



Cedar Valley Gems

Cedar Valley Rocks & Minerals Society

Cedar Rapids, Iowa

cedarvalleyrockclub.org

CEDAR VALLEY GEMS

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

Next CVRMS Meeting

Tues. Feb. 18

7:15 pm

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

featured presentation

“The Benefits of Geology Field Camp & CVRMS-Supported Research at U of IA”

by **Prof. David Peate &
U of IA Geoscience Students**

University of Iowa School of Earth,
Environment, and Sustainability



The Largest Gold Deposit in the World

The largest gold deposit in the world has been found. Who is the lucky one and what is known about it? Recently, the largest gold deposit in history was found. It has already been dubbed supergiant. The lucky ones are the Chinese. A group of geologists stumbled upon 40 gold veins. And the main treasure is hidden inside. According to expert estimates, there are **\$83 billion** worth of gold deposits here. Experts conducted a preliminary assessment of the deposit. The amount of gold here was estimated at **1.1 thousand tons**. For comparison, *only 233 thousand tons of gold have been mined in the entire human history*. It was found practically in the heart of China - in the Pingjiang District of Hunan Province. Pingjiang used to



be famous for camellia oil, which was used in the production of cosmetics and cleaning products. And now there will be a real gold rush here. But the gold mining will be done by large state companies, not by enthusiasts. The concentration of gold here is very high - 138 grams of gold per metric ton of ore, which is higher than the average figures recorded in gold mining. Gold veins are located at a depth of about 2 kilometers. Until now, the largest gold mine in the world was the South Deep Mine in South Africa. Its volumes are 1,025 tons of gold, which is smaller than the Chinese mine. China already produces 10% of the world's gold. The top five gold miners also include Russia, Indonesia and Chile.

CVRMS Meeting January 21 – Minutes –

MEETING CALLED TO ORDER: 7:21 pm by Marv, president. Only 20 members present and no new members or guests (*temperature -5° F*).

MINUTES FROM NOV. MEETING: Motion to accept by Kim and 2nd by Bill. Minutes accepted.

TREASURERS REPORT: Dale was not present, so no treasurer's report.

PROGRAM: *Geology of Saylorville Gorge* by Ray Anderson. An emergency spillway, like the Devonian Gorge but the Saylorville spillway has flooded 5 times and exposed many Pennsylvanian geologic units.

RAY WON: the door prize.

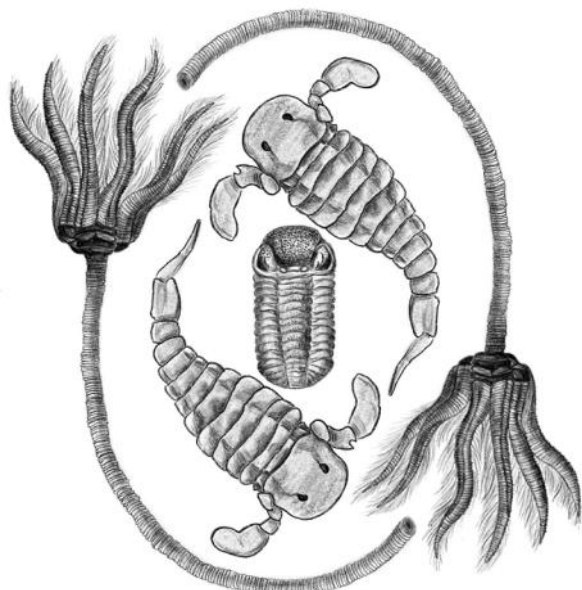
2025 ROCK SHOW: MARCH 22-23 : Friday Pot Luck, Saturday Hy Vee catered-members decided to have the same menu as last year. Dale will email Show Chair Duties assignments to everyone. A geode cracker will be there. Still looking for Raffle items.

FIELD TRIPS: We are still looking into a group trip to the amethyst .mines near Thunder Bay this year.

UPCOMING PRESENTATIONS: Bill and Ray will be displaying at Freeze Fest in IC on Feb 3. Kim L, and others will be cracking geodes in Marengo on Feb 15. Kim K. will present at STEAM Night on Apr 15. Kim K. and Ray will present at Central City Scout Camp on Earth Day, Apr 22.

MOTION TO ADJOURN: 8:50pm by AJ and second by Ray. Meeting adjourned.

Respectfully Submitted.



Cornell Pangea Club

CVRMS Board Meeting Jan. 28 – Minutes –

MEETING CALLED TO ORDER: 7:07 pm by Marv Houg at his house. Board members present, Ray Anderson, Marv Houg (president), Jay Vavra, Kim Kleckner, Sharon Sonnleitner, Dale Stout, and Laura Halladay.

SECRETARY MINUTES FROM LAST MEETING. Jay moved to approve, Ray 2nd, minutes approved by vote.

TREASURERS REPORT. Dale presented report, \$7,285 in checking, \$2,965 in savings. Laura moved for approval, Jay 2nd, report approved.

2025 ROCK SHOW: March 22-23, Theme **THE ICE AGE.** Raffle prizes so far include geodes, agates, and Iowa specimens. Two items will be requested from dealers. And we need 1 more.

2025 ROCK AUCTION: Jay reported 930 lots committed so far. Advertising on Facebook was discussed with several options reviewed. It was decided that Kim would pursue advertising. The Food Truck will provide meals on Saturday; the club, under Sharon's direction, will provide food on Sunday.

