

Cedar Valley Gems

Cedar Valley Rocks & Minerals Society Cedar Rapids, Iowa

cedarvalleyrockclub.org

CEDAR VALLEY GEMS

MAY 2025

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

Next CVRMS Meeting Tues. May 20 7:15 pm

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

featured presentation

"The Geologic History of Linn County" by Ray Anderson CVRMS



Silurian dolomite exposed along the Cedar River at Palisades-Kepler State Park

Changes Proposed for CVRMS Bylaws

In response to changes that Cornell College has initiated for accepting student scholarship funds dedicated to individual departments, the CVRMS Board has decided to modify our bylaws. This modification will insure that the scholarships that we provide Cornell Geology Department, using profits from our annual Gem, Mineral, and Fossil Show, will go directly to assisting their students. The proposed changes to the bylaws must be approved by a majority vote of our membership at a monthly meeting, so the **vote to approve these changes will take place at our May 20 meeting.**

Proposed change to bylaws Article IX, No. 12

Change from:

At the Executive Committee meeting following the Annual Show, the Executive Committee shall decide if money shall be awarded to the University of Iowa Geology Department and Cornell College (in Mount Vernon) for scholarships for geology students to use for the Summer Field Trip Course necessary for their degree. Additionally...

to

At the Executive Committee meeting following the Annual Show, the Executive Committee shall decide if money shall be awarded to the University of Iowa Geology Department and Cornell College students (Mount Vernon) for scholarships for geology students to use for the Summer Field Trip Course necessary for their degree or for faculty-guided research in years when the Field Course is not offered. Cornell's student recipients shall be selected by Cornell Geology Department Professors and paid directly by Cedar Valley Rocks & Minerals Society. Additionally...

CVRMS Meeting April 15 – Minutes –

MEETING CALLED TO ORDER: 7:34 pm by Marv Houg. Two new members were introduced, Jack Thompson and Kate. **SECRETARY MINUTES FROM LAST MEETING.** Minutes of previous meeting were reviewed. Bill made a motion to accept, second by Ray, motion passed.

TREASURERS REPORT. Dale reported on initial review of Rock Show profits. Receipts~\$28,000; expenses~\$11,000; profits~\$17,000. A question was raised about including the deposit in the Hawkeye Downs expenses. It will be checked.

PRESENTATION BY RYAN CLARK: Ryan updated us on *"Iowa's Hydrogen Potential,"* including a discussion of current exploration activities in Iowa's Midcontinent Rift basalts and possibly related CO2 sequestration. Great presentation!

2026 ROCK SHOW: AJ proposed that we have a show in 2026; Jeff seconded; motion passed

2025 ROCK AUCTION SEPT. 20-21: We have a full allotment of rock lots. The board continues planning.

OLD BUSINESS: Laura reported on her trip to the Midwest Federation Annual Meeting in Lincoln. She discussed activities and passed around a few rock samples from a field trip. **Marv** commented that the 2025 TACO Event at Klein Quarry would be scheduled some time in July.

NEW BUSINESS: Cornell College has a new gifting procedure that may restrict our annual geology scholarships. Marv and Sharon met with an attorney from The Larned A. Waterman lowa Nonprofit Resource Center to discusse the problem, with our response yet to be decided. **Dell is recovering** after her fall, will be in rehab for a few weeks. **Kim Hanna is recovering** from back surgery. **We need** materials for next year's Rock Show pebble pit. Brief discussion of dealers for next Rock Show. **Glen Rocca** thanked CVRMS members for their help at Black Hawk Rock Show.

MOTION TO ADJOURN: by AJ, second by Matt. Motion approved. Meeting adjourned at 9:40 pm.

Respectfully submitted *Ray Auderson*, Acting Secretary



A big congratulations

to **Joel Smith** from our club for winning the **six-inch intarsia machine** from Highland Park Lapidary Company in their big drawing. His name was drawn from hundreds of people that had registered. We'll expect some beautiful intarsia projects from you in the future.

Again, CONGRATULATIONS Joel.

CVRMS Board Meeting April 22 — Minutes —

MEETING CALLED TO ORDER: 7:12 pm by Marv Houg at his house. Board members present, Jay Vavra, Marv Houg, Dale Stout, Ray Anderson, Matt Burns, Sharon Sonnleitner, Kim Kleckner, Laura Halladay.

SECRETARY MINUTES FROM LAST MEETING. Minutes of previous meeting were reviewed. Sharon noted the minutes should be amended to include Jay's motion to host a rock show in 2026, and the Board's affirmative vote, to be presented to membership at April meeting. Kim made a motion to accept the minutes as amended, second by Jay, passed.

TREASURERS REPORT. Dale passed out and reviewed financial report on 2025 rock show. Show profits were \$14,311, and scholarships were allocated in accordance with club bylaws: \$6,200 to UI Geoscience, \$4,100 to Cornell College geology students, and \$2,600 to VAST; a total of 90% of show profits. Laura moved we allocate these amounts, seconded by Ray, and approved. Motion will be presented for approval of membership at next meeting.

