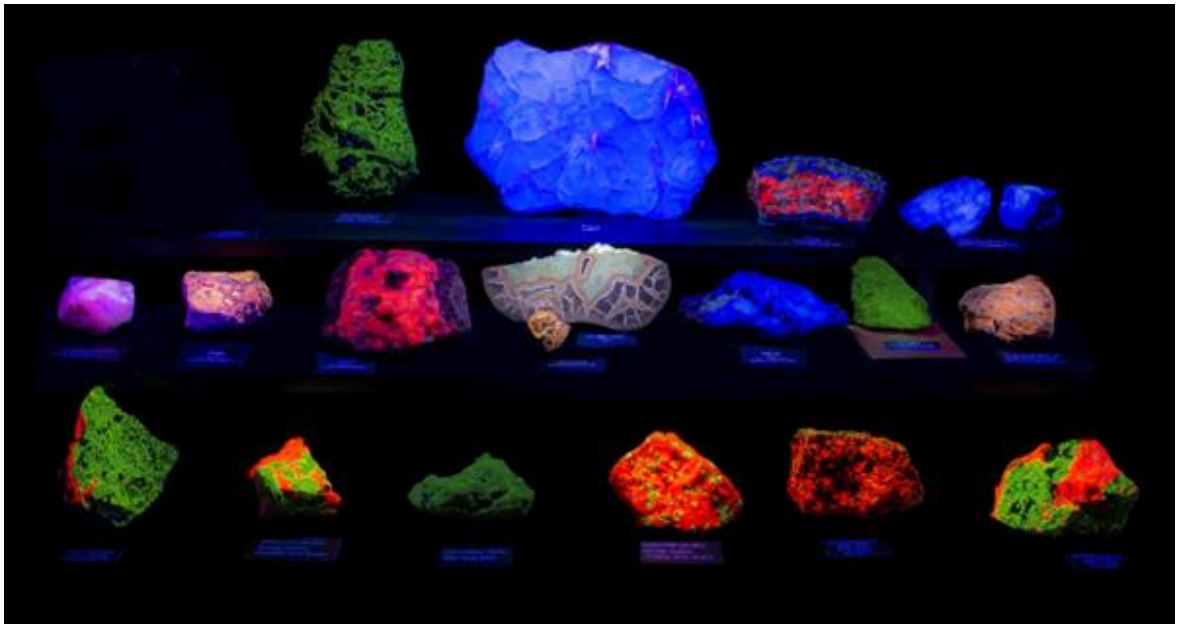
Flatirons Facets

Flatirons Mineral Club of Boulder County, Colorado
Volume 64, Number 6 November-December, 2021



Flatirons Mineral Club fluorescent mineral display at the Denver Gem & Mineral Show.

Specimens from the collections of Brian Walko and Gerry Naugle.

Photo credit: Brian Walko.

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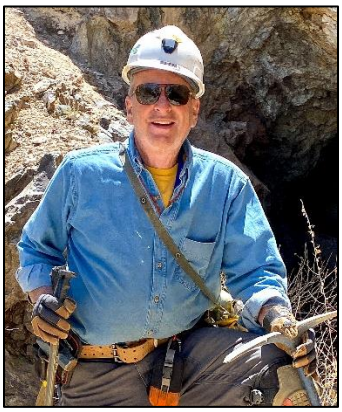


The Flatirons Mineral Club is a non-profit organization, which is dedicated to developing and maintaining interests in Earth science and associated hobbies. The purpose of this Club includes, but is not limited to, studying geology and Earth science, teaching others about our hobby, including young people, 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.

President's Message

President's Message

A busy fall. We are back in the swing of things. FMC members supported the Denver Gem & Mineral Show. Some members went on the Crawford Agate and Baculite Mesa field trips. The FMC had our first in person meeting since February 2020 with an excellent presentation by Dana Hauschulz about "The Wreck of the Edmund Fitzgerald & Banded Iron Formation."

Now it is time to focus on our annual Rocks & Rails Show, December 10-12th. FMC volunteers run the bulk of the show. Please sign up for some of the many volunteer opportunities associated with the show. See page 4 for details.

Please read below to find out more about these and future events.

Regards,
Brian Walko

Come to the Towel Show – Thursday, November 11

If you're new to the club, you're probably asking, "What is a Towel Show?" Each year, members bring specimens they have collected, as well as lapidary and jewelry work they have completed, to show to other club members. The specimens are displayed on a towel, hence "The Towel Show".

Prizes are awarded to both adults and juniors in the following categories: personal field trip, club field trip, lapidary/jewelry, best mineral, best fossil, best ugly rock, and even best towel. Everyone votes for their favorites and Amazon gift cards are presented to the first and second place winners in each category. So, pick out some of your best specimens in as many categories as you like, make labels for them, and bring them to display on your towel.

The Towel Show will start at 7:00 pm in the **Left Hand Grange in Niwot** (195 2nd Avenue, Niwot, 80544). If you are bringing items to show, plan to arrive 10 minutes early to set up your display. Also, you can bring snacks to share with everyone.

Come and join in the fun of displaying your special finds and creations and enjoying those of other members.

Charlie explaining where he collected his specimens at the last Towel Show.

Where in Colorado?

Each month, we will test your knowledge of geological features in Colorado. This photo looks like it was taken somewhere in Utah, but this area is located east of the Front Range. Where in Colorado is this?

See page 20 for the answer.

Holiday Party and Gift Exchange – December 14

To finish the year, come and join the fun at the annual Holiday Party on Tuesday, December 14. It is a time to exchange gifts and share snacks and stories with one another. So, bring a gift and some snacks to share with others.

One of the highlights of the evening is the annual gift exchange. Bring a wrapped $5 to $10 mineral-related gift. The gift exchange is great fun, with gifts exchanging hands throughout the evening. Members young and old will have a great time, and you never know what gift will go home with you.

The party starts at 7:00 pm at Mountain View United Methodist Church, 355 Ponca Place in Boulder (right across the street from Frasier Meadows, our previous meeting place). Enter the building from the south side.

Koji shows his gift at our last holiday party. Credit: Dennis Gertenbach

Rocks & Rails - December 10-12

Rocks & Rails, the club's annual Gem and Mineral Show, is on December 10-12 at the Boulder County Fairgrounds in Longmont, 10 am to 5 pm each day. Adult admission is $8 and children 12 and under are free with a paid adult. Our show is run in conjunction with the Boulder Model Railroad Club, so you can enjoy lots of rocks, minerals, and fossils, plus model trains in the other half of the building. The show features gem and mineral dealers, exhibits, speakers, fluorescent minerals, classes, and children's activities including games, grab bags, and the Rock R Magic Show.

