



Cedar Valley Gems

Cedar Valley Rocks & Minerals Society

Cedar Rapids, Iowa

cedarvalleyrockclub.org



CEDAR VALLEY GEMS

AUGUST 2024

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**Next CVRMS Meeting
Tues. August 20
we eat at 6:30 pm
Pot-Luck Picnic!**

**at Morgan Creek Park
7212 E Ave NW, Cedar Rapids**



**Rock Hound Bingo
Rock Identification**

**Rock Show & Tell
(bring some rocks to show off
or learn more about)**

- **Bring Your Favorite Dish to Share**
- **Bring Your Own Table Service**

Study Finds Life on Earth Emerged 4.2 Billion Years Ago

Once upon a time, Earth was barren. Everything changed when, somehow, out of the chemistry available early in our planet's history, something started squirming, processing available matter to survive, to breed, to thrive. Now, a new study has found that life emerged surprisingly early. By studying the genomes of organisms that are alive today, scientists have determined that the last universal common ancestor (LUCA), the first organism that spawned all the life that exists today on Earth, emerged as early as **4.2 billion years ago**. Earth, for context, is around 4.5 billion years old. That means life first emerged when the planet was still practically a newborn. Back then Earth was a very different place, with an atmosphere that we would find extremely toxic today. Oxygen, in the amount current life seems to need, didn't emerge until around 3 billion years ago. But life emerged prior to that; we have fossils of microbes from 3.48 billion years ago. And scientists think that conditions on Earth may have been stable enough to support life from around 4.3 billion years ago. But our planet is subject to erosional, geological, and organic processes that make evidence of that life, from that time, almost impossible to find. So researchers from the University of Bristol went looking somewhere else: in genomes from living organisms, and the fossil record. Their study is based on something called a molecular clock. Basically, we can estimate the rate at which mutations occur, and count the number to determine how much time has passed since the organisms in question diverged from common ancestors. All organisms, from the humblest microbe to the mightiest fungus, have some things in common. There's a universal genetic code. The way we make proteins is the same. There's an almost universal set of 20 amino acids that are all oriented the same way. And all living organisms use adenosine triphosphate (ATP) as a source of energy in their cells. What they found was probably very similar to a prokaryote, a single-celled organism that doesn't have a nucleus. It was obviously not reliant on oxygen, since there would have been little oxygen available; that's not unexpected for a microbe. As such, its metabolic processes probably produced acetate. But what is really interesting is that it's clear it possessed an early immune system, showing that even by 4.2 billion years ago, our ancestor was engaging in an arms race with viruses. This implies that it takes relatively little time for a full ecosystem to emerge in the evolutionary history of a planet – a finding that has implications far beyond our own little pale blue dot. <https://www.sciencealert.com/gobsmacking-study-finds-life-on-earth-emerged-4-2-billion-years-ago>

Stegosaurus 'Apex' Sold for Nearly \$45 Million to a Billionaire

A hedge-fund billionaire has purchased a nearly complete stegosaurus skeleton dubbed "Apex" for **\$44.6 million**. Confirmed first by *The Wall Street Journal*, founder and CEO of Citadel LLC Ken Griffin paid about ten times Sotheby's pre-sale estimate of somewhere between \$4 and \$6 million. His purchase marks the most money ever paid for dinosaur fossils—and is not without controversy. First announced on July 10, the auction house described roughly the 150-million-year-old remains as "the finest Stegosaurus skeleton to ever come to market." Discovered in 2022 by a commercial paleontologist in Colorado, Apex includes 254 of its total 319 fossil bone elements. At 11-feet-tall and 27-feet-long from nose to tail, the ancient animal was large for its species, and even lived long enough to develop arthritis, according to Sotheby's. "Professionally prepared, and accurately articulated anatomically, the skeleton is mounted in an aggressive attack pose on a custom steel armature," read Apex's official lot description, which adds "the specimen was meticulously prepared to the highest standards" to showcase its "natural beauty" and "important contextual information" like fossilized skin impressions and three pieces of throat armor known as ossicles. Apex's final sales price is well beyond the previous \$31.8 million fossil auction record set in 2020 by "Stan," a Tyrannosaurus rex. But such auctions are drawing increasing criticism



and scrutiny within the scientific community. "\$44.6 million for a stegosaurus? Sorry, the paleontologists around me are laughing," Jingmai O'Connor, a paleontologist at Chicago's Field Museum, told *The New York Times*. At least one other paleontologist declined an invitation to examine the skeleton because they didn't want to promote a specimen that could be sold to a commercial buyer. The lucrative collector's market for dinosaur bones often makes it very difficult for institutions like museums, universities, and other expert organizations to financially compete with wealthy, private purchasers. Meanwhile, critics have repeatedly accused auction houses like Sotheby's of wildly overinflating the presale estimates of recent remains in the hopes of netting another massive profit after 2020's then record-setter, Stan, which is currently located at a natural history museum in Abu Dhabi, UAE. Although remains as complete as Apex are extremely rare, the amount of partial remains available to the scientific community also casts doubt on its potential research importance. *The WSJ* reports Apex's new owner and frequent Republican Party donor intends to lend the skeleton to a US museum. "Apex was born in America and is going to stay in America," Griffin said after the sale.