2025 ROCK SHOW REVIEW: Marv suggested we send a questionnaire to show vendors for suggestions of what could be improved. Board members will send proposed questions to Marv. **Doug DeRosear** is retiring, and his space has been filled by current dealers. **The problem with crowding** around the easels with door prize postings was discussed. Laura proposed we discontinue door prizes at next year's show, Matt seconded, motion approved. **Kim proposed** we purchase polished stones on lanyard necklaces for next show, and after discussion Matt proposed we buy 500 at a total cost of \$125 or less, Laura seconded, motion passed.

2025 ROCK AUCTION: Jay reported 1201 lots accepted, and 8 of 25 contracts returned. **Dale has not yet** contacted the Saturday food vendor.

OLD BUSINESS: The Square tax report has been completed. **Cornell College's** new scholarship procedures were discussed. (Following the meeting a motion was made by Ray via email to amend the bylaws as noted on page 1, seconded by Jay and approved. The motion will be presented at the May meeting for approval by the membership. –ED)

NEW BUSINESS: Marv suggested we consider a new CVRMS logo. Most wanted to keep the old logo, but members will submit possible new logos for Board consideration and discussion.

FIELD TRIPS: Laura has been trying to get cost estimates for a 2025 bus trip to the Field Museum on 1st or 2nd weekend in October. **Thunder Bay** amethyst trip still being considered for 2026. **Haunted Ridge** quartz plate trip still being considered for Fall. **No local trips** scheduled at this time.

MOTION TO ADJOURN: by Ray, second by Jay. Motion approved. Meeting adjourned at 9:35 pm.

Respectfully submitted *Ray Anderson*. Acting Secretary

Wilkes Land Crater: The Giant Hole in East Antarctica's Gravity Field Likely Caused by a Meteorite

The Wilkes Land crater is a hole in the bedrock beneath East Antarctica's ice sheet measuring 315 miles across. Researchers have been trying to explain its existence since the 1960s, and the most recent evidence suggests it was born from a cataclysmic meteorite impact. The crater was first detected as a huge dent in Earth's gravitational field. Initial groundbased seismic and gravity surveys already indicated that the crater was huge. around 150 miles across but newer techniques reveal that it is likely more than double this size. According to a 2018 study, the Wilkes Land crater sits about 1 mile beneath the surface of Antarctica's ice sheet. The study showed the crater in more detail than ever before and examined its potential link with southern Australia, which was connected to East Antarctica until around 35 million years ago. While the origin of the crater remains uncertain, the results of the study suggest the event that created the hole likely occurred before the continents separated. Researchers have proposed several explanations for the Wilkes Land crater, including that it could be a volcanic structure, a sedimentary basin, a deeply eroded valley or a meteor impact crater, according to a 2015 paper. For that paper, scientists used satellite remote sensing techniques to map the crater and determine its physical characteristics. In the middle of the hole in Earth's gravitational field, known as a negative gravity anomaly, they found a positive gravity anomaly, with the ice sheet filling the gap around this central peak like a huge, frosty donut. The central peak is likely a structure known as a mass concentration, or a "mascon," according to the study. Mascons can occur within meteor impact structures due to the meteor crashing through Earth's crust and affecting the mantle beneath. Following the impact, the mantle may recoil and form a dense plug, resulting in a positive gravity anomaly, the study authors wrote. A map of Antarctica showing gravity data across the frozen continent. Wilkes Land is situated in the bottom right corner of the map. The Wilkes Land crater and its mascon aren't perfectly circular and instead form a Ushape, according to the 2018 study, whose results support the conclusion that the crater was caused by a meteor impact. The northern side of the crater is fragmented, perhaps as a result of tectonic processes that ripped Australia and Antarctica apart, the authors noted. Parts of the crater are clearly visible in southern Australia, they added. If the Wilkes Land crater is an impact crater, then it would be the largest impact crater known on Earth in terms of its size, the authors wrote. However, because of the constraints imposed by the overlying continental ice sheet other explanations for the subglacial structure remain viable.

https://www.livescience.com/planet-earth/antarctica/wilkes-landcrater-the-giant-hole-in-east-antarcticas-gravitational-field-likelycaused-by-a-meteorite



May's birthstone, the emerald, is one of the most regal of all and one which denotes life and love. It is also one of the most valuable (the very highest quality emeralds can be more expensive than diamonds). Emeralds are the deep green variety of the mineral beryl [Be3Al2(Si6O18)], colored by the element chromium. Emeralds are very hard, 7.5-8 on the Mohs scale. The best emeralds are found in South America, having been cherished by the Inca and Aztec peoples, who regarded emerald as a holy gemstone. In contrast, "Cleopatra's Mines" in Egypt had already been exhausted by the ancient Egyptians, so that when they were rediscovered in the 19th century, there was simply nothing left! These are only a few of the cultures which treasured this gemstone. In Roman times, emerald was associated with Venus, goddess of beauty and love. Its pigment was so venerated that Pliny remarked that green "gladdened the eye without tiring it!" It is also valued in the Catholic Church, green being considered the most elemental and natural of the colors used in their worship. The Vedas, Hinduism's oldest scriptures, acknowledge the healing powers of emeralds, promoting well-being as well as good fortune. Emeralds are also highly prized in Islam - green was the Prophet Muhammed's favorite color, and all dwellers of paradise are said to be dressed in green. In the 1960s, the