2019 Rocks & Rails Show. Credit: Brian Walko

Club members can participate in many ways. The show is planned and run by club volunteers; see below to find out how you can help. There will be eight display cases to showcase your special specimens or lapidary work. Details on how to sign up for a display case on are on page 5. Club members can also sell their own creations or rock collections at the Artisan Sale. Information about selling at the Club Artisan's Table is on page 5. Also, specimens are needed for the Kids Corner; we have a home for those specimens you collected years ago but no longer want. More information on donating specimens can be found on page 6.

PLEASE VOLUNTEER TO HELP AT THE ROCKS 'N RAILS SHOW THIS YEAR.

Contact Char Bourg at showvol46@gmail.com for information about the areas where we need help.

Volunteer at the Show

This Show runs on VOLUNTEERS. We need volunteer help from set-up on Wednesday at 10 am until breakdown Sunday night. This is your club and we need your help to put on the show. From kids to grandparents, we need you all! **Volunteers get into the show for free all weekend!**

Volunteer at the Show on Friday through Sunday

Help is needed for SECURITY and in the KIDS CORNER, perhaps running a game, selling grab bags, or chatting about the club with visitors. You don't have to stand all the time; we have sitting positions too. Contact Charlotte at showvol46@gmail.com to sign to help.

In addition to coming to and enjoying the show, there are other opportunities for your family to participate. These include:

- Helping to run games and selling grab bags
- Putting together a display case for the public to enjoy.

- Demonstrating special rocks and minerals at one of the Jr. Geologists' fabulous Rock R Magic Shows, held several times on Saturday and Sunday.

Volunteer for Show Set-up and Tear-down

Four or five people are needed to help with show setup on Wednesday, December 8 at the Longmont fairgrounds from 10 am till about 2 pm. We will be setting up tables, chairs and electrical cables, so this is mildly physical labor. We also need another 5 to 6 people on Sunday evening December 12 from 5:30 till around 8 pm to help undo what we put together on Wednesday. On Sunday evening and Wednesday noon the club will provide pizza and soda for all who volunteer to help. If you can help with either or both times, please contact Charlotte at showvol46@gmail.com.

Everyone's help is needed to make the show successful.

Connel with his first-place display case. Credit: Dennis Gertenbach

Display Your Best

Once again, we will have display cases for our members to showcase their rocks, minerals, fossils, and lapidary work. The display cases are from the Denver Show and feature a glass front, overhead lighting, and are secured. The display cases will be set up for you. All you need to do is bring your specimens, labels, and liners on Thursday, December 9, and fill your case. Plan to take down your case on Sunday at 5 pm.

The display cases are always a great hit with the public and help to interest people in joining our club. To reserve a display case, please contact Dennis Gertenbach at gertenbach1@gmail.com. Preference for cases will be given to the juniors.

Show Club Artisan Sale Table

This year we are continuing the opportunity for club members who are not dealers to sell their own creations or rock collections at our December show in Longmont. This can include bulk rocks, slabs, jewelry and other items that fit the following description from our dealer contract: Dealers will be permitted to display or sell only materials or equipment directly related to the Earth Sciences, Rocks, Minerals, Fossils, Lapidary, Gems, Jewelry, Indian Artifacts, or printed, film or video materials associated with any of these fields.

We will provide a set of tables at the show designated for this purpose, and we are calling it the "FMC Club Artisan Table". You are not required to get either a Colorado Multiple Events License and/or a Tax Resale number if you do not anticipate selling over $1,000 worth of merchandise.

A few ground rules for participation are:

1. This is being offered on a first come first served basis, so please don't wait too long to register if you are interested.
2. We are limiting each individual's space to 3, 4, 5 or 6-foot increments. When you contact me, please let me know the number of linear feet you are requesting, so I can make sure we have the room available. Individuals may combine for more space or to help with staffing.
3. You must sign up by Thursday, December 9. The price for table space is $10 per foot and you will need to pay for your

Club members selling items at the Artisan's Table at the 2019 show. Credit: Brian Walko

space by Friday, December 10, the first day of the show. You may set up your space either on Thursday, December 9, between 7:30 am and 9 pm, or on Friday morning between 7:30 am and 10:00 am.

4. All items must be clearly marked as to price, either individually or in groups, (which you can then negotiate as you wish).
5. The "FMC Club Artisan Table" area must be staffed at all times to properly register sales and for security purposes. To this end, it is the obligation of all participants in this offering to register for one or more time slots to oversee this area. Once I have a list of the people who will be participating, I will then coordinate the staffing.

If you would like to join this endeavor, please contact Andrew MacGregor at andrew.d.macgregor@gmail.com to register. Once you register, he will send you a confirmation.

Specimens needed for the Rocks & Rails Show

It is time for you to go through your rock collections and donate to the KIDS CORNER for our Rock and Mineral show. We need donations for the WHEEL OF ROCKS, ELECTRIC MATCHING, and a new game, PIC-A-DIN0. These all need SMALLER SPECIMENS, about the size of a quarter, for prizes. Some examples are small pieces of calcite, Apache tears, quartz crystals, fossils, wood, etc. We like to be able to fill a container with the same type of specimen for the kids to choose from.

Of course, if you have rocks and minerals that you aren't sure of, bring them anyway. Some we can cut down and use while others may end up in a pothole. To DONATE your specimens, contact Charlotte at rckhnd4252@gmail.com.

First In-Person Club Meeting for 2021 in October

Dana talking about the history of the Banded Iron Formation. Credit: Dennis Gertenbach

Last month was our first in-person meeting since February 2020. Club member Dana Hauschulz presented "The Wreck of the Edmund Fitzgerald & Banded Iron Formation." The talk began with the sinking of the Edmund Fitzgerald in 1975 carrying a load of iron ore made from a deposit of Banded Iron Formation (BIF) mined near Lake Superior, along with Gordon Lightfoot's song of the same name. This led to an even greater tragedy buried in the rock record from over 2 billion years ago. The story included the rise in oxygen in the atmosphere, a Snowball Earth covered in ice, and the rise of single-cell life that evolved to the plants and animals on Earth today.

Thanks to Dana for an educational and entertaining talk.

New Day, New Meeting Place for Club Meetings

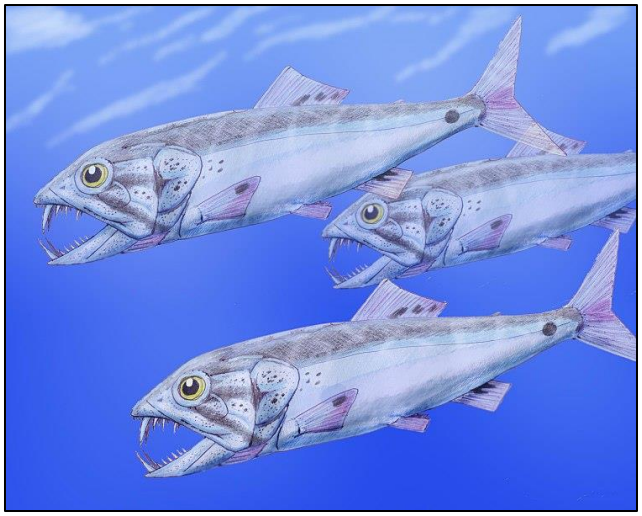
Club meetings are now on the second Tuesday of each month, starting at 7:00 pm. We are meeting at Mountain View United Methodist Church, 355 Ponca Place in Boulder (right across the street from Frasier Meadows, our previous meeting place). Enter the building from the south side. The next meeting at our new location is the Holiday Party in December.

