Cedar Valley Gems

Cedar Valley Rocks & Minerals Society

Cedar Rapids, Iowa

cedarvalleyrockclub.org

CEDAR VALLEY GEMS | AUGUST 2022 | VOL. 49, ISSUE 08

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

Next CVRMS Meeting
Tues. August 17
6:00 pm; Eat at 6:30
Pot-Luck Picnic!

Morgan Creek Park

Bingo Night
Rock Identification
Rock Show & Tell
Bring Your Favorite Dish to Share
Bring Your Own Table Service

Newly Discovered Giant Predatory Dinosaur Had Tiny Arms, But It's Not Related to T. Rex

Researchers have discovered a new species of giant dinosaur that has been called ***Meraxes gigas***: just like the *Tyrannosaurus rex*, *M. gigas* has very short forelimbs, and it seems

that both of these massive dino theropods evolved the trait separately. Not only are *T. rex* and *M. gigas* a long way apart on the evolutionary tree, the newly discovered species became extinct during the Late Cretaceous period, some 20 million years before *T. rex* even appeared on the scene. *M. gigas* belongs to a group known as the **carcharodontosaurids**, large and predatory theropod dinosaurs, characterized by hollow bones and limbs with three main digits. They're some of the biggest predators to ever stomp across Earth. Based on an analysis of fossil bones recovered in the northern Patagonia region of Argentina, the researchers determined that the dinosaur they'd discovered was 45 years old when it died, about 36 feet long, and weighed more than four tons.

https://www.sciencealert.com/a-new-giant-predatory-dino-has-been-discovered-with-teeny-tiny-t-rex-arms

CVRMS Monthly Meeting, July 19 — Minutes —

PICNIC AT WANATEE PARK

On July 19 CVRMS had no formal meeting, but hosted a Pot-Luck picnic dinner at Wanatee Park in Marion. In addition to the good food, many people brought rocks for a informal show and tell session, and Marv and Dale cracked geodes for a number of people. The weather was beautiful and a good time was had by all.

Respectfully submitted,
Ray Anderson, Acting Secretary

Because of rising costs over the years, the Board voted to propose the following change to our Bylaws:

Article IV

DISBURSEMENT OF SOCIETY FUNDS*: Disbursements needed for Society business up to $100.00 must be approved by the Executive Committee; any Disbursements over $100.00 must be approved by the majority vote of the membership, except that the Treasurer shall be authorized to disburse funds necessary to the office, up to $25.00 without prior approval of the Executive Committee.*

Change to

DISBURSEMENT OF SOCIETY FUNDS*: Disbursements needed for Society business up to $250.00 must be approved by the Executive Committee; any Disbursements over $250.00 must be approved by the majority vote of the membership, except that the Treasurer shall be authorized to disburse funds necessary to the office, up to $25.00 without prior approval of the Executive Committee.*

According to our bylaws: *These Bylaws may be amended by simple majority vote of the membership present at any Regular or Special Meeting. Members must be notified of proposed amendments five days before the meeting.* **The above proposed change will be voted on at the September meeting**.

CVRMS Board Minutes July 26

MEETING CALLED TO ORDER: 7:20 by Marv at his house. Board Members present. Marv Houg, President, Ray Anderson, Dale Stout, Matt Burns, Jay Vavra, Bill Desmarais, Kim Kleckner, Dell James, and Sharon Sonnleitner on Zoom.

MINUTES OF PREVIOUS MEETING reviewed. Motion to accept as published by Bill, 2nd by Jay. Minutes approved.

TREASURER'S REPORT: Donations of Scholarships eliminate most of Rock Show profits from checking; now $5,389.72. Move to approve report by Ray, 2nd by Bill. Treasurer's report approved.

2023 SHOW: Still waiting on contract with Hawkeye Downs. When signed dealer contracts will be sent out. Will seek membership for approval for show theme ***"Wonderful World of Agates"*** at August picnic.

AUCTION 2022—OCTOBER 8-9: Kim has acquired sufficient materials for 3 years of door prizes and pebble pit. More specimens needed for silent auction, especially agates. **Consignor contracts** sent out. **Food truck** will be contracted for Saturday; no Sunday food plans yet. **Marv** will work with Sharon to confirm list of items for flyer. **Kim will send** Sharon photos of auction items for website. **Advertising the show** will include Kim on social media, Sharon notes to previous bidders, and Kim notes to Rock Clubs in Iowa and surrounding states. **Sharon** will inventory auction supplies. **Bill will check** on his availability to provide security.

FIELD TRIPS: The club will have a field trip to Klein Quarry on Sunday August 14. Limit 25 participants. Contact Marv to sign up.

CVRMS OUTREACH: Kim presented program to Cedar Rapids Day School on July 6.

OTHER TOPICS: Nothing decided on officer liability insurance. **No one contacted Kim** about presenting Wire Wrap class. **Marv will contact John Franklin** about Flint Knapping class. **Marv proposed to change By-laws** increasing the limits on Board spending without membership approval. Jay suggested from $100 to $250. Ray seconded. Increase approved subject to Membership vote.

