

Cedar Valley Gems



Cedar Valley Rocks & Minerals Society

Cedar Rapids, Iowa

cedarvalleyrockclub.org

CEDAR VALLEY GEMS

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Next CVRMS Meeting
Tues. March 19
7:15 pm

Hiawatha Community Center
101 Emmons St., Hiawatha - 7:15 pm

featured presentation

Cornell College's Geological Field Course in Utah and Grand Canyon

by **Professor Rhawn Denniston**
Cornell College Department of Geology



Background: Despite an increasing emphasis on laboratory analyses of rocks in recent years, geology remains primarily a field-oriented science. In fall 2022, geology majors from Cornell College spent three weeks at Grand Canyon and southwest Utah learning the basics of field mapping and the geological history of the Colorado Plateau. This travel was supported in part by the generous donations of the CVRMS

What Was the Typical Life Span of a Dinosaur?

Dinosaurs have left a wealth of information behind in their fossils, including how they defended themselves, what they ate, and sometimes even how they died. But when these beasts bit the dust, did they leave any clues behind about how old they were, indicating whether they were youngsters, middle aged or old geezers? In a word, yes, largely thanks to "growth rings" in their fossilized bones. These rings, which are laid down in a similar way to tree rings, were discovered only in the past few decades and have revealed that most non-avian dinosaurs didn't live that long, despite sometimes growing to huge sizes. For instance, the Chicago Field Museum's fearsome Sue, one of the most complete *Tyrannosaurus rex* specimens ever discovered, died at age 28, her growth rings indicate. Herbivorous duck-billed dinosaurs, meanwhile, seem to have lived for only one or two decades. These young ages initially surprised paleontologists; many believed that dinosaurs got to be really big because they lived for a really long time. African bush elephants (Earth's largest living land animal) can live up to 70 years, and bowhead whales can live as long as 200 years. But dinosaurs are another story. A thin slice of animal bone has a series of parallel lines caused by the outward growth of the bone. A new line is produced every year, so counting these lines gives an accurate estimate of the animal's age. These lines are created by annual changes in the way animals grow. While dinosaurs didn't live as long as some of today's large animals, there are some similarities. For instance, bigger animals tend to live longer than smaller ones, and the same generally holds true with dinosaurs. Sauropods, a group of long-necked leaf eaters that includes the largest dinosaurs that ever lived, likely had the longest lives of all of the dinosaurs, with the oldest-known sauropods living to around 60 years old. Some dinosaurs were at least partially warm-blooded, and they would have had incredibly fast metabolisms for reptiles, which could have led to rapid growth and early death. Or maybe reproduction was a factor. Many dinosaurs produced very large clutches of eggs, which meant they produced a lot of offspring in a short period of time. Ultimately, we still don't know why nonavian dinosaurs died so young.

<https://www.livescience.com/animals/dinosaurs/what-was-the-typical-life-span-of-a-dinosaur>

CVRMS Meeting February 20 – Minutes –

MEETING CALLED TO ORDER: by President Marv Houg at 7:20 pm. About 45 members present. One visitor, Sue Wackman.

MINUTES OF PREVIOUS MEETING: Skipped.

TREASURER'S REPORT: Because last month's meeting was canceled due to weather, Dale first presented his January report and then his February report. We currently have \$9,789 in Checking and 2 cds, all totaling \$34,828.

MARV'S COMMENTS: Passed around a sign-up sheet for the Hy Vee-catered Rock Show dinner on Saturday, March 23. The cost will be \$19 per person and must be paid at the dinner. If you sign up and don't show, you will be charged.

SHARON'S COMMENTS: Passed around a sign-up sheet for helping set-up and at the Rock Show and for Displays.

PROGRAM: U of IA geology professor Bill McClelland with 3 students who described research projects funded in part by CVRMS scholarship donations.

OLD BUSINESS: Discussion of **2024 CVRMS Rock show** (March 23-24); reminder of member help needed for set-up on Friday March 22 and following pot-luck (make extra food for vendors), use social media to publicize the show, we still need materials for Silent Auction, Pebble Pit, and Door Prizes. **TAKO at the quarry** on May 18. CVRMS member will assist and provide some displays. **No MASHA training** will be available before the Rock Show this year.

NEW BUSINESS: Dale has the CVRMS name badges that were ordered. Contact him if you want to order one; \$5 each with pin, \$5.50 each with magnet.

CVRMS ROCK AUCTION: just a reminder that it will be on Sept 21-22 at the Amana RV park.

CALL FOR ADJOURNMENT: Motion by Dale, seconded by ????. Meeting adjourned 9:32 pm.

Respectfully Submitted.

Ray Anderson, Acting Secretary

CVRMS Board Meeting Feb. 27 – Minutes –

MEETING CALLED TO ORDER: 7:09 pm by Marv Houg at his house. All board members present

SECRETARY'S MINUTES FROM PREVIOUS MEETING: Motion to accept by Dale, second by Bill. Minutes passed.

