

Cedar Valley Gems

Cedar Valley Rocks & Minerals Society

Cedar Rapids, Iowa

cedarvalleyrockclub.org



CEDAR VALLEY GEMS

JUNE 2024

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

Next CVRMS Meeting
Tues. June 18
we eat at 6:30 pm
Pot-Luck Picnic!

at Thomas Park

343 Marion Blvd , Marion

Begley #2 Pavilion



Rock Polishing

Rock Identification

Rock Show & Tell

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

The Largest Stone Ever Man-Cut in Antiquity

German archaeologists who are carrying out research at the Jupiter temple in Baalbek, Lebanon, have discovered the largest stone ever man-cut in antiquity. Still partially covered, the monolith measures **65 feet long**, **20 feet wide** and at least **18 feet high**. Its weight is estimated at **1,650 tons**,



which makes it the largest stone block in antiquity. It was found by a team of the German Archaeological Institute in a stone quarry in Baalbek.

Known in Roman times as Heliopolis, "*the city of the Sun*", Baalbek hosted one of the empire's greatest sanctuaries. The quarry was located about 1/4 mile from the city's temple complex and houses two other huge blocks: one weighing **1,240 tons** and the other, known as "*Hajjar al-Hibla*" (*The Pregnant Woman's Stone*) weighing about **1,000 tons**. Right next to Hajjar al-Hibla and below it, archaeologists have uncovered a third block. The level of smoothness indicates that the block should have been transported and used without being cut; it is therefore the largest rock known from antiquity. Archaeologists believe the limestone blocks date back to at least **27 B.C.**, when Baalbek was a Roman colony and construction of three major and minor temples began. The huge stone blocks 65 feet long were used for the podium of the large Temple of Jupiter in the sanctuary. Only a few portions of the temple remain today, including six large columns and 27 giant limestone blocks at the base. Three of them, weighing **800 tons** each, are known as "*Trilithon*." How these monoliths were transported and precisely placed during the construction of the temple remains a mystery. Some even suppose that the block was prepared by a culture prior to Alexander the Great, who founded Heliopolis in 334 BC. The stone block was probably cut for use in the temple, but was abandoned because it was unportable.

CVRMS Meeting May 21 — Minutes —

MEETING CANCELLED DUE TO THREATENING WEATHER

Auroras Could Paint Earth's Skies Again in Early June. Here Are the Key Nights to Watch For.

Earth's most powerful geomagnetic storm in more than two decades happened between May 10 and May 12, painting the skies with colorful auroras as far south as Florida and Mexico in an ultra-rare occurrence. This was the result of at least five solar storms that hit Earth simultaneously, all originating from a massive sunspot, a dark patch on the sun more than 15 times wider than Earth. The barrage of charged particles collided with Earth's magnetosphere, which funneled them along magnetic field lines toward the poles, generating vibrant auroras along the way. Crucially, the fallout from the solar storms arrived a few nights after May's new moon, when the night sky was free from moonlight, making even faint auroras easier to see. Because the sun rotates on its axis once every 27 days, the sunspot disappeared from view around a week later, but it didn't stop producing solar flares. It is now becoming visible again as the sun rotates, and it will be Earth-facing once again during the new moon on June 6. *"It will align nicely,"* Ryan French, a solar physicist at the National Solar Observatory (NSO) in Boulder, Colorado, stated. *"As soon as the sunspot starts to appear, we will enter the window of opportunity [for solar flares]."* The monster sunspot will reappear in late May/early June, but when the sunspot reaches just to the right of the center of the sun, from our perspective, the sun-Earth system will be most connected. That's when our planet is most likely to be hit by solar weather, potentially resulting in another display of auroras at low latitudes. *"That's exactly where it produced all of those large flares,"* said French. *"But in theory, if you had a large enough eruption, even if it's just to the left of the sun's center, we could still get the edge of that impact."* June 6's new moon rises exactly 27 days after May 10, so be on alert a few nights before and after that date, just in case there's a repeat of last month's extreme geomagnetic activity. If auroras are visible near you, you'll need to get far from obscuring clouds and city lights to be able to see them. Even after June's new moon, there may still be other chances to catch the aurora near you this year. Sunspots appear in greater frequency, and trigger more powerful solar flares, during the peak of the sun's 11-year activity cycle, known as the solar maximum. Scientists suspect that the current cycle's maximum may already be underway, hitting us sooner and harder than previously estimated. But we won't be able to determine the maximum's precise timing until after it ends, and solar activity finally quiets down again.

<https://www.livescience.com/space/auroras-could-paint-earths-skies-again-in-early-june-here-are-the-key-nights-to-watch-for>

CVRMS Board Meeting May 28 — Minutes —

MEETING CALLED TO ORDER: 7:15pm at Marv's House. Board Members Present; Marv, Dale, Sharon, Bill, Jay, Ray, Matt, and Kim.