Discovery of a Mosasaur Bone

Trick Runions

There is a layer of brown matrix found in the Comanche National Grassland (CNG) in southeast Colorado that is called the Juana Lopez Member. It is Late Cretaceous in age, measuring 3 feet thick there and 17 feet thick in New Mexico, and full of various invertebrate fossils, fish bones, and shark teeth.

I have been on numerous WIPS trips there, usually led by Steve Miller in recent years, as he was conducting exploratory investigations and stratigraphic analysis of the landscape in various parts of the CNG. On one of those trips, I found a piece of bone that turned out to be a part of a jawbone of an *Enchodus gladiolus*, a 7-foot wicked fish, with fangs that stuck out of the front of its mouth like a vampire's fangs (nicknamed the saber-toothed Herring). This fossil was donated to the Denver Museum of Nature and Science.

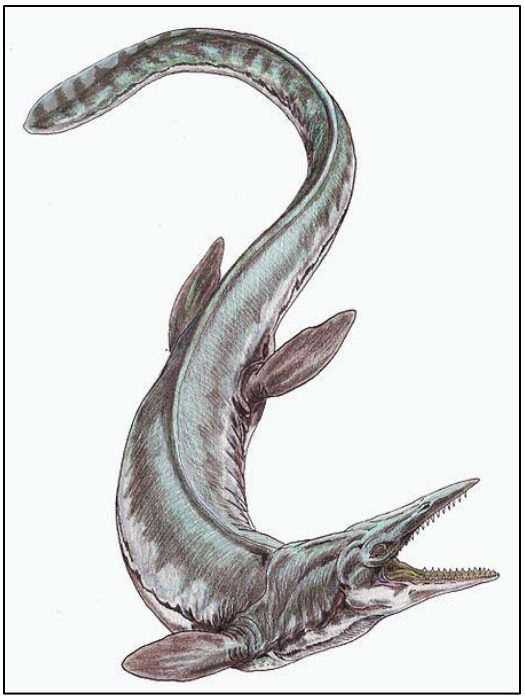


Enchodus from the Western Interior Cretaceous Sea. Credit: Dmitry Bogdanov, GNU Free Documentation License

On another trip I found a fish fin, species unknown, indeterminable, and a vertebra nearby that I found in a 2-foot x 1-foot plate of stone from the Juana Lopez. Bruce Schumacher, paleontologist for the USDA Forest Service, identified the bone as a mosasaur vertebra, probable *Tylosaurus* due to its size. It was halved in the flat rock longitudinally, top to bottom, about 4 inches tall, 3 inches wide.

Other than a few teeth found on private land, this is the only known skeletal material of a mosasaur found in the Juana Lopez Member. A paper will be published by Bruce in the spring of 2022, and this important fossil will be included in his full paper on CNG discoveries.

Mosasaur vertebra I found. Credit: Trick Runions

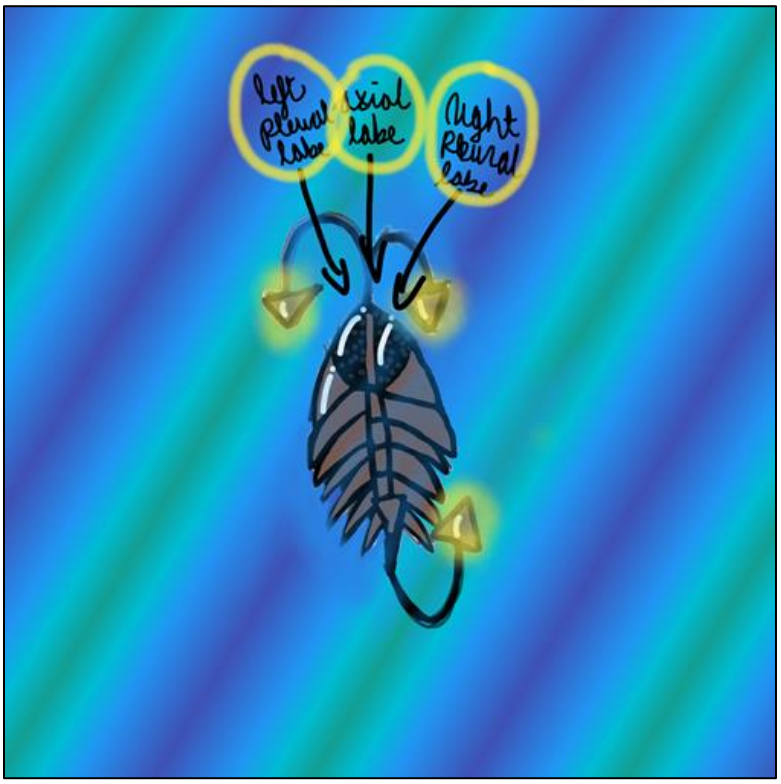


Reproduction of a Tylosaurus. Credit: Dmitry Bogdanov, GNU Free Documentation License

Parts of a Trilobite

Artwork by Charlotte Small

Trilobites have three lobes shown below (hence the name). They also have three parts - a head, body, and tail.



Editor's Note: Charlotte is in 8th grade and has been a Jr. Geologist for nearly 6 years.

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

Jr. Geologists Activities

With the nice weather this past two months, the Jr. Geologists visited a Dinosaur Quarry in September and hunted for trilobites in October. At our November meeting, we will learn about rocks and minerals with special properties in preparation for the Rocks R Magic Show at the club's annual show in December. Plus, there is a national contest for all Jr. Geologists.

Dinosaur Quarry Visit

Located in Como Bluff, Wyoming, the Nail Quarry is managed by club member Anita Colin. For over 120 years, hundreds of dinosaur bones have been recovered from Como Bluff. Bones and teeth of *Camasaurus*, *Stegosaurus*, *Allosaurus*, and other dinosaurs have been found at the Nail Quarry.

Junior Geologists helping to plaster a dinosaur bone.
Credit: Dennis Gertenbach

Braden shows off the belemnite fossils he collected. Credit: Dennis Gertenbach

The Jr. Geologists spent a day at the quarry, learning how dinosaur bones are recovered from the rock, jacketed in plaster to protect them, and then transported to the Tate Museum in Casper, Wyoming, for further study. They also hiked to outcrops where they could collect belemites (extinct squid-like animals), oysters, and ammonites. Everyone had a good time and we thank Anita and her crew for spending time with the Jr. Geologists.