TREASURER'S REPORT: current checking account balance \$9798.55 Motion to accept by Jay. Seconded by Matt. Treasurer's report accepted.

ROCK SHOW MARCH 23-24: Sharon reported that dealer contracts are ok. Dale reported that the raffle permit has been received. Sharon reported that 60 18-hole egg carton rock kits were completed for the pebble pit. A general discussion regarding raffle prizes: So far we have an amethyst cathedral donated by John McArdle; an agate table from Kim Long; a dinosaur puzzle, coprolite sample, 3-D-printed dinosaur from Gene Fletcher and books from Julie; mineralized vugs from by Matt Burns; onyx goblets from Dennis Schlicht; box of agates from Marv. A memorial for show flint-knapper Tim Murphy will be at the Show.

ROCK AUCTION SEPTEMBER 21 -22: Consigners and lot numbers were discussed. 1245 lots are predicted. Dale will call the lady with the Food Truck about setting up on Saturday.

TAKO-TAKE A KID OUTDOORS: Scheduled for May 18 at Klein Quarry. More discussion of our involvement will follow.

OLD BUSINESS: Kim and maybe Bill will handle a presentation to Boy Scouts on April 20 Earth Day at Central City. Kim will review the Field Trip Guidelines and Requirements and send board members a copy. Sharon announced that vendor Dave Walz needs help during the show. Sharon will ask if Jeff would be interested. Sharon reported that we have left over materials from our fluorescent display upgrade. We will ask Mike and Diana if they have any interest. Matt moved that we donate \$200 for the science fair: \$80 first prizes for Jrs. and Srs. And \$40 for the science fair. Seconded by Jay. Motion carried.

KIM MADE MOTION TO ADJOURN. Second by Matt. Meeting adjourned at 9:28 pm.

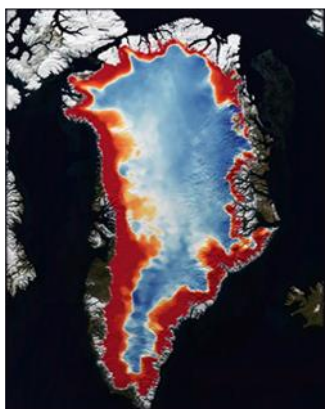
Respectfully submitted

Dell James, Secretary.



Greenland Is Literally Rising From The Ocean as It Loses Its Fringe of Glaciers

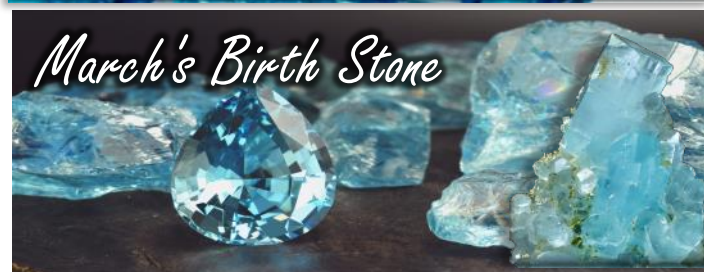
In a mocking fluke of physics, Greenland, one of the main sources of meltwater flooding Earth's shores, is actually rising faster than the rising oceans. The elevating bedrock is gradually birthing new land in Greenland's sea including small islands and skerries, like Uunartoq Qeqertaq. Translating as 'warming island', this new (8 mile long landmass off the east coast of Greenland was officially recognized and added to Greenland's maps in 2005. "The land uplift we observe in Greenland these years cannot be solely explained by the natural post-ice age development," explains Technical University of Denmark geodesist Shfaqat Abbas Khan. "Greenland is rising significantly more." Greenland has been gradually rising since the last ice age 12,000 years ago, its frozen coat of water trickling slowly into the sea. But data recorded from 58 GPS stations across the country reveals this melting has been significantly speeding up. Researchers have found that in roughly the last decade Greenland's bedrock has risen up to 7.9 inches, which is a rate of about 6.6 feet per century. "With our data from GNET, we can precisely isolate the part of land uplift caused by the current global climate changes," says Khan. While glaciers around Greenland's periphery make up just 4 percent of the island's ice cover, they're responsible for almost 15 percent of its ice loss. It turns out this outsized decrease also contributes significantly to the land mass's uplift. Loss of mass



Loss of Greenland ice between 2003-2019 shown in red, mostly around its perimeter.