ADJOURNMENT: Motion to adjourn by Jay, 2nd by Bill. Meeting adjourned 8:30 pm .

Respectfully submitted,
Ray Anderson, Acting Secretary

When Did Earth's First Forests Emerge?

From Earth's tallest living plants, California's redwoods, to the planet's largest tropical rainforest, the Amazon, stately forests may seem timeless. But like every species or ecosystem, they have a birth date. In fact, though plants first arrived on land about 470 million years ago, trees and forests didn't hit the scene until nearly 390 million years ago. During that interval, plant life slowly evolved genetic precursors needed to produce trees, which then outcompeted other plants. The oldest forest on record, uncovered in Cairo, New York, have revealed that features characteristic of trees and forests (namely wood, roots and leaves amid a population of dozens of plants) appeared far earlier than previously suspected: in the early Devonian period, 385 million years ago. The Cairo site preserved fossilized root systems of ancient trees, pinpointing where they would have appeared in life. There were no fossils of the trees, but the roots mapped exactly where those trees were standing. The roots were from *Archaeopteris*, an ancient plant that boasted large woody roots and woody branches with leaves, like modern trees, according to researchers. Previously, the earliest known *Archaeopteris* find had been dated at 20 million years later. The development of these early forests depended on the evolution of precursors to defining tree traits. Researchers think that the trigger is evolutionary, the development of anatomies which allow more complex branching. Such anatomies arrived once plants had evolved "the genetic toolkit to be able to build" tree-like structures. Early branching systems, for example, developed just before the Devonian, in the Silurian period (443.8 million to 419.2 million years ago), while the first roots arrived in the early Devonian. Tree traits thereafter conferred major advantages, particularly the ability to rise above competition to soak up sunlight. Some environmental changes may have made at least one important tree feature possible, however. **Megaphylls,** leaves that are common today and are characterized by branching veins, can grow much larger than their predecessors, thus absorbing more sunlight. They first appeared about 390 million years ago but started out small and became widespread only 30 million years later, at the end of the Devonian. That delay occurred because high carbon dioxide (CO_2) levels made Earth too hot for large, megaphyll leaves, the study found. They'd simply absorb too much sunlight and overheat. Plummeting CO_2 levels in the Devonian, however, doubly benefited megaphylls: Reductions in this greenhouse gas cooled the planet, while large megaphylls could fit in more pores called stomata to take in higher levels of dwindling CO_2. Such leaves could then help push forward the forest revolution.

https://www.livescience.com/when-did-first-forests-emerge?utm_campaign=368B3745-DDE0-4A69-A2E8-62503D85375D

Spotlight Gemstone: Peridot

August's birthstone, **peridot**, is gem-quality olivine, a silicate mineral with the formula of $(Mg, Fe)_2SiO_4$. As peridot is a magnesium-rich variety of olivine (forsterite), the formula approaches Mg_2SiO_4. Its green color is dependent on the iron contents within the structure of the gem. Peridot occurs in silica-deficient rocks such as volcanic basalt as well as in pallasite meteorites. Peridot is one of only two gems not formed in the Earth's crust, but in molten rock of the upper mantle. Gem-quality peridot is rare to find on Earth's surface due to its susceptibility to weathering during transportation from deep within the mantle to the surface. With a hardness of 6.5 -7, peridot is one of the few gemstones that occur in only one color: an olive-green. The intensity and tint of the green, however, depends on the percentage of iron in the crystal structure, so the color of individual peridot gems can vary from yellow, to olive, to brownish-green. In rare cases, peridot may have a medium-dark toned, pure green with no secondary yellow hue or brown mask. Inclusions are common in peridot crystals but the variety depend on the location it is found at. Stones from Pakistan contain silk and rod like inclusions as well as black chromite crystal inclusions surrounded by circular cleavage discs resembling lily pads, and finger print inclusions. Brown Mica flakes are more evident in Arizona gems. Peridot's apple-green hue has been treasured for over 4,000 years. The Ancient Egyptians so adored Peridot that the location of its fog-shrouded volcanic mines on the Red Sea island of Zabargad were a closely guarded secret. The Romans dubbed it "*evening's emerald*" because unlike the deep-green emerald, Peridot's citrus tones remain constant even by candlelight. In the Middle Ages, Europeans adorned cathedrals with fine Peridot stones, and today many large fine peridots can be viewed in the world's museums. The largest cut peridot olivine is a 310 carat (62 g or 2.2 ounce) specimen in the Smithsonian Museum in Washington, D.C.

What in the World?

What in the World is this rare and expensive mineral and how expensive is it??

July's Photo

Last Month's **What in the World** photo showed Ankylosaurus Dinosaur Footprints in the Rocks in the Wide Toro Toro National Park Valley in Potosi, Bolivia. So far, more than 3,500 dinosaur footprints and trackways have been found inside the park, belonging to eight different species that roamed this area in the Cretaceous Period. During the Cretaceous, this area was near a vast ocean inlet whose wetlands provided an ideal habitat for dinosaurs. These track were left by armor-plated ankylosaurs with their hefty tail clubs.

