Cedar Valley Gems

Cedar Valley Rocks & Minerals Society

Cedar Rapids, Iowa

cedarvalleyrockclub.org

CEDAR VALLEY GEMS NOVEMBER 2021 VOL. 48, ISSUE 11

Ray Anderson, Editor: rockdoc.anderson@gmail.com

Next CVRMS Meeting

Annual Mtg - Tuesday Nov. 16

Hiawatha Community Center

101 Emmons St., Hiawatha - 7:15 pm

featured speaker:

Bill Desmarais

"To Mt. Belford and Back"

"This presentation is a description of my 5 day backpacking trip with my son Colton (CVRMS member) and others in the Collegiate Peaks Wilderness of Colorado. Starting at the Pine Creek trailhead off of Colorado highway 24 we proceeded up the Pine Creek valley to Silver King Lake (12,600'), then to Mt. Belford (at 14,197' one of Colorado's 58-14,000' mountains), past Iowa Peak, and over Elkhead Pass (at 13,200' one of the highest passes in Colorado). It will include people backpacking, mountain scenery, wildflowers, and wildlife."

—-Pandemic Precautions —-

to attend we recommend that you *BE VACCINATED*

in the building you *MUST BE MASKED*

and *PRACTICE SOCIAL DISTANCING*

If you have a cough or cold STAY HOME

Kasolite

Kasolite is an uncommon, **strongly radioactive**, yellow-ocher mineral composed of hydrous lead uranium silicate that occurs in monoclinic crystals. It is an oxidation product of uraninite and can be found in localities in Gabon, Germany, England, France, Australia, the United States, Canada, Mexico, and other minor localities. It is named for its type locality, the Kasolo Mine in Zaire. Kasolite's orange color is similar to that of the radioactive **Fiesta Ware** dishes, so perhaps this mineral is one of those used to get the dramatic orange color. Fiesta Ware was produced by the Homer Laughlin Company of West Virginia which introduced the line of dinnerware in 1936. Red (orange) was a cornerstone glaze for the original Fiesta pottery line, the original red glaze was in production for just over six years before the popular color was discontinued when the uranium used in the glaze became restricted for governmental use during World War II. Fiesta resumed using the red glaze in the 1950s, using depleted uranium. The use of depleted uranium oxide ceased in 1972. Fiesta Ware manufactured after this date is not radioactive. Fiesta dinnerware made from 1936-1972 may be radioactive.

Red Fiesta Ware bowl

http://www.geologypage.com/2014/05/kasolite.html

CVRMS Meeting Minutes Oct. 19

Hiawatha Community Center

Called by President Marv Houg at 7:20
at Hiawatha Community Center

TREASURER'S REPORT: by Dale Stout. Review of auction figures. Club income after expenses paid $10,447.75. Congratulations all around. Checking account balance $16,476.36. Motion to accept treasurer's report by AJ and second by Ray. Treasurer's report approved.

MINUTES OF LAST MEERING: as published in the newsletter. Motion to approve by Bill, second by Julie. Minutes approved as published.

PROGRAM: Alec Lockett new graduate student from U of IA. Presented a talk about Geologic Mapping in the Southeastern Brooks Range, Alaska. This was followed by a Show and Tell of rocks brought in by members.

Door prize won by Cary, and since we had no prizes there, the club will owe him one.

2021 ROCK SHOW: We still need volunteers for various jobs. Friday's work will start about 9:00am. Lots of prep jobs need to be done. Bring scissors and energy. Sharon has list of volunteers needed. **The club** will have a sample case of meteorites. **Anybody with meteorites** big or small can display them in the case. **Masks** must be worn by all at the show. **Sunday night** after the show, clean-up help will be needed. **We need items** for silent auction, pebble pit and door prizes.

2022 AUCTION: Essentially full but we will try to spread out some smaller pieces to accommodate estates. If you know of any, please have them contact Marv or Sharon ASAP.

OTHER BUSINESS: Tom reminded us that the Davenport Show is coming up October 31. **Marv reminded us** of the upcoming MAPS show in Springfield, Illinois.(For those who like fossils.)

ADJOURNMENT

Motion to adjourn by Cary; second by AJ; 8:55 meeting adjourned.

Respectfully submitted,
Dell James, secretary

CVRMS Board Minutes Oct. 25

7:10 MEETING CALLED TO ORDER by Marv at his house.

PRESENT: Marv Houg, Kim Kleckner, Ray Anderson, Bill Desmarais, Sharon Sonnleitner, Jay Vavra, Allan Johnson

MINUTES OF PREVIOUS MEETING: Motion to accept as published by Bill, 2nd by Kim. Motion passed.

NOVEMBER ROCK SHOW NOV 6-7: Ray confirmed that specimens of all Iowa meteorites will be at show. **Discussion of face shields** versus a shield at the front desk. Face shields were chosen with 20 to be ordered. **Displays are set**; we need more meteorite specimens for club display. **More help from Club Members** will be needed; only a few have signed up. **Discussion of new format** for Silent Auction, new specimen tracking sheet and Kims will assist AJ. **Ray will confirm** that U of IA and Cornell students will participate

2022 ROCK SHOW MAR 26-27: Theme *"Iowa's Industrial Minerals".* Sharon will send contracts to regular vendors.

REVIEW OF CVRMS BY-LAWS: Jay and Sharon presented suggested revisions to the By-laws, which will be reviewed in December and taken to the membership before our March meeting.