from these outer glaciers is causing an even greater rise in some areas than the loss of the main Greenland ice sheet, due to a process called elastic rebound. This is where the previously compressed earth, now liberated from surrounding weight, relaxes into its more naturally expanded shape like a squashed pillow released to take up more volume. Kangerlussuaq glacier in southeast Greenland, which has retreated 10 kilometers since 1900, aided in the largest uplift the team measured, equalling 0.3 inches per year. While past studies had accounted for this process due to the loss of the main ice sheet, the peripheral ice hadn't been fully factored in until now. Having a better understanding of the uplift will allow researchers to make more accurate sea rise estimates. "These are quite significant land uplifts that we can now demonstrate. They indicate that local changes in Greenland are happening very rapidly, impacting life in Greenland," explains Berg. This odd phenomenon adds to a growing list of climate change's astonishing, large-scale physical reshaping of our world. Previous examples include the shrinking of an entire layer of our atmosphere to the shifting of Earth's axis. We're quite literally reshaping the Earth. [https://www.sciencealert.com/greenland-is-literally-rising-from-the-ocean-as-it-loses-its-fringe-of-glaciers?](https://www.sciencealert.com/greenland-is-literally-rising-from-the-ocean-as-it-loses-its-fringe-of-glaciers)

Spotlight Gemstone: Aquamarine



March's Birth Stone

Aquamarine, the blue variety of the mineral Beryl and birthstone of March, is a rich, medium to dark blue colored stone produced in Brazil, Madagascar, Russia, and the USA, and it has long been a symbol of youth, health and hope. Recently, aquamarine from China and Columbia has come on the market, but they are generally a little bit more yellow. Aquamarine is a highly sought-after semi precious gem, which for centuries has been used in the creation and encrustation of jewelry and everyday items. Sailors of legend believed that mermaids' tails were made of Aquamarine. The lucky stone was thought to protect the sailors from drowning and ensure their safe return. The gem was believed to aid in digestion, and Roman physicians would employ Aquamarine to treat overeating and reduction of body fluid retention. Aquamarine was thought to possess the ability to reawaken the love in married couples. Roman legend also tells that it absorbs the atmosphere of young love; "When blessed and worn, it joins in love, and does great things." It is also considered an appropriate gift for a groom to give to his bride following the consummation of their marriage. To the Sumerians, Egyptians, and Hebrews, Aquamarine was the symbol of happiness and everlasting youth. Legend says that you should place your Aquamarine under a full moon, to help restore its look and renew its energy. Aquamarine colors range from very light blue all the way through to a deeply saturated Ocean blue. The best color is often called Santa Maria Blue and recently there has been a new find in Madagascar called Double Blue. The name Aquamarine comes from the Latin words "aqua" (Water) and "marina" (Sea). The largest stone ever found is from Minas Gerais, Brazil; It weighed 242 pounds and measured 19 inches x 17 inches. The largest cut Aquamarine is the **Dom Pedro** which now sits in the Smithsonian Institute. It finished weighing in at 10,363 cts and measured 14 x 4 inches.

<https://www.gemrockauctions.com/learn/a-z-of-gemstones/aquamarine-information-the-blue-beryl>

What in the World?



What in the World is this strange geologic structure??

February's Photo



Last month's What in the World image was a photo of a faceted specimen of **Hiddenite**, a pale-to-emerald green variety of *spodumene* (a lithium aluminum silicate and has a hardness of 6.5 to 7). The intensity of the green color is influenced by factors such as the presence of the trace element chromium. Due to its green color, hiddenite was sometimes referred to as "lithia emerald."

ROCK CALENDAR CVRMS EVENTS OF INTEREST

2024

Mar. 19 — CVRMS Monthly Meeting
Hiawatha Community Center 7:15 pm
Professor Rhawn Dennison and Cornell College
Geology students

Mar. 23-24 — CVRMS Rock Show
Hawkeye Downs, Cedar Rapids
Show Theme: **FOSSIL CORALS**

Apr. 16 — CVRMS Monthly Meeting
Hiawatha Community Center 7:15 pm
Program to be announced

May. 18 — TAKO Rockin' Rocks & Fossils
River Products Klein Quarry 9:00-Noon

May. 21 — CVRMS Monthly Meeting
Hiawatha Community Center 7:15 pm
Program to be announced

June. 18 — CVRMS Monthly Meeting
Picnic at Thomas Park, Marion
Rock Show and Tell and Polishing

July. 16 — CVRMS Monthly Meeting
Picnic at Wanatee Park, Marion
Rock Show and Tell and Geode Cracking

Aug. 20 — CVRMS Monthly Meeting
Picnic at Morgan Creek Park, Marion
Rock Show and Tell and Rock Bingo

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.

The other day I ran across an article on [quora.com](https://www.quora.com) that revisited the cause of the **Snowball Earth** events that just preceded **Cambrian Explosion** of life on our planet. During a series of 3 Snowball Earth events, nearly the entire Earth (oceans and all) was blanketed in ice and snow between about 717 and 540 million years ago. The first, and longest, of these events lasted over 50 million years dramatically changing sea-water chemistry leading to the deposition of iron and manganese deposits and providing the appropriate environment for the sudden radiation of multicellular biological forms on Earth.