MINUTES OF LAST BOARD MEETING: Matt moved to approve; Jay seconded, minutes approved.

TREASURER'S REPORT: Dale presented the Treasurer's report. Scholarships from Rock Show awarded: University of Iowa Geoscience-\$6,000, Cornell College Geology=\$4,000, VAST=\$2,500. Current checking = \$4,050. Ray moved to approve, Matt seconded, disbursement approved.

2025 ROCK SHOW THEMES: Possible themes discussed. *"The Ice Age"* was chosen and will be suggested for approval at the next club meeting. Kim proposed the theme, Jay seconded.

2024 BILL'S BIG BUS BOOGIE: **Saturday October 5** chosen as best date. Trip will visit **Grotto of the Redemption** in West Bend and **Calkins Nature Area** near Iowa Falls.

2024 AUCTION: September 21-22. about 8 consignee contracts still outstanding. About 1250 lots consigned to date.

TAKO EVENT: *Take a Kid Outdoors* May 18 **"Rockin' Rocks and Fossils"** was held at the River Products Klein Quarry and was assisted by a number of CVRMS members. The event went well with about 200 people attending.

NEW DATE FOR MAY MEETING: May 21 meeting was cancelled due to weather. A same-week date could not be scheduled so the Board decide to cancel it.

NEW BUSINESS: **Outreach programs**, no new requests. **Kim** sent thank-you cards to people who donated materials and contributed money to Club. **Discussion of sharing** some of Sharon's Rock Show responsibilities to continue.

2024 PICNICS: June 18-Thomas Park-lapidary work, July 16-Wanatee Park-geode cracking, August 20-Morgan Creek Park-Bingo.

FUTURE FIELD TRIPS: No trips scheduled until July when Matt returns from Oregon. Future trips will visit Linn County Sand and Riverside Sand and Gravel.

MOTION TO ADJOURN: 8:15pm by Jay and second by Ray. Meeting adjourned.

Respectfully Submitted.

Ray Anderson, Acting 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 serving supplies and enlisting members to bring refreshments to the monthly meetings

A Vast, Untapped Source of Lithium Has Just Been Found In The US

Almost two centuries after California's gold rush, the United States is on the brink of a lithium rush. As demand for the material skyrockets, government geologists are rushing to figure out where the precious element is hiding. In September 2023, scientists funded by a mining company reported finding what could be the largest deposit of lithium in an ancient US supervolcano. Now public researchers on the other side of the country have uncovered another untapped reservoir, one that could cover nearly half the nation's lithium demands. It's hiding in wastewater from Pennsylvania's gas fracking industry. Lithium is arguably *the* most important element in the nation's renewable energy transition, the material of choice for electric vehicle batteries. And yet, there is but one large-scale lithium mine in the US, meaning for the moment the country has to import what it needs. Officials at the US Department of Energy are desperate to change that. By 2030, they want all lithium produced domestically. Expanding America's lithium industry, however, is highly controversial, as mining can destroy natural environments, leach toxic chemicals, and intrude on sacred Indigenous land. At the same time, however, lithium-ion batteries are considered a crucial technology in the world's transition to renewable energy, storing electricity generated by the wind and the Sun. Finding a source of lithium that doesn't cause more environmental destruction than necessary is key, but a clean solution is complicated. **Pennsylvania** sits on a vein of sedimentary rock known as the **Marcellus Shale**, which is rich in natural gas. The geological foundation was deposited almost 400 million years ago by volcanic activity, and it contains lithium from volcanic ash. Over vast stretches of time, deep groundwater has dissolved the lithium in these rocks, essentially "*mining the subsurface*," according to Justin Mackey, a researcher at the National Energy Technology Laboratory in Pennsylvania. Mackey and his colleagues have now found that when wastewater is dredged up from the deep by fracking activities, it contains an astonishing amount of lithium. Because of its location, Pennsylvania is a leading state in controversial fracking activities, which have spurred numerous environmental and health concerns. Fracking works by drilling an L-shape into the earth so that water can be pumped downward. This forces deeper substances, including gas, out into the open. "*Wastewater from oil and gas is a burgeoning issue. Right now, it's just minimally treated and reinjected*," says Mackey. As this new study shows, in properly measuring lithium reserves in fracking wastewater, there could be another way to put the waste to good use. The Marcellus Shale "*has the capacity to provide significant lithium yields for the foreseeable future*;" as long as fracking continues, that is. If scientists can extract even a conservative amount of lithium from fracking wastewater in the state, they calculate it could meet more than 30 percent of the current US demand. To fulfill our climate goals, global demand for lithium is expected to increase by 400 percent in the coming decades.