<https://www.popsi.com/science/stegosaurus-skeleton-sale/>

CVRMS Board Meeting July 23 — Minutes —

MEETING CALLED TO ORDER: 7:11 pm by Marv Houg at his house. Board members present, Marv, Dale, Sharon, Bill, Ray, Dell, and Matt

MINUTES FROM PREVIOUS MEETING reviewed and motion made to approve by Dale; seconded by Bill. Motion to approve.

TREASURERS REPORT by Dale. Checking account balance \$2538.13. Motion to accept by Ray seconded by Matt. Treasurers report approved.

SHOW THEME IDEAS. Already decided; *ICE AGES*.

CVRMS ROCK AUCTION: A couple of consignors have dropped out. Members have some ideas that maybe more consignors will increase their numbers. Still plan on having about 1200 lots available for auction. **Will have a food truck** on Saturday and Sharon will supply the food on Sunday. Dell will supply the food for workers on Friday. **Darren will not be at the auction due to a conflict**, but Marv will call and see if he will still bring his lots.

FLINT KNAPPING CLASS: Thursday July 26th 1:00 to 3:00. There is a total of 15 registered. First time offered by club. Beginners only. Supplies will be provided.

IT IS WITH REGRETS that we have to announce the passing of Deb Tisor. Deb was the **River Products Quarry** manager and a valued supporter of our club. Ray will work on a plaque for the rock display case located at River Products office.

UV FILTERS: Sell them at auction.

REQUESTS FOR PROGRAMS: Ray has Solon library for Sept and October. Bill reported on his last presentation at the Corps of Engineers headquarters; 66 people attended.

BILL'S BIG BAD BUS BOOGIE 2024: Bill announced that we have lined up our bus trip for Saturday, October 5th. Leave at 6:30am and return about 6:00pm. Bring a sack lunch. Stops include the **Calkins Nature Area** near Alden and the **Grotto of the Redemption in West Bend**.

AUGUST PICNIC: We need Rock Bingo prizes for the picnic. Marv has some flats of calcite and geodes that he will sell to the club for bingo prizes. Motion made by Matt to pay Marv \$95 for the bingo prizes; seconded by Ray. Motion carried.

MOTION TO ADJOURN by Bill, second Ray. Meeting adjourned at 8:15pm.

Respectfully submitted

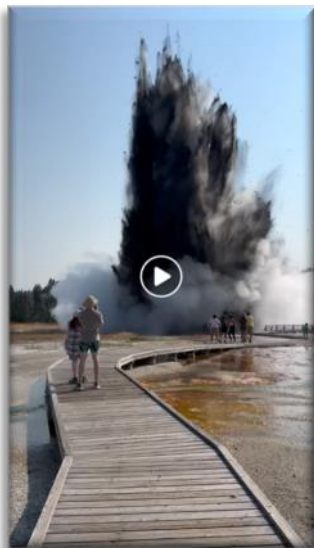
Dell James secretary

HELP NEEDED

A volunteer who regularly attends CVRMS monthly meetings is needed to assume the duties of Club Hostess. You will be in charge of bringing refreshments to the monthly meetings

Yellowstone Geyser Erupts, Firing Steam and Debris Over Tourists

A surprise hydrothermal eruption at Yellowstone National Park coughed up huge clouds of steam and dust on July 23, according to the National Park Service, prompting visitors to flee and staff to close the area.



open to view video

<https://www.facebook.com/vlada.bolotinsky/videos/1671583060070276/>

Videos posted online show dozens of people along a boardwalk running away from a 100-foot-tall plume of debris in Yellowstone's Biscuit Basin, located just north of the Old Faithful geyser. Biscuit Basin is known for its collection of colorful geysers and thermal pools, including Sapphire Pool, which is close to the eruption site. No one was injured by the eruption, which took place at 10:19 a.m. Mountain Time, but the nearby boardwalk "will need a few repairs," representatives of the U.S. Geological Survey (USGS) wrote in a post on the social platform X. Pictures taken after the eruption showed rocky debris and silt strewn across the boards and guardrails. "What we saw today was spectacular

and definitely hazardous," Michael Poland, scientist-in-charge of the Yellowstone Volcano Observatory, stated. The eruption, which was "relatively small" compared with past eruptions in Yellowstone, was nevertheless "a very good reminder of an underappreciated hazard," Poland said. Clogs in the natural plumbing system underlying Yellowstone may have triggered the eruption, Poland said. Blockages may have fueled a buildup of heat and pressure in a passageway beneath Biscuit Basin, which in turn may have flashed water into steam, causing a sudden expansion in volume that sparked an explosion, he said. "We saw more steam coming up and within seconds it became this huge thing," said a park visitor. "It just exploded and became like a black cloud that covered the sun."