We now have new insights into why our planet became almost entirely frozen 717 to 660 million years ago into a snowball, with perhaps only a few open patches or a band of the ice-free ocean at the equator. This extraordinarily long and brutal ice age that



*lasted 57 million years was a very long time ago, before the existence of dinosaurs and before Pangea formed. If it happened now and if humans causing global warming weren't around, it would result in an extinction event so severe that only some simple marine multicellular organisms would survive, especially if there were no band of ice-free water remaining at all. Fortunately, multicellular life was only beginning to take off at the time, and existing organisms were still very simple. The harsh waves of ice ages that humans experienced until about 10,000 years ago, when mammoths roamed the Earth, and Neanderthals only recently died out, only lasted tens of thousands of years. It's hard even to imagine the scale of what it was like when **the entire***

Earth froze over for 57 million years. With the use of computer modeling of plate tectonics, it was revealed that the carbon dioxide levels fell to an all-time low. Without this greenhouse gas, the temperatures on the surface of Earth dropped dramatically. The main factor contributing to this was very low emissions of carbon dioxide from volcanic activity during the breakup of the previous supercontinent, **Rodinia**. It coincided with the weathering of immense areas covered in volcanic rocks in what is now Canada. This process is known to be very good at absorbing atmospheric carbon dioxide. This research is important for understanding the future of climate evolution on our planet during the aging of the Sun, which will provide Earth with more and more energy over time. In about 250 million years, continents should again amass into a new supercontinent, **Pangea Ultima**. It will have immense, scorching, and arid mega Saharas where rain-bearing clouds will be blocked by supercontinental mountain ranges taller than the Himalayas. At the same time, if humans are not around anymore, carbon dioxide will reach very low levels, aided by the weathering of rocks and low volcanic emissions. Considering this, it's now difficult to know whether these two processes will cancel each other out, at least for a while, and if the weather becomes extremely hot or ultra-cold again. More research is needed to figure that out.



This is what Earth's continents might look like in 250 million years when Pangea Ultima forms.

Bronze Age "Treasure" Was Crafted with Extraterrestrial Metal

A dazzling Bronze Age hoard discovered in Spain more than 60 years ago contains some out-of-this-world metal, as a new analysis reveals that parts of the treasures were made from meteoric iron. The hoard, known as the **Treasure of Villena**



and discovered by archaeologists in 1963, encompasses a total of 59 bottles, bowls and pieces of jewelry exquisitely crafted from gold, silver, amber and iron. Upon the hoard's discovery, in a gravel pit in the province of Alicante, however, researchers noticed a few curious details about some of the iron pieces. At the time, they described the items as being crafted of "a dark leaden metal. It is shiny in some areas, and covered with a ferrous-looking oxide that is mostly cracked." Now, new research has revealed that the iron used in two of the artifacts originated from a meteorite that fell to Earth around 1 million years ago, according to a translated study published Dec. 30 in the journal *Trabajos de Prehistoria*. For the new study, researchers tested two of the iron pieces: a C-shaped bracelet and a hollow sphere topped with a gold sheet that may have once decorated a sword's pommel. Both items were crafted between 1400 and 1200 B.C. Using mass spectrometry, a technique that measures the mass-to-charge ratio of molecules, they measured traces of iron-nickel alloy that were comparable to that found in meteoric iron, according to the study. Given that the compositions of the artifacts are very similar, "both objects could [have] come from the same meteorite," researchers said. "The iron technology is completely different to the copper-based metallurgy and to the noble metals (gold and silver)." The only known artifacts that include meteoric iron from the first millennium B.C. include an arrowhead from 900 B.C. found in Möri-gen, Switzerland, and a few objects from Poland from around 800 B.C. As for where the hoard's artifacts came from, that's still up in the air. "One option is [they] came from the eastern Mediterranean where other contemporary objects are known (for example, the dagger and other items from [King] Tutankhamun's tomb)," researchers said. "We do not have arguments to support a more local production, because other meteoritic iron in Europe has later chronologies (from Poland or Switzerland)." The items are part of the collection at the Archaeological Museum in Villena, Spain. <https://www.livescience.com/archaeology/bronze-age-treasure-was-crafted-with-extraterrestrial-metal>

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Did a Dust Plume Kill the Dinosaurs?

It's well known that an asteroid slamming into Mexico's Yucatan Peninsula unleashed a catastrophic nuclear winter that



ultimately killed off nearly three-quarters of life on Earth at the end of the Cretaceous period, about 66 million years ago. For years scientists have debated