<https://www.sciencealert.com/a-vast-untapped-source-of-lithium-has-just-been-found-in-the-us>

Spotlight Gemstone: Alexandrite

June's Birth Stone



natural light incandescent light

June has three official birthstones, moonstone, pearl, and alexandrite. Of these, I think that alexandrite is the most interesting, so that is the birthstone that will be discussed this month. A relatively modern gem, alexandrite was discovered in Russia's Ural Mountain emerald mines. Legends claim that it was discovered in 1834 on the same day that future Russian Czar Alexander II came of age, hence the name honoring him. Because this unique gemstone changes colors from green to red (*see example above*), the national colors of Russia, alexandrite became Imperial Russia's official gemstone. Sometimes described as "*emerald by day, ruby by night*," alexandrite is a rare variety of the mineral *chrysoberyl* (an aluminate of beryllium with the formula BeAl_2O_4), a strongly pleochroic (trichroic) gem that will exhibit emerald green, red, and orange-yellow colors depending on viewing direction in partially polarized light. After Russia's mine deposits were exhausted, the popularity of alexandrite waned until new supplies were discovered in Brazil in 1987. Brazil, Sri Lanka and East Africa are now the main sources for alexandrite, though these are not as vividly colored as the original Russian stones.

Because it's so scarce, fine quality alexandrite is practically unaffordable to the general public. Even lower quality stones are expensive and limited in supply. Since the 1960s, labs have grown synthetic alexandrite (not to be confused with simulated alexandrite, which is actually corundum or colored crystals infused with chromium or vanadium for color). Creating synthetic alexandrite is an expensive process, so even lab-grown stones can be costly. Color change is the most important factor when determining alexandrite's quality and value. The brighter the colors and the more dramatic the change from bluish green in daylight to purplish red under incandescent light, the more valuable the gem. Like most gems, alexandrite is weighed in carats. Higher clarity may weaken the stone's color change, so color is much more important than clarity in this case. Alexandrite is more expensive than most gemstones, including sapphires, rubies, emeralds and diamonds. Top-quality Russian alexandrite has sold for as much as \$10,000 per carat. Most of the original Russian stones belong to museums or private collectors. The few gemstones that are produced today only fit the budgets of the most discerning gem experts. Alexandrite is a solid investment because of its rarity, durability and historical significance.

<https://www.americangemsociety.org/en/alexandrite-overview>

What in the World?



What in the World is this giant balanced rock and what is its history??

May's Photo



Last month's **What in the World** photograph was Monument Rocks, also known as the Chalk Pyramids, a series of chalk formations in Gove County, Kansas, that are rich in fossils. The rocks are up to 50 feet tall and 300 feet deep, and were formed from sediment that settled on the floor of an inland sea about 80 million years ago. The rocks are a reminder of a time when the region had more water

ROCK CALENDAR CVRMS EVENTS OF INTEREST

2024

June 18 — CVRMS Monthly Meeting

Picnic at Thomas Park, Marion
Rock Show and Tell and Polishing

July. 16 — CVRMS Monthly Meeting

Picnic at Wanatee Park, Marion
Rock Show and Tell and Geode Cracking

Aug. 20 — CVRMS Monthly Meeting

Picnic at Morgan Creek Park, Marion
Rock Show and Tell and Rock Bingo

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 \(keokukiatourism.org\)](http://keokukiatourism.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

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.

Jay Vavra was reading an article (**reproduced below**) that I had already selected for this issue of the Newsletter and was wondering about the differences between **Limestone**, **Travertine**, and **Marble**. All three are **CaCO₃ (calcium carbonate)** with or without some magnesium (which may be called Dolomite). Both **Limestone** and **Travertine** are sedimentary rocks. **Limestone** forms from the accumulation of calcium carbonate produced by an organism or by supersaturation participation, mainly in the ocean. **Travertine** is formed by the precipitation of calcium carbonate from mineral springs or terrestrial water. Both **Limestone** and **Travertine** can be transformed to **Marble** (a metamorphic rock) by recrystallization due to heat and pressure, usually from deep burial.