501C3 DESIGNATION: Sharon has worked on it. We now need financial information.

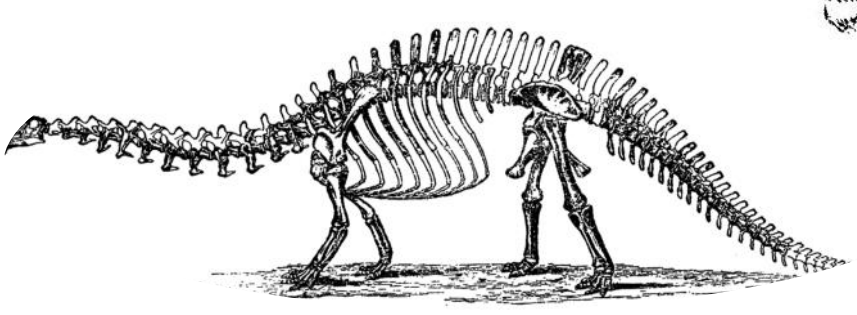
NOMINATING COMMITTEE: Marv appointed Sharon, Bill, and Kim to the committee. They suggested that all current members remain at their posts on the 2022 board and that Bill be re-elected as board member (thru 2024).

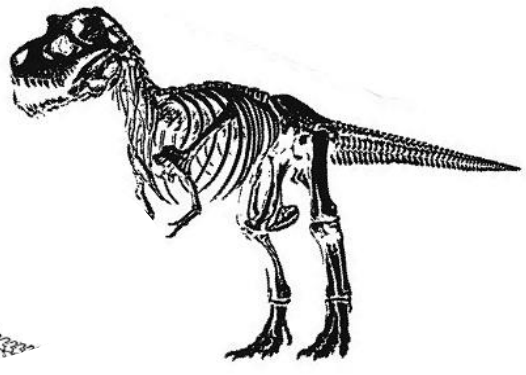
ENFORCE MANDATORY MASK AT MEETING; Sharon and Marv strongly suggested that use of a mask at CVRMS meetings be enforced. Ray will emphasize in Newsletter.

2021 HOLIDAY PARTY: The board agreed to CANCEL this year's December Holiday Party. Instead we will have a normalish club meeting on **DECEMBER 14**.

Motion to adjourn by Jay. 2nd by Bill. Meeting adjourned at 9:04.

Respectfully submitted,
Ray Anderson, Acting Secretary





CVRMS

ELECTION OF CVRMS 2022 OFFICERS AT NOVEMBER *ANNUAL* MEETING

The November 16 CVRMS meeting is our official ***Annual Meeting,*** which means that it is time for members to elect club officers. Toby Jordan resigned as Director ending 2022, so a replacement will be elected. Jay Vavra serves as Director through 2023. Bill Desmarais' term as Director expires this year; however, the Nominating Committee recommended that Bill be re-elected to a second 3-year term as Director, and they suggested that all other incumbent officers be re-elected. .

Slate of Officers offered by the Nominating Committee:

President	Marv Houg
Vice President	Ray Anderson
Treasurer	Dale Stout
Secretary	Dell James
Editor	Ray Anderson
Liaison	Kim Kleckner
Director '22	Matt Burns
Director '24	Bill Desmarais
Webmaster	Sharon Sonnleitner

Anyone else interested in serving in one of these offices may enter their name at the November 16 meeting, and club members present will vote to elect club officers for 2022.

pink rhodochrosite, transparent calcite octahedrons, lustrous arsenopyrite and quartz crystals

Spotlight Gemstones: Citrine & Topaz

November's Birth Stones

citrine

topaz

Citrine is a member of the large quartz family (SiO_4), which, with its multitude of colors and structures, offers gemstone lovers almost everything their hearts desire in terms of adornment and decoration, from absolutely clear rock crystal to black onyx. The name citrine is derived from its color, the yellow of the lemon (although the most sought-after stones are a clear, radiant yellowish to brownish red). Like all crystal quartzes, the citrine has a hardness of 7 on the Mohs scale and is relatively resistant to scratches. With no cleavage, it is also resistant to fracturing. Although citrine's refractive index is relatively low, the yellow stones have a mellow, warm tone that seems to have captured the last glow of autumn. Natural citrines are rare, and most good quality stones are found in Minas Gerais Brazil, Madagascar, and Hasawarka in the Ural mountains of Russia. Most commercial citrines are heat-treated amethyst or smoky quartz.