NEW BUSINESS: Jay led off a discussion of possible Directors' liability insurance. He commented that another organization is insured through West Bend. Marv said he uses and likes West Bend, so we will work with West Bend. Sharon reported that Hawkeye Downs will be building a new Expo Center, to replace our current show venue in 2026. We (along with the antiques show and the gun show) will be given scheduling priorities in the new building. But it will cost more. There was a discussion of who was receiving the emails from our CVRMS email. Square, our remote credit card service, reported our transactions to the IRS in Jay's name (through our CVRMS email). He will get it switched to the Club's name, and he will be added to the CVRMS email recipients. Laura is making arrangements to represent the Club at the Midwest Federation of Mineralogical and Geological Societies annual meeting on April 5-6 in Lincoln, Nebraska.

FIELD TRIPS: Laura has been organizing distant field trips for the club. She's researching a May 23 trip to the Bonne Terre area (Haunted Ridge, Cadet, Old Mines, Elephant Rocks), an Aug. 30—Sept 4 trip to Thunder Bay, and an Oct. 4th or 11th bus trip to the Field Museum in Chicago. A possible trip to the Moose Lake Minnesota agate show was also discussed and will be researched. Planning will continue.

MOTION TO ADJOURN: by Kim, second by Jay.

Meeting adjourned at 9:30 pm.

Respectfully submitted

Ray Anderson, Acting Secretary

What Would a Dinosaur Taste Like?

Unless someone finds well-preserved dinosaur DNA and decides to breed, say, free-range Velociraptors in an agricultural twist on the standard *Jurassic Park* scenario, we're probably not ever going to taste the flesh of the roughly 700 species of extinct dinos. But we can hypothesize, and the answer is a lot more complicated than **"dinosaurs probably tasted like chicken."** Let's get one thing out of the way first: If you've eaten any type of bird, you've eaten dinosaur. Modern birds are the last living theropods, the same group of animals that includes Tyrannosaurus rex and Velociraptor, so they're not simply "descended from" dinosaurs, they *are* dinosaurs. So yes, chicken (a dinosaur) tastes like chicken. Crocodylians (like alligators), which share a common ancestor with dinosaurs, also kind of taste like chicken. And that's a good starting point when you're thinking about what *Stegosaurus* or *Compsognathus* might've tasted like. "In evolutionary biology terms, there is an extant phylogenetic bracket of chicken-tasting animals, crocs and birds, surrounding the dinosaurs on the family tree, making it reasonable that the dinosaurs had a chicken taste too," says Steve Brusatte, a paleontologist and professor at the University of Edinburgh. But it's not that simple. Every bird has a unique taste. If you've eaten duck in the US, it was probably the American Pekin, a domesticated mallard with a mild, somewhat gamey taste. *Merganser*, another type of duck, is quite fishy and some people find it unpalatable. Extinct dinosaurs likely had similarly varied flavor profiles. There are also countless factors that go into making something taste the way it does, but two of the most important are muscle usage and diet. *Triceratops* and *Allosaurus* likely had fast- and slow-twitch muscles like people and other animals do. Slow-twitch fibers are associated with dark meat, thanks to reddish hues linked to the oxygen-carrying protein myoglobin, while fast-twitch fibers are associated with white meat. Smaller predatory dinosaurs probably had to move quickly to ambush prey and dart away from threats, so they might've had a fair amount of white meat. *Velociraptor* may have truly tasted like chicken. Larger dinos, on the other hand, likely had large muscles that were constantly moving and needed a lot of oxygen, so they might've more closely resembled beef or venison. Animals can also take on the flavor of things they eat. Grass-fed beef can be a bit more earthy than corn-fed cattle, for example. Dinosaurs, however, probably didn't eat much grass, as it didn't evolve until the very end of their 165 million-year reign. Theropods had a varied diet, while herbivores chomped down on ferns, cycads, and conifers, to name some ancient plants that are still around today. Today, deer eat a similar diet, so some dinosaurs could've tasted like venison. Ultimately, there's no definitive answer for what extinct dinosaurs might've tasted like, but we can let our imaginations run wild. And if someone ever does acquire the ability to bring dinosaurs back from extinction, we'd do well to remember that the *Jurassic Park* movies don't end with people eating their creations; more often, it's the other way around.

<https://www.popsci.com/what-did-dinosaurs-taste-like/>

Spotlight Gemstones: Amethyst

February's Birth Stone



February's birthstone, **amethyst**, is the purple variety of the mineral quartz, its most famous and valuable gem variety. Quartz in other colors include gemstones such as **citrine** (yellow), **rose quartz** (pink), and **smoky quartz** (gray). The purple of amethyst is most often caused by iron impurities, though it can also be colored by natural radiation exposure. Amethyst is sometimes heat treated to deepen the color, or to transform it into citrine. Some forms of amethyst may also change to a light green color upon heat treatment (called **prasiolite** or "**green amethyst**"). Amethyst is mined in many locations, some of which produce distinct color styles. For example, amethyst from Uruguay has a deep purplish-blue color, as does amethyst from Arizona. Amethyst from deposits that have since been exhausted in Russia, is known as "**Siberian amethyst**," a very deeply reddish and bluish colored stone which commands a high price. African amethyst is generally more deeply colored than the South American variety. Some amethyst from a few locations may slightly fade in color upon prolonged exposure to light. The color distribution of amethyst is sometimes uneven, and this is often taken into account when cutting a stone. Due to the abundance of amethyst, it is usually clean and free of flaws or inclusions. Because of this, amethyst with any visible flaws or inclusions should be avoided. Amethyst can occur in huge flawless crystals, and gems of all sizes have been faceted. Many rock hounds in this area have collected amethyst at the mines located just east of Thunder Bay, Canada. Amethyst from this locality is frequently found in fractures in granitic rocks. Although there are numerous natural sources of amethyst, synthetic amethyst gems are also produced, using the hydrothermal method. A natural mixture of purple amethyst and golden citrine has been coined with the trade name "**Ametrine**." Amethyst is faceted into many cuts, and is used in all forms of jewelry including rings, necklaces, earrings, bracelets, and pendants. Many large gems weighing several hundred carats have been cut from amethyst. Ornamental objects are also occasionally carved from large pieces. Lower quality amethyst is an important bead gem and can also be cut into cabochons. Tumbled beads of purple amethyst mixed with white quartz are also used as necklaces and bracelets.

http://www.minerals.net/gemstone/amethyst_gemstone.aspx

What in the World?