ROCK CALENDAR
CVRMS EVENTS OF INTEREST

2022

Aug. 16 — CVRMS Picnic Pot Luck
Morgan Creek Park Shelter 6:00 pm; eat at 6:30
BINGO Night

Sept. 20 — CVRMS Monthly Meeting
Hiawatha Community Center 7:15 pm
Program to be determined

Sept. 23-25 — Geode Fest
First Christian Church Parking Lot
3476 Main Street
Keokuk, IA
http://keokukiowatourism.org/event calendar/geode-fest

Oct. 2 — Sunday At The Quarry
BMC Morgan Quarry
About 1 mile west of Dewer, Iowa
10:00 am — 4:00 pm

Oct. 8-9 — CVRMS Rock Auction
Amana RV Park and Event Center
Amana, Iowa
Saturday Oct. 8 Auction 9:00 a.m. to about 8:00 pm
Sunday Oct. 9 Auction 9:00 am to about 3:30 pm
(see page 10 for more information)

Oct. 21-23 — MAPS Fossil Show
Orr Building, Illinois State Fair Grounds
Springfield, Illinois
http://www.midamericapaleo.org/

Oct. 22-23 - Rocktoberfest - Gem, Mineral & Lapidary Show
Sac & Fox Lapidary Club
Jefferson Co. Fairgrounds,
2606 W Burlington St, Fairfield, Iowa

Nov. 15 — CVRMS Monthly Meeting
Hiawatha Community Center 7:15 pm
Program to be determined

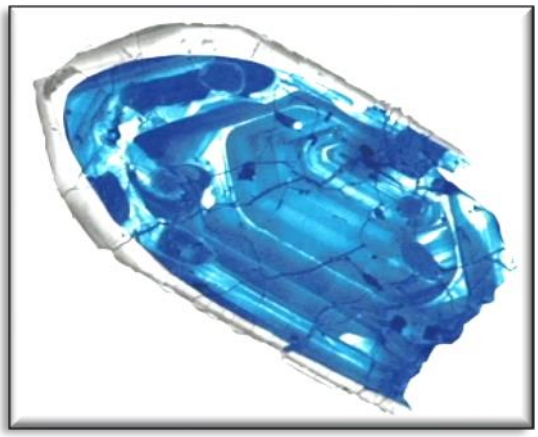
Ask a Geologist

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.

I have always enjoyed following scientists that are searching for the oldest rocks on Earth. I recently ran across this article that described zircons found in rocks in Australia that crystallized very shortly after the formation of the Earth. Zircons are very tough minerals with a very high melting point. And, they commonly host uranium atoms (nearly the same size as zirconium) in their crystal structure. As the trapped uranium atoms decay, the mother and daughter products are trapped in the zircon crystal where they can be measured allowing researchers to date when the crystals formed. I think you will enjoy this article.

Scientists say they have dated an ancient crystal called a zircon to about 4.4 billion years, making it the earliest confirmed piece of the planet's crust. The findings – the first to describe the zircon – were published in the journal Nature Geoscience on Sunday. "*This is the oldest and the best dated of all the crystals that have been reported,"* said John Valley, lead study author and professor in the Department of Geoscience at the University of Wisconsin-Madison. This crystal is a translucent red, Valley said, but glows blue when bombarded with electrons. At 400 micrometers long, its biggest dimension is just a tad larger than a house dust mite, or about four human hairs. The crystal was found in an arid region north of Perth, Australia, in a low range of hills called the Jack Hills, in 2001. Scientists say the crystal's chemistry – specifically, the ratio of oxygen isotopes within it – suggests that the temperatures on Earth 4.4 billion years ago would have supported liquid water, and therefore perhaps life. Two isotopes of an element are considered different if they contain different numbers of neutrons. "*What we've learned is that the Earth cooled much more quickly than people had thought," Valley said. "The surface formed a crust much more quickly than people thought*." Our planet is thought to be about 4.5 billion years old, but the oldest fossils are about 3.5 billion years old. That doesn't necessarily mean that no life existed before that time, but no direct evidence has been found yet. The first rocks that have been found deposited by water are about 3.8 billion years old, Valley said. But very little is known about the first 600 million years or so of the planet's history, known as the "**Hadean Eon**" because it was thought to be "*hell-like*," Valley said. The leading theory is that Earth was bombarded by meteors in its early history. It took a big hit from an object the size of Mars about 4.5 billion years ago, leading to the formation of the moon. These impacts vaporized the Earth's crust and formed a super-hot magma ocean. Evidence including this zircon suggests that within the first 100 million to 200 million years of its existence, our planet cooled enough to make crust. Steam from the atmosphere condensed to make oceans. *"Once you know that there were oceans, it's very reasonable that there would have been life that early*" – even when it was only 200 million years old, Valley said. Valley and colleagues reported on a different crystal from early Earth in 2001 from the same Jack Hills area. But there had been an open question regarding that crystal and others about how to determine the age. The standard method of dating such rocks involves looking at the radioactive decay of uranium atoms to lead. But if the lead has moved within the crystal over time, this could lead to a faulty estimate of age. If lead has migrated away from the area of the rock being tested, that could make the rock appear younger than it is, or older if lead has concentrated itself. In this new study, researchers used a technique called atom-probe tomography, which allows scientists to image single atoms of lead and determine the isotope ratio. Scientists found that clumps of lead atoms had formed 1 billion years after the zircon crystallized. These clusters are tiny, about 5 to 10 nanometers in diameter. All that means that the lead atoms hadn't moved enough to thwart scientist's existing methods of determining the crystal's age, Valley said. They determined that age to be 4.4 billion years old. *"Although incredibly laborious, their analytical technique can be applied to not only additional terrestrial zircons but also to zircons from meteorites and lunar samples, to perhaps tease out a detailed thermal history of magmatism and impacts,"* Samuel Bowring, professor of geology at Massachusetts Institute of Technology, wrote in an accompanying article in *Nature Geoscience*. https://www.cnn.com/2014/02/24/world/oldest-earth-fragment/index.html#:~:text=From%20a%20sheep%20ranch%20in,piece%20of%20the%20planet's%20crust.