Dentist Shocked To Find Ancient Human Jawbone Stuck In Home Floor Tile

by Leslie Katz

(<https://www.forbes.com/sites/lesliekatz/2024/04/28/dentist-shocked-to-find-ancient-human-jaw-embedded-in-home-floor-tile/>)

A European dentist who's seen his share of jawbones got a stunning surprise earlier this month when he spotted a human mandible in a highly unlikely place—embedded in the newly installed tile floor at his parents' house. Since the dentist first [posted a photo of the find to Reddit's fossils subreddit](#), curious and enthused paleontologists the world over have contacted him. An international team of scientists now plans to examine the fossil, which they suspect belongs to an extinct member of the human lineage. "If it turns out to be a fossil hominin, which I think it is, it should be studied and placed in a museum," John Kappelman, an anthropology professor at the University of Texas at Austin who specializes in hominid and hominin origins and evolution, said in an email. The dentist, who goes by Kidipadeli75 on Reddit, found the fossil in travertine tile sourced from Turkey and located in a hallway leading to his mom and dad's outdoor terrace. Travertine, a form of natural limestone deposited around mineral springs, is a popular



choice for floor and wall tiles for its natural beauty, ancient aesthetic and durability. Travertine tile has been known to contain fossils of plants, algae and animals, including rhinos and giraffes, with human fossils a far more rare find, University of Wisconsin paleoanthropologist John Hawks wrote in a blog post about the jawbone discovery. He titled the piece [How many bathrooms have Neanderthals in the tile?](#) "I expect there will be many twists and turns in the story of this jawbone," Hawks wrote. "With some teeth preserved and abundant surrounding rock, I expect that specialists will be able to learn a great deal about the life of this individual and when he or she lived." The European dentist, an expert in dental implants, says he immediately knew he wasn't just looking at stone tile's natural pattern variations when he saw several teeth staring up at him. "From my dentist point of view I had no doubt it was some kind of human," he said in an interview over Reddit chat. "The teeth distribution and size of the mandible is characteristic. Also the width of the cortex is specific to ancient humans." "I don't think it is Jimmy Hoffa," the dentist joked in a follow-up to his original Reddit post. He said he prefers not to reveal his name, or his parents' location, to protect the family's privacy. To say the dentist was taken aback to spot a jawbone as part of his parents' home upgrade would of course be an understatement. Kappelman shares the surprise, but

for a different reason. "It is very, very unusual to find vertebrate fossils in processed travertine tile, and hominin fossils 100 times more so," Kappelman said. "We have only a handful." Kappelman was part of a team that observed the earliest evidence of tuberculosis, etched on 500,000-year-old human skeletal remains discovered by factory workers in Turkey cutting travertine tile for commercial use. The scientists published the findings of their research in 2007 in [The American Journal of Physical Anthropology](#).

Another member of the team that studied that Homo erectus fossil, geologist Mehmet Cihat Alcicek of Turkey's Pamukkale University, is among the experts who will study the newly discovered mandible. The tile containing it originated in a quarry in the Denizli Basin in western Turkey. Scientists have previously dated stone in the area back to between 1.8 million and 0.7 million years, Alcicek [told The Washington Post](#).

How did birds survive the K-Pg extinction event 66 million years ago while all other dinosaurs died out?

Here is why birds survived, while other dinosaurs and many other animals perished when the comet hit the Earth 66 million years ago.



The species that survived didn't live in trees that were burned in the firestorm caused by the strike of the comet. **(1)** They lived either on the ground, nested in caves or sides of cliffs. **(2)** There were many types of birds before the comet, but the ones that survived cared for their young. This might indicate that the lineages that made it through might have been smarter than the ones that didn't make it. They were better able to find solutions to problems that they encountered just after the disaster. **(3)** Only three to six species that had a beak without teeth survived and gave rise to about 10,500 species of birds that are alive today. Dinosaurs will never have teeth again. They can only have serrations of beaks at most. This might be related to the fact that the ones that had this adaptation ate insects and seeds. This type of food was less affected by this disaster. Insects can feed on decaying matter, while seeds can stay in the ground and be found with a beak by hungry birds for years after and still be eatable. **(4)** Only small birds survived because they didn't need that much food. During such disasters, large animals are the first to be killed off. **(5)** Their ability to fly and cover large distances in the food search gave them an edge in finding shielded places where there was still some sustenance that they could exploit. **(6)** The survivors might have originated in the southern hemisphere, which was a bit less affected by the disaster that struck the Yucatan Peninsula in the north of Central America. **(7)** They had feathers, which protected them from cold during nuclear winter-like conditions after the strike of the comet. Many birds migrate long distances and are adapted to multiple climatic zones, which means that they could be able to brave a cold spell. Some animals might have frozen to death during this disaster. Most other dinosaurs most likely also had feathers, but bigger ones might not have had much of such covering, and some had none at all. Otherwise, they would overheat during the hot climate before the disaster if they were very huge.

It was not only dinosaurs that died out during this cataclysm. There is a misconception that mammals were not affected, but all the ones that are alive today are also the descendants of a number of the surviving species that made it through.