What in the World is going on in this spectacular fossil plate?

January's Photo



January's **What in the World** photo was an aerial photo of the Sahara, the largest desert on Earth, located in northern Africa. The formation of the Sahara was a slow and progressive process that took about 6,000 years and ended about 2,700 years ago. This photo, showing a line of camels, was taken from a hot air balloon

ROCK CALENDAR CVRMS EVENTS OF INTEREST

2025

Feb. 18 — CVRMS Monthly Meeting
Hiawatha Community Center 7:15 pm
University of Iowa Students and Faculty
Program to be announced

Mar. 18 — CVRMS Monthly Meeting
Hiawatha Community Center 7:15 pm
Cornell College Students and Faculty
Program to be announced

Mar. 22-23 — CVRMS Rock Show
Hawkeye Downs, Cedar Rapids
Show Theme: *The Ice Age*
more information on Page 10

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

May 20 — CVRMS Monthly Meeting
Hiawatha Community Center 7:15 pm
Program to be announced

June 17 — CVRMS Monthly Meeting
Potluck at Thomas Park, Marion 6:30 pm
Lapidary

July 15 — CVRMS Monthly Meeting
Potluck at Wanatee Park, Marion 6:30 pm
Geode Cracking

Aug. 19 — CVRMS Monthly Meeting
Potluck at Morgan Creek Park, Cedar Rapids 6:30 pm
Bingo

Sept. 20-21 — CVRMS Rock Auction
More Informtion Next Newsletter

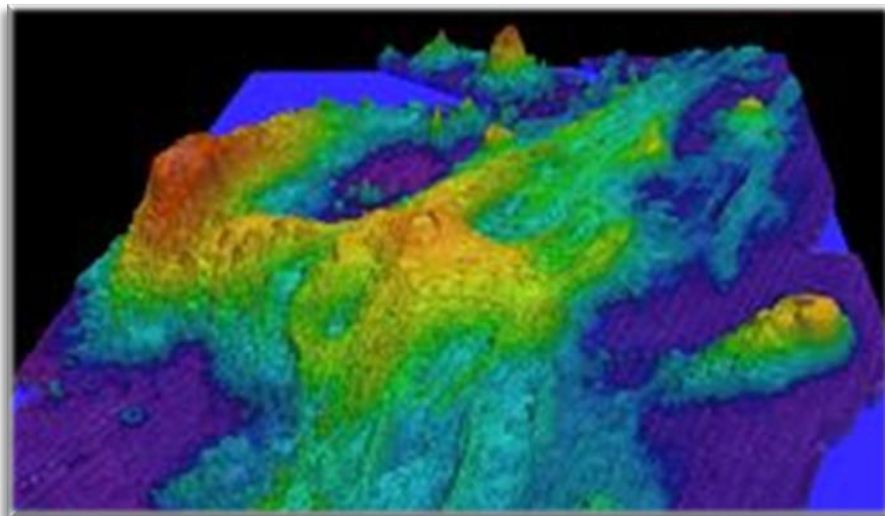
Ask a Geologist by Ray Anderson aka Rock Doc, CVRMS Vice President

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 provided a question to "Ask a Geologist" this month I have an opportunity to discuss an article of interest to me. The Cascadia Subduction Zone along the Pacific coast of British Columbia, Washington, Oregon, and northern California where two small oceanic plates, the Juan de Fuca and the Gorda plates, are being pushed beneath North America by the Pacific Plate. As these plates are subducted, they melt and erupt on the surface as the volcanoes of the Cascade Mountains. At least 18 volcanoes can be found in the Cascades, including Mount Baker, Mount Rainier, Mount Adams, Mount St. Helens, Mount Hood, Crater Lake, and Mount Shasta. Now a new volcano is about to erupt just under the ocean off the coast of Oregon.

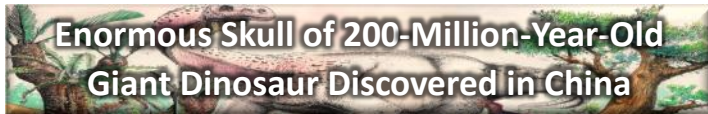
Undersea volcano off Oregon coast could erupt this year, geologists predict

An undersea volcano off Oregon's coast will probably erupt in 2025, scientists say. The volcano, known as **Axial**, is a seamount 300 miles west of Cannon Beach, Oregon. The Axial seamount erupts regularly, it rumbled to life in 1998, 2011 and 2015, according to a blog by scientists monitoring the seamount, and it doesn't pose a threat to people. But because of the seamount's regular activity and its relative proximity to land, researchers made it the site of the world's first underwater volcano observatory, known as the **New Millennium Observatory**. Now, the monitors at Axial are showing that the surface of the seamount is inflating, a sign of moving magma that likely presages an eruption, William Chadwick, a geologist at Oregon State University who studies the volcano and its nearby hydrothermal vents, reported at the annual meeting of the American Geophysical Union in December 2024. The volcano's surface has now risen to 95% of what it was before the 2015 eruption, Chadwick reported. The activity follows a period of quiet between 2015 to 2023, during which the seamount