Topaz ($Al_2SiO_4(F,OH)_2$) is one of the few gem minerals that contains fluorine. The gem can be found in many varieties; colorless, pink, and shades of yellow to sherry-brown are most common, but blue and green-blue stones can resemble aquamarine, and natural red and pink colors are extremely rare. Sherry colored crystals can be heat-treated before cutting, producing pink topaz, a process called "pinking." Its hardness of 8 makes it very resistant to scratching. **Orange topaz**, also known as **precious topaz**, is the traditional November birthstone (and the state gemstone of Utah), while blue topaz is the birthstone for December. Topaz is commonly associated with silicic igneous rocks (granite and rhyolite.) It typically crystallizes in granitic pegmatites or in vapor cavities in rhyolite lava flows including those at Topaz Mountain in western Utah. The American Golden Topaz is the largest piece of cut yellow topaz in the world. It is sized at 22,892 carats (10 lbs) and has 172-facets (flat-faced cuts applied to gems, in order to help them reflect light.) The gem was cut from a piece of yellow topaz that was 26 lbs in size, discovered in the Minas Gerais, Brazil. It was donated to the Smithsonian Institute, and put on display in the National Museum of Natural History in Washington, D.C.

What in the World?

What in the World? Is this spectacularly striped material??

September's Photo

September's ***What in the World?*** photo shows one of many well-preserved Pennsylvanian age Lycopsid tree casts complete with bark preserved in clay in a cliff face in rocks in Eastern KY

ROCK CALENDAR
CVRMS EVENTS OF INTEREST
2021

Nov 19 — CVRMS Monthly Meeting

Hiawatha Community Center 7:15 pm

feature program

"To Mt. Belford and Back"

by Bill Desmarais

** ***PANDEMIC PROTOCOLS WILL BE MANDATED*** **

More details on Page 1

Nov. 6-7 — CVRMS Rks, Fos, & Min Show

theme:

"Meteorites: Earth's Oldest Rocks"

Hawkeye Downs

Cedar Rapids, Iowa

See Page 10 for details

Dec. 14 — CVRMS Monthly Meeting

Hiawatha Community Center 7:15 pm

HOLIDAY PARTY CANCELLED FOR 2021

our meeting is a week early this month
the program is yet to be determined,
but we will be doing something special

CEDAR VALLEY ROCKS & MINERALS SOCIETY

Ask a Geologist

by Ray Anderson aka "Rock Doc", CVRMS Vice President

Ask a Geologist is a monthly column that gives CVRMS members an opportunity to learn more about a geologic topic. If you have a question that you would like addressed, please send it to rockdoc.anderson@gmail.com, and every month I will answer one in this column. Please let me know if you would like me to identify you with the question. I will also try to respond to all email requests with answers to your questions.

Since the theme of this month's Rock Show is ***"Meteorites; Earth's Oldest Rocks"*** this is a good opportunity to review a basic question, **What are asteroids?**

Asteroids are essentially leftovers from the solar system's creation 4.6 billion years ago. The solar system coalesced from a cloud of gas and dust about 4.6 billion years ago. Gravity drew the central part of this cloud into a giant ball that ignited into the sun, while the remaining material gradually formed into little pebbles and rocks. The gravitational attraction between these small objects brought them closer together and allowed some to unify into larger bodies such as planets. Big planets, like Jupiter and Saturn, gobbled up most of the material. Many of the remaining chunks ended up in the largest asteroids, such as Ceres and Vesta. These were among the first asteroids discovered, with Ceres large enough to be considered a dwarf planet. The scraps became the rest of the asteroids in the solar system, orbiting the sun just like the Earth does. Many asteroids can be found in the **main asteroid belt**, located between Mars and Jupiter. These rocks were confined there by Jupiter's gravitational pull as the giant planet settled into its orbit. The volume of asteroids in the belt was originally much larger, but over billions of years, quirks in Jupiter's gravity occasionally flung an asteroid away, throwing many out of the solar system. More space rocks float around with pieces of ice in the **KuiperBelt**, which is beyond the orbit of Neptune. Some of these objects are deflected into the inner solar system where they are heated by the sun, some getting hot enough for material to evaporate off, forming a thin atmosphere around them called a coma. These particular space rocks are typically called comets. A final group of extremely cold space rocks lives quite far from the sun, in a place known as the **Oort cloud**. These entities are spread over a distance that stretches nearly halfway to the nearest star, Proxima Centauri. Gravitational forces between the solar system and the Proxima Centauri system can occasionally fling the rocks either toward the sun or out into interstellar space. Main-belt asteroids experience all kinds of forces, such as heat from the sun, as they rotate. If one face of an asteroid becomes warmer than others, it will release infrared radiation that can push the object and set it drifting, bringing it closer to Jupiter or Mars. Gravitational kicks might then send the asteroids on a path towards Earth, in which case they become what astronomers call **near-Earth objects** which might one day impact Earth. As of July 2021, NASA had counted more than 1.1 million known asteroids. Researchers are obviously eager to know if any of these space rocks pose a danger to our planet and have been scanning the skies for hazardous asteroids for a long time. In 2010, NASA completed a catalog that identified the orbits of 90% of objects 0.6 miles in diameter or larger, which would be catastrophic if they hit our planet, and found that none are currently on collision courses with Earth. However, NASA estimates that 40% to 50% of these medium-size asteroids are undiscovered and the search continues. Smaller space rocks hit Earth almost constantly. But because the majority of our planet is covered in water or thinly populated areas, most of these impacts go unnoticed. Of course there are always surprises, such as the Chelyabinsk meteorite that exploded over Russia in 2013, but these occurrences are rare. Catastrophic impacts, such as the one about 66 million years ago that created a 110-mile-wide crater near the town of Chicxulub, Mexico, and caused a massive extinction including dinosaurs, are extremely rare. Most of these large asteroids have been discovered, so we shouldn't be surprised by such an event in the future. But, just in case, NASA's upcoming *Double Asteroid Redirection Test* (DART), which is expected to launch this month, will test a new type of technology to deflect an asteroid by impacting it.