The eruption doesn't mean volcanic activity beneath Yellowstone is ramping up, according to the NPS. "Today's explosion does not reflect a change in the volcanic system, which remains at normal background levels of activity," representatives wrote. The explosion is small compared with past hydrothermal events at Yellowstone, including a series of eruptions 13,800 years ago in the Mary Bay area on the northeastern side of Yellowstone Lake. Those eruptions blew out a crater measuring 1.5 miles across, the largest known from a hydrothermal explosion on Earth. Yellowstone staff and USGS geologists are monitoring the area and will reopen it to visitors once it is safe to do so, according to the NPS.

<https://www.livescience.com/planet-earth/geology/spectacular-and-definitely-hazardous-yellowstone-geyser-erupts-firing-steam-and-debris-over-nearby-tourists>

Spotlight Gemstone: Peridot

August's Birth Stone



Peridot, sometimes called *chrysolite*, is a yellowish-green transparent variety of olivine. The word peridot comes from the Arabic root word of *Faridat*, which means gem. Peridot is one of the few gemstones that occur in only one color, 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. Lighter-colored gems are due to lower iron concentrations. Peridot can be found in silica-deficient mafic (igneous rocks that are rich in iron and magnesium) and ultramafic rocks occurring in lava and peridotite xenoliths from the mantle. However, gem-quality peridot occurs in only a fraction of these settings. Peridot is one of only two gems that is **not** formed in Earth's crust, but deep in the molten rock of the upper mantle. Peridot has a chemical formula of $(\text{Mg}, \text{Fe})_2\text{SiO}_4$ and is the principal birthstone for the month of August (spinel and sardonyx are also recognized as August birthstone). Olivine, the mineral name of peridot, is a common mineral, Peridot crystals have been collected from some *pallasite* meteorites. Pallasitic (extraterrestrial) peridot differs chemically from its earthbound counterpart, in that pallasitic peridot lacks nickel. Peridots can be differentiated by size and composition. A peridot formed as a result of volcanic activity tends to contain higher concentrations of lithium, nickel and zinc than those found in meteorites. Olivine is an abundant mineral, but gem-quality peridot is rather rare due to its chemical instability on Earth's surface. Olivine is usually found as small grains and tends to exist in a heavily weathered state, unsuitable for decorative use. Large crystals of forsterite, the variety most often used to cut peridot gems, are rare; as a result, peridot is considered to be precious. Peridot has always been associated with light. In fact, the Egyptians called it the "gem of the sun." Some historians believe that Cleopatra's famous emerald collection might actually have been peridot. In the ancient world, the mining of peridot on St. John's Island in the Red Sea began about 300 B.C. The principal source of peridot olivine today is the San Carlos Apache Indian Reservation in Arizona. It is also mined at another location in Arizona, and in Arkansas, Hawaii, Nevada, and New Mexico at Kilbourne Hole, in the US; and in Australia, Brazil, China, Egypt, Kenya, Mexico, Myanmar (Burma), Norway, Pakistan, Saudi Arabia, South Africa, Sri Lanka, and Tanzania.

What in the World?



What in the World is this conglomeration??
 (Hint: It is not one of Dell's desserts.)

July's Photo



Last month's **What in the World** photograph was a cannonball concretion in "Valley of the Planets" an unusual area in the Krufa region of the Libyan desert. The concretions average about 35 feet in diameter, and are said to make visitors feel like they are in outer space. Little is published on the geology of this site.

ROCK CALENDAR CVRMS EVENTS OF INTEREST

2024

- Aug. 20 — CVRMS Monthly Meeting**
 Picnic at Morgan Creek Park, Marion - Eat at 6:30
Rock Show and Tell and Rock Bingo

- Sept. 17 — CVRMS Monthly Meeting**
 Hiawatha Community Center 7:15 pm
Program to be announced

- Sept. 21-22 — CVRMS Rock Auction**
 Amana RV Park
 Saturday Sept. 21—9:00 am—8:00 pm
 Sunday Sept. 22 —9:00 am—3:30 pm

- Sept. 27, 28, & 29 — Geode Fest**
 First Christian Church Parking Lot
 3476 Main Street, Keokuk, Iowa
Keokuk Area Convention & Tourism Bureau
[Official Website \(keokukiowatourism.org\)](http://Official Website (keokukiowatourism.org))

- Oct 5 — Bill's Big Bus Boogy 2024**
 CVRMS Bus Trip to the Grotto of the Redemption
 and Calkins Nature area
Details in next month's newsletter