The world's largest uncut emerald American jewelry industry changed the definition of "emerald" to include the green vanadium-bearing beryl as emerald. As a result, vanadium emeralds, purchased as emeralds in the United States, are not recognized as such in the UK and Europe. In America, the distinction between traditional emeralds and the new vanadium kind is often referred to as "Colombian Emerald."

What in the World?



What in the World is this unusual rock formation and where is it?

April's Photo



April's **What in the World** photo was one of "*the world's most unusual rock formations*" at a littleknown Kansas state park, **Mushroom Rock State Park**. The formations are sandstone, the largest up to 25 feet around.



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 <u>rockdoc.anderson@gmail.com</u>, 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 no one provided a question to "Ask a Geologist" this month again I have an opportunity to discuss an article of interest to me. One of my principal geologic interests is the Precambrian, going back to the formation of the Earth. The article below describes what might have happened after a moon-forming collision with another planetesimal (Thera) about 4.5 billion years ago left Earth a ball of molten rock.

An ocean of magma formed early in Earth's history and it may still influence our planet today, study finds

by Stephanie Pappas

Earth held a deep ocean of magma beneath its surface in its early history, new research finds, potentially explaining odd anomalies seen in the mantle today. This basal magma ocean has been hotly debated for years. Some geochemical evidence indicates that in the first few hundred million years of the planet's existence, a persistent sea of melt formed at the boundary between Earth's core and its middle layer, the mantle. But models of the planet's formation suggested that when Earth was new and molten, it solidified from the bottom up, making it hard to understand how a deep magma ocean could exist. The new study, published March 26 in the journal *Nature*, found that not only could a magma ocean exist, but that its presence was inevitable. No matter the precise location where the molten newborn planet started to crystallize into a solid, a basal ocean still formed, the study revealed. Remnants of this hidden magma sea could still exist today in the form of large low-shear velocity provinces (**LLVPs**) or mantle "*blobs*," which are giant regions of the deep mantle where earthquake waves travel more slowly than they do



Remnants of the magma ocean my still exist today as LLVPs, or giant "blobs" in Earth's mantle

through the rest of the mantle. Scientists have debated whether these LLVPs are the remains of oceanic crust that have been pushed deep into the mantle, meaning they date back a few hundred million years, or whether they're the leftovers from Earth's basal magma ocean, making them 4.4 billion years old. The new study argues for the latter and the findings could have major implications for how researchers understand Earth's history, said study lead author Charles-Édouard Boukaré, a planetary physicist at York University in Toronto. "It would affect thermal communication between the core and the mantle," Boukaré told Live Science. "It might affect the location of tectonic plates." The researchers built a new model of Earth's formation that considered both geochemical data and seismic data, the two main methods of peering into Earth's deep history. In particular, there are important trace elements that chemically prefer to stay in the magma while other minerals crystallize into rock. The amount of these trace elements in rock can reveal when and in what order the rocks of the mantle solidified. Most studies of this era of Earth's formation focus on the initial solidification of the mantle and the dynamics when the mantle was still mostly liquid. Boukaré and his team focused a little later, looking at the point at which the mantle would have been crystallized enough that it was behaving as a solid rather than a liquid. They found that regardless of where the solidification first started, in the middle of the mantle, or right at the boundary with the core, a basal mag-

ma ocean formed. The process would have started with a thin crust of solids forming on the surface of the new Earth, but the solids were cold and less buoyant than the underlying mantle, so they sank and remelted. However, as the mantle continued to cool, solids that formed in the upper mantle started to sink and accumulate in the lower mantle. These solids were rich in iron oxide, which is dense and has a low melting point, so these solids sank deeper and often remelted. Because of how dense iron oxide is, even in its liquid form, this melt did not rise back up, as liquids usually rise above solids. Instead, it stayed in the deep mantle, where the heat from the core kept it melted. This formed the basal magma ocean. The researchers varied the conditions in their model to alter the depth of the solid formation, but those parameters didn't change anything. Even in the least conducive circumstances for a deep magma ocean, one still formed. The findings suggest that the main structure of the planet formed very early in its history, Boukaré said. "Another way to say this is there is a memory," he said. The seeds of the planet's dynamics would have been planted very early, with these ancient structures continuing to influence how the planet changed moving forward. "We might say if we have some initial condition of the planet and we can model the very early stages of planetary evolution, we can then predict most of its behavior on long timescales," Boukaré said. He next plans to improve the modeling by incorporating more trace elements. It would also be interesting to apply the model to other planets such as Mars to see if other rocky planets go through similar transitions, Boukaré said. "Maybe this basal ocean thing is not something that is unique to the Earth," https://www.livescience.com/planet-earth/an-ocean-of-magma-formed-early-in-earths-history-and-it-may-still-influence-ourhe said. planet-today-study-finds