Images of some of the asteroids in the Main Belt.

Much of the information for this article was taken from https://www.livescience.com/asteroids

City-Sized Asteroids Smacked Ancient Earth 10 Times More Often Than Thought

Asteroids the size of cities, like the one that wiped out the dinosaurs, slammed into the ancient Earth way more often than previously thought, a new study has found. Approximately **every 15 million years**, our evolving planet would get a hit by a piece of rock about the size of a city, or even a bigger province, scientists with the new study said in a statement. The research was presented at the Goldschmidt geochemistry conference this month. This violent period, which took place between **2.5 and 3.5 billion years ago**, saw the planet in upheaval on a regular basis, with the chemistry near its surface undergoing dramatic changes that can be traced in the rocks. In the study, researchers looked at the presence of the so-called spherules, small bubbles of vaporized rock that were thrown up to space by every asteroid impact, but then solidified and fell back to Earth, forming a thin layer that geologists see today. The team developed a new method to model the effect of asteroid impacts in terms of their ability to generate spherules and affect their global distribution. The bigger the asteroid, the thicker the layer of spherules in the rock should be. But when the researchers looked at the actual amount of spherules in the different layers of the bedrock and compared it with current estimates of past asteroid impacts, they found the two values did not match. *"We found that current models of Earth's early bombardment severely underestimate the number of known impacts, as recorded by spherule layers," researchers said. "The true impact flux could have been up to a factor of 10 times higher than previously thought in the period between 3.5 and 2.5 billion years ago."* Those past asteroid strikes may also have affected the oxygen levels and the ability of the young planet to support life. *"We find that oxygen levels would have drastically fluctuated in the period of intense impacts. Given the importance of oxygen to the Earth's development, and to the development of life, its possible connection with collisions is intriguing and deserves further investigation. This is the next stage of our work."* According to previous research, some chemical markers point towards the existence of *"whiffs"* of oxygen in the early atmosphere, before a permanent rise that occurred around 2.5 billion years ago. There is considerable debate surrounding the significance of these whiffs, if they occurred at all. Rocky bodies without an atmosphere, such as the moon, carry a detailed record of past asteroid impacts. On a planet like Earth, with varied weather patterns and geological activity, the traces of many of the past impacts have long been erased. It took until the late 1970s for scientists to discover the Chicxulub impact crater in Mexico. It took a further few years for them to identify this impact as the cause of the extinction of dinosaurs. These large impacts would certainly have caused some disruption. Unfortunately, few rocks from this far back in time survive, so direct evidence for impacts, and their ecological consequences, is patchy. The model put forward by this research helps us to get a better feel for the number and size of collisions on the early Earth." https://www.livescience.com/ancient-earth-hit-by-city-size-asteroids-often.html

How Is Aura Rainbow Quartz Made?

Aura quartz is quartz that has been enhanced with a combination of titanium and niobium.

Metal-coated crystals are natural crystals, such as quartz, whose surface has been coated with metal to give them an iridescent metallic sheen. Crystals treated this way are used as gemstones and for other decorative purposes. Possible coatings include gold (*resulting in a stone called aqua aura),* indium, titanium, niobium and copper. Other names for crystals so treated include; *angel aura, flame aura, opal aura or* ***rainbow quartz.*** Aqua aura is created in a vacuum chamber from quartz crystals and gold vapor by vapor deposition. The quartz is heated to 871 °C (1600 °F) in a vacuum, and then gold vapor is added to the chamber. The gold atoms fuse to the crystal's surface, which gives the crystal an iridescent metallic sheen. When viewed under a gemological microscope in diffused direct transmitted light, aqua aura displays the following properties:

titanium aura quartz cluster

- *A coppery surface iridescence in tangential illumination*
- *Diffused dark outlines of some facet junctions*
- *A patchy blue color distribution on some facets*
- *White facet junctions, irregular white abrasions and surface pits, where the treatment either did not "take" or had been abraded away.*

Rainbow quartz have been treated with a combination of titanium and gold. Titanium molecules are bonded to the quartz by the natural electrostatic charge of the crystal in a process known as magnetron ionization. The brilliant color of flame aura is the result of optical interference effects produced by layers of titanium. Since only electricity is used to deposit the titanium layers and create these colors, very little heat is involved and the integrity of the crystal is maintained. The crystal does not become brittle or prone to breakage as with other treatments. https://www.geologyin.com/2017/06/how-is-aura-rainbow-quartz-made.html

With ecosystems as varied as oceans, plains and frozen tundras, North America is home to some giant and ferocious predators. But these modern creatures, including alligators, great white sharks and polar bears, look minuscule next to the continent's slew of ancient predators. So, what are the largest predators that have ever lived in North America? As for furry animals, North America's largest predatory mammal was probably the massive **short-faced bear (*Arctodus simus*)**. Sometimes affectionately called the "**bulldog bear**," this now-extinct creature had a signature short, broad muzzle. It stood around 5.5 feet tall at the shoulder and over 11 feet on its lanky hind legs. It can be difficult for scientists to gauge the exact body weight of an extinct species, because they have to extrapolate those numbers using existing species as benchmarks. However, paleontologists comfortably estimate that the short-faced bear probably weighed around 1,540 pounds. Modern polar bears (*Ursus maritimus*) aren't too far off, the largest males stand around 5 feet (1.5 m) at the shoulder and weigh around 1,300 pounds. Short-faced bears went extinct about 11,000 years ago, around the end of the last ice age.