- Oct. 15 — CVRMS Monthly Meeting**
 Hiawatha Community Center 7:15 pm
Program to be announced

- Nov. 19 — CVRMS Monthly Meeting**
 Hiawatha Community Center 7:15 pm
Program to be announced

Ask a Geologist by Ray Anderson aka "Rock Doc", CVRMS Vice President

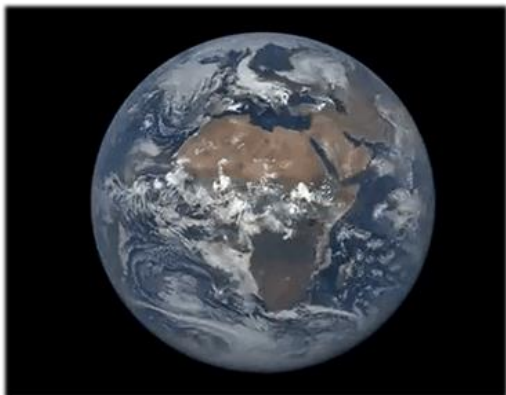
Ask a Geologist is a monthly column that gives CVRMS members an opportunity to learn more about a geologic topic. If you have a question that you would like addressed, please send it to rockdoc.anderson@gmail.com, and every month I will answer one in this column. Please let me know if you would like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

Since no one posed any questions to *Ask a Geologist* last month, once again I was free to choose a topic that I thought you would find of interest. This month I chose share an article that discusses how human-induced global warming is physically affecting the Earth.

Earth is wobbling and days are getting longer — and humans are to blame

By Harry Baker

The length of Earth's days and the orientation of our planet are being thrown out of balance as human-caused climate change continuously alters Earth's spin, new research suggests. Initially, these changes will be imperceptible to us, but they could have serious knock-on effects, including forcing us to introduce negative leap seconds, interfering with space travel and altering our planet's inner core, researchers warn. A day on Earth lasts about 86,400 seconds. But the exact time it takes our planet to complete a single rotation can shift by tiny fractions of milliseconds every year due to a number of factors, such as tectonic plate movements, changes to the inner core's rotation and gravitational tugging from the moon. However, human-caused climate change is another factor that can alter the length of our days, and scientists are just starting to realize how much this will affect our planet's spin in the coming years.



Over the past few decades, the rate of ice loss from Earth's polar regions, particularly Greenland and Antarctica, has been increasing rapidly due to global warming, leading to rising sea levels. Most of this extra water accumulates near the equator, causing our planet to bulge slightly around the middle. This, in turn, slows the planet's spin because more weight is distributed farther away from the planet's center, similar to how spinning figure skaters slow down by moving their arms away from their bodies. In the new study, published July 15 in the journal *PNAS*, researchers used an advanced artificial intelligence program that combines real-world data with the laws of physics to predict how the planet's spin will change over time. The results back up a similar study published in March, which suggested that Earth's days will get longer in the future. However, the new program offered much more precise estimates of how days will lengthen over time. The same research team behind the new paper also released another study, published July 12 in the journal *Nature Geoscience*, which showed that the increased water near the equator is moving Earth's axis of rotation. This is making the mag-

netic poles wobble farther away from the axis every year. Scientists previously found that this effect has likely been happening for at least the past three decades. However, the new study suggests the axis will move even farther from its current position than previous studies predicted. *"We humans have a greater impact on our planet than we realise,"* Benedikt Soja, a geodesist at ETH Zurich in Switzerland who was a co-author on both the new studies, said in a statement. *"And this naturally places great responsibility on us for the future of our planet."* Earth's days have always varied in length. Around 1 billion years ago, our planet likely took only 19 hours to complete a single rotation, before slowing to the 24 hours we experience today. It also changes on shorter timescales. For example, in 2020, Earth was spinning more quickly than at any point since records began in 1960. In 2021, the planet's rotation began to slow down again even though we experienced the shortest-ever recorded day in June 2022. But in general, Earth's rotation has been slowing for millennia, mainly due to a process known as lunar tidal friction, in which the moon's gravitational effect on our oceans pulls water away from the poles. At the moment, this effect is lengthening our days by around 2.3 milliseconds every century. The new studies show that climate change is currently lengthening our days by around 1.3 milliseconds every century. However, based on current global temperature models, the researchers predict that this could increase to 2.6 milliseconds per century by the end of the 21st century, which would make climate change the biggest influence on our planet's spin. One of the most likely effects of longer days would be the need to introduce negative leap seconds, where we'd occasionally lose a second from some future days to accommodate the lengthening days, similar to how leap years work. The March study suggests that this may need to start happening as soon as 2029, mainly to accommodate for how much the days have already lengthened over the past few millennia. In the past, scientists have suggested this introduction could mess with the timekeeping of computers and smartphones. However, not everyone is convinced this will be a major issue. The researchers of the new studies also noted that future changes could impact space travel. *"Even if the Earth's rotation is changing only slowly, this effect has to be taken into account when navigating in space, for example, when sending a space probe to land on another planet,"* Soja said. It is therefore important to monitor these changes closely, he added. The team also warned that the changes to Earth's rotational axis could alter the rotation of Earth's inner core, which could further increase how fast days lengthen. However, this potential interaction is still largely unknown.