Dinosaurs Probably Didn't Roar

If asked what a dinosaur sounded like, many people would likely recall the roaring T. rex of *Jurassic Park*. However, that earth-shaking bellow seems to be a case of Hollywood exercising some creative liberty. While we don't know what these reptiles *really* sounded like, since they mostly died out some 66 million years ago, scientists at least have some reasonable



ideas based on anatomical the structures of well fos--preserved sils, combined with studies of the dinosaurs and their close relatives that exist today. Yes, dinosaurs do still exist, in the form of which birds, branched off

from non-avian dinosaurs around 160 million years ago. Although birds mainly produce noises via a soft-tissue organ called the syrinx, which has yet to be uncovered from a nonavian dinosaur fossil, many of our feathered friends also engage in closed-mouth vocalization, in which sounds are pushed out from a pouch in the neck area. Another modern animal that utilizes closed-mouth vocalization is the crocodile, which just so happens to share a common ancestor with dinosaurs. Given the family ties, it's logical to conclude that some dinosaurs emitted something resembling the cooing of a dove, the booming of an ostrich, or the rumbling of a croc. Since larger animals with longer vocal cords produce lowerfrequency sounds, it's also likely that enormous sauropods like Brachiosaurus delivered noises that, to our ears, would dip into an octave of infrasound, felt and not heard. On the other hand, the ear structures of the dinosaur-crocodile predecessor indicate a sensitivity to high-pitched noises, possibly the chirping of babies. The field continues to evolve as new information comes to light; the recent discovery of the first known fossilized dinosaur larynx, from an ankylosaur, suggests these creatures were able to modify noises in a birdlike way despite the lack of a syrinx. And none of this even touches on the sound capabilities of hadrosaurs like Parasaurolophus, which almost certainly delivered a distinct call from the air passages that funneled through a conspicuous head crest. All in all, while a roar from a Jurassic-bred beast may have been the work of a Hollywood studio, there's no movie magic needed to recognize that Earth's prehistoric hills were alive with all sorts of reptilian sounds of music.

https://mail.google.com/mail/u/0/#inbox/FMfcgzQZTzSKDNhsb WSdBdvblFcjrtDr

Is it True that All of Our Planet's Gold Came from a Supernova Explosion Billions of Years Ago ?

Yes, it is true that some gold came from a Supernova but the majority of gold in the universe came from the collision of neutron stars. The reason for this is relatively simple. The atomic number of Iron is 26 whereas the atomic number of Gold is 79. This is important. When a star undergoes nuclear fusion it is fusing light elements into heavier elements, hydrogen to helium, helium to carbon / oxygen and so forth, and at each fusion cycle a much higher temperature is required. Hydrogen required a minimum of 18-22 million degrees Fahrenheit to fuse; Helium - 180+ million degrees Fahrenheit, Carbon - 1080+ million degrees and so on. The last element before Iron is Silicon which requires around 5.3 billion degrees Fahrenheit. Then we get to Iron. The problem with this is that all fusion cycles before Iron give off energy, albeit to a lesser degree with each element up to Iron. A star cannot fuse Iron into heavier elements because the star NEEDS energy to complete the fusion, and the star cannot borrow any energy. You then have a Supernova. Temperature at the point of explosion in a Supernova is over 10.8 billion degrees Fahrenheit. A little gold could be made through this process but not very likely as it is not really hot enough. The temperature of two colliding neutron stars is estimated to reach 1500 billion degrees Fahrenheit. This is plenty to create Gold and all the other elements through to Uranium. It all comes down to heat as heat is required to make the atoms move fast enough to collide and thereby fuse. Heavy elements require enormous temperatures.

https://www.quora.com/Is-it-true-that-all-of-our-planets-goldcame-from-a-supernova-explosion-billions-of-years-ago-If-so-howdo-scientists-know-this-to-be-true



Artist's conception of the collision of two neutron stars.

Fascinated by Fossils, Minnesota Man Builds a Small-Town Science Museum Bone by Bone

A small storefront on Main Street **in Blue Earth** has been home to many businesses since it was built in 1892. Its creaky wooden floor is now covered with fossil displays as the <u>Southern Minnesota Museum of Natural History</u> takes shape. *"In the museum, we have a representation of everything from the very beginning — four-and-a-half billion years ago to today,"* said Jim Pollard, the museum's driving force, as he showed off some of his prized collection. Pollard, 70, spent his career as an artist, but he's long



been fascinated by fossils. He remembers combing for them as a kid along the beaches of Lake Michigan. His parents also had an eccentric friend whose house was filled with fossils. *"He knew I was nuts for fossils, and there'd be big nests of eggs and bones and stuff,"* said Pollard. *"And when I got to Blue Earth, I thought I could make a museum for these kids to sort of have the same 'wow' experience." "Wow"* also works as a response when Pollard tells his own story of how he landed in Blue Earth and why he dedicated himself to creating a natural history museum here.