I Love Trilobites Meeting

A donor shipped two boxes of shale from a quarry in western Utah that contained lots of trilobites. For October's meeting, the Jr. Geologists learned about trilobites from Charlotte and Dennis. To figure out what trilobites tasted like, they made trilobite cookies. The rest of the meeting was spent splitting shale to find trilobites. Everyone found lots of trilobites to take home.

A presentation on trilobites by Charlotte.
Credit: Dennis Gertenbach

Making trilobite cookies (left) and splitting shale to find trilobites (right). Credit: Dennis Gertenbach

November Meeting

Many rocks and minerals have special properties, and the Jr. Geologists will learn about these at November's meeting as they complete requirements for the Special Effects badge. From what they learn at the meeting, the Jr. Geologists will perform the Rocks R Magic Show at the club show in December. We will also learn techniques about how to put together a display case for the show.

The meeting will be on Wednesday, November 10, starting at 6:30 at Mountain View Methodist Church, 355 Ponca Place in Boulder.

Display Case at the Rocks & Rails Show

Jr. Geologists are encouraged to put together a display case with some of their specimens for the Rocks & Rails Show. Tips and techniques for creating a display case will be part of November's meeting. If you would like to put together a display case, please contact Dennis Gertenbach at gertenbach1@gmail.com.

A Jr. Geologists display at the last club show.
Credit: Dennis Gertenbach

Help with the Rocks & Rails Show

Come to the Rocks & Rails Show on Saturday or Sunday, December 11 and 12, and help at the Kids Area. Families can run games and sell grab bags at the show. In addition, juniors will run our Rocks R Magic Show every hour these days. You can demonstrate cool rock and mineral properties to the public, showing these "magic" properties. To volunteer, please contact Charlotte Bourg at showvol46@gmail.com.

Braden demonstrates magical mineral properties at the Rocks R Magic Show at the last club show. Credit: Brian Walko

Contests for Jr. Geologists

The American Federation of Mineralogical Societies is holding two special contests for juniors throughout the country. One is to design an official mascot to represent juniors involved with the badge program. The other is to develop an oath or pledge that new kids would take when joining a rock club's juniors program.

Winners of each contest will earn $100 and a certificate of achievement from the American Federation. Contest rules can be found at http://www.amfed.org/news/n2021_09.pdf on page 9. Deadline is May 1, 2021.

In Memoriam: Raymond "Ray" Stanley Horton

We were saddened by the death of Ray Horton in September. Ray, along with his late wife Dorothy, were mainstays of the Flatirons Mineral Club for many years. Ray served on the club's board, helped run club shows, and led many field trips. Many of us enjoyed trips to the Phoenix Mine outside of Idaho Springs that Ray organized for the club.

Ray was born in Hay Springs, Nebraska, at the beginning of the Great Depression. By the age of 10 he ran his uncle's farm, at 13 he became a professional bull rider, and at 14 he drove trucks for the military during World War 2. He served in the Korean War and led a special forces unit that operated behind enemy lines. He was the last man standing in the Battle of Old Baldie where 1,050 US soldiers and 10,000 of the enemy were killed on one day. Ray received multiple purple hearts and many other medals for his time in the service.

Ray met his future wife, Dorothy Hamel, during the Christmas season of 1955 and they were married the following June. Ray worked at Rocky Flats for 30 years, mostly as a metallurgist in conjunction with NASA, creating many inventions used in the space program. He also taught metallurgy courses at the School of Mines.

We will miss Ray at our meetings and our annual club show.

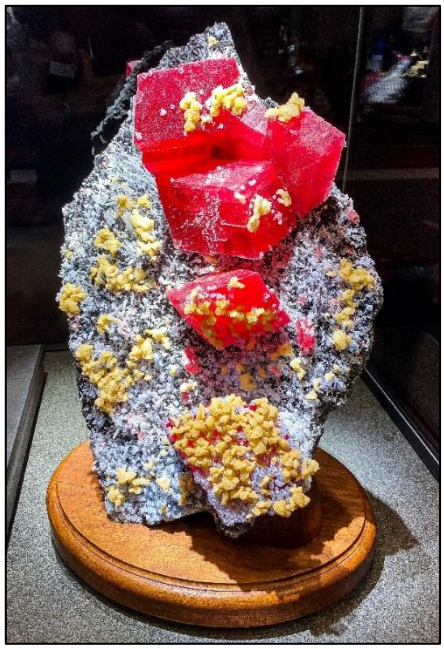
Write an Article for the Club Newsletter

One of the best features in each club newsletter are articles and other contributions by club members. Club members have a wide range of interest in earth science and rockhounding and are willing to share their interest with other members through articles, photos, poetry, and artwork. Throughout this newsletter, you will find articles, photos, and artwork by club members - both adults and juniors.

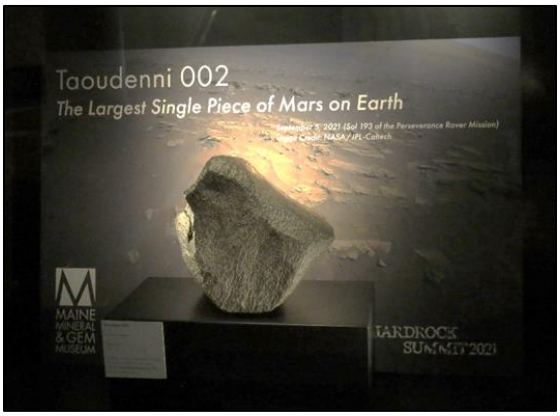
We are looking for items for future newsletters from all age groups, including adults and Jr. Geologists. Please consider sending a contribution to the newsletter to Dennis at gertenbach1@gmail.com. If you need help with your contribution, please contact Dennis. We have special specimens for all contributors.

Highlights from the Denver Gem & Mineral Show

It was great to have the Denver Gem & Mineral Show back again this year in a new location. Here are photos of some of the highlights from the show.