To find a more massive land predator, we'll have to travel further back in time. The largest predatory North American dinosaur is also the continent's most famous: the king, ***Tyrannosaurus rex***. During the late Cretaceous period, about 100 million to 66 million years ago, North America was a land of monsters. Carnivorous dinosaurs had *incredible* variety in North America across the Mesozoic [252 million to 66 million years ago]. There was the spiny-backed ***Acrocanthosaurus***, the sharp-clawed ***Deinonychus***, and the slender, feathery ***Microvenator***. But at nearly 12 feet tall at the hips and up to 40 feet long, according to a nearly-complete, school bus-size T. rex specimen known as Stan, the terrible tyrant *rex* towered over most of its carnivorous contemporaries. ***Acrocanthosaurus***, a "*shark-toothed*" cousin of tyrannosaurs and member of a group known as **carcharodontosaurs**, nearly matched *T. rex*'s length but was lighter, weighing 6.8 tons, compared with T. rex's 7.8 tons. *T. rex* used all that bulk to its advantage: With its powerful jaw muscles, it could deliver up to 6 tons of pressure per bite, enough to tear through steel as if it were a piece of paper. The only dinosaurs alive today are birds, making the largest living dinosaur in North America the California condor **(*Gymnogyps californianus*).** At 10 feet from wing tip to wing tip, this bird is significantly smaller than its ancient meat-eating cousin *T. rex* but formidable in its own right, feeding on the carcasses of deer, pigs, cattle, sea lions and even whales, according to the Cornell Lab of Ornithology.

When it comes to ancient sea behemoths, a giant reptile takes the cake. Ichthyosaurs were a group of predatory marine reptiles that lived during the Mesozoic era, the same time period as the dinosaurs. In the late Triassic period, roughly 237 million years ago, an ichthyosaur known as ***Shonisaurus sikanniensis*** began swimming in the waters of what is now British Columbia, Canada. *S. sikanniensis* is regarded as the largest known marine reptile of all time. There is some debate about which ichthyosaur genus *S. sikanniensis* belonged to: *Shastasaurus* or *Shonisaurus*. Members of both genera were large, streamlined and speedy, though species of the *Shonisaurus* genus had barrel-shaped chests and long snouts compared with the slender, shorter-snouted *Shastasaurus*. Regardless of taxonomy, there is no question that *S. sikanniensis* was absolutely colossal; it measured an astonishing 65 feet long from snout to tail, easily about three times longer than the largest known living great white shark. But size doesn't always equal ferocity. A 2011 study suggested that *S. sikanniensis* may have been a suction feeder, slurping up soft-bodied prey such as squids and belemnites (shelled squids). Each of these creatures, however, eventually died out as the result of environmental upheaval. Like many highly specialized predators, once their prey became scarce, they simply couldn't keep up with their energy needs. At a certain point, bigger is not better. https://www.livescience.com/north-america-largest-predators

This Trilobite Was Equipped With a 'Hyper-Eye' Never Seen Before in the Animal Kingdom

The humble trilobite, a helmet-headed creature that lived on ocean floor from the early Cambrian period (521 million years ago) to the end of the Permian (252 million years ago) , was hiding an extraordinary secret, a "*hyper-eye*" never seen before in the animal kingdom. By poring over X-ray images, researchers found that certain species of trilobite, extinct arthropods distantly related to horseshoe crabs, had "*hyper compound eyes*," complete with hundreds of lenses, their own neural network to process and send signals and multiple optic nerves. Today's arthropods, like dragonflies and mantis shrimp, are also known for their powerful compound eyes, which are composed of myriad eye facets called *ommatidia*, each equipped with its own lens, like a disco ball. But, according to the new findings, trilobites from the family **Phacops** had compound eyes that were far larger and more complex than their modern-day arthropod relatives. Each of their eyes held hundreds of lenses. At nearly a millimeter across, these primary lenses were thousands of times larger than a typical arthropod's. Nestled beneath them like bulbs in a car headlight sat six (or more) faceted substructures akin to a typical compound eye. So each of the big Phacopid eyes is a hyper compound eye with up to 200 compound eyes each. Researchers confirmed that a mysterious series of "*fibers*" seen in X-ray images from more than 40 years ago were actually bundled optic nerves connected to the trilobites' eyes. Remarkably preserved specimens discovered in the Hunsrück Slate in a quarry near Munich, Germany , included phacopid trilobites, so well preserved that even their delicate soft tissues were visible. Researchers noted that the trilobites appeared to have fossilized "fibers" connected to their compound eyes, which they described in the June 1973 issue of the journal ***Paläontologische Zeitschrift***. The prevailing wisdom at the time was that soft tissue, like nerves, simply did not fossilize, and that the researchers must have mistaken gill filaments for optic nerve tissue. After nearly half a century, the researchers feel they have finally vindicated their earlier work. Sadly, these trilobites are no longer with us, as they went extinct about 358 million years ago at the end of the Devonian period, along with about 75% percent of all life on Earth. However their extinction was surely not because of their sophisticated, highly adapted eyes. https://www.livescience.com/trilobite-eyes?