'Why treat kids like imbeciles?' Pollard has been collecting fossils for most of his life. He recovered some from digs in South Dakota and Wyoming and purchased others from locations around the world. *"There's a nest of eggs, the petrified poo, which is always amusing for kids to see, and we have a triceratops humerus, the end has been bitten off by a tyrannosaur,"* said Pollard as he

explained his fossil philosophy. "Everything I collect here is collected because it has a story to it. Otherwise, it's just a door stop. Because that's how kids learn, through storytelling," he said. The focus is on kids, but you won't find any glitzy games or plastic dinosaur models here. "I thought, why dumb down a museum? Why treat kids like imbeciles?" said Pollard. "You know, they'll rise to your expectations." Pollard still finds childlike joy in his collection. He often uses the word "cool" to describe pieces. He laughed about a recent package from an amateur fossil hunter in Russia who sends him fossils pulled from thawing Siberian permafrost. "The last thing he sent was a little plastic bag you get in the grocery store, and it was a sopping wet thing, and I opened it up and it's two mammoth turds inside," said Pollard. "I thought, my God, you don't expect that in the mail." A prominent display in the museum is a collection of 7,000-year-old bison bones that were saved from a construction site near Coon Rapids in Anoka County about 35 years ago by amateur fossil hunters Pat and René Cherney. "They walk over and they see the machinery and they look around and they see these bison skulls. And they go, 'Whoa, these are bison occidentalis, these are extinct bison,' recalled Pollard, who has made the story of citizen science part of the museum's display. Pat Cherney died in 2013. His wife René is 67 and still gets excited talking about the two years they spent in the early 1990s digging bones from an old peat bog as heavy equipment worked around them. René said initially they contacted museums about their find, but no one was interested, so her husband convinced the contractor to let them dig the site. "We were hoping to find skulls, and we found a lot," she said in a recent interview at her home. "We called ourselves Rescue Paleontology, because we really felt like we were rescuing the bones." A few years ago, she sold the collection to a fossil collector from South Dakota, who in turn sold them to Jim Pollard. She said she's happy to know "a museum actually has my bones. Pat would be so thrilled, because he knew, darn it, he knew this was important. And I feel like I did a good job of getting the bones where they were supposed to go."

Finding Blue Earth from a hospital bed Pollard grew up surrounded by artists. His father was a professional portrait painter, his mother an illustrator. Following in their footsteps, he spent his professional career painting portraits, including generals and members of Congress. His life changed in 2009, he said, when during the Great Recession several leaders of finance he had painted refused to pay what amounted to a year's worth of income. The stress put him in the hospital and he decided it was time for a change. He borrowed a laptop and from his hospital bed started searching for cheap homes. "And in Blue Earth there was this house from 1889. It was in perfect shape, original condition, for the price of a used car. And so I bought it." He remembered passing through Blue Earth on his way to fossil digs in western states but knew little else about the community. He started a company with his son making high end pastel paints sold to artists around the world and began to think about ways to give back to the community. These days, he's focused squarely on the museum, which opened last year, and raising money for its future. "When I am around these fossils, it's almost like you can sense that that time is still sort of emitting out of the bone," he said as he stood amid display cases filled with bones. "It's like a feeling that you get. It's a little touchy-feely, but kids seem to automatically have that feel. They look at it, and their imagination brings them back in time." In the museum, the Cherney bison skulls hang on a wall and are displayed in cases. In a back room there are stacks of plastic totes filled with bones. Pollard plans to build a full skeleton for display. "And what's cool about this, too, is that we have the photographs, we have an oral history interview. We have some of the tools that were used," said Pollard, who calls the Cherneys' work inspiring. He hopes the story will inspire kids at the museum. "This is what you can do if you just decide you want to do it. You just have to be interested. If you learn how to teach yourself, you're set for life," he said. "It's like the Wordsworth poem, 'the child is father of the man.' What you do when you're young affects your whole life," said Pollard. "And so we're trying to get kids hooked on science, and fossils are like the perfect way in, because they're big and scary and they're just cool." https://www.mprnews.org/story/2025/03/24/fascinated-by-fossilsminnesota-man-builds-a-smalltown-science-museum-bone-by-bone