The 4.4 billion year old zircon is about 1/100th of an inch in the long direction (about the size of a dust mite.)

How do Oysters Make Pearls ?

While nearly all of the world's most treasured gemstones can be found buried underground, pearls hide in a far more unexpected setting: inside a shell. So how exactly did these iridescent jewels wind up in such an unlikely place? Despite what many people may think, pearls aren't the result of an errant speck of sand weaseling its way inside the shell of an unsuspecting mollusk. In fact, sand (which is common in the aquatic environments where mollusks live) isn't involved at all. Instead, pearls are formed when an irritant, such as a food particle or a parasite, slips between the shells of an oyster or other mollusk and lodges into its mantle, the muscular wall where its internal organs are located. In an act of self-defense, the invertebrate oozes a liquid containing **aragonite** (*a carbonate mineral*) and **conchiolin** (*a protein*), and as the secretion intermingles with the intruder, it creates a material called **nacre**, or **mother-of-pearl**. Over time, these layers of nacre turn into what eventually becomes a pearl. Pearls come in a variety of colors, shapes and sizes, and much like snowflakes, no two are the same (even in the case of cultured freshwater pearls). These commercially farmed gemstones are the result of human intervention, in which a farmer implants a small bead made of shell into the interior of a mussel to kickstart the nacre-secreting process. The vast majority of pearls sold on the market today are cultured, according to the Gemological Institute of America. The lustrous nature of pearls has made them a coveted item for thousands of years and across many cultures. In Hindu folklore, it was believed that the moon would drip dewdrops into the sea that turned into pearls, while Greek mythology professed that pearls were tears of joy shed by the goddess Aphrodite. Regardless of where pearls came from, throughout history, they were often just as valuable, if not more so, as gold and diamonds, often being strung into jewelry or offered as a form of trade. Not surprisingly, pearls became associated with nobility, with Julius Caesar passing a law that only aristocrats could don pearls while in Rome, and Cleopatra dissolving a pearl earring in vinegar and drinking the brew to win a bet against her lover Marc Anthony. Today, pearls continue to captivate, thanks to their beauty and the curious nature in which they're formed. https://www.livescience.com/32289-how-do-oysters-make-pearls.html

Tiny Gemstones Show When Earth's Crust First Started Moving

A thin layer of rock and dirt covers the Earth. Known as the crust, it may have begun moving roughly **3.8 billion years ago**. That's the finding of a new study. A handful of ancient **zircon crystals** found in South Africa hold the oldest evidence of subduction, a key element of plate tectonics, according to a newly published study. These rare time capsules from Earth's youth point to a transition around 3.8 billion years ago from a long-lived, stable rock surface to the active processes that shape our planet today, providing a new clue in a hot debate about when plate tectonics was set in motion. Earth's crust and the top layer of mantle just under it are broken up into rigid plates that move slowly on top of viscous but mobile lower layers of mantle rock. Heat from Earth's core drives this slow but inexorable motion, responsible for volcanoes, earthquakes, and the uplift of mountain ranges. Estimates for when this process revved up and modern crust formed range from over 4 billion years ago to just 800 million years ago. Uncertainty arises because the geologic record from Earth's youth is sparse, due to the surface recycling effect of plate tectonics itself. Almost nothing remains from the Hadean Eon, Earth's first 500 million years. In an exciting step forward in solving this mystery, in 2018 researchers unearthed a chronological series of 33 microscopic zircon crystals from a rare, ancient block of crust in the Barberton Greenstone Belt in South Africa, that formed at different times over a critical 800-million-year span from 4.15 to 3.3 billion years ago. Zircon is a relatively common accessory mineral in Earth's crust, but ancient representatives from the Hadean Eon, 4 to 4.56 billion years ago, are exceedingly rare, found in only 12 places on Earth, and usually in numbers fewer than three at each location. Hafnium isotopes and trace elements preserved in the Greenstone Belt zircons told a story about the conditions on Earth at the time they crystalized. Zircons 3.8-billion-years-old and younger appeared to have formed in rock experiencing pressures and melting similar to modern subduction zones, suggesting the crust may have started moving. At 3.8 billion years there is a dramatic shift where the crust is destabilized; we have new rocks forming and we see geochemical signatures becoming more and more similar to what we see in modern plate tectonics. In contrast, the older zircons preserved evidence of a global cap of "*protocrust*" derived from remelted mantle rock that had remained stable for 600 million years, the study found. https://www.geologyin.com/2022/07/tiny-gemstones-show-when-earths-crust.html