<https://www.livescience.com/planet-earth/climate-change/climate-change-day-length-ttk>

First CVRMS Flintknapping Class

On July 25, 14 CVRMS members participated in our first Flint Knapping class at the Hiawatha Community Center. The class was taught by Terry Carter, who was the flintknapper at our March Rock Show. A good time was had by all and some nice points (arrow heads) were produced,



The proud new CVRMS flintknappers and their points.



Terry Carter gives some personal knapping instructions.



Marv and others flaking their points.



The final product. A beautiful obsidian point produced by Sharon Sonnleitner. Well Done!!

Bill Desmarais Presents Show on Dinosaurs at the Corps of Engineers Sugar Bottom Campground

CVRMS Director Bill Desmarais presented a program titled "Track 'em Down and Dig 'em Up: Dinosaur Discoveries in Alberta" at the Corps of Engineers Sugar Bottom campground on Saturday, July 6. Even though conditions were not the best (the weather was hot and the 7:00 pm starting time meant that the sun had not yet set and the slides were difficult to see, the audience of 60 people enjoyed Bill's presentation. The daylight did allow him to show off his many dinosaur bones, casts, and related fossils. Good work. Thank you Bill!



Bill and his audience at the Sugar Bottom campground.



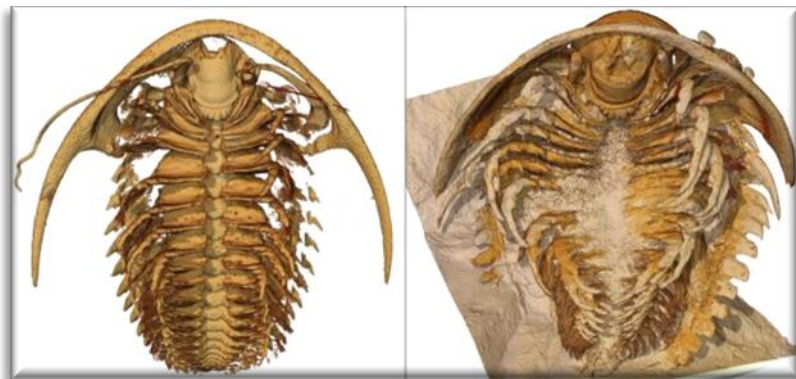
Audience members take a close look at dinosaur bones.

Bill describes the lower jaw of a T-Rex using a resin cast.



Never-Before-Seen Trilobite Anatomy Preserved by Pompeii-Like Ash in Morocco

Every now and again, serendipity gives us a unique window into times long past. An explosive volcanic eruption that took place in prehistory is one of them. As the ash from a pyroclastic flow during the Cambrian age was dumped on a shallow marine environment, its population of ancient arthropods called trilobites were preserved almost instantly, including any soft tissues that are normally degraded or destroyed during other fossilization processes. Now, hundreds of millions of years later, those unfortunate animals have given us an unprecedented record of their three-dimensional anatomy, along with any smaller creatures that happened to be clinging to their bodies at the time.



Comparison of reconstructions of the two species of trilobite.

"Cambrian ellipsocephaloid trilobites from Morocco are articulated and undistorted, revealing exquisite details of the appendages and digestive system," write a team led by sedimentologist Abderrazzak El Albani of the University of Poitiers in France. "This occurrence of moldic fossils with three-dimensional soft parts highlights volcanic ash deposits in marine settings as an underexplored source for exceptionally preserved organisms." In spite of more than 22,000 known trilobite species documented across a span of nearly 300 million years from the beginning of the Cambrian more than half a billion years ago, the number of fossil specimens with intact internal anatomy is extremely limited, and those usually incomplete. That's because soft tissues don't tend to survive the temperature and pressure changes that result in the formation of a fossil. But

there is more than one way to make a fossil impression. And, just over half a billion years ago, one of them went off in spectacular style: a volcanic eruption in what is now Morocco that spewed a rain of ash that buried the surrounding region, and a lot of the life in it. We know



Artistic reconstruction of two species of trilobite an instant before burial in a flow of volcanic ash 510 million years ago.