A bathymetric map of the Axial volcano

barely budged. The new rise began in the fall of 2023 and increased in January 2024, with the ground moving upward at a rate of about 10 inches per year as of mid-2024. This inflation was accompanied by swarms of hundreds of small earthquakes. Since then, the inflation rate has stabilized, Chadwick reported in his blog. "The rate of inflation at Axial has been steady for the last 6 months and the rate of seismicity has moderated," he wrote. "An eruption does not seem imminent, but it can't do this forever." He and his co-author Scott Nooner, a geophysicist at the University of North Carolina Wilmington suspect that **the volcano will erupt before the end of 2025**. The scientists are hopeful that their prediction is correct, because the well-monitored Axial is a promising location to work out the patterns a volcano experiences before eruption. The fact that the volcano has recently erupted several times over two decades, rather than once in centuries, like many volcanoes, makes discerning patterns easier. Researchers are also more comfortable offering tentative predictions for a volcano that doesn't threaten life or property, because there are no downsides to being wrong. Volcanologists can currently make accurate short-term predictions of eruptions, but according to the Smithsonian Global Volcanism Program, predictions are rarely reliable more than a few days in advance. "There's no crystal ball," stated Valerio Acocella, a volcanologist at Roma Tre University in Rome. A volcano could always switch up its habits. But making predictions based on a well-monitored volcano and trying to understand how the surface activity of the volcano reflects the movements of magma and fluids underneath could help researchers make longer-term predictions at volcanoes around the world. "We need these ideal cases to understand how volcanoes work," Acocella said. <https://www.livescience.com/planet-earth/volcanos/undersea-volcano-off-oregon-coast-could-erupt-this-year-geologists-predict>

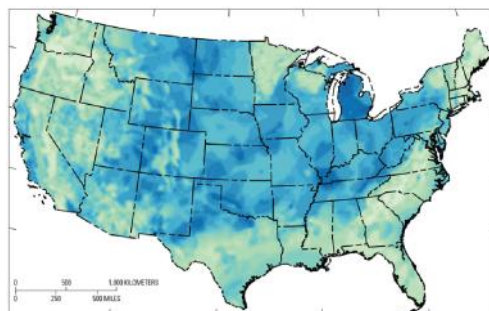


Enormous Skull of 200-Million-Year-Old Giant Dinosaur Discovered in China

An enormous, extremely well preserved dinosaur skull unearthed in China belongs to a never-before-seen species, researchers say. The early sauropod relative was discovered in 2007 in the Lufeng Dinosaur National Geopark in Yunnan Province, southern China. It grew to massive proportions, reaching up to 33 feet in length, researchers estimate. The species, named *Lishulong wangi*, belongs to the group known as the sauropodomorphs, which includes sauropods, such as Brontosaurus and Diplodocus, and their ancestors. The sediments in which it was found date to the Early Jurassic Hettangian Age (201.3 million to 199.3 million years ago), according to the study published Dec. 12, 2024, in the journal *PeerJ*. *L. wangi* is likely the **largest non-sauropod sauropodomorph unearthed** from the Lufeng Formation, the authors claim. The formation has been particularly rich in early sauropodomorphs: seven other genera have been discovered there as well. The finely grained sediments of the region helped preserve the animal remains, study lead author Qian-Nan Zhang, a paleontologist with the Institute of Vertebrate Paleontology and Paleoanthropology at the Chinese Academy of Sciences, said. The clays, sand and silt deposited by the lakes and rivers that shaped the landscape protected the dinosaur remains from erosion. The minerals in the sediment then infiltrated the bone structure, contributing to fossilization. These conditions likely contributed to the exquisite preservation of the skull, which is rare in sauropodomorphs. While it was squashed by the sediments layered on top of it, only a handful of the cranial bones were lost. Non-sauropodan sauropodomorphs were the most prevalent medium to large herbivorous dinosaurs until the Middle Jurassic (174.1 million to 163.5 million years ago). Unlike the plodding behemoths that replaced them, they were able to walk on just their hind limbs. They share ancestors with theropods such as *Tyrannosaurus rex* which retained a bipedal posture. The new discovery comprises a skull and nine neck vertebrae. "Due to the lack of preserved shoulder girdle, pelvic girdle, and limb bones in this specimen, it is not possible to determine whether it was bipedal or quadrupedal," Zhang said. However, she added that its nearest relative, *Yunnanosaurus*, is thought to have been partially quadrupedal (being able to switch between two and four legs), suggesting that *L. wangi* may have been as well. The researchers distinguished the two species in part due to the differing sizes of their nasal openings, *L. wangi* had bigger nostrils. The species was probably a herbivore. "Their main food sources were probably gymnosperms and other primitive plant types. This likely included ferns, cycads, ginkgos, and conifers," Zhang said. The animal was likely mature when it died. "Based on the fusion of skeletal elements in the skull and cervical vertebrae, as well as the overall size of the individual, it is inferred that this specimen likely represents an adult," Zhang said. It's still unclear how *L. wangi* met its end. "Because the specimen is only preserved with its skull and cervical vertebrae and lacks other bones, it suggests that the remains have undergone transportation after death, complicating the determination of the cause of death," Zhang said. <https://www.livescience.com/animals/dinosaurs/enormous-skull-of-200-million-year-old-giant-dinosaur-discovered-in-china?>

Giant Reserves of 'Gold' Hydrogen May be Lurking Beneath at Least 30 US States, 1st-of-Its-Kind Map Reveals

A first-of-its-kind map of the United States has revealed the likely locations of huge, naturally occurring hydrogen reserves. The map, which you can explore here, is the first to show prospective locations for hydrogen on such a huge scale, marking areas where hydrogen gas may be lurking beneath the surface in quantities large enough to extract. The researchers who created the map already suspected there could be more hydrogen buried in Earth's crust than scientists previously thought. But now that the results are out, even the team that created the map can't quite believe their eyes, according to a statement. Highly prospective areas include most of Michigan, eastern Kentucky and southern North Dakota, as well as parts of Kansas, Colorado, Wyoming, Iowa and Oklahoma. Whether a region is a prospective location for hydrogen depends on three main factors coming together: a source (or sources) of hydrogen, reservoir rocks and natural seals to trap the gas underground. Geologic hydrogen, hydrogen that occurs naturally, also known as "white" or "gold" hydrogen, is



A map showing areas in the U.S. that are unlikely to host hydrogen reserves (white to light blue) and likely to host hydrogen reserves (blue to dark blue).