Cognac-colored crystal of Zircon on a sugary, tan matrix of calcite

CVRMS News and Information:

CVRMS Contributes $11,249 to Area Education Programs

Using a formula defined in CVRMS By-Laws, the profits from our **2022 Rocks, Fossils, and Minerals Show** were divided between three local educational programs. Funding for scholarships were presented to The **University of Iowa Department of Earth and Environmental Sciences** (**$5,375**) and the **Cornell College Department of Geology** (**$3,687**), and funding to help advance the educational programs of the **Grant Wood Educational Agency's Van Allen Science Teaching Center ($2187).**

Kim Kleckner Presents Program to Cedar Rapids Day School

Wednesday, July 6th, **Kim Kleckner** (CVRMS Liaison) gave a 1 hour presentation about **Rocks of Iowa** to students ages 6-8 at the **Cedar Rapids Day School** in downtown CR. Each child received a bag of six specimens to help them learn about common rocks that can be found in Iowa. We also discussed other treasures that you might come across like bones and skulls, which they enjoyed handling/observing. Great group with many excellent questions. See photos below.

Kim Kleckner and the Cedar Rapids Day School students.

Kim's students examining rock specimens.

Paul Stults and Others Visit REM

CVRMS member Paul Stultz arranged a geode cracking session for six clients and two staff members of a local REM Iowa organization at his shop on July 16. Paul, Jeff Groff and Glen Rocca spent several hours cracking geodes, passing them around with a lot of "*oohs*" and "*ahhs*" from the different minerals and habits displayed. Though the loudest exclamations came when we would turn off the room lights and shine our UV lights on the geodes showing the red, white, yellow and green fluorescent and phosphorescent colors of the different minerals. The clients and staff were given the geodes to take home along with rocks and minerals that Paul donated.

How Long Does it Take to Make Petrified Wood

Petrified Forest National Park, in northeastern Arizona, is known for, and named in honor of, its extensive deposits of petrified wood. So impressive and picturesque is the forest that it was used as the backdrop for the 1936 romantic thriller *"The Petrified Forest,"* starring Bette Davis and Humphrey Bogart. But what, exactly, is petrified wood? How is it made, and how long does it take to form? Petrified wood is essentially mineralized wood. For wood to become petrified, it has to be buried quickly under mud, silt or volcanic ash before any rotting can set in. It needs to be buried within this sediment for an extended period of time (usually millions of years). If the ground in which the wood is buried is particularly well compacted, it won't be able to interact with oxygen or organisms, so it won't decay. In such instances, the organic material becomes fossilized. During this process, known as mineralization, groundwater rich in minerals flows through the sediment and the dead tree, whose woody remains are replaced over time by the water's minerals. In the case of petrified wood, these minerals tend to be silica, calcite, pyrite or another inorganic material, such as opal. So, although the material is called petrified "*wood,*" it is actually not wood at all; rather, the minerals have replaced and taken on the appearance of the wood that was once there. The mineralization can be from either mineral precipitation in or between the wood's cellular structures, or mineral replacement of the actual organic material that once made up the cell walls of the wood. The former process is called permineralization, while the latter is simply called replacement. This can take a very long time (on a human time-scale), but on rare occasions it can be amazingly quick, for example in mineral hot springs, such as those at Yellowstone National Park. Much of the petrified wood we see in the rock record, though, formed over longer timescales of thousands to millions of years and, sometimes, re-mineralization in multiple stages. The exact amount of time needed for wood to become petrified depends on the conditions, the main one being how rich the groundwater is in minerals such as silica, but generally ranges from hundreds of thousands of years to millions of years. Those long timescales mean petrified wood forms better in some environments and locations than in others. Many of the world's most famous petrified wood localities are in sedimentary rocks that were deposited in fluvial-lacustrine (rivers - lakes) paleoenvironmental conditions. Once the wood was buried in these locations, groundwater supplied the minerals needed to petrify the wood and eventually remove all of the tree's original organic matter. Petrified wood is found in the fossil record ever since the Devonian Period, more than 350 million years ago. https://www.livescience.com/32316-how-long-does-it-take-to-make-petrified-wood.html