China's 'Heavenly Pits': The Giant Sinkholes That Have Ancient Forests Growing Within

Take one look at the giant sinkholes that pockmark China's southwestern regions and it's easy to see why they are dubbed "*tiankeng*," a Mandarin word meaning "*heavenly pits*." Not only do the sinkholes look like they were punched out of the landscape with a cookie cutter, they also harbor primitive forests and pristine ecosystems, according to the UNESCO Courier. Southwestern China is home to karst landscapes, limestone formations that are highly prone to dissolution. Over hundreds of thousands of years, rainwater trickling down through the soil made its way into the bedrock and gradually eroded the limestone. Rivers of slightly acidic water widened cracks into tunnels and caves that eventually could no longer prop up the rock ceiling. The ceilings therefore collapsed to the bottom, opening up the enormous sinkholes. China's "heavenly pits" are some of the largest sinkholes in the world, in particular Xiaozhai Tiankeng, located in Fengjie County in southern-central China, which is **the deepest sinkhole on Earth**. To qualify as a *tiankeng*, a sinkhole must measure at least 330 feet deep and wide. *Tiankeng* must also have steep sides and rivers, or the ghosts of ancient rivers, flowing along the bottom. At Xiaozhai Tiankeng, for example, the rainy season feeds an underground river that snakes through a network of caves. China is home to around 200 *tiankeng*, which are mostly distributed from the central Shaanxi province down to the Guangxi Zhuang autonomous region in the southwest. Roughly **one-third of the country** consists of karst, the highest proportion of overall surface area of any country in the world, compared with **just under one-fifth in the United States**. China boasts incredibly visually spectacular karst with enormous sinkholes and giant cave entrances. Despite their size, China's *tiankeng* can be hard to spot among the jagged mountains and lush forests that cover much of the southwestern part of the country. That's why dozens of them have only been discovered in recent years. The most recent discovery was in May 2022 in Guangxi. A cave exploration team descended into the sinkhole, located near the village of Ping'e in Leye County, and found the pit measured 630 feet deep and up to 1,004 feet across. The find brought the number of known *tiankeng* in Leye to 30. The bottom of the sinkhole harbored a primal forest with ancient trees that were up to 131 feet tall. The undergrowth was dense and as high as a person's shoulder. Researchers said that they wouldn't be surprised to know that there are species found in these caves that have never been reported or described by science until now.

<https://www.livescience.com/planet-earth/geology/chinas-heavenly-pits-the-giant-sinkholes-that-have-ancient-forests-growing-within>

Cedar Valley Rocks and Minerals Society Field Trip Guidelines and Requirements

All MSHA and site-specific guidelines must be followed at all times and will be strictly enforced. Serious safety violations could result in MSHA fines for the quarry, quarry supervisor, and the offending rock club member. Note: When an infraction occurs, MSHA may levy fines on all three entities, including the rock club member.

Members under the age of 18 must be accompanied by an adult. If the adult is not the child's parent or legal guardian, the child must have permission and waiver of liability forms signed by their parent or legal guardian for both CVRMS and host.

The FTC (field trip coordinator) will have a first aid kit at each field trip.

Each member must notify the field trip chairman ahead of time that they will be attending and they must arrive on time. If cancellation is necessary, members must notify the FTC as soon as possible, as others may be on a waitlist.

Each member must meet with the FTC or assistant upon arrival and departure to complete the site check-in and check-out form. They also must sign the waiver form for the quarry, the CVRMS yearly master waiver, the site hazard awareness form and be current with CVRMS club dues.

All attending members must meet with the FTC before entering the quarry for site specific hazard awareness training and review of CVRMS guidelines. If you miss the training, you will be denied access.

Each member must wear the required PPE (personal protective equipment) at all times outside of their vehicle. This includes a hard hat, class II bright orange or lime green safety vest, safety toe boots and long pants. Safety glasses are strongly encouraged but not required.

No member may possess firearms, alcohol, or illegal drugs on premises.

Each member will respect property with no willful damage of any kind. All collecting areas will be left devoid of litter regardless of how found.

Each member will cooperate with the FTC and those in designated authority in all collecting areas. Be courteous and cooperate with the quarry host representative.

Each member must always conduct themselves in an appropriate manner which will add to the stature and public image of CVRMS.

Each member will respect the personal property of others. Marked collected piles and personal items are to be left alone.

Each member must mark their collection piles with tape, cloth, or chalk rather than tools. (A hammer going through a crusher can cause thousands of dollars in damage.) Each member must leave with all tools and equipment that they arrived with.

Each member must stay back twenty feet from a ledge or overhang when on top. The height of the wall is the distance that each member must stay back from the base (on bottom). Do not cross safety barriers or rock berms. Stay away from blast drill holes and do not touch any wires you might come across. Stay away from equipment and do not go under overhead conveyors. Stay away from ponds or lakes.