such pyroclastic outflows can preserve a snapshot of what they bury. The most famous example is Pompeii, the people of which were buried and cast in millions of tons of ash that rained down on the ancient Roman city, preserving their last moments in horrifying detail. In the Tatelt Formation in Morocco, a fossil bed with many layers that span ages, there's a thick layer that comprises volcanic ash and debris. And in those, El Albani and his colleagues found specimens of two species of trilobite. The features of this ash layer indicate that it was deposited during a single, large, pyroclastic flow event, in which hot ash and gas traveled along the ground away from a volcanic eruption, with minerals indicative of a rapid interaction between hot volcanic material and salty seawater. To determine the effect this had on the fossilization process of the trilobite specimens within, the researchers used microtomographic X-ray imaging to reconstruct the interior anatomy of the animals in three dimensions. And what they found was nothing short of spectacular. They were able to observe the exoskeletons of the trilobites, articulated and undistorted by time. They also probed their antennae, digestive systems, and the complex anatomy around their mouths the trilobites used to feed. Some of the uncovered features had never been identified before. The pyroclastic flow even preserved tiny brachiopods – tiny clam-like creatures that adhered to the shell of the trilobites in an epibiotic relationship. These brachiopods are in a relaxed life position, suggesting that the two species died together, either buried alive, or not long after death. They were even able to resolve a long-standing debate about trilobite mouths. Their scans revealed, for the first time, a mouth part called a hypostome constructed of soft tissue. Previous researchers

had theorized, due to the absence of a clear hypostome in other trilobite fossils, that perhaps it was part of a different mouth part called the labrum. The new research shows that, in both trilobite species, the hypostome and labrum are two separate structures. We now know just that little bit more about one of the most abundant animal groups ever to exist on our planet, but the research also highlights an untapped paleontological resource. "Although the soft-bodied anatomy of trilobites has been known for over 100 years, the Tatelt specimens reveal critical details at a level not previously observed, despite the long stratigraphic range and abundance of this iconic group of Paleozoic fossils," the researchers write. "The extraordinary preservation of fine anatomical detail in the ash deposit of a pyroclastic event is unexpected but points to the great potential of ash deposits in marine settings to yield further discoveries."

The research has been published in *Science*.

<https://www.sciencealert.com/never-before-seen-trilobite-anatomy-preserved-by-pompeii-like-ash-in-morocco>

Scientists Can Finally Reveal the Secret of How Pterosaurs Took Flight

The secret to pterosaurs taking flight long before birds and bats dominated the air wasn't feathers or hollow bones. Although those features no doubt helped, new research shows that a lattice-like structure stopped pterosaurs' broad-ended tails fluttering like flags in the wind and instead, once stiffened, helped guide these flying reptiles into the sky. Pterosaurs took to the skies using powered flight about 215 million years ago, the first vertebrates to do so. Although they started out small, amongst their ranks were some of the largest flying animals in Earth's history. Like birds, pterosaurs had feathers, but they weren't birds, nor were they bats. And although pterosaurs lived and died alongside dinosaurs, these flying reptiles weren't dinosaurs either but close cousins of them, evolving from upright-walking, rabbit-like creatures on a separate branch of the



reptile family tree. So what helped early pterosaurs win the evolutionary race of vertebrate flight? For a long time, we haven't had a clear idea. But a new study, not yet peer-reviewed, suggests that it was the stiffness of their tail vanes, which are broadly diamond-shaped and have been thought of as steering aids. Pterosaurs are relatively rare in the fossil record because their thin and hollow bones, which would have been great for flying, are easily degraded by the grains of time. Traces of soft tissue are ever rarer, with skin, organs and connective tissue disintegrating much faster than bone. To have a handful of pterosaurs preserved well enough for the fossils to retain details of the thin, soft tissue tail vane is something to behold. University of Edinburgh palaeontologist Natalia Jagielska and colleagues pored over 100 pterosaur fossils held in various museum collections, to find four "exceptional specimens" that fluoresced pink and white under UV light, indicating soft tissue structures had been preserved. Imaging the four specimens with a technique called laser-stimulated fluorescence revealed hidden anatomical details in the pterosaurs' tail vanes: thick, vertical rods projecting out of the central tail bone laced with thinner fibers to create a cross-linked lattice that prevented the tail vane from bending out of shape, reducing drag and stabilizing flight. The vane was stiffened by a rod-like lattice structure, which offered greater stabilization and control during flight. Tail vanes, like pterosaurs themselves, however, come in many sizes, and this study only analyzed four fossils of long-tailed *Rhamphorhynchus* pterosaurs. Yet the researchers think the specimens still reveal some details about how the structures evolved. They deduced from imaging that pterosaur tail vanes likely contained "fleshy folds" at the end, and might have developed similar to the flukes of cetaceans that help whales and dolphins glide through water. Another body part thought to be crucial to pterosaurs taking flight was a tendon called the *propatagium*, which stretches along the leading edge of the wing, connecting the equivalent of our wrist and shoulder joints. It likely controlled flight take-off and landing by altering the flow of air over each wing's upper surface. But today's birds and bats also have a propatagium on each wing, so it wasn't distinctive like the pterosaur's oar-like tail vane. https://www.sciencealert.com/scientists-can-finally-reveal-the-secret-of-how-pterosaurs-took-flight=email&utm_term=0_fe5632fb09-a12c2e622f-365948861