whether sulfur released on impact or soot from rampant wildfires acted as the ultimate extinction factor. Now, in a study published earlier this year in the journal *Nature Geoscience*, a group of researchers argue that ultimately pulverized rock in the form of dust thrown up by the asteroid's impact may have driven harsh climatic conditions. By blocking out sunlight, these tiny dust particles set the scene for swathes of life to be snuffed out post-impact, including the dinosaurs. Researchers sought to understand the different role of sulfur, soot, and fine silicate dust on the earth's climate and biodiversity following the impact. Investigating a sediment layer in North Dakota, a team led by Cem Berk Senel, with the Royal Observatory of Belgium in Brussels, found large amounts of small, fine particles of silicate dust ranging from around 0.8 to 8.0 micrometers. These particles are remnants of the asteroid's impact, which resulted in an enormous crater, now known as the Chicxulub crater. Senel and his team plugged their data into a paleoclimate model which indicated that a massive plume of these dust particles may have stayed in the atmosphere for as long as 15 years following the asteroid's impact, ultimately plunging global temperatures by as much as 15° C during this time. It's estimated around 2,000 gigatons of pulverized rock may have been released by the impact, and that figure is likely a "conservative" number. The most significant result is that these sunlight-blocking particles led to a "global shutdown in photosynthesis" that lasted nearly two years after the asteroid slammed into Earth. They used the model to compare the relative effects of sulfur, soot, and dust, with the latter clearly causing the most drastic changes. "In the case of sulphur and soot, we saw only regional or less significant responses in the photosynthetic shutdown, which lasted less than six months," Senel says. "But in the silicate dust case, the global shutdown lasted almost 620 days, which could have caused severe challenges for life on Earth after the impact." The team's findings suggest this particular "kill mechanism" may be the main driver behind one of Earth's major extinctions, which led to the mass die-off of the non-avian dinosaurs. <https://www.discovermagazine.com/planet-earth/did-a-dust-plume-kill-the-dinosaurs>

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Underwater Santorini Volcano Eruption 520,000 Years Ago was 15 Times Bigger than Record-Breaking Tonga Eruption

Deep beneath the Mediterranean seabed circling the Greek island of Santorini, scientists have discovered the remnants of one of the most explosive volcanic eruptions Europe has ever seen. A giant layer of pumice and ash, which is up to 500 feet thick, re-



An illustration of the islands of the Greek archipelago of Santorini with the submarine volcano erupting

vealed that around half a million years ago, the Santorini volcano erupted so explosively it was 15 times more violent than the Hunga Tonga-Hunga Ha'apai eruption of 2022. The Tonga eruption shattered several records, triggering the fastest atmospheric waves ever seen and the first known mega-tsunami since antiquity. "We know that this volcano's had many big, explosive eruptions — sort of Krakatoa style," study lead author Tim Druitt, a professor of volcanology at the University of Clermont Auvergne in France, told Live Science. But the newly discovered deposits point to a cataclysmic blast "that we didn't even know had existed." Extensive land-based research has previously painted a

relatively detailed picture of past volcanism across the Hellenic Island Arc, a string of volcanic islands stretching from Greece to Turkey along a curved line where the African tectonic plate plunges beneath Europe. For instance, geologists knew that Santorini emerged from the sea about 400,000 years ago, as successive eruptions piled volcanic debris onto the seafloor. The present-day Santorini archipelago formed during the Late Bronze Age (1600 to 1200 B.C.), when the explosive Minoan eruption blasted the top off what was then one island. A magma chamber beneath the Kameni islands, in the center of the Santorini caldera, still feeds the volcano today. But there's only so much scientists can learn on land, Druitt said, because erosion from rain and wind wipes away some geological evidence. "That's why we moved to the marine realm, because in the sea it's calmer," he said. To find out more about the region's volcanic activity, Druitt and his colleagues drilled into marine sediments around Santorini in late 2022 and early 2023. With help from the International Ocean Discovery Program, the researchers extracted sediment cores from up to 3,000 feet below the seafloor at 12 drilling sites. The team could then read the different layers of sediment "like a book," Druitt said. "What you see is volcanic layers from all the eruptions that we knew on land," he said. "But then we go down to deeper levels before the volcano became emergent, when it was still submarine." It's in these deeper levels that researchers discovered the remnants of a 520,000-year-old eruption that was "bigger than anything else Santorini's produced and probably one of the two biggest eruptions that the whole Hellenic volcanic arc has ever had," Druitt said.



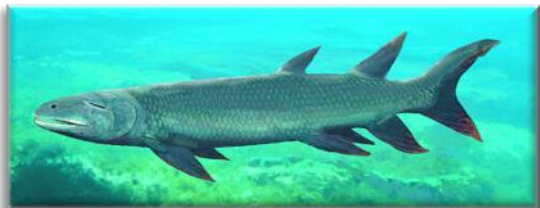
Scientists examine core sections from the expedition. Each recovered core is 31 feet long and is cut into sections 4.9 feet long for handling. The sections are then sliced in half along their length for detailed description and collection of samples for further laborato-

<https://www.livescience.com/planet-earth/volcanos/underwater-santorini-volcano-eruption-520000-years-ago-was-15-times-bigger-than-record-breaking-tonga-eruption>

Bizarre Prehistoric Predator Fish Breathed Air, Had Fangs And Four 'Limbs'

More than 380 million years ago, a sleek, air-breathing predatory fish patrolled the rivers of central Australia. Today, the sediments of those rivers are outcrops of red sandstone in the remote outback.