Each member must wear a seatbelt at all times within the quarry and obey the site-specific speed limit and traffic pattern. When notified that it is time to leave, you must immediately proceed to the exit.

Posting of pictures or videos on social media is forbidden without the permission of quarry management. The name of the quarry or the location also may not be posted/shared without quarry management permission.

The FTC is the only member that may contact quarries on behalf of the club.

Failure to abide by these guidelines and requirements will result in having to leave the premises and not being allowed to attend future field trip(s).

Surprise! This Tiny Animal May Be The Long-Lost Ancestor of Cows, Pigs, And Deer

Meet the newly discovered species *Militocodon lydae*: Thought to be about the size of a rat and weighing up to 455 grams, or 16 ounces, this small mammal is the likely ancestor of all modern hoofed animals, called **ungulates**. The animal would have lived around 65 million years ago, appearing just after the extinction of the dinosaurs, and was identified from part of a skull and jawbone recovered from



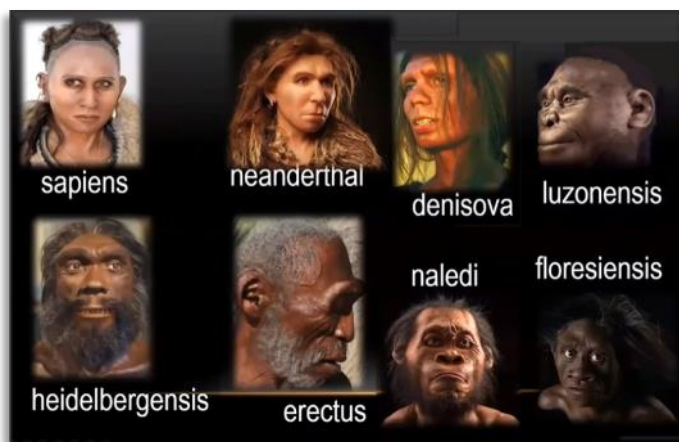
A reconstruction of *Militocodon lydae*.

the Corral Bluffs, a fossil site in Colorado. According to the researchers behind the discovery, the creature fills some important gaps in our knowledge of the Periplychidae family of early mammals, which ascended after the dinosaurs' departure. "The discovery and thorough descriptions and comparisons of the partial *M. lydae* skull represent an important step toward unraveling the complex evolutionary history of periplychid mammals," paleontologist Lucas Weaver of Kent State University in Ohio and colleagues write in their published paper. After unearthing the specimen and cleaning it up, the team used sophisticated scanning techniques, 3D reconstructions, and teeth comparisons (measuring them against teeth from other fossils and modern-day animals) to put *M. lydae* in the right place on the evolutionary tree. Key to the research was evidence that the animal's teeth were used to shear and crush rather than grind. That suggests the small creature would eventually lead to the cows, pigs, and deer we have today. The researchers have only found a handful of *M. lydae* fossils across the last eight years, so further discoveries and studies are still needed to confirm that this small and rather cute-looking animal is indeed what we think it is. "The continued discovery and study of early Paleocene archaic ungulates will almost certainly reveal more specimens that do not fit neatly into existing taxonomic bins, forcing us to contend with an evolutionary history tangled by evolutionary grades and transitional forms," the researchers write. Each new fossil discovery gives researchers a chance to refine and rethink the pattern of evolution on Earth, almost like the bigger picture comes into sharper focus every time a new find is analyzed. Tracing the evolution of animals directly after the demise of the dinosaurs has been challenging for experts because of a paucity of fossils from this time. The Corral Bluffs site, which paleontologists have been excavating for decades, is proving increasingly valuable in helping to tackle that problem. It would have been a time of speedy and widespread diversification in the animal kingdom, but particularly for mammals. After the dust settled from the asteroid impact, and with the dinosaurs out of the way, mammals like *M. lydae* took the opportunity to thrive. The discovery and description of a fossil mammal skull is an important step forward in documenting the earliest diversification of mammals after Earth's last mass extinction.

<https://www.sciencealert.com/surprise-this-tiny-animal-may-be-the-long-lost-ancestor-of-cows-pigs-and-deer>

Homo Sapiens Has Been on Earth for Only 0.0067% of Its Existence.

Though humans have been the planet's dominant species for some 50,000 years, our reign is a blink of an eye in the grand scheme of things. *Homo sapiens* (Latin for "wise man") has been on Earth for **only 0.0067%** of its existence, an infinitesimally small amount of time that emphasizes both how insignificant and how impressive a species we are. *Homo sapiens* first emerged in Africa approximately 300,000 years ago, at which point several other types of humans were still extant, including Neanderthals, Denisovans, *Homo floresiensis*, *Homo naledi*, *Homo luzonensis*, and *Homo erectus*. Though our ancestors are known to have coexisted with Neanderthals and Denisovans, it's possible they never encountered the other early humans.