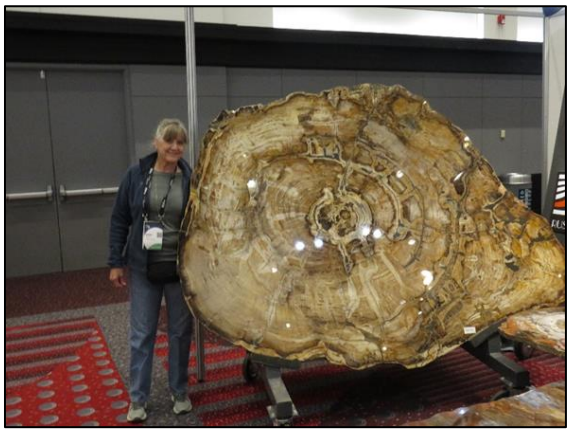


Two of the most magnificent rhodochrosite specimens in the world, the Alma Rose (left) and the Alma King (right). Credit: Brian Walko



The largest meteorite from Mars. Credit: Trick Runions

Skull of the Sun, carved from one piece of silver sheen obsidian from Mexico. Credit: Dennis Gertenbach



Debbie Stewart with a giant fossilized wood slab. Credit: Trick Runions

Short-wave UV specimens from Ed Raines.
Credit: Brian Walko

Crawford, Nebraska, Fairburn Agates and Fluorescent Chalcedony Field Trip Report

Oct. 2-3, 2021
Brian Walko

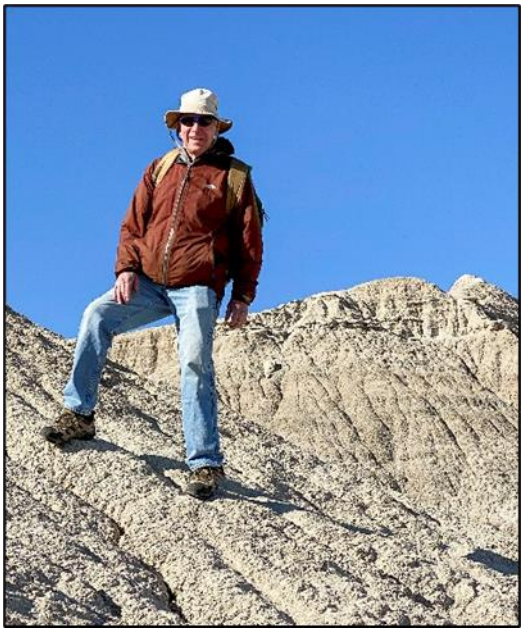
The high plains of Northwest Nebraska greeted us with perfect weather for our field trip. About 30 members from both the Flatirons Mineral Club and Colorado Mineral Society attended. We started at Toadstool Geologic Park, world famous for its Oligocene White River Group fossils. After an orientation and strong reminder that all fossil collecting was prohibited by law, the group explored the Brule formation looking for mammal and turtle fossils.

Toadstool Park orientation. Credit: Brad Willkomm

Adventurous fossil hunters exploring the Brule formation at Toadstool Park. Credit: Brian Walko

Some fossil teeth and vertebrae found in the washouts by the Junior Geologists. After being identified, they were returned to their original location.

Junior Geologists showing off their finds. Credit: Brian Walko



Terry O'Donnell hasn't lost his climbing skills. Credit: Brian Walko

Next, we headed to the Chalcedony Beds. This was to familiarize the members with the terrain, because we would be returning that evening in the dark for fluorescent chalcedony collecting.

The remainder of the day was spent searching several agate beds for the illusive Fairburn agate. Unfortunately, no Fairburns were found. But everybody collected plenty of prairie agate, petrified wood, jasper, and chert.

At sunset we all met back at the Chalcedony Beds. Chalcedony fluoresces best under shortwave ultraviolet light (UV). Most people had longwave UV flashlights. All UV flashlights need a filter to allow only the ultraviolet light to pass and block the other bands of light including white light. The first people to see the green fluorescence had filtered flashlights. As the sky turned to total darkness, everybody started detecting some green glow from the chalcedony. Then they would bring their pieces over to me and I would light it up with 35 watts of shortwave UV.

Eliza Rayner, Terry O'Donnell and Carol Oakes on the Chalcedony Beds. Credit: Brian Walko

As I scanned the ground with the shortwave UV light, the trip members were amazed the entire ground they were walking on was fluorescing brilliant green.

Fluorescent chalcedony. Credit: Brian Walko

The second day we headed to Agate Reservoir. Some local natives were reluctant to let us pass to the agate beds. A couple of toots of the horn, and they let us pass.

Local natives guarding the Agate Beds. Credit: Brian Walko

Agate Reservoir is a depression that was dammed to provide cattle irrigation water. The banks of the dam contain agates from the original gravel bulldozed to make it. We scouted from the low water line to the dam; however, the best agates and petrified wood came from the prairie on the other side of the dam.

Terry O'Donnell, Jerry Schultz, Analou Schultz, and Carol Oakes. Credit: Brian Walko

On the way home we gave Terry O'Donnell a unique birthday treat. Brad and I took him to special location to collect chalcedony roses.

Brad Willkomm and Terry O'Donnell. Credit: Brian Walko

Chalcedony rose. Credit: Brian Walko

It was a great trip. The FMC runs this trip every other year. If you are interested in a high plains adventure, look for the October 2023 trip announcement.

Baculite Mesa Field Trip Report

October 23, 2021

By Brian Walko

Baculite Mesa, located just east of Pueblo, Colorado, was part of a vast inland sea also known as the Pierre Seaway during the Cretaceous Period about 70 to 80 million years ago. During this time numerous invertebrate sea creatures such as ammonites, baculites, *Inoceramus* clams, scaphites, pelecypods, gastropods, and nautiloids lived here. Their remains are well preserved in the sediment now known as the Pierre Shale formation.

Our trip was in conjunction with the Colorado Mineral Society. After an orientation briefing by Amber Brenzikofer, CMS trip leader, we headed off to the Pierre Shale in search of fossils.

Baculite Mesa Terrain. Credit: Brian Walko

We hunted along the flats, through the slot canyons and along the upper slopes of Baculite Mesa in search of fossils.

In search of fossils. Credit: Brian Walko

Weathered baculites were the most common fossil found.

Weathered baculite.
Credit: Brian Walko

Methane vent/seep. Credit: Brian Walko

Another interesting feature of the Baculite Mesa area are the methane vents/seeps. These vents/seeps were encrusted with clam fossils. Methane vents/seeps acted like today's deep ocean vents, where they attract bacteria on which the marine life feed.

A surprise creature crawling around Baculite Mesa was the tarantula. According to the local people, it was tarantula migration/mating season. Almost everybody saw one or more while fossil hunting.

Oklahoma Brown Tarantula. Credit: Brian Walko

Everybody came back with fossils. Lots of baculites, a few ammonites, scaphites, and *Inoceramus* clams were also found.

Inoceramus clam. Credit: Brian Walko

Dangers of Rock Dust

Glen Kuban

Note: This article appeared in the October 2021 AFMS Newsletter, which was first published in the December 1997 Paleo Footnotes and republished to inform a new generation of members.

Many collectors use a mechanical rock saw to cut, trim, or abrade rocks and fossils in the field or lab. Dangers of this activity include flying rock chips, wounds from the blade itself or broken blades, and rock dust, which is extremely dangerous to inhale. Always read and understand the proper operation of any mechanical tool before using it. Whenever cutting or grinding rock, wear protective eye goggles. Also wear a good respirator, or use a dust collection system, to avoid inhaling rock dust which accumulates in the lungs and can cause a variety of serious illnesses.