A new paper, published in the *Journal of Vertebrate Paleontology*, describes the fossils of this fish, which have been named *Harajicadectes zhumini*. Known from at least 17 fossil specimens, *Harajicadectes* is the first reasonably complete bony fish found from Devonian rocks in central Australia. It has also proven to be a most unusual animal. *Harajicadectes* was a fish in the Tetrapodomorpha group. This group had strongly built paired fins and usually only a single pair of external nostrils. Tetrapodomorph fish include the forerunners of modern tetrapods (animals with backbones and limbs such as amphibians, reptiles, birds and mammals). The initial discoveries were in 1973 in the Middle-Late Devonian Harajica Sandstone 100 miles west of Alice Springs. Within red sandstone blocks on a remote hilltop were hundreds of fossil fishes. The vast majority of them were small *Bothriolepis*, a type of widespread prehistoric fish known as a placoderm, covered in box-like armour. Scattered among them were fragments of other fishes. These included jaw fragments of a previously unknown tetrapodomorph. Many more partial specimens of this Harajica tetrapodomorph were collected in 1991. There were early attempts at figuring out the species, but this proved troublesome. A new expedition to the site in 2016 yielded the first almost complete fossil of this animal. This beautiful specimen demonstrated that all the isolated bits and pieces collected over the years belonged to a single **new type of fish, *Harajicadectes***. Up to 15 inches long, *Harajicadectes* is the biggest fish found in the Harajica rocks. Likely the top predator of those ancient rivers, its big mouth was lined with closely-packed sharp teeth alongside larger, widely spaced triangular fangs. It seems to have combined anatomical traits from different tetrapodomorph lineages via convergent evolution (when different creatures evolve similar features independently). Exactly where it sits among its closest relatives is difficult to resolve.



The most striking and perhaps most important features are the two huge openings on the top of the skull called **spiracles**. These typically only appear as minute slits in most early bony fishes. Similar giant spiracles also appear in *Gogonasus*, a marine tetrapodomorph from the famous Late Devonian Gogo Formation of Western Australia. They are also seen in the unrelated *Pickeringius*, an early ray-finned fish that was also at Gogo. These animals were extremely close to the ancestry of limbed vertebrates. The only living fishes with similar structures are bichirs, African ray-finned fishes that live in shallow floodplains and estuaries. It was recently confirmed they draw surface air through their spiracles to aid survival in oxygen-poor waters. That these structures appeared roughly simultaneously in four Devonian lineages provides a fossil "signal" for scientists attempting to reconstruct atmospheric conditions in the distant past. It could help us uncover the evolution of air breathing in backboned animals.

<https://www.sciencealert.com/bizarre-prehistoric-predator-fish-breathed-air-had-fangs-and-four-limbs>

What is Spectrolite?

Labradorite is a feldspar mineral of the plagioclase series that is most often found in mafic igneous rocks such as basalt, gabbro, and norite. It is also found in anorthosite, an igneous rock in which labradorite can be the most abundant mineral. Some specimens of labradorite exhibit a schiller effect, which is a strong play of iridescent blue, green, red, orange, and yellow colors. Labradorite is so well known for these spectacular displays of color that the phenomenon is known as "*labradorescence*." Specimens with the highest quality labradorescence are often selected for use as gemstones. Translucent **labradorite** with the best exhibit of spectral color is known in the gemstone trade as "**spectrolite**." Labradorescence is not a display of colors reflected from the surface of a specimen. Instead, light enters the stone, strikes a twinning surface within the stone, and reflects from it. The color seen by



the observer is the color of light reflected from that twinning surface. Light reflecting from different twinning surfaces in various parts of the stone can give the stone a multi-colored appearance. Labradorite is the only mineral in the plagioclase series that exhibits strong labradorescence;

however, many specimens of labradorite do not exhibit the phenomenon. Without seeing labradorescence, distinguishing labradorite from other members of the plagioclase series can be difficult. The methods used for distinguishing them are x-ray diffraction, chemical analysis, optical tests, and specific gravity determinations on pure specimens. Some specimens of **sunstone** are labradorite. Sunstone is a plagioclase gemstone in which tiny platelets of copper or another mineral are arranged in a common orientation. These platelets produce a reflective flash when incident light enters the stone at a proper angle relative to the angle of observation. Some cautions are required when using labradorite as a gemstone. It breaks in two directions with perfect cleavage. This makes it subject to breaking with impact and not a good candidate for jewelry or other objects that could be subject to impact. It also has a hardness of 6 on the Mohs scale. It will therefore scratch much more easily than diamonds, rubies, sapphires, and emeralds, and slightly more easily than jasper and agate. Labradorite is found in igneous, metamorphic, and sedimentary rocks. It most often occurs as a primary mineral in mafic igneous rocks such as **basalt**, **gabbro**, and **norite**. It is also found in anorthosite, an igneous rock in which labradorite can be the most abundant mineral. Labradorite occurs in **gneiss** that has been produced through the metamorphism of labradorite-bearing igneous rocks. It is also found in sediments and sedimentary rocks that are derived from the weathering of other rocks that contain labradorite.