A 30,000-Year-Old Feather Is a First-of-Its-Kind Fossil

Valentina Rossi first saw the **30,000-year-old griffon vulture** as a master's student in Rome in 2014. The fossil, which had been found by a local landowner near Rome in 1889, was remarkably well-preserved. She couldn't look away as her future collaborator, Dawid lurino, presented about the fossilized imprint of the bird's head. *"I was mind-blown,"* Rossi said. The presentation by lurino, now an associate professor at Universita degli Studi di Milano Statale, ended with a discussion of the bird's feathers. Rossi remembers him saying that determining what exactly the feather fossils were made of was a topic for future research because analyzing such well-preserved structures was outside of the expertise of the team of paleontologists at the time. Now, a new study by Rossi, lurino, and others, published in *Geology*, has finally revealed the answer: The feather fossils are made of zeolites, minerals made of aluminum and silicon compounds. This study is the first time scientists have reported soft-tissue mineralization by zeolites. *"We finally did it,"* said Rossi, lead author of the paper and a paleontologist at University College Cork in Ireland. It's extremely rare to find feathers preserved in three dimensions and even rarer to find mineralized feathers, Rossi said. The knowledge that the feathers were fossilized by zeolites, minerals that form naturally by reactions between volcanic rock and water, could guide paleontologists to target volcanic settings when searching for fossils. *"The more people look, the more people are going to find the preservation of materials that we previously thought was impossible,"* said Mary Schweitzer, a paleontologist and emeritus professor at North Carolina State University who was not involved in the new study. Rossi and the team of scientists used a powerful electron microscope to study the shape and texture of the preserved structures, confirming that the tis-



sue was mineralized. Then, they analyzed the chemical structure of the fossil using multiple spectroscopy methods. "We recognized certain chemical bonds that are similar to those found in zeolites," Rossi said. Certain soft tissues lend themselves to fossilization. Muscle tissues, for example, are commonly mineralized by the calcium phosphate mineral apatite. That's because muscle tissue already contains calcium and phosphorus, which jump-start the mineralization process. Laboratory studies have shown that zeolites will form on biological materials in solutions of silicon and aluminum. But feathers do not contain these elements, making the zeolite fossil puzzling, Rossi said. Schweitzer said that parts of

Feather fossils are rarely found in three dimensions and are even more rarely found in mineralized form.

certain molecules that make up decaying feather tissue may have an affinity for aluminum or silica but that more research would be needed to determine the exact chemistry behind the mineralization. Another explanation for the mineralization, Rossi suggested, may involve the pH of the soft tissue, especially as the tissue decays. The findings helped Rossi and her colleagues create a taphonomic model, likely story line of how the bird went from a living animal to a hunk of rock. Previous studies of the whole fossil had not indicated that the bird was injured; Rossi suspects toxic gases from a nearby volcanic eruption may have killed it. Dead but intact, the bird lay in the path of a lava flow. Rossi thinks the vulture was probably guite far from the actual eruption and may have been covered by a cooler, slow-moving volcanic flow, as its tissues weren't destroyed by heat or turbulence. The volcanic flow hardened and cooled with the griffon vulture beneath it. Eventually, rains soaked the rock, creating a fluid rich in minerals. The chemical composition of the bird's feathers spurred a reaction with the silicon- and aluminum-rich fluids, and zeolites began to form and replace the tissue. The feathers turned to stone faster than they decayed. Something similar may have happened to many more specimens over Earth's history, which could mean that paleontologists are overlooking entire categories of rock in which highly preserved soft-tissue fossils may be found, the authors write. Volcanic settings are typically disregarded as likely spots to find fossils because volcanic flows are turbulent and hot and usually destroy soft biological material that might otherwise be fossilized. But the new paper's results mean there are likely some exceptions. The findings "open up another window for fossilization," Schweitzer said. https://eos.org/articles/a-30000-year-old-feather-is-a-first-of-its-kind-fossil

'Dispiriting and Exasperating': The World's Super Rich are Buying Up T. Rex Fossils and It's Hampering Research

Fewer *Tyrannosaurus rex* fossils are available for scientific research because wealthy people are purchasing them for private collections, a new study has found. Dinosaur fossils are a popular showpiece at many high-end auctions, with near-complete skeletons selling for tens of millions of dollars. However, the **private trade in** *T. rex* specimens could be hampering researchers' understanding of the iconic Cretaceous predator, the study found. *T. rex* researcher Thomas Carr, an associate professor of biology at Carthage College and director of the Carthage Institute of Paleontology in Wisconsin, showed that there are now more scientifically valuable *T. rex* specimens in private or commercial ownership than in public museums and other public trusts. Carr told Live Science in an email that the situation was "dispiriting and exasperating" and noted that the ownership of juvenile and sub-adult specimens was especially worrisome. *"The early growth stages of T. rex are bedeviled by a poor fossil record, and so*