There are a number of theories seeking to explain why we survived and our predecessors didn't, including superior brainpower and dumb luck, plus a newer theory suggesting that our interpersonal skills and dependence on one another helped us succeed where others failed. (Perhaps the secret really was the friends we made along the way.) We haven't been here the longest, that would be *Homo erectus* whose 1.5 million years on the planet is a record among humans that we *sapiens* won't surpass for some 1.2 million years. but we have left the most sizable footprint. Whether that ends up being a good thing may be for the next species to decide.

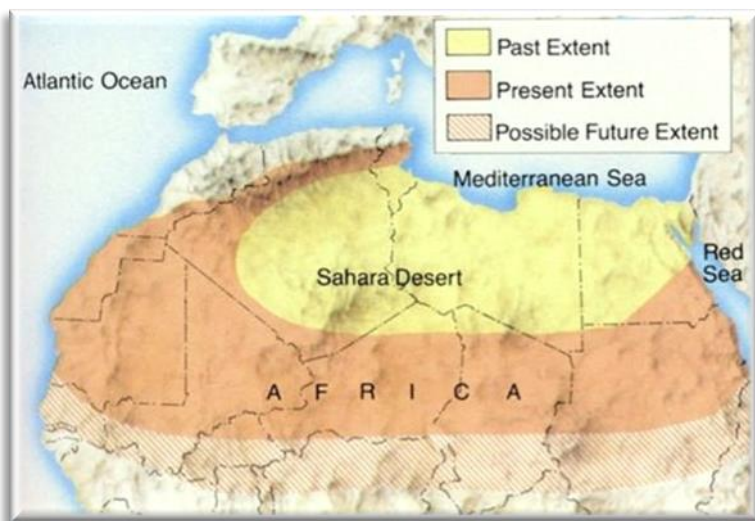
<https://historyfacts.com/science-industry/fact/homo-sapiens-have-been-on-earth-for-only-0-0067-of-its-existence/>

I DIG ROCKS!



Dramatic Shift in Africa 5,000 Years Ago Could Be a Warning of The Future

Around five and half millennia ago, northern Africa went through a dramatic transformation. The Sahara desert expanded and grasslands, forests and lakes favored by humans disappeared. Humans were forced to retreat to the mountains, the oases, and the Nile valley and delta. As a relatively large and dispersed population was squeezed into smaller and more fertile areas, it needed to innovate new ways to produce food and organize society. Soon after, one of the world's first great civilizations emerged, **ancient Egypt**. This transition from the most recent "*African humid period*," which lasted from 15,000 to 5,500 years ago, to the current dry conditions in northern Africa is the clearest example of a **climate tipping point** in recent geological history. Climate tipping points are thresholds that, once crossed, result in dramatic climate change to a new stable climate. A new study published in *Nature Communications* reveals that before northern Africa dried out, its climate "*flickered*" between two stable climatic states before tipping permanently. This is the first time it's been shown such flickering happened in Earth's past. And it suggests that places with highly variable cycles of changing climate today may in some cases be headed for tipping points of their own. Whether we will have any warnings of climate tipping points is one of the biggest concerns of climate scientists today. As we pass global warming of 1.5°C, the **most likely tipping points** involve the collapse of ice sheets in Greenland or Antarctica, tropical coral reefs dying off, or abrupt thawing of Arctic permafrost. Some say that there will be **warning signs of these major climate shifts**. However, these depend very much on the actual type of tipping point, and the interpretation of these signals is therefore difficult. One of the big questions is whether tipping points will be characterized by flickering or whether the climate will initially appear to become more stable before tipping over in one go. To investigate further, an international team of scientists went to the basin of Chew Bahir in southern Ethiopia. There was an extensive lake there during the last African humid period, and deposits of sediment, several kilometers deep, under-



neath the lake bed record the history of climate-driven lake level fluctuations very precisely. Today, the lake has largely disappeared and the deposits can be drilled relatively cheaply without the need for a drill rig on a floating platform or on a drillship. They drilled 900 feet below the dry lake bed (almost as deep as the Eiffel Tower is tall) and extracted hundreds of tubes of mud around 4 inches in diameter. By putting these tubes together in order they form a so-called sediment core. That core contains vital chemical and biological information which records the past 620,000 years of eastern African climate and environmental history. They determined that at the end of the African humid period there were around 1,000 years in which the climate alternated regularly between being intensely dry and wet. In total, they observed at least 14 dry phases, each of which lasted between 20 and 80 years and recurred at intervals of about 160 years. Later there were seven wet phases, of a similar duration and frequency. Finally, around 5,500 years ago