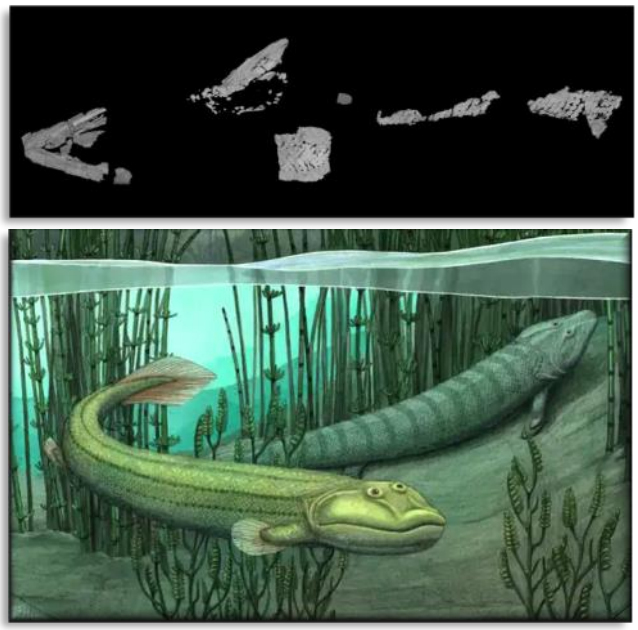
Diamond Formed Deep Inside Earth Holds Never-Before-Seen Mineral

Within a diamond formed deep beneath Earth's surface, scientists have discovered the first example of a never-before-seen mineral. Named **davemaoite** after prominent geophysicist Hokwang (Dave) Mao, the mineral is the first example of a high-pressure calcium silicate perovskite ($CaSiO_3$) found on Earth. Another form of $CaSiO_3$, known as *wollastonite*, is commonly found across the globe, but davemaoite has a crystalline structure that forms only under high pressure and high temperatures in Earth's mantle, the mainly solid layer of Earth trapped between the outer core and the crust. Davemaoite has long been expected to be an abundant and geochemically important mineral in Earth's mantle. But scientists have never found any direct evidence of its existence because it breaks down into other minerals when it moves toward the surface and pressure decreases. However, analysis of a diamond from Botswana, which formed in the mantle around 410 miles below Earth's surface, has revealed a sample of intact davemaoite trapped inside. As a result, the International Mineralogical Association has now confirmed davemaoite as a new mineral. *"The discovery of davemaoite came as a surprise,"* according to lead author Oliver Tschauner, a mineralogist at the University of Nevada, Las Vegas. Tschauner and his colleagues uncovered the davemaoite sample with a technique known as synchrotron X-ray diffraction, which focuses a high-energy beam of X-rays on certain spots within the diamond with microscopic precision. The sample of davemaoite within the diamond was just a few micrometers (millionths of a meter) in size, so less-powerful sampling techniques would have missed it. Davemaoite is believed to play an important geochemical role in Earth's mantle. Scientists theorize that the mineral may also contain other trace elements, including uranium and thorium, which release heat via radioactive decay. Therefore, davemaoite may help to generate a substantial amount of heat in the mantle. The discovery of davemaoite shows that diamonds can form farther down in the mantle than previously thought, and it suggests that they might be the best place to look for more new minerals from the mantle. https://www.livescience.com/new-mantle-mineral-found-in-diamond

Researchers discovered the mineral davemaoite inside a diamond that was formed in Earth's mantle.

One of The First Animals to Venture Onto Land Went Straight Back Into The Water

Approximately 365 million years ago, one group of fishes left the water to live on land. These animals were early tetrapods, a lineage that would radiate to include many thousands of species including amphibians, birds, lizards and mammals. Human beings are descendants of those early tetrapods, and we share the legacy of their water-to-land transition. But what if, instead of venturing onto the shores, they had turned back? What if these animals, just at the cusp of leaving the water, had receded to live again in more open waters? A new fossil suggests that one fish, in fact, did just that. In contrast to other closely related animals, which were using their fins to prop their bodies up on the bottom of the water and perhaps occasionally venturing out onto land, this newly discovered creature had fins that were built for swimming. In March 2020, researchers at The University of Chicago were preparing a fossil that was collected back in 2004 during an expedition to the Canadian Arctic. From the surface of the rock it was embedded in, they could see fragments of the jaws, about 2 inches long with pointed teeth. There were also patches of white scales with bumpy texture. The anatomy suggested that the fossil was an early tetrapod. But researchers wanted to see inside the rock, so they used a CT scanner, which shoots X-rays through the specimen, to look for anything that might be hidden within. They discovered it contained a complete fin buried inside. A fin can give scientists clues into how early tetrapods were evolving and how they were living hundreds of millions of years ago. For example, based on the shape of certain bones in the skeleton, they can predict whether an animal was swimming or walking. Although that first scan of the fin was promising, they needed to see the skeleton in higher resolution. So they used a rock saw to trim away excess rock, allowing for a better scan and a closer view of the fin. After a new scan they realized that this animal was a new species, one of the closest known relatives to limbed vertebrates (creatures with fingers and toes). They named it *Qikiqtania wakei*. Its genus name, pronounced "*kick-kiq-tani-ahh,*" refers to the Inuktitut words *Qikiqtaaluk* or *Qikiqtani*, the traditional name for the region where the fossil was found. When this fish was alive, many hundreds of millions of years ago, this was a warm environment with rivers and streams. Its species name honors the late David Wake, a scientist and mentor who inspired so many of us in the field of evolutionary and developmental biology. *Qikiqtania* revealed a lot about a critical period in our lineage's history. Its scales tell researchers unambiguously that it was living underwater. They show sensory canals that would have allowed the animal to detect the flow of water around its body. Its jaws tell us that it was foraging as a predator, biting and holding onto prey with a series of fangs and drawing food into its mouth by suction. But it was *Qikiqtania*'s pectoral fin that was most surprising. It had a **humerus bone**, just as our upper arm does. But *Qikiqtania*'s has a very peculiar shape. Early tetrapods, like *Tiktaalik*, have humeri that possess a prominent ridge on the underside and a characteristic set of bumps, where muscles attach. These bony bumps tell us that early tetrapods were living on the bottom of lakes and streams, using their fins or arms to prop themselves up, first on the ground underwater and later on land. *Qikiqtania*'s humerus is different. It lacked those trademark ridges and processes. Instead, its humerus is thin and boomerang-shaped, and the rest of the fin is large and paddle-like. This fin was built for swimming. Whereas other early tetrapods were playing at the water's edge, learning what land had to offer, *Qikiqtania* was doing something different. Its humerus is truly unlike any others known. Researchers believe that *Qikiqtania* had turned back from the water's edge and evolved to live, once again, off the ground and in open water. Evolution isn't a simple, linear process. Although it might seem like early tetrapods were trending inevitably toward life on land, *Qikiqtania* shows exactly the limitations of such a directional perspective. Evolution didn't build a ladder towards humans. It's a complex set of processes that together grow the tangled tree of life. New species form and they diversify. Branches can head off in any number of directions. This fossil is special for so many reasons. It's not just miraculous that this fish was preserved in rock for hundreds of millions of years before being discovered by scientists in the Arctic, on Ellesmere Island. It's not just that it's remarkably complete. It also provides, for the first time, a glimpse of the broader diversity and range of lifestyles of fishes at the water-to-land transition. It helps researchers see more than a ladder and understand that fascinating, tangled tree. *Qikiqtania* was found on Inuit land, and it belongs to that community. https://www.sciencealert.com/one-of-the-first-animals-to-venture-onto-land-went-straight-back-into-the-water