For those not convinced that rock dust is a serious danger, or that they can get away with not wearing a respirator or working under a hood (if working indoors), I encourage you to read the message below. The original message was posted on 7-14-97 in the Rocks and Fossils News groups, and my reply was sent to that list as well as the Dinosaur List, VrtPaleo and Fossil Nuts.

The original message I am responding to was posted in Rocks and Fossils, but I am sending my response to the other paleo related lists as well, because I feel this is an important safety issue. It affects anyone who even occasionally cuts rocks or fossils, or does fossil preparation work. It will be very worthwhile if it prevents even one person from suffering lung problems or dying prematurely. With that deliberately onerous introduction, let me quote the post that prompted my response:

Peter's Post: "Last night I spent an hour cutting sandstone sidewalk blocks with composition blade made of fiberglass and carborundum grit. This is a dry saw and it was a still night and clouds of dust were all around. Some of it hung in the air for minutes. I am not really concerned about a one-shot exposure, but it did make me wonder if this is the size of silica which DOES represent a health hazard. Of course, I do not know for sure that the fine dust was silica, as opposed to calcium carbonate (the cement in the sandstone) or material from the new blade..."

Credit: Safety Provisions, Inc. Used by permission

Glen's Response: "It's funny, or really not so funny, that you should write now. I'm suffering a chronic lung irritation, and seeing doctors now, because of the results of a similar incident. In short, yes, one or a few exposures to significant amounts of freshly-cut rock dust can cause serious problems. Silicosis is only one of the many lung problems that can be caused by rock dust, many of which (like fibrosis) can occur no matter what the composition of the rock. Wearing a good respirator or hood with dust collector if working indoors in a must. If you don't have the proper safety equipment, don't cut the rock!

Unfortunately, I found out the hard way, I hope everyone learns from my mistakes. About a year ago our fossil club went to Ontario to collect trilobites, and we took along a diamond rock saw. I only sawed out a few trilobites for fellow members (without wearing a mask, I forgot to bring one) and I tried to not inhale the dust. However, large clouds of it were kicked up each time, and it was impossible to avoid inhaling quite a bit of it. By the next morning I had significant lung irritation, and have had it ever since - some days worse than others. I have frequent coughing and uncomfortable sensation in my upper chest. After this went on a few weeks, I went to a doctor, not knowing if I had contracted a bacteria, fungus, or other microbe at the quarry, or just had accumulated too much dust in my lungs. An x-ray was clear, but that is not unusual in such cases (it sometimes takes years for fibrosis, TB, cancer and other diseases to develop). Apparently, the rock dust itself is the cause of the current lung irritation, and it may never get better. In fact, it may worsen into other conditions, as explained below.

Many people assume years of exposure to rock dust is needed to cause serious problems, and this is generally true when dealing with wind-blown, low concentration dust, which usually has already weathered to some degree. But not so with freshly cut rock. After I started having my problems, I began talking to doctors and doing lots of reading. I also talked to an uncle who used to work in a quarry, and is now dying of pulmonary fibrosis at the age of 55. I am now going to his doctor.

Credit: ARA Insurance, used by permission

It turns out that not only do rock particles of any composition tend to stay and accumulate in the lungs, but freshly cut rock is the worst, and extremely pernicious. Even one or a few incidents of significant inhalation of such dust can cause long irritation and start a process of increasingly serious lung damage. The microscopic particles are like millions of razor-edged shards that damage lung tissue directly, as well as create conditions promoting the development of TB, micro plasms, fibrosis, and cancer. Experiments with rats and other animals have shown that inhalation of fresh cut rock dust is far more damaging than worn rock dust of any composition, and leads to far greater rates of several diseases, including pulmonary fibrosis and lung cancer. But even accumulations of worn rock dust in the lungs greatly increases chances of lung disease.

I've also made many fossil molds and casts over the years, and although I often wore a mask while working with plaster, sometime I did not. I may well have accumulated plaster in my lungs as well, which may have contributed to or aggravated my lung condition. Plaster hardens when in contact with moisture, wherever it occurs, including one's lungs. But I did not have the constant lung irritation until after the Ontario trip using the rock saw (on hard shales and siltstones), and have had it ever since.

I have another appointment with a pulmonary doctor on Thursday, but from what I have learned, such damage is generally irreversible, and the best I may hope for is to have my condition not get worse. I may have to live with lung irritation and chronic cough for the rest of my life, plus increased chances for the serious conditions I listed above.

So PLEASE, whenever you are cutting or grinding rock of any kind ALWAYS wear a respirator (not just a cheap dust mask). If working indoors, use a dust collecting hood, or don't do it. Your health is not worth any rock or fossil.

There are serious inhalation dangers in the lab also, including solvents, urethanes, glues, and other chemicals used on prep work. These too can have accumulated effects, and lead to a variety of health problems. Work with such chemicals only with very good ventilation, or under a hood, or don't do it. Again, a rock or fossil is not worth your health. If I scared anyone, I can't feel too bad, because I wish someone had scared me before I did what I did, and now may have to pay the price the rest of my life.

Pete, in your case, I hope you do not have any problems and can only urge you not to do it again, at least not without wearing a respirator. The dust you created by cutting sandstone probably included a mixture of siliceous sand particles, calcium carbonate particles (from the cement between the grains), and fibers from the fibrous saw blade. All could be dangerous to inhale.

Thank you, Glen Kuban,

Ed: Given the current health issues resulting from Covid, this story can alert us to dangers we may tend to ignore when we are enjoying our shops. We should all consider keeping those annoying masks on when we are using lapidary equipment or sawing, soldering, or buffing silver and copper or doing torch work. Just for example, my own brother-in-law used to build futon frames in his garage. The work involved a lot of wood dust from some of the exotic woods he used, but he refused to wear a respirator—too hot, too clumsy, too sissifying. Some years later he, who had never smoked a day in his life, died of inoperable lung cancer.

Where in Colorado?

Dennis Gertenbach

This photograph shows the sedimentary outcrops at Paint Mines Interpretive Park, located near the town of Calhan, east of Colorado Springs.

