bit of work, but look at the reward! Without the Denver Gem & Mineral Show, the local activities for our gem, mineral, and fossil hobbies would be dullsville.

Don't forget the Show Committee is producing a 50 Year Retrospective about the show. It will be a 100 plus page booklet all about the 50 years of the show. The booklet will be highlighted with pictures of all kinds, stories about unique happenings, exhibits from the past that make you wonder where they are today, humorous incidents, names of many of the people who were involved with the show, brief club histories, and so much more. Everyone will want a copy.

Respectfully submitted, Judy Knoshaug, Show Secretary

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Volunteer Chair

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A friendly reminder to pay your 2017 annual dues

Dues are still only \$18 per individual and their immediate family. You can pay in two ways:

PAY Gerry Naugle, Treasurer and Membership Chair, at any FMC monthly meeting. Gerry is at or near the sign-in table when you enter the room for the monthly meetings.

SEND a check made to "Flatirons Mineral Club" or "FMC" to P.O. Box 3331, Boulder, CO, 80307. Please do not send cash in the mail.

Your 2017 dues must be received by January 20th, 2017 in order to stay current with the member benefits, which include electronic club newsletters containing the information about club activities, club field trips information, annual show opportunities, silent auction opportunities, and the annual club summer picnic. Your receipt is your new annual 2017 FMC membership card.





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

First Class Mail

Upcoming Events

Thursday, Sept. 14	Monthly club meeting; Gerry Naugle will have a special presentation	Frasier Meadows
Friday-Sunday, Sept. 15-17	50th Anniversary Denver Gem and Mineral Show featuring Gold and Silver	Denver Mart, 451 E. 58 th Avenue, Denver
Thursday, Oct. 12	Monthly club meeting; Pete Modreski speaking about how to start a mineral collection.	Frasier Meadows
Wednesday, Oct. 18	Jr. Geologists Meeting	Meadows Branch Library