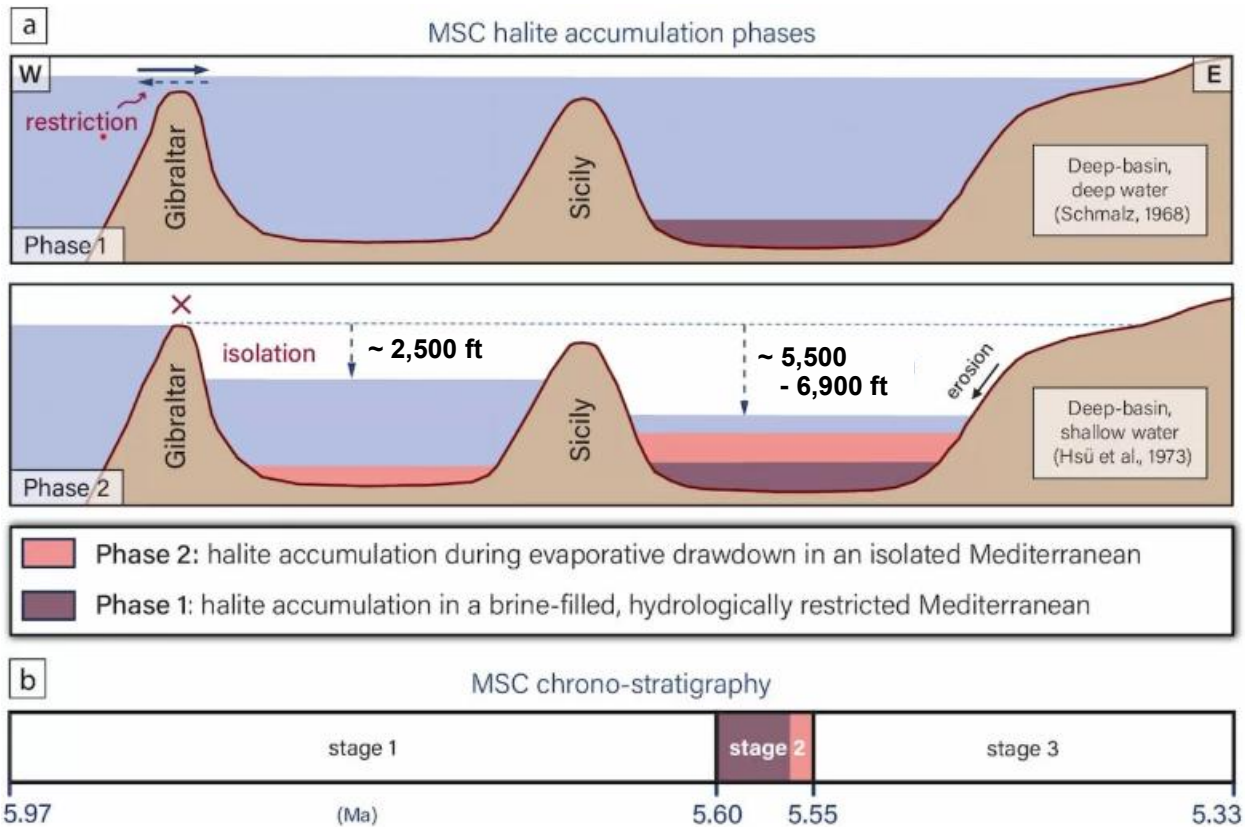
produced through chemical reactions in rocks, the simplest being a reaction that splits water into hydrogen and oxygen. The map shows that at least 30 U.S. states have the conditions needed for

hydrogen to accumulate belowground. There is high potential for the gas to be found in large swathes of the Midwest, as well as in areas along the California coast and Eastern Seaboard, according to the statement. Hydrogen is a source of clean energy. Researchers project that it will account for up to 30% of the future energy supply in some sectors, with demand likely to rise fivefold by 2050. In a study published last month, the same researchers calculated that Earth's total buried hydrogen reserves could amount to 6.2 trillion tons of gas. Just 2% of that would supply all the energy required to power the world for 200 years, they said. But that estimate came with no indication of where those reserves are located, which dictates whether they are accessible and, therefore, extractable. In the previous study, "we showed there is a significant potential for geologic hydrogen as an emerging energy resource," Sarah Gelman, a geologist with the USGS Central Energy Resources Science Center who participated in the new research, said in the statement. "The logical next step was to find where it might be in the United States." The map and an accompanying report detailing the results were published (Jan. 16) on the USGS website. <https://www.livescience.com/planet-earth/energy/giant-reserves-of-gold-hydrogen-may-be-lurking-beneath-at-least-30-us-states-1st-of-its-kind-map-reveals>

How the Mediterranean Lost So Much Water 5.3 Million Years Ago That Its Level Was 3250 Feet Below the Atlantic Ocean

A recent study led by a CNRS scientist analyzed the significant drop in the Mediterranean Sea level during the monumental geological event known as the **Messinian Salinity Crisis**. This event, which occurred between 5.97 and 5.33 million years ago, transformed the Mediterranean into a massive salt reservoir. Until recently, the way in which approximately 250,000 cubic miles of salt accumulated on the Mediterranean seabed in a short period of time remained unknown. Thanks to the analysis of chlorine isotopes in the salt deposits from the Mediterranean seabed, researchers identified two stages of this extreme desiccation process. In the first phase, lasting about 35,000 years, salt deposits began to accumulate in the eastern Mediterranean due to a partial restriction in the connection between this sea and the Atlantic Ocean. Subsequently, in a second, much shorter stage (less than 10,000 years), widespread salt deposits formed throughout the entire Mediterranean, leading to a rapid desiccation of the waters. This caused the water level to drop by 5,500 to 6,900 feet in the eastern Mediterranean and approximately 2,500 feet in the western sector, resulting in a **loss of up to 70% of the total water volume** in the Mediterranean.

The repercussions of this remarkable drop in sea level were not limited to a change in the Mediterranean’s geography. The drastic desiccation affected both the terrestrial ecosystem and the landscape of the entire Mediterranean basin. Additionally, the reduction in weight on the Earth’s crust caused by the disappearance of this massive body of water may have triggered volcanic activity in the region. This crustal relief not only generated local alterations but also influenced the global climate, as the depression caused by the water loss impacted global climate patterns. The results provide a fresh perspective on past geological dy-



The two phases of accumulation of the Mediterranean salt layer during the Messinian salinity crisis. In the first phase, salt accumulated in a brine-filled Mediterranean basin; in the second phase, salt accumulated in a Mediterranean completely isolated from the Atlantic Ocean as a result of the significant drop in sea level in the western and eastern Mediterranean sub-basins.

namics and the impact of extreme desiccation events on ecosystems and the global climate. Scientists conclude that, in the final moments of this salinity crisis, the Mediterranean’s level was approximately 3250 feet below the Atlantic level, creating such an extreme difference that it eventually led to the collapse of the Strait of Gibraltar. This event allowed Atlantic waters to return, ending the crisis, restoring normal flow, and transforming the Mediterranean back into an open sea. <https://www.quora.com/>

Dog-Like Predator's Bones Belong to Oldest Known Mammal Relative

Ancient fossils of the world's very first dinosaurs may be buried in places almost impossible to investigate, according to new research from University College London and the UK's Natural History Museum. The oldest dinosaur fossils currently on record date back around 230 million years. These specimens, recovered from sites that were once part of Gondwana, the southern half of the late Paleozoic supercontinent Pangea, occupy relatively distant branches of the dino family tree, suggesting they had already been evolving and perhaps dispersing across the world for millions of years. Convinced the true point of origin of dinosaurs is yet to be traced, paleontologists now suspect the starting point for all 'terrible lizards' could be hidden in some of Earth's most hard-to-get places. Between each hemisphere's claims to the earliest fossils lies a massive gap in the record around the equator. In places where we have found no dinosaur



Artist's rendering of *Ahvaytum bahndooiveche* in its wet, Carnian-era habitat.

fossils, it's easy to assume that there were no dinosaurs, but that might not necessarily be the case. The conditions have to be just right for fossils to be preserved in the first place. For trace fossils, like footprints, an imprint in soft mud must be filled in with loose

sand that is then compacted. For a body fossil to form, the animal carcass must be covered with mud or silt soon enough after death that it doesn't rot away completely. But even if the perfect fossil formed, we might not necessarily find it, especially in locations that are difficult to reach. In a new paper led by University College London paleontologist Joel Heath points out that paleontological expeditions in the Amazon and the Sahara haven't been particularly common, or easy-going. And that's a problem, because these are the places where they suspect we might find dinosaurs' more ancient evolutionary history. Their study modeled the radiation of dinosaurs in reverse, using known dinosaur fossils, taxonomic data on both dinosaurs and their reptile relatives, and the geography of the period. Rather than assuming that places with no fossils equal places with no dinosaurs, these regions were categorized as having missing information. And since we don't really know exactly how the oldest known dinosaurs are related to each other, they modeled three different scenarios based on proposed evolutionary trees. A low-latitude Gondwanan origin, for which proof may be lying in the Sahara and the Amazon, was supported most strongly by a model where silesaurids (which are considered more like dinosaur cousins than dinosaurs) are ancestors of ornithischian dinosaurs. Ornithischians are one of the three main dinosaur groups that is oddly absent from the early dinosaur fossil record, but silesaurids as their ancestors would fill some of that gap. Conveniently, low-latitude Gondwana is also the midpoint between the earliest dinosaur fossils in our current record. "So far, no dinosaur fossils have been found in the regions of Africa and South America that once formed this part of Gondwana," Heath says. "However, this might be because researchers haven't stumbled across the right rocks yet, due to a mix of inaccessibility and a relative lack of research efforts in these areas." <https://www.sciencealert.com/fossil-discovery-rewrites-global-dinosaur-history>

Caligula's Stunning 2,000-Year-Old Sapphire Ring Tells of A Dramatic Love Story

It's hard not to admire this stunning 2,000-year-old sapphire ring. It's an ancient Roman treasure believed to have once belonged to Caligula, the third Roman emperor, ruling from 37 to 41. Named Gaius Julius Caesar after Julius Caesar, the Roman emperor acquired the nickname "*Caligula*" (meaning "*little soldier's boot*"). Today, Caligula is remembered as an infamous emperor who was smart but also cruel. Whether he was insane or not is still debated, but there is no doubt he was one of the most brutal emperors in ancient Rome. He forced his contem-