Argyle Mine: Earth's Treasure Trove of Pink Diamonds Born During a SuperContinent's Break-Up

The Argyle mine held the biggest cache of pink diamonds ever discovered on Earth. Unlike blue and yellow diamonds, which are tinted by impurities like nitrogen and boron, pink diamonds get their color through geological processes that distort their crystalline structure. Pink diamonds are extremely rare and can



Jewelry illustration of a pink Argyle diamond ring set with white diamonds and gold band.

fetch more than \$2 million per carat (1 carat is equal to 0.2 grams, or 0.007 ounces). The Argyle mine closed in 2020 due to a dwindling supply of diamonds and

unfavorable economic conditions, including a rise in operational costs. The mine sits on the shores of Lake Argyle in a remote region of northeast Western Australia, 340 miles southeast of Darwin. Mining operations there lasted 37 years and yielded more than 865 million carats (191 tons) of rough diamonds, including white, blue, violet, pink and red diamonds. The Argyle rock formation is an unusual spot for diamonds, because it sits on the edge of a continent rather than in the middle, where the precious stones typically emerge. In addition, diamonds are usually found in kimberlite rock formations, but the Argyle formation features a type of volcanic rock called **olivine lamproite**. Researchers dated the rocks at Argyle at 1.3 billion years old. This puts the Argyle formation's origins right at the start of the breakup of the supercontinent **Nuna**, revealing clues about how the diamonds formed, and why so many of them are pink. Pink diamonds are born out of specific heat and pressure conditions that arise when tectonic plates collide. The sheer force of these collisions can bend the crystal lattice of pre-existing diamonds in a way that colors them different shades of pink, although too much force can turn them brown. The supercontinent Nuna formed when two sections of Earth's crust crashed into each other around 1.8 billion years ago. The region in which they are thought to have smashed together overlaps with the present-day Argyle formation, suggesting the collision gave rise to Argyle's pink diamonds. At that point in time, however, the diamonds would have been buried deep within the crust. But 500 million years later, when Nuna began to break apart as the tectonic plates moved away from one another, the rocks carrying the diamonds rose to Earth's surface. Those rocks also contained an abundance of brown diamonds, which Rio Tinto mined and sold in huge numbers. Argyle is an exceptional spot, and while it's possible there might be another such cache of diamonds somewhere, finding it will "take a lot of luck." <https://www.livescience.com/planet-earth/geology/argyle-mine-earths-treasure-trove-of-pink-diamonds-born-during-a-supercontinents-break-up>

How Did Humans Survive the Ice Age?



Earth has experienced at least five significant ice ages in its history, periods in which colder global temperatures caused glaciers to expand across the planet's surface. *Homo sapiens*, which emerged about 300,000 years ago in Africa, survived two such ice ages. The most recent, known as the Last Glacial Period, or simply the "last ice age," occurred between 120,000 and 11,500 years ago. It reached peak conditions between 24,000 and 21,000 years ago, in a period known as the **Last Glacial Maximum**, when vast ice sheets covered North America and northern Europe. At that point, *Homo sapiens* had already spread around the world. Many of our ancestors, therefore, found themselves in a survival situation during the frigid ice age, along with animals such as brown

bears, caribou, and wolves, as well as large animals known as megafauna. These impressive creatures included woolly mammoths, mastodons, and saber-toothed cats, all of which went extinct during the last ice age. How, then, did humans survive? It was no easy task, for sure, but our ancestors were highly adaptable. Here's how humans not only managed to survive the last ice age, but also emerged as the most dominant species on Earth.

Weatherproof Shelters: Contrary to the popular image of ice age humans, or "cavemen" living in deep caves, our ancestors were more likely to have built sturdy rock shelters. While these shelters often made use of natural features, such as a depression in a cliff face, early humans would also have made extensive modifications to further weatherproof their shelters, such as draping large animal hides from overhangs to block out the bitter winds. With a warm fire blazing inside, these shelters provided ample protection from the cold. In the brief but slightly warmer summer months, when hunters moved out onto the open plains, they built dome-shaped huts or tents out of mammoth bones, which were then covered with animal skins.