Apex, the stegosaurus fossil that sold at auction for \$44.6 million

the loss of them carries the heaviest scientific cost," Carr said. "At the current moment, our knowledge of one of the most basic aspects of T. rex biology is frustratingly compromised by market interests." Carr published his findings, titled "Tyrannosaurus rex: An endangered species," on April 10 in the journal Palaeontologia Electronica. To better understand the private market's impact on the number of T. rex fossils available to researchers, Carr targeted what he described as "scientifically informative" specimens, skulls, skeletons and isolated bones that researchers would include in studies of T. rex development and variation. Carr counted the "informative" specimens in public and private ownership by scouring books, museum records, news articles, auction records, anecdotal reports and other sources. He found a total of 61 specimens in public trusts and 71 specimens, including 14

juveniles, in private ownership, likely an underestimate given "the secretive nature" of the private market and year-to-year discovery of new specimens, according to the study. Commercially sourced specimens sometimes end up in public museums, either on loan or after being purchased by the museum. But Carr found that only 11% of the commercially harvested T. rex fossils end up in public trusts, and that commercial companies are now discovering twice as many T. rex fossils as museums. Carr also noted that the private sale of dinosaurs isn't limited to T. rex. The luxury fossil market includes all kinds of dinosaurs, the most expensive ever sold was a stegosaurus, auctioned for \$44.6 million in 2024. (It is currently on loan to the American Museum of Natural History in New York City). Carr hopes his study will inspire other researchers to examine how the commercial market is impacting other ancient species, like he has done for T. rex. "My hope is that concerned colleagues will start counting up, and publishing on, the specimens of the species that they study that are lost to the commercial market," Carr said. Thomas Holtz, Jr., a vertebrate paleontologist at the University of Maryland, has been researching the changes in Tyrannosaurus during its growth, and said it was "disheartening" to find out that many critical specimens that would help to clarify those changes aren't accessible. "Much like Carr, I am concerned not merely that there are good specimens which are not accessible to researchers, but especially that juvenile and sub-adult specimens happen to be overrepresented in the commercial samples," Holtz commented. David Hone, a reader in zoology at Queen Mary University of London, noted that while he'd love to see more specimens in public collections, he wasn't as concerned about the T. rex fossil trade as Carr. "For a start, there's not that much that can realistically be done about the commercial trade of things like this," Hone said. "And while I'd certainly love to see more specimens in public collections, there are still plenty that can be studied. There are rarer and more important things that are being traded illegally that I'd be more concerned about," he said, referring to Brazilian and Mongolian fossils, including dinosaurs, that are smuggled illegally out of their respective countries. https://www.livescience.com/animals/dinosaurs/dispiriting-and-exasperating-the-worlds-super -rich-are-buying-up-t-rex-fossils-and-its-hampering-research



Cedar Valley Rocks & Minerals Society will hold its annual 2-day consignment auction on September 20-21 at Amana RV Park.

The purpose of the auction is to help collectors or families of collectors dispose of their collections.

Knowledgeable club members act as auctioneers. Since the auctioneers are also collectors, they bid openly on material that interests them. Auctions typically attract about 100 bidders and are limited to about 1200 lots over the 2-day auction. Auction lots can be viewed from 5:00-7:30 Friday night, and before the auction at 7:30 Saturday morning and 8:00 Sunday morning. Saturday's auction runs from 9:00 a.m. to about 8:00 p.m. with hot food available during the day until about 7:00 pm. The Sunday auction runs from 9:00 a.m. to about 3:30 p.m., again with hot food available.

Cash, credit cards (with small service fee) or good checks are accepted for payment. Iowa sales tax of 7% is also added to all items. Bidders who provide Iowa tax permits are exempt from paying it.

If you can't stay for those special lots you want, you can leave a maximum bid, and a club member will bid for you up to your maximum.

Motel rooms are available in Amana, but they are sometimes sold out. Motels are also available in Little Amana (15 minutes away), Cedar Rapids & Iowa City (each about 25 minutes away, although motel rooms are scarce in Iowa City on home football weekends). Since the auction includes multiple consigners, the order of sale rotates among the consigners. All lots are numbered, and a sheet with the order of sale for each day will be provided. Equipment will be sold at about 2:00 on Saturday.

If you have a rock collection or equipment to dispose of, please contact <u>Marv Houg</u> or <u>Sharon Sonnleitner</u>. The club does all the advertising and sets up auction lots on the Friday before the auction. A 25% commission is charged for non-members, and 20% is charged for members or families of members who have belonged to the club for at least 2 years



Auction site at the Amana RV Park



Bidding at the 2024 Auction



Mysterious 3-Toed Footprints in Canada Reveal New Ankylosaur Species

Sets of prehistoric three-toed footprints pressed into stone have led paleontologists to discover a new dinosaur in the armored ankylosaurid family. The trackways were found near the town of Tumbler Ridge in British Columbia, which became known for its ankylosaur fossils after Mark Turner and Daniel Helm, both young boys at the time, first discovered a trackway in 2000. Ankylosaurids are one of the two main families of ankylosaurs, the other being nodosaurids. We know the difference between these families because of their tail armor: nodosaurids lack the bony tail club that defines the ankylosaurids. This is the first time we've seen precious, 100-million-year-old ankylosaurid footprints, which have only three toes on their back feet, unlike their relatives' four. Ankylosaur specialist Victoria Arbour, who also happens to be the paleontology curator at the Royal British Columbia Museum, visited Tumbler Ridge in 2023, where she met with Charles Helm, scientific advisor at the Tumbler Ridge Muse-