Sapphire hololith with an intaglio portrait of his wife Caesonia.

poraries to worship him as a god, committed incest with his sisters, and wanted to make his horse a consul. The sky blue hololith (a ring made from a piece of precious stone—in this case sapphire) is believed to depict Caesonia, Caligula's fourth and last wife. Rumors said she was so beautiful that the emperor told her to parade naked in front of his friends occasionally. Caligula's love story with Caesonia resulted in the birth of Julia Drusilla. Caligula was deeply in love with Caesonia, and she was the emperor's most important confidant. However, the couple was surrounded by enemies who wished to remove Caligula from power. Caligula was assassinated due to a conspiracy by officers of the Praetorian Guard, senators, and courtiers. Caesonia and her daughter were murdered as well. Different sources report different versions of the murder. According to some, Caligula was stabbed in the chest. Immediately following the murder, Caesonia and Drusilla, the emperor's young daughter, were killed. Caligula's beautiful sapphire ring was part of the collection of the Earl of Arundel from 1637 to 1762 when it became one of the famous "*Marlborough Gems*." Not surprisingly, the ring caused a sensation when it was made available for purchase in an auction by Royal jewelers Wartski. "*This ring is one of the prestigious 'Marlborough Gems,' having previously been in the collection of the Earl of Arundel. It is crafted entirely of sapphire. Very few hololiths exist, and I would argue this is the best example you can find. We believe it belonged to the debauched Emperor Caligula, and the engraving shows his final wife Caesonia,*" Kieran McCarthy, Wartski director, said. Caligula's ring was finally sold for close to £500,000 in 2019.

<https://www.thearchaeologist.org/blog/caligulas-stunning-2000-year-old-sapphire-ring-tells-of-a-dramatic-love-story>

It Literally Takes Fire and Brimstone to Transport Gold to Earth's Surface

The processes that haul gold up to the surface from deep within Earth's mantle rely on the sulfur that bubbles beneath active volcanoes. Two new papers have agreed that some forms of sulfur form molecular bonds with gold that would otherwise remain sequestered in the mantle, allowing the precious element to rise. What they don't quite agree on is which form of sulfur is most important. According to numerical modeling and experiments conducted by a team of geologists led by Deng-Yang He of the China University of Geosciences, **trisulfur is key**. But, according to experiments conducted by Stefan Farsang and Zoltán Zajacz of the University of Geneva, **bisulfide is the crucial player**. Both sets of results are interesting and worth following up, because understanding how gold deposits form can help us make the most of this beautiful, valuable, and useful resource. Gold deposits are often associated with volcanic activity at places where tectonic plates meet. There, the edge of one tectonic plate can slip beneath the adjacent plate, creating what is known as a subduction zone. Interactions between the two plates create a region riddled with earthquakes and volcanoes, such as the long volcano chain known as the Pacific Ring of Fire. The gold in these deposits originates deep below Earth's surface, in the mantle. Left to its own devices, there the dense metal would stay; but it gets incorporated into the magmas that rise up via volcanic activity to the surface, where it is deposited. Scientists believe the key to its transport is sulfur. Sulfur bonds strongly with heavy metals, including gold. But what form that sulfur takes to transport gold through Earth's subduction zones is a topic of debate among Earth scientists. Deng-Yang He and his colleagues experimented with different pressures and temperatures to develop a thermodynamic model that could predict the real-world conditions that result in gold transport. They found that, at a set of very specific temperatures and pressures where water is heated and oxidized as Earth's crust sinks, gold and trisulfide bond to form a soluble complex with the formula $\text{Au}(\text{HS})_3$. This complex, their calculations showed, can transport gold concentrations of several grams per cubic meter of fluid, more than three orders of magnitude higher than the average abundance of gold in Earth's mantle. It's an extremely efficient means of slurping the gold out of the mantle and dumping it into the crust. "This thermodynamic model that we've now published is the first to reveal the presence of the gold-trisulfur complex that we previously did not know existed at these conditions," says geologist Adam Simon of the University of Michigan. "This offers the most plausible explanation for the very high concentrations of gold in some mineral systems in subduction zone environments." But it may not be the only means of transportation. In their experiment conducted at the University of Geneva, Farsang and Zajacz found a way to tweak the oxidation state of the sulfur in their experiment, adding it to pressure conditions and temperatures of 1607 Fahrenheit, consistent with the temperature of natural magmas. Previous experiments, including a heavily cited 2011 paper, had shown that trisulfur was responsible for the transport. The new results showed that bisulfide, hydrogen sulfide, and sulfur-dioxide were all strongly present at magmatic temperatures. This is interesting, because bisulfide plays a role in metal transport in hydrothermal fluids, which are lower in temperature. It was thought that bisulfide couldn't exist at magmatic temperatures; but the work of Farsang and Zajacz found that it can. "By carefully choosing our laser wavelengths," Farsang says, "we also showed that in previous studies, the amount of sulphur radicals in geologic fluids was severely overestimated and that the results of the 2011 study were in fact based on a measurement artefact, putting an end to this debate."



Hot elemental sulfur gas seeping from a volcanic vent in Hawaii.

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Gold is highly prized for many reasons, not least of which is its resistance to corrosion.

<https://www.sciencealert.com/it-literally-takes-fire-and-brimstone-to-transport-gold-to-earths-surface>

Cedar Valley Rocks & Minerals Society
Presents its
**2025
GEM, MINERAL & FOSSIL
SHOW**

60th
Annual
Show

**Iowa's Largest Show
Among Midwest's Largest**



Saturday, Mar 22 - 8:30 a.m. to 6:00 p.m.
Sunday, Mar 23 - 9:30 a.m. to 4:00 p.m.