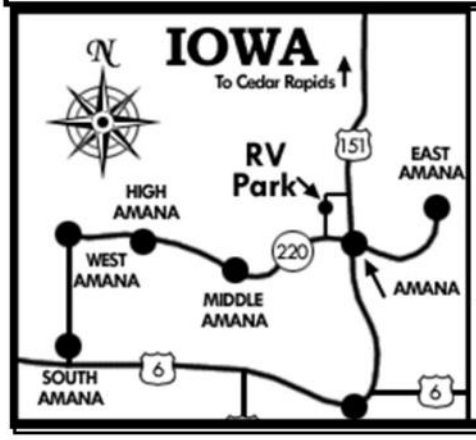
The fossil of *Qikiqtania wakei* (above) and an artists representation of the animal (below).

2022 Auction Venue - Amana, Iowa

The CEDAR VALLEY ROCKS & MINERALS SOCIETY Presents

A TWO-DAY ROCK and MINERAL AUCTION

Amana RV Park and Event Center, 3850 C St, Amana, Iowa 52203
Saturday, October 8 – 9:00 a.m. - 7 p.m.?
Sunday, October 9 – 9:00 a.m. – 3 p.m.?
Viewing Hours: Fri., Oct. 7, from 5:00 to 7:30 p.m.; Sat. at 7:30 a.m.; Sun at 8:00



APPROXIMATELY
1,300 LOTS
From Several Collections

LOTS of Equipment, Minerals, Rough, Fossils, Equipment, Books

HOT FOOD AVAILABLE
CAMPING AVAILABLE
(www.amanarvpark.com)

THE FOLLOWING IS A PARTIAL LIST OF ITEMS TO BE AUCTIONED
EQUIPMENT WILL SELL AT 2:00 ON SATURDAY

ROCKS & MINERALS

AGATE: Bahia, polished; Botswana rough; Casa Grande (cut); Coldwater; Fire rough; Green tree rough; Laguna; Lake Superior; Madascar Dendritic (Mad River Agate); Mexican lace rough; Turritella
Amethyst, standing, crystals, clusters, buttons
Apophyllite
Barite, Linwood Mine
Buckets of Rough
Cactus Quartz
Calcite, iridescent (Knoxville IA)
Calcite, Linwood Mine
Citirine
Emerald in matrix
Fluorescent Specimens (Willemite, Calcite, Franklinite), Trotter Dump Franklin N.J
Fluorite, octahedrons & specimens
Geodes, Tobasco, Ocho
Geodes, uncracked and cracked
Herkimer Diamonds
India Zeolites
Jade
Labradorite Palm-stones
Misc. slabs
Mixed Minerls
Ocean Jasper slabs, rough
Quartz
Rhodochrosite Sphere
Ruby (corundum xls)
Selenite, wands, cubes, xls
Solution Quartz, Jeffry Quarry, ARStilbite
Thomsonite
Thundereggs, cut
Tourmaline, black

EQUIPMENT (will sell at 2:00 on Sat.)