Colored formations in the Paint Mines Interpretive Park near Calhan, east of Colorado Springs. Credit: Dennis Gertenbach

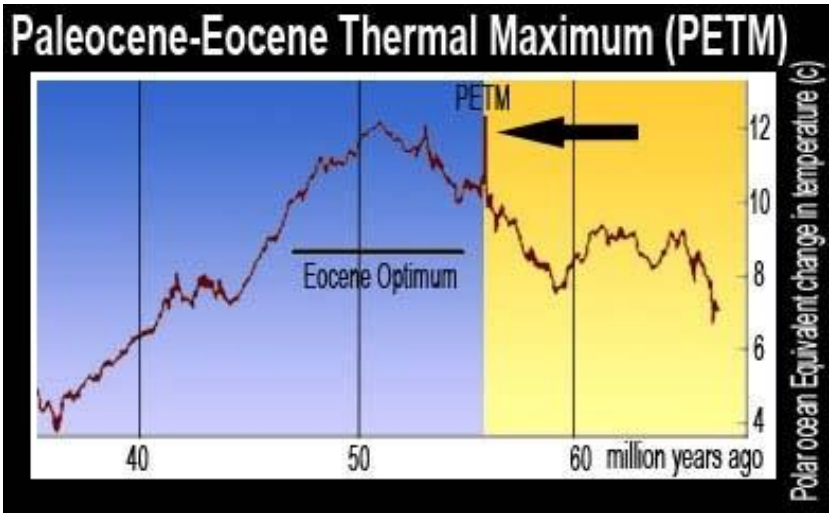
The Paint Mines are named for their colorful clays that were collected by Native Americans to make paint. The different colored bands of clay are caused by oxidized iron compounds and other minerals. The park features fantastically shaped geological formations, including spires and hoodoos, formed by eroding gullies and ravines that cut through the landscape.

The Paint Mines Interpretive Park covers approximately 750 acres and have evidence of human life as far back as 9,000 years ago. Excavations have revealed arrowheads, spear tips and petrified wood tools. The park includes a restroom facility, four miles of trails, interpretive signage, and many natural wonders.

Geology

The rocks at the Paint Mines are interlayered shale and clay with embedded selenite (gypsum) and jasper. The clay layers are stained various shades of red, brown, yellow, and orange by iron oxide. Capping the clay layers is a more resistant layer of sandstone, which forms the white caprocks on some of the hoodoos.

The layers in the park date to the end of the Paleocene, a time when the Earth's climate rapidly warmed as much as 5 to 8°C (9 to 14°F). Dating to about 55.5 million years ago, this rapid rise in temperature marks the end of the Paleocene and the beginning of the Eocene, and is known as the Paleocene-Eocene Thermal Maximum (PETM). The PETM temperature spike can be seen in the graph below.



Credit: https://sites.google.com/site/thepaleoceneeocenethermalmaxim/home, used by permission

Geologists believe that this warming was caused by a rapid, massive release of methane (a potent greenhouse gas) into the atmosphere. Scientists study rocks from the PETM to gain a better understanding of the effects of today's rapidly increasing carbon dioxide (another greenhouse gas) concentrations on changes to the Earth's ecosystems.

More information about the park can be found at https://communityservices.elpasoco.com/parks-and-recreation/paint-mines-interpretive-park/. A field trip guide of the geology of the park can be downloaded at http://www.fcdcc.com/docs/2016-04-15-field-trip-guide-to-the-geology-of-paint-mines-interpretative-park.pdf.

Worth Visiting in the Area

North of Colorado Springs along I-25 is the wonderful Western Museum of Mining and Industry. Opening in 1970, the museum preserves and interprets the rich mining history of Colorado and the American West. The museum features working machinery, a model mining drift, and gold panning stations in the 12,200 square foot exhibit hall. You will learn how turn-of-the-century miners timbered, drilled, blasted, mucked, and hauled ore from the mine to the stamp mill, where ore was crushed and processed. Outside are historic buildings and machinery on their 27-acres campus.

Working equipment at the Western Museum of Mining and Industry. Credit: https://wmmi.org/

There are lots of hands-on exhibits and activities for all ages to enjoy, making it a fun family outing with lots of learning as a bonus! Tours are free with your admission, with knowledgeable tour guides bringing mining history to life with stories to engage all ages.

You can learn more about the museum, including hours and admission costs, at https://wmmi.org/.

Fossils in the News

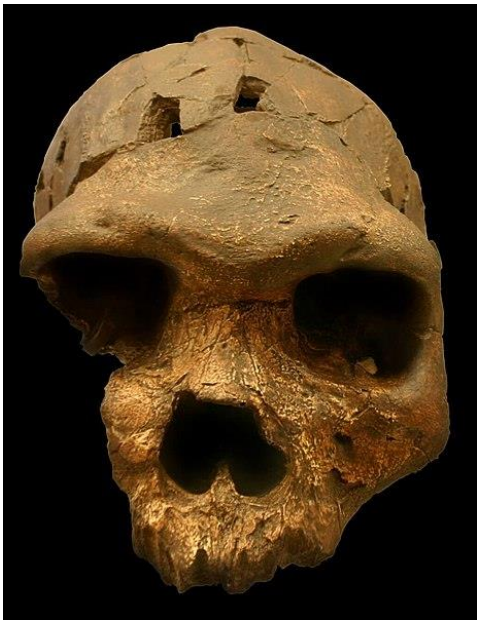
Dennis Gertenbach

We Now Have a New Ancestor

Researchers recently announced a new human ancestor named *Homo bodoensis*. This species lived in Africa during the Middle Pleistocene, around half a million years ago, and is thought to be the direct ancestor of modern humans. At this same time, other *Homo* species lived, including Neanderthals (*Homo neanderthalensis*) in Europe and our own species (*Homo sapiens*) in Africa.

The name *bodoensis* was given to a skull found in Bodo D'ar, Ethiopia. Other, less well-defined ancient homo species are now classified *H. bodoensis*. These include most Middle Pleistocene humans from Africa and some from Southeast Europe. The description of this newly named species helps bring clarity to a problem that paleoanthropologists call "the muddle in the middle."

Information from https://news.uwinnipeg.ca/experts-name-new-species-of-human-ancestor/



Cast of *Homo bodoensis* skull. Credit: Ryan Somma from Occoquan, USA, licensed under the Creative Commons Attribution-Share Alike 2.0

Which Small Pterosaurs Dominated the Cretaceous Skies?

During the Cretaceous Period (145 to 66 million years ago), pterosaurs big and small dominated the skies. But paleontologists have noted that the number of smaller pterosaur species had drastically dropped at this time, compared to the earlier Jurassic and Triassic Periods.

Juvenile pterosaur fossil, public domain

It had been previously thought that the smaller species of pterosaurs were outcompeted by newly evolving birds. However, a new study examined the skeletons of both large and small pterosaurs from the Kem Kem Group in Morocco. By careful microscopic examination, researchers could determine the age of the animals when they died. They found that the fossils of the small pterosaurs were mostly juveniles, not adults. These findings suggest that hatchling pterosaurs - known as flaplings - could fly soon after hatching and were quickly independent. These juveniles competed for the same food as small adult pterosaurs and eventually outcompeted them.