Warm Clothing: Unsurprisingly, warm clothing was absolutely vital to survival in the ice age. While humans might have once worn rudimentary, loose-fitting animal hides, such clothing would not have been adequate in freezing temperatures. Thankfully, about 30,000 years ago, our ancestors developed what anthropologist Brian Fagan called the most important invention in human history: the needle. Carved out of ivory or bone, with tiny eyes bored through by a fine-pointed flint drill, these ice age needles would be instantly recognizable today. They allowed for the manufacture of tight-fitting clothing that was tailored to the individual and often sewn together in layers, providing effective protection from the cold.

Innovative Tools: Needles weren't the only innovation that helped humans survive the ice age. As part of their adaptation, *Homo sapiens* improved upon existing tools, some of which had been used by the Neanderthals, while also creating new innovations in toolmaking and weaponry. One of the most important tools created during the ice age was the burin, a type of rock chisel used to cut grooves and notches into materials such as bones and antlers, allowing for the creation of intricate and lightweight spearheads and harpoon tips. Not only did this mark one of the first instances of detachable and interchangeable technology, known as compound tools, but it was also the first time that tools had been developed exclusively for making other tools.

Scientists suggest that *Homo erectus*, an extinct early human species, may have used a primitive form of conversation, or proto-language, when it walked the Earth some 2 million years ago. Fast-forward to the last ice age, and members of *Homo sapiens* were most definitely talking among themselves. Language was arguably as important as anything else when it came to surviving the ice age. It allowed humans to share knowledge, whether regarding new technology, edible plants, or animal migrations. And through spoken language, as well as symbolic activities such as rituals, personal adornments, and art (the cave paintings at sites such as Lascaux in France, for example), our ancestors created a shared sense of social identity. This, in turn, allowed them to band together and forge connections beyond their immediate communities. By collaborating, early humans had a far greater chance of surviving the extremes of the ice age, and, ultimately, they came out stronger than ever before

<https://historyfacts.com/science-industry/article/how-did-humans-survive-the-ice-age/>

"Bill's Big Bus Boogie" 2024

Calkins Nature Area Museum & The Grotto of the Redemption

The **2024** edition of "Bill's Big Bus Boogie" on **Saturday, October 5**, will take CVRMS members on two of the Iowa's best *Rock Hound* attractions. First we will visit the **Calkins Natural Area** just east of **Alden** in **Hamilton County** and tour their exceptional Museum. Then, we will travel down the road to **West Bend** in **Palo Alto County** to visit the spectacular **Grotto of the Redemption**.



Calkins Natural Area Museum



Grotto of the Redemption

You must sign up for the bus trip. Signup sheets will be available at the August picnic and at the September regular meeting. If you cannot sign up at one of these events you **MUST** email Director Bill Desmarais at (desmarais_3@msn.com) with the names and contact information of phone number and email address for each person you sign up. Director Desmarais will not accept sign up by phone.

It will be another great and memorable "Bill's Big Bus Boogie" field trip!

Bill's Big Bus Boogie 2024
will leave from Cedar Valley World Travel;
6100 7th St. SW, Cedar Rapids
Sat. Oct. 5 - **6:30 a.m. SHARP** and return ~6:00 p.m.
monitored parking available



The Bus will NOT stop for lunch, so bring a sack lunch !





Cedar Valley Rocks & Minerals Society holds an annual 1- or 2-day consignment auction in September at the Amana RV Park. **The 2024 Auction will be held Saturday and Sunday, Sep 21-22.** 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 800 lots for a 1-day auction and 1200 lots for a 2-day auction. Viewing is from 5:00-7:30 Friday night, at 7:30 Saturday morning and 8:00 Sunday morning. The 1st day runs from 9:00 a.m. to about 8:00 p.m. with hot food available during the day and a dinner offered from 5:30 to 6:00 p.m. The 2nd day runs from 9:00 a.m. to about 3:30 p.m., again with hot food available. Cash, credit card (with small service fee) or good check is accepted for payment. Iowa sales tax of 7% is also added to all items. Bidders who provide Iowa tax permits are exempt from paying sales tax. 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 each sale has multiple consigners, the sale rotates among the consigners. All lots are numbered, and an order of sale is available at viewing on Saturday morning. Equipment sells at 2:00 on Saturday. If you have a collection to dispose of, please contact Marv Houg (m_houg@yahoo.com) or Sharon Sonnleitner (sonnb@aol.com). The club does all the advertising and sets up 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. As the date of the auction draws closer, images of many of the items to be auctioned will be featured on the CVRMS Website and Facebook pages (<https://www.facebook.com/groups/Cedarvalleyrocks/>).



Images from the previous CVRMS Auctions

Ray Anderson, Editor
2155 Prairie du Chien Rd. NE
Iowa City, Iowa 52240-9620



Next Meeting:
AUGUST 20
Morgan Creek Park—CR
Pot-Luck Picnic
Morgan Creek Shelter

CEDAR VALLEY GEMS

AUGUST 2024

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2024 & 2025 Officers, Directors, and Committee Chairs

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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 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