4 ft. Setup for Tumbler Barrels
Air Compressor
Assorted Parts
Belt Sander
Blower Fan
Combo Units, some with Saws (6)
Drop Saws (3)
Electric Solder Machine
Kiln
Motors
Polish
Sand Blasters, 1 mini, 1 large, 1 small table-top
Saws, 6" to 20" (5 or 6)
Spin Caster
Tumbler (2-barrel Lot-O-Tumbler)
Tumbler Barrels
Tumbler Frames
Tumbler, 4-5 lb.
Vacuum Pumps
Vibro-Tumbler, 2-barrel
Wood Display
Wood Spool Polisher in Case
Wooden Storage Drawers

BOOKS

The Fabulous Keokuk Geodes
The Wilmington Coal Flora

FOSSILS

Arizona Petrified Wood Piece, 100 lbs+
Petrified Wood, full rounds
Blue Forest Petrified Wood, polished
Trilobite, Acadoparadoxides, Morocco

MISC.

Magnetic Bracelets
Plastic "5-dram" jars with lids (new)
Rock & Gem magazines
Septarian Spheres

JEWELRY.

Belt Buckle findings
Bolo Ties and findings
Jade Butterfly Broaches
Jewelry Findings



I.D. will be required to obtain buying number. Cash, credit card (2.75% convenience fee) or good check. Two forms of I.D. required for all checks.
7% tax added to all sales. Buyers who provide proof of tax permits are exempt.
No items removed until settled for on day of sale. Not responsible for accidents, theft or damage.
Announcements day of sale take precedence over advertising.
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https://www.cedarvalleyrockclub.org/auction.html

The 'Weirdest Wonder' of Evolution Had an Even Weirder Cousin, New Study Finds

With five eyes, a backward-facing mouth, and a long, claw-tipped trunk where its nose should be, *Opabinia regalis* is one of the strangest-looking celebrities of the Cambrian period. In fact, this ancient sea-dweller is so unique that scientists have never discovered another species in the fossil record that appears to fit into its alien-faced family. **That is, until now.** Meet ***Utaurora comosa,*** a small, spiky-tailed marine animal that lived a few million years after *Opabinia* in what is now North America. First described in 2008, *U. comosa* was originally classified as a relative of the fearsome *Anomalocaris*, a claw-faced apex predator that terrorized the Cambrian seas. But a new study suggests that *U. comosa* may have been much more than just another ancient predator. In a paper published earlier this year in the journal ***Proceedings of the Royal Society B***, researchers reexamined the only known *U. comosa* fossil, comparing it with more than 50 living and extinct animal specimens. The team concluded that *U. comosa* is almost certainly a relative of *Opabinia,* and not a relative of *Anomalocaris,* making *U. comosa* only the second member of *Opabinia*'s family ever discovered and the first one found in more than 100 years. *"The weirdest wonder of the Cambrian no longer stands alone,"* the researchers wrote in their paper. From **541 million to 485 million years ago**, Earth's seas bloomed with biodiversity for the first time. This era, sometimes called the **Cambrian explosion**, was when the relatives of all major animal groups alive today first appeared in the water. The Cambrian explosion also gave rise to the world's first truly fearsome apex predators. Those carnivorous killers are known as the **radiodonts**, a reference to the circular-saw-shaped mouths on the undersides of their heads. Many of them, including the infamous *Anomalocaris,* also had grasping, claw-like appendages on the fronts of their heads, likely for snatching unsuspecting prey and delivering it to their hungry mouths. The only known fossil of *U. comosa,* discovered in Utah's Cambrian Wheeler Formation, had no such appendages on its head. Meanwhile, its inch-long body was segmented into 14 or 15 furrows, each tipped with a pointy flap, much like *Opabinia*. Despite these details, the *U. comosa* fossil was classified as a radiodont in 2008. That didn't sit right with paleontologist Stephen Pates, a former Harvard graduate student and lead author of the new study. So, in their new paper, Pates and his colleagues reexamined the *U. comosa* fossil, comparing 125 of the fossil's traits with more than 50 groups of living and extinct arthropods, which is the largest phylum in the animal kingdom and includes all insects, crustaceans and arachnids. The team's analysis showed that almost none of *U. comosa*'s traits fit in with the radiodont family; rather, the fossil creature was almost certainly related to *Opabinia*. *"This means Opabinia was not the only opabiniid,"* Pates said in a statement. *"Opabinia was not as unique a species as we thought."* These findings are exciting for a few reasons, not the least of which is that *Opabinia* can now invite at least one other species to its family reunions. In a broader sense, the existence of another opabiniid shows that this wasn't just a family of weirdos but that both creatures were "*part of a bigger picture*" of Cambrian evolution, Pates said. With their backward-facing mouths and furrowed bodies that appear almost segmented, *Opabinia* and *U. comosa* seem to be clear predecessors of modern arthropods, many of which possess these same traits, Pates added. https://www.livescience.com/cambrian-period-opabinia-extinct-relative

An artist's rendering of Utaurora feeding in the Cambrian sea.

The fossil of *Utaurora comosa*, found in Utah's Wheeler Formation.

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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:

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CVRMS website:
cedarvalleyrockclub.org

Next Meeting:
AUGUST 16
Morgan Creek Park
Pot Luck Picnic
Bingo & Rock Show & Tell

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