<https://geology.com/gemstones/labradorite/>

How Did Some Animals Survive the Asteroid that Killed the Dinosaurs?

When a **6-mile-wide asteroid struck Earth** at the end of the **Cretaceous period** some **66 million years ago**, it wiped out the majority of living organisms. Many victims were instantly fried by fires or drowned in tsunamis. The rest, meanwhile, succumbed to hostile conditions and the gradual collapse of entire ecosystems. In the end, about three-quarters of all species were swept into oblivion. Yet many also survived and, eventually, repopulated the planet. Every living thing today is descended from the resourceful (or lucky) few who found ways to eke out an existence in that apocalyptic landscape. But how did those organisms persist long enough to see the world through to better days? Which Animals Were Able to Survive the Asteroid Impact? The challenge to life was immediate, within minutes of the impact, a global pulse of thermal radiation raised Earth's surface to lethal temperatures. Marine species were safely insulated, but the survival of land-dwellers demands explanation. In 2004, University of Colorado Boulder researcher, Douglas Robertson, and his colleagues introduced the **sheltering hypothesis**: The animals with the best shot at lasting through those initial hours were the ones who could escape to cooler environments. From crocodiles and lizards to birds and mammals, as Robertson put it in a later paper, "*all the surviving species were plausibly able to take shelter from heat and fire underground or in water.*" In addition to the radiation, fossil evidence suggests the asteroid also flung tons of molten rock into the atmosphere. There, it hardened into deadly glass shards which then fell back to Earth, shredding any animals stranded in the open. This first hurdle rewarded specific characteristics, namely small bodies and a burrowing or semi-aquatic lifestyle. Dinosaurs,



for the most part, didn't fit the bill, and many experts believe the vast majority died before the end of that cataclysmic day. As for the survivors, their trials were far from over, and shelter was no guarantee of long-term security. As soon as they emerged, they had to confront a land ravaged by wildfires, and soon to be shrouded by "*impact winter*," as a result of dust, soot and other atmospheric particles blocking the sun. The world's forests had been reduced to ash, and they wouldn't be growing back soon. With photosynthesis on hiatus, animals that depended on living plant matter were in for a bad time. Without plants, the herbivores starved; without herbivores, the carnivores starved. Specialized diets were a great idea when the getting was good, but became a liability when primary producers (plants and other microorganisms, like algae and certain kinds of bacteria, that get their energy from sunlight) stopped producing. That left the unfussy insectivores, scavengers and seed-eaters to pick up whatever scraps they

could find and carry on as vegetation slowly returned. University of Wisconsin paleontologist Peter Sheehan writes in *Geology* that because their food chains were based on detritus rather than living biomass, "*there was a food supply adequate for the interval when photosynthesis was halted.*" The big post-extinction story is the sudden rise of mammals. When the asteroid struck, it deposited a thin layer of iridium around the globe: Below that layer, fossils show that dinosaurs were Earth's undisputed rulers; above it they disappear, leaving a few unimposing, shrew-like creatures to take charge. The traditional, simplified explanation is that dinosaurs held their would-be competitors at bay by filling all the major ecological niches. While the top dogs were still kicking, mammals were forced to remain diminutive and unspecialized. (Today, these critters are described by some scientists and journalists as rat-like creatures "scurrying in the shadows.") In reality, several mammalian lineages flourished throughout the dinosaur age, growing to medium size and acquiring all sorts of novel diets and behaviors. An extinct group of rodent-like animals called **multituberculates** was particularly prosperous, as were the forebears of modern marsupials. A group of organisms called **eutherians** (*our direct ancestors*) were indeed archetypal scurriers, subjugated by more dominant powers. But that turned out alright for them in the end, not only did they eventually get the chance to proliferate into the 6,000 diverse placental mammals we see today, but it's likely they survived *because* of their abilities to live in the shadow of the dinosaurs. As generalized creatures low on the totem pole, eutherians were primed for disaster. They hid until the coast was clear, then got by eating whatever they could. Even their slightness played to their advantage: Besides not needing many calories, small-bodied species typically have shorter gestation periods and reach sexual maturation faster, allowing them to quickly replenish their numbers. In the aftermath, writes University of Edinburgh paleontologist Steve Brusatte, "*these plucky survivors forged a new world.*" In the end, however, it's hard to know why certain animals survived and others perished. Extinctions are often described, aptly, as the greatest mysteries of all time, it's nearly impossible to determine what killed who, and why (not to mention why it didn't kill everything else). Even the best theories come with conundrums. Why did crocodiles fare better than mosasaurus, both being aquatic carnivores? Why didn't a single one of the small, omnivorous non-avian dinosaurs make it out alive? In many cases, survival may have been no more than a matter of chance. It's possible some branches of the animal kingdom endured to the present simply because a pocket of their late-Cretaceous representatives, for whatever reason, lucked out with uniquely tolerable circumstances while the rest of the planet withered. For all we know, that's the only reason we're here today. <https://www.discovermagazine.com/the-sciences/how-did-some-animals-survive-the-asteroid-that-killed-the-dinosaurs>