A close-up view of a hyper compound eye in a trilobite

Some Rare Diamonds Form Out of the Remains of Once-Living Creatures

Despite humanity's intense fascination with sparkly pieces of carbon, it seems there is still plenty to learn about how diamonds form deep within our planet. The Earth's deepest diamonds are commonly made up of former living organisms that have effectively been recycled more than 250 miles below the surface, new research has discovered. The research, published in *Nature's Scientific Reports*, found that both diamonds found in oceanic rocks and the so-called super-deep continental diamonds shared a common origin of recycled organic carbon deep within the Earth's mantle. Lead author Dr Luc Doucet, said the findings offered a fascinating insight into the world's most expensive gemstones. *"Bringing new meaning to the old trash to treasure adage, this research discovered that the Earth's engine actually turns organic carbon into diamonds many hundreds of kilometers below the surface,"* Dr Doucet said. *"Ballooning rocks from the Earth's deeper mantle, called mantle plumes, then carry the diamonds back up to the Earth's surface via volcanic eruptions for humans to enjoy as sought-after gemstones. While recycling is becoming a modern-day necessity for our sustainable survival, we were particularly surprised to learn, through this research, that Mother Nature has been showing us how to recycle with style for billions of years*." The three main types of natural diamonds include oceanic, super-deep continental, and lithospheric diamonds, formed at different levels of the mantle with a varying mixture of organic and inorganic carbon. The research provided a model that explains the formation and locations of all three major types of diamonds. "*This is the first time that all three major types of diamonds have been linked to mantle plumes, ballooning hot rocks driven by plate tectonics and the supercontinent cycle from deeper Earth*," said co-author Zheng-Xiang Li. *"This research not only helps to understand Earth's carbon cycle, but also has the potential to unlock more secrets of the Earth's dynamic history through tracking the past locations of mantle plumes and super-plumes. This can be achieved by mapping out the distribution of both continental and oceanic diamonds.*" However, Professor Li said it remained a mystery as to why diamonds formed in the so-called "*mantle transition zone",* 250 to 375 miles deep, utilized recycled organic carbon only. *"This might have something to do with the physical-chemical environment there"*, Professor Li said. *"It is not uncommon for a new scientific discovery to raise more questions that require further investigation."*

https://www.geologyin.com/2021/08/some-rare-diamonds-form-out-of-remains.html

Antarctica Was on Fire 75 Million Years Ago, Ancient Embers Reveal

Raging wildfires tore through Antarctica 75 million years ago, back when dinosaurs still roamed the Earth, a new study finds. During the late Cretaceous period (100 million to 66 million years ago), one of the warmest periods on Earth, Antarctica's James Ross Island was home to a temperate forest of conifers, ferns, and flowering plants known as angiosperms, as well as to a slew of dinosaurs. But it wasn't a total paradise; ancient paleo-fires burned parts of those forests to a crisp, leaving behind charcoal remnants that scientists have now scooped up and studied. "*This discovery expands the knowledge about the occurrence of vegetation fires during the Cretaceous, showing that such episodes were more common than previously imagined,*" study lead researcher Flaviana Jorge de Lima, a paleobiologist at Federal University of Pernambuco in Recife, Brazil, said in a statement. The finding marks the first evidence on record of a paleo-fire on James Ross Island, a part of the Antarctic Peninsula that now sits below South America. The discovery adds evidence that spontaneous fires were common in Antarctica during the Campanian age (about 84 million to 72 million years ago); in 2015, in a separate study, researchers documented the first known evidence of dinosaur-age wildfires in West Antarctica, according to a study in the journal *Palaeogeography, Palaeoclimatology, Palaeoecology*. For the new work, an international team of scientists analyzed fossils collected during a 2015-2016 expedition to the northeastern part of James Ross Island. These fossils contained fragments of plants that looked like charcoal residue, which had weathered away over the past tens of millions of years. The charcoal fragments were small – the largest paper-thin pieces were just 0.7 by 1.5 inches (19 by 38 millimeters). But scanning electron microscope images revealed their identity: These fossils are likely burned gymnosperms, likely from a botanical family of coniferous trees called Araucariaceae, the researchers found. Intense forest fires were frequent and widespread during the late Cretaceous, although most of the evidence for these blazes lies in the Northern Hemisphere, with a few documented cases in the Southern Hemisphere in what is now Tasmania, New Zealand, and Argentina, the researchers said. During the late Cretaceous, the supercontinent of Gondwana was breaking up, leaving places like Antarctica more isolated than before. This ice-free region had plenty of ignition sources, including lightning strikes, fireballs from falling meteors, and volcanic activity, as well as flammable vegetation and high oxygen levels, which help fires burn, the researchers noted. "*Antarctica had intense volcanic activity caused by tectonics during the Cretaceous, as suggested by the presence of fossil remains in strata related to ash falls," the researchers wrote in the study." It is plausible that volcanic activity ignited the paleo-wildfire that created the charcoal reported here.*" Now, the researchers are looking for new records of paleo-fires in other locations in Antarctica.

Reconstruction of paleo-wildfires in Antarctica during the Cretaceous.

https://www.sciencealert.com/scientists-discover-that-antarctica-was-on-fire-75-million-years-ago

56th Annual Show

Cedar Valley Rocks & Minerals Society

Presents its

2021 GEM, MINERAL & FOSSIL SHOW

Show moved to Nov due to COVID

Saturday Nov 6 - 8:30 a.m. to 6:00 p.m.
Sunday, Nov 7 - 9:30 a.m. to 4:00 p.m.

Hawkeye Downs Expo Center
4400 6th Street SW
Cedar Rapids, Iowa

METEORITES
Earth's Oldest Rocks
Featuring Iowa Meteorites

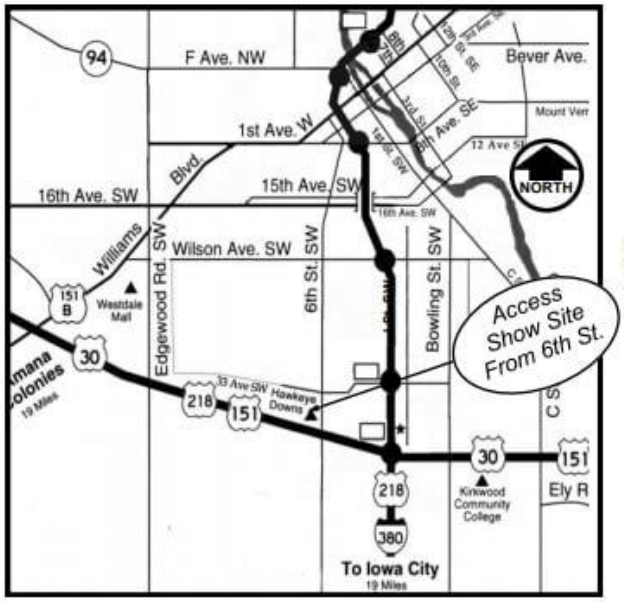
PROGRAMS
Programs on Theme-Related Topics
Call ahead or check our website for Speakers & Times

ROCK IDENTIFICATION
Iowa Geological Survey

DEMONSTRATIONS
Tumbling
Glass Bead Making
Cabbing, Beading
Silversmithing
Flint Knapping
Geode Cracking

PEBBLE PIT FOR KIDS
1¢, 5¢, 10¢, 25¢, & 50¢ Items
$1 Rock & Mineral Kits

HOT FOOD
Hy-Vee Concessions



DISPLAYS

Agates
Geodes
Minerals
Crystals
Fossils
Amethyst
6' Iowa Eurypterid Model
Crinoids, Petrified Wood
Polished Stones, Spheres

SILENT AUCTION
Geodes, Minerals, Crystals, etc.

DONATIONS REQUESTED

Adults	$3.00
Students (12-18)	$1.00
Children (Under 12)	Free
Youth Groups (w/adult)	Free

SLUICE FOR MINERALS (Kids & Adults)

MANY ITEMS FOR SALE, INCLUDING:

Books	Fossils	Jewelry	Minerals	Book Ends
Opal	Agates	Carvings	Seashells	Petrified Wood
Slabs	Geodes	Crystals	Tumblers	Lapidary Equip.
Gems	Beads	Spheres	Meteorites	Jewelry Findings

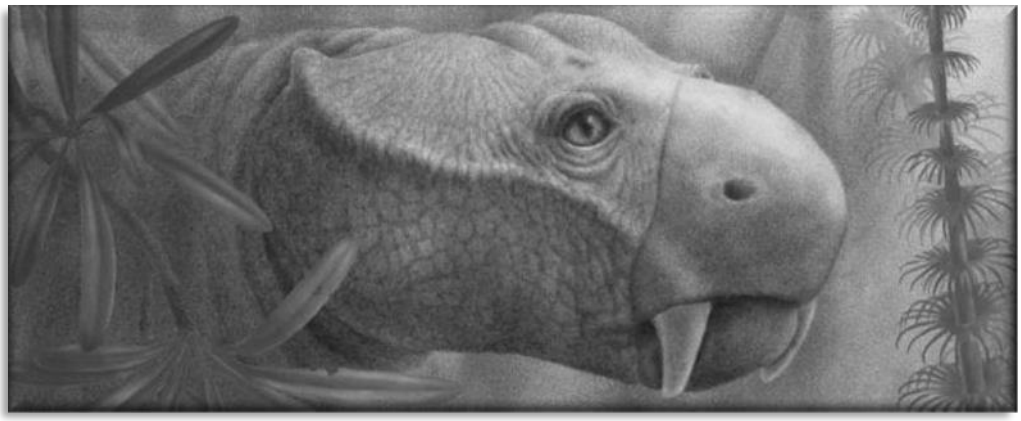
PROFITS GO TO SCHOLARSHIPS
NOT RESPONSIBLE FOR ACCIDENTS

CHILDREN MUST BE ACCOMPANIED BY AN ADULT
ONLY SERVICE DOGS ALLOWED

For Additional Information, Contact:
Marvin Houg (319-364-2868, m_houg@yahoo.com); Sharon Sonnleitner (319-396-4016, sonnb@aol.com); Ray Anderson (rockdoc.anderson@gmail.com)
For program, dealer, and show updates, check: cedarvalleyrockclub.org