Information from https://www.port.ac.uk/news-events-and-blogs/news/tiny-pterosaurs-dominated-cretaceous-skies

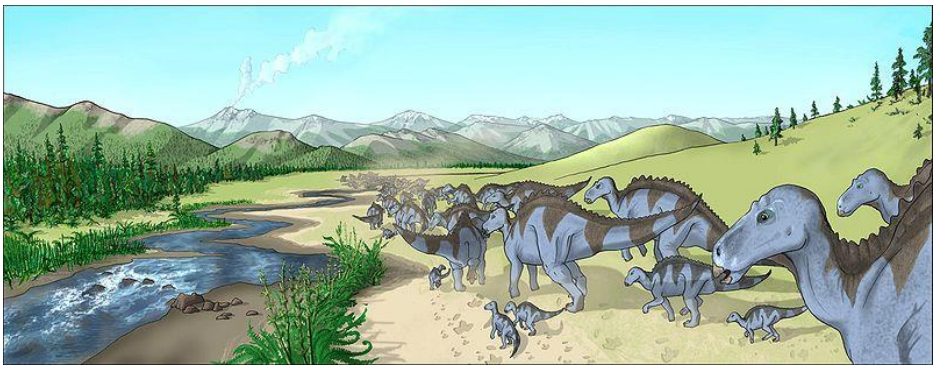
Herds of Dinosaurs 193 Million Years Ago

Fans of the Jurassic Park movies and visitors to Dinosaur Ridge know that some species of dinosaurs lived in herds. A new study in *Scientific Reports* shows that dinosaurs were living in herds much earlier than previously thought. They

discovered an exceptionally preserved group of early dinosaurs showing signs of herd behavior 193 million years ago, 40 million years earlier than previously found.

A rich fossil bed in southern Patagonia has yielded more than 100 dinosaur eggs and partial skeletons of 80 juvenile and adult dinosaurs. Using X-ray tomography imaging, they found that the eggs contained embryos of the plant-eating *Mussaurus patagonicus*. The skeletons of the juvenile and adult dinosaurs are the same species. Eggs and hatchlings were found in one area, juveniles in another area, and adults throughout the fossil bed. This age segregation is a strong sign of a herding social structure, rather than related adults, juveniles, and eggs living together, but separated from other families.

Information from https://news.mit.edu/2021/dinosaurs-may-have-lived-social-herds-early-1021



Dinosaur herd with adults, juveniles, and hatchlings. Credit: User:Debivort, GNU Free Documentation License

What Did In the Wooly Mammoths?

Nearly 4,000 years ago, wooly mammoths vanished from the earth, after surviving for five million years. Ancient humans hunted these animals for food, shelter, and weapons, even featuring them in artwork on cave walls. For many years, paleontologists speculated that humans overhunted mammoths, causing their extinction.

The results of a 10-year study were recently published in *Nature*. Scientists sequenced DNA from plant and animal remains in soil from sites in the Arctic where mammoth remains were found. The conclusion from this study: Humans did not cause woolly mammoths to go extinct – climate change did. Mammoths ate grass, flowers, plants, and small shrubs. The researchers found that when the climate got wetter and the glaciers began to melt, lakes, rivers, and marshes formed. This ecosystem change reduced the biomass of the vegetation and could no longer sustain herds of mammoths. Climate change, specifically precipitation, not humans, led to the demise of the mammoths.

Information from https://www.joh.cam.ac.uk/humans-did-not-cause-woolly-mammoths-go-extinct-climate-change-did

Recent research shows that climate change, not human activity, led to the extinction of wooly mammoths. Credit: Charles R. Knight, public domain

Other Rockhounding Events and Activities in the Area

If you plan to attend any of these that have not been canceled, please check their websites for the latest updates before you go.

- **Tuesday, November 9**, at 4 pm at the **Western Museum of Mining and Industry** in Colorado Springs features a program on **Explosives in Mining**. Mining is a risky undertaking for a variety of reasons. The explosives are one part of mining with an extraordinary amount of risk: life, limb, investment and ultimately the success of the mine. Join subject-matter expert, Richard O'Meara, for a fascinating discussion for their final Lecture Series of the year. https://wmmi.org/education/

- **Wednesday, November 17**, at 7 pm, the **Denver Museum of Nature and Science** presents **Digital Earth: Changing Colorado**. Ka ChunYu and Bob Raynolds will discuss past (Cretaceous), present and future state landscapes. $5 member and $10 non-member fee. https://www.dmns.org/visit/events-and-activities?e=(11.17)%20Digital%20Earth:%20Changing%20Colorado

- **Saturday, December 4**, beginning at 3 pm, the **Western Interior Paleontological Society** will hold their **Annual Auction Fundraiser** at Clements Center, 1580 Yarrow Street, Lakewood (1 block NW of Wadsworth and W. Colfax). Bid on earth science books, fossils, fossil replicas, minerals, art and much more. Enjoy potluck refreshments provided by our members. Proceeds benefit WIPS grants and scholarships for research and education in paleontology. Anyone is welcome to bid, buy, or donate (100% to WIPS). Must be a WIPS member to choose to be a seller/donor at 50% to WIPS, 50% to seller. Masks required. Paleo-themed holiday attire encouraged. Questions to Dan Winester at deadfishrman@gmail.com.

Rocky Mountain Federation News

The Rocky Mountain Federation of Mineralogical Societies (RMFMS) is made up of 78 clubs representing 13 Western states. Our club is a member of RMFMS. Their newsletter, the Rocky Mountain Federation News, is published about 10 times a year and can be downloaded at http://rmfms.org/index.php?page=newsletters. Each newsletter contains several articles about rocks, minerals, and fossils. Their website also has regional information of interest to rockhounds.

A.F.M.S Newsletter

The American Federation of Mineralogical Societies (AFMS) serves seven regional federations, including the Rocky Mountain Federation, to which the Flatirons Mineral Club belongs. The A.F.M.S Newsletter is published monthly and is located at http://www.amfed.org/news/default.htm. The AFMS has a wealth of information about rocks, minerals, and fossils, which can be accessed from their home page at https://www.amfed.org/.

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Denver Show Club Table
open

Practice social distancing
Wear a mask when appropriate
Be Safe
Stay Healthy!

Flatirons Facets
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Boulder, CO 80307-3331

First Class Mail

Upcoming Events

Date	Event	Location
Wednesday, November 10	Jr. Geologists Meeting featuring special rock and mineral properties. See page 10	Mountain View United Methodist Church in Boulder
Thursday, November 11	Towel Show, where you can display your best finds and lapidary work. See page 2	Left Hand Grange in Niwot
Friday-Sunday, December 10-12	Rocks & Rails, our annual club show. Come and see fabulous rocks, minerals, and fossils, and help volunteer at the show. See page 4	Boulder County Fairgrounds in Longmont
Tuesday, December 14	Holiday Party and gift exchange. See page 3	Mountain View United Methodist Church in Boulder

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.