2024 CVRMS Rock and Minerals Show — Details for Club Members

Schedule for Rock Show

**** - workers needed for these functions**

Friday March 22

****Set up—9:00 am -???**

Lunch provided for workers—12:00 noon

Pot Luck Dinner for Dealers & CVRMS members—6:30 pm

Saturday March 23

**** Show hours—8:30 am - 6:00 pm**

Catered Dinner for Dealers & CVRMS members (\$19)—6:15 pm

—Reservations Required—

Sunday March 24

**** Show Hours—9:30 am - 4:00 pm**

**** Show tear-down—4:00 pm -???**

We need workers for all of the functions that are highlighted by asterisks **. There is lots of work required to set up the the tables and related equipment prior to the show, and to tear down and clean up after the show. We also need people to assist during the show hours, we have a lot of jobs and will show you what to do. To help at the show or register for the catered dinner please fill out the forms on our web page at

https://cedarvalleyrockclub.org/show_committeesDisplays.html,

Cedar Valley Rocks & Minerals Society
Presents its

2024 GEM, MINERAL & FOSSIL SHOW

59th Annual Show

Iowa's Largest Show
Among Midwest's Largest



Saturday, Mar 23 - 8:30 a.m. to 6:00 p.m.
Sunday, Mar 24 - 9:30 a.m. to 4:00 p.m.

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



CORAL: ONE OF IOWA'S BEDROCK FOSSILS

PROGRAMS

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

DEMONSTRATIONS

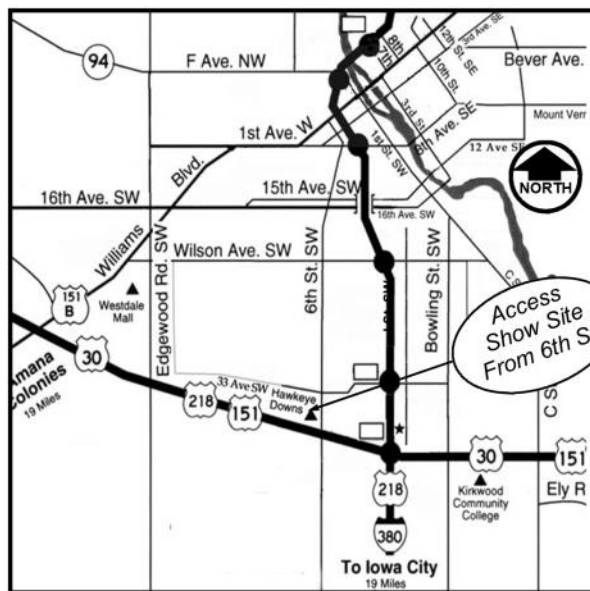
Flat Lap Polishing
Flint Knapping
Gold Panning
Wire Wrapping

ACTIVITIES

Pebble Pit for Kids:
1¢, 5¢, 10¢, 25¢, & 50¢ Items
\$1 Rock & Mineral Kits
Dinosaur Bones Interaction
Geode Cracking
Gold Panning
Making Casts
Sluicing for Minerals

HOT FOOD

PROFITS GO TO
SCHOLARSHIPS
NOT RESPONSIBLE
FOR ACCIDENTS



DISPLAYS

Agates, Geodes
Minerals, Crystals
Amethyst, Fossils

SILENT AUCTION

Geodes, Minerals,
Crystals, Agates
Fossils, Shells

EDUCATIONAL POSTERS

Posters on Various Aspects
of the Theme

ROCK IDENTIFICATION

Iowa Geological Survey

DONATIONS REQUESTED

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

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

CHILDREN MUST BE
ACCOMPANIED BY AN ADULT
ONLY SERVICE DOGS
ALLOWED

For Additional Information, Contact:

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Sharon Sonnleitner (319-310-0085, sonnbn@aol.com); Ray Anderson (rockdoc.anderson@gmail.com)

For program, dealer, and show updates, check: <https://www.cedarvalleyrockclub.org>

Ray Anderson, Editor
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 Iowa City, Iowa 52240-9620



Next Meeting:
TUESDAY MARCH 19
Hiawatha Community Center
Cornell College's Geological Field Course
in Utah and the Grand Canyon.
 by **Professor Rhawn Denneston**
 Cornell College Department of Geology

CEDAR VALLEY GEMS

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2024 & 2025 Officers, Directors, and Committee Chairs

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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. Meetings are held at 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:

Dale Stout
2237 Meadowbrook Dr. SE
Cedar Rapids, IA 52403

CVRMS website:
cedarvalleyrockclub.org