Scientists Traced The Weird Origins of Tusks to Find Out Where They Came From

Stick a turtle's beak on a baby hippo. Then twist its front legs so they stick out to either side, but keep its back legs straight. And give it tusks. Presto, you have something that looks a little bit like a prototype mammal-like animal that walked the planet hundreds of millions of years ago. These creatures are called **dicynodonts**, a term that means "*two dog teeth*", in reference to the impressive pair of canines protruding from the animal's mouth. And it's those teeth that could tell us why you'll never find tusks on anything with feathers or scales. *"Tusks are this very famous anatomy, but until I started working on this study, I never really thought about how tusks are restricted to mammals,"* said Megan Whitney, a researcher in evolutionary biology from Harvard University. Strictly speaking, dicynodonts aren't mammals themselves, but belong to an extinct group of relatives called **therapsids.** They fluctuated in range and diversity from the Permian until their eventual extinction in the Triassic about 200 million years ago, ranging in size from something you can hold in your hand to elephantine behemoths. They were also nothing if not successful, putting their mash-up of anatomy to good use across a range of ecological niches. Those protruding teeth have attracted a lot of attention since the first dicynodont fossils were scrutinized more than 150 years ago. The famous paleontologist Richard Owen gave us the first real insight into the teeth in 1845, claiming they were mostly made of dentine, with thin layers of enamel and cementum, and a rather open pulp cavity. Since then, studies on other specimens have pointed out a lack of dentine, throwing in suggestions that much like rabbit's teeth (and, for that matter, tusks of modern animals like elephants and walruses), the canines didn't stop growing. At least in some species. Understanding precisely how teeth grow is important if we're to know how an extinct animal behaved. But it also poses an interesting philosophical question, one that has consequences for understanding our own evolution. *"For this paper, (*published in *Proceedings of the Royal Society B Biological Sciences) we had to define a tusk, because it's a surprisingly ambiguous term,"* says Whitney. Just so we're all on the same page, here's what they came up with. Usually when we talk about tusks, we refer to teeth that poke a considerable distance from the oral cavity. Think walruses and mammoths, not to mention warthogs, and much smaller mammals called hyraxes. To set their stand-out teeth apart from the jagged chompers of a crocodile, true tusks are defined by continuous growth, making them literally long in the tooth. What about rats and rabbits? Their long teeth might continue to grow, but are constantly coated in a hard-wearing surface called enamel. Tusks don't bother. Coating them with enamel would sure help make them tougher, but their oblique angles make it nigh impossible for a body to lay down a consistent coat. Lastly, tusks are firmly held in place by a ligament that helps them sustain the occasional hard knock. All of these features reflect the use and abuse tusks suffer in contrast to most other teeth. They're commonly used to dig through muck, and to combat rivals and predators, so they need to be durable enough to do the job but still regenerate easily when damaged. Looking at a range of dicynodont teeth, the researchers echoed previous findings of considerable variety among the famous old canines. Not only were true tusks more likely to be found in newer dicynodont species, they'd evolved independently from non-tusks across their family tree. Knowing the steps teeth took to evolve in these ancient animals, along with a clear definition of the tusk's characteristic features, we now have a clearer understanding of why they don't appear in lizards, fish, or amphibians. "*For instance, this study shows that reduced rates of tooth replacement and a flexible ligament attaching the tooth to the jaw are needed for true tusks to evolve,*" says Ken Angielczyk, a curator at Chicago's Field Museum. "*It all ladders up to giving us a better understanding of the tusks we see in mammals today.*"



Reconstruction of the dicynodont Dicynodon

https://www.sciencealert.com/tusks-are-exclusively-a-mammal-thing-and-200-million-year-old-fossils-show-why

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Club meetings are held the 3rd Tuesday of each month from September through November and from January through May at 7:15 p.m. During the COVID emergency meetings will be via ZOOM. When the emergency is over, meetings will return to the Hiawatha Community Center in the Hiawatha City Hall, 101 Emmons St., Hiawatha IA. The December meeting is a potluck dinner held on the 1st Tuesday at 6:30. June, July, and August meetings are potlucks held at 6:30 p.m. at area parks on the 3rd Tuesday of each month

CEDAR VALLEY ROCKS & MINERAL SOCIETY

CVRMS was organized for the purpose of studying the sciences of mineralogy, geology, and paleontology and the arts of lapidary and gemology. We are members of the Midwest (MWF) and American (AFMS) Federations. Membership is open to anyone who professes an interest in rocks and minerals.

Annual dues are $15.00 per family per calendar year. Dues can be sent to:

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Cedar Rapids, IA 52403

CVRMS website:
cedarvalleyrockclub.org

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