**Hawkeye Downs Expo Center
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For Additional Information, Contact:

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

Rock Show Information

Rock Show Schedule

Friday March 21 Show Set-Up

- 9:00 am begin setting up tables
- ~12:00 noon Lunch provided by Dell
- 1:00 pm continue set-up and help dealers
- 6:00 pm **POT LUCK DINNER**
PLEASE BRING YOUR BEST DISH TO SHARE
- 7:00 pm complete set up

Saturday March 22 First Day of Show

- 8:30 am doors open
- 6:00 pm show ends for the day
- 6:30 pm Hy Vee catered dinner. dealers and members

Sunday March 23 Second Day of Show

- 9:30 am doors open
 - 4:00 pm show ends
 - 4:00 pm show tear down
- WE WILL NEED LOTS OF HELP TO TEAR DOWN ASAP**

The Loch Ness Monster Has a Scientific Name

The scientific name *Nessiteras rhombopteryx* may look more or less like any other. As with many Linnaean labels, the species name *rhombopteryx* references the creature's overall appearance, in this case, its diamond-shaped fins. But there's one key difference here: The creature it describes doesn't exist (probably).

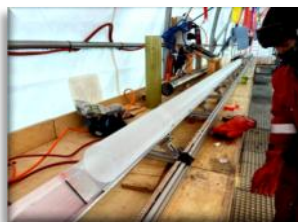


Nessiteras rhombopteryx, or "Ness monster with diamond-shaped fins," is the proposed taxonomic moniker of the Loch Ness monster, also known as Nessie. As a brief cryptozoology refresher, Nessie is a fabled reptilian

monster believed to reside in a lake called Loch Ness in the Scottish Highlands. For nearly a century, "people have scoured the lake" with binoculars, sonar, and other equipment, hoping to glimpse this anachronistic plesiosaur. Although "confirmed sightings" number more than a thousand, no specimen has ever been captured and cataloged. The modern fascination with Nessie dates back to the 1930s, but the legend of a mythical creature lurking in Loch Ness is much older. The mythological history of the Loch Ness monster dates back to at least 564 CE. <https://mail.google.com/mail/u/0/#inbox/FMfcgzQXKqrWtdbrJKPcrqZQcDmHMgrR>

Oldest Unbroken Record of Earth's Climate Pulled From Antarctic Ice Sheet

A colossal ice core sample drilled in Antarctica may contain the **oldest, unbroken timeline of Earth's climate**, stretching back more than a million years. Laid horizontally, the entire ice core's 9,186-foot length could extend across San Francisco's Golden Gate Bridge, and then some. Each meter-long segment contains up to 13,000 years of deep, compressed history, including bubbles of ancient air. Together, the evidence provides a baseline for our current climate crisis, and it could reveal more about past extreme climate change events that threatened human survival. "We have a strong indication that the uppermost 2,480 meters contain a climate record that goes back to 1.2 million years," says Julien Westhoff, chief scientist for the European Project for Ice Coring in Antarctica (EPICA). Further analysis needs to be done, but there's a chance that the deepest parts of the drilling could contain ice that dates back to the pre-Quaternary period, more than 2.5 million years ago. The oldest ice uncovered in Antarctica so far dates back 2.7 million years, but Earth's movements pushed this ice into a shallower patch of frozen material, so it doesn't provide a continuous climate chronicle; it's more of a snapshot. Previously, the EPICA record for the oldest vertical ice core covered the last 740,000 years or so, and it was obtained in 2004. Ice cores are precious to scientists, because they trap particles, water isotopes, and bubbles of atmospheric gases, like carbon dioxide and methane. This allows researchers to reconstruct climates and environments in our planet's history. The new drilling from East Antarctica covers a period of time when Earth's cycles of glaciation inexplicably lengthened, sometime between 900,000 and 1.2 million years ago. Some scientists suspect nearly 99 percent of early humans in Africa may have died out during this period of extreme cold swings, although that hypothesis remains contentious and is mostly based on modern genetic data. The fresh ice core from Antarctica could reveal more details about Earth's climate shifts during this time. It will probably also confirm just how far off track anthropogenic emissions have taken our planet's natural cycles of glaciation. The extraction site of the recent drilling is called Little Dome C, in East Antarctica, and it was chosen because radar surveys revealed the presence of extremely thick ice here, layered like a cake, with a bottom that had not yet melted away. At 3,200 meters above sea level, high on Antarctica's central plateau, summer temperatures on Little Dome C sit around -31 °F and often there are high wind speeds to contend with as well. Researchers at EPICA, including scientists from the British Antarctic Survey, had their work cut out for them. It took about 20 days just to deliver all their infrastructure and cargo to the site from a nearby research station. When drilling finally got underway, an isotopic analysis system was able to read out glacial and interglacial cycles almost in real time, as each bit of the ice core was extracted from the ground. That's why scientists at EPICA are making such big claims, so early in their analysis. Today, the Antarctic ice sheet holds 90 percent of our planet's ice. A drilling like this one, straight from its belly, could reveal just how Earth's southernmost continent came to hog most of its freshwater. Climate scientist Richard Alley commented that EPICA's ice core was "truly, truly, amazingly fantastic." "They will learn wonderful things," Alley predicted. <https://www.sciencealert.com/oldest-unbroken-record-of-earths-climate-pulled-from-antarctic-ice-sheet>



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



Next Meeting:
TUESDAY FEB. 18
Hiawatha Community Center
“The Benefits of Geology Field Camp &
CVRMS Supported Research at U of IA”
 by **Dr. David Peate and students**
 U of IA School of Earth, Environment, and Sustainability

CEDAR VALLEY GEMS

FEBUARY 2025

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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