a dry climate prevailed for good. These high-frequency, extreme wet-dry fluctuations represent a pronounced climate flickering. Such flickering can be simulated in climate model computer programs and also happened in earlier climate transitions at Chew Bahir. They identified the same types of flickering during a previous change from humid to dry climate around 379,000 years ago in the same sediment core. It looks like a perfect copy of the transition at the end of the African humid period. This is important because this transition was natural, as it occurred long before humans had any influence on the environment. Knowing such a change can occur naturally counters the argument made by some academics that the **introduction of livestock and new agricultural techniques** may have accelerated the end of the last African humid period. Conversely, humans in the region were undoubtedly affected by the climate tipping. The flickering would have had a dramatic impact, easily noticed by a single human, compared to the slow climate transition spanning tens of generations. It could perhaps explain why the archaeological findings in the region are so different, even contradictory, at times of the transition. People retreated during the dry phases and then some came back during the wet phases. Ultimately, humans retreated to the places that were consistently wet like the Nile valley. Confirmation of climate flickering as precursors to a major climate tipping is important because it may also provide insights into possible early warning signals for large climate changes in future. It seems that highly variable climate conditions such as rapid wet-dry cycles may warn of a significant shift in the climate system. Identifying these precursors now may provide the warning we need that future warming will take us across one or more of the sixteen identified critical climate tipping points. This is particularly important for regions such as eastern Africa whose nearly 500 million people are already highly vulnerable to climate change induced impacts such as drought.

<https://www.sciencealert.com/dramatic-shift-in-africa-5000-years-ago-could-be-a-warning-of-the-future>

Dire Wolves Were Actually Ice Age Mega-Foxes

When you picture a **dire wolf**, the image that comes to mind is probably one of those unbelievably fluffy yet terrifying creatures that inhabited Winterfell in Game of Thrones. And you'd hardly be the only one, fans of the show that fell in love with its otherworldly pups started buying up their modern-day "lookalike," the Siberian husky, to the point where it resulted in sketchy breeding and rising abandonment. But when they did traipse the world, dire wolves hardly looked like their Westerosi counterparts. The giant canids that once roamed Pleistocene-era North America probably looked more like **giant red foxes** than mega-sized Malamutes, said Angela Perri, an archaeologist at Durham University. Even more surprisingly,



the wolf-like beast was hardly a wolf at all, the dire wolf genetic line cut off from our modern-day wolves, coyotes, and dogs six million years ago. Dire

wolves were first discovered in the 1850s, and many samples have been preserved in nearly perfect condition thanks to places like the La Brea tar pits in what is now Los Angeles, which are natural pits of asphalt that sucked up the bodies of prehistoric beasts like mammoths, sloths, and American lions while they still walked the earth. The morphology of the canine was so similar to a mega-size gray wolf that nobody thought to argue with what seemed like a sure thing. As evolution tells us over and over again, something that looks like a certain species doesn't necessarily mean it's a family member. But hunting down the DNA of the mysterious dire wolf is no easy task. In cases like La Brea, the tar can preserve a skeleton beautifully, but mangle the DNA inside from all sorts of creatures sharing the asphalt-filled grave, spreading different biochemical signatures all over the place. After years of hunting down samples of undisrupted DNA from across the continent, researchers managed to get five usable samples, and after genetic analysis, not only did the researchers discover how different the dire wolf was from the other dog-like creatures that occupy our current world, but also that they were the last surviving lineage of their kind. That's right, there's no dire-dogs or dire-coyotes running around today—they vanished from the earth around 12 or 13 thousand years ago. Now that we know how special dire wolves are, it opens a whole new set of questions for scientists, like did they interact with early humans, who were their close relatives, and figuring out whether the 160-pound pups had fur like a wintery beast or a massive Shiba Inu. <https://www.popsoci.com/story/animals/dire-wolf-genetics/>

Clam Chowder with a Side of Pearl

In 2021, Gemological Institute Of America's laboratory in New York had the opportunity to examine a fascinating find and hear about an even more fascinating story. According to Bryan Gosman, co-owner of Gosman's Fish Market in Montauk, Long Island, one of his staff was shucking clams in the kitchen while preparing to cook New England chowder when he discovered a pearl the size of a gumball. "It didn't look real," said Gosman. "Usually [pearls are] the size of your pinky nail or something like that, but this looked like a plastic knob." He then reached out to Rebekah Harris, a co-owner of The Shipwreck Jewelry and Trading Company, to help him confirm the identity of the pearl. She assured him that the