Ankylosaurids were formidabe herbivores, but their footprints are pretty darn adorable.

um (and Daniel's father). He showed her a number of three-toed footprint trackways that had been turning up around the area in recent years. All specimens were found within the Tumbler Ridge UNESCO Global Geopark, except for one that was found in western Alberta. These footprints were preserved in the non-marine deposits of the Dunvegan and Kaskapau Formations, from the middle of the Cretaceous period. At this time, the nowmountainous region of the British Columbia Rockies was a lowland delta, freshly scoured with channels, point bars, shallow lakes, and mud squelchy enough to preserve the imprint of dino toes. Trackways like this are particularly useful to paleontologists because they provide multiple footprint specimens from the same animal. And in a region lacking skeletal fossil material, wellpreserved trace fossils like these are essential to understanding prehistoric life. https://www.sciencealert.com/mysterious-3-toedfootprints-in-canada-reveal-new-ankylosaur-species



A Life Oasis Protected Plants During the Permian Mass Extinction Event

Even during one of Earth's largest mass extinction events, where heat waves killed off a majority of Earth's species, at least one oasis of survival existed. The findings suggest that there may have been pockets of protection throughout Earth, challenging the notion that the heat affected life on the planet uniformly, according to a paper in Science Advances. About 250 million years ago, a series of massive volcanic eruptions warmed Earth. This period, sometimes referred to as "The Great Dying," was aptly named. It killed off about 95 percent of marine species and 75 percent of land-locked lifeforms, although some species appeared clever enough to find ways to beat the heat. The researchers found an abundance of plant fossils dating back to that time in China's Turpan-Hami Basin. The implication? Even though the region was relatively close to some volcanic activity, it somehow shielded a wide variety of plants. "This suggests that local climate and geographic factors can create surprising pockets of resilience, offering hope for conservation efforts in the face of global environmental change," Liu Feng, a paleontology researcher with the Chinese Academy of Science and an author of the paper, said in a press release. The fossils the team found pointed to a widely diverse plant community that survived the initial destructive events. Those fossils indicate both resilience that allowed them to bounce back from the volcanic events, as well as the evolutionary ability they needed to adapt afterward. The team's findings suggest that some land areas were shielded from the worst effects of extinction, creating pockets of resilience that played a crucial role in the rebound of life on Earth. The researchers cited the region's stable, semi-humid climate as essential to the area's ability to continuously support life. The scientists analyzed layers of soil in the area and determined that it received fairly consistent rainfall during the mass extinction period. The findings challenge one prevailing theory about the Permian mass extinction event. That theory claims that volcanic eruptions in Siberia triggered wildfires, acid rain, and toxic gases, which indiscriminately killed off much of the life on Earth. The opposing view argues that these events differed around the globe, due to differences in atmosphere, latitude, and perhaps geography. The new findings tilt the scale toward the "variable effects" side. Evidence includes fossil records of fern fields and coniferous forests that existed 160,000 years before the extinction and persisted 160,000 years after it was over. The fossils include intact tree trunks and fern stems, which lend credence to the notion that this was local vegetation, not transported by wind or other elements. The scientists did detect SOME extinction in the area during that time period, but at 21 percent it was far lower than at much of the rest of the planet. Because the plant oasis persisted, it presented a welcome place for animals to thrive after the event ended. The team found some animal fossils dating to about 75,000 years after the extinction. The discovery of this "life oasis" shows incredible resiliency and suggests that, with the right conditions, plants and animals can persist following major disasters.

https://www.discovermagazine.com/the-sciences/a-life-oasisprotected-plants-during-the-permian-mass-extinction-event Ray Anderson, Editor 2155 Prairie du Chien Rd. NE Iowa City, Iowa 52240-9620



Next Meeting: 20 TUESDAY MAY Center TUESDAY MAY Center Hiawatha Community Cinn County" Hiawatha Community Hiawatha Community Center Hiawatha Community Hiawatha Community Hiawatha County"

CEDAR VALLEY GEMS

MAY 2025

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2024 & 2025 Officers, Directors, and Committee Chairs

PresidentMarv Houg (m_houg@yahoo.com)(31	9)350-9435
Vice PresidentRay Anderson (rockdoc.anderson@gmail.com)	530-2419
TreasurerDale Stout (dhstout55@aol.com)	365-7798
SecretaryDell James (cycladelics@msn.com)	270-6854
EditorRay Anderson (rockdoc.anderson@gmail.com)	530-2419
LiaisonKim Kleckner (ibjeepn2@gmail.com)	560-5185
Imm. Past PresSharon Sonnleitner (sonnb@aol.com)	310-0085
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SunshineDolores Slade (doloresdslade@aol.com)	351-5559
HospitalityKim Kleckner (ibjeepn2@gmail.com)	560-5185
Webmaster Sharon Sonnleitner (sonnb@aol.com)	310-0085

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 2nd Tuesday at 6:30. June, July, and August meetings are potlucks held at 6:30 p.m. at area parks on the 3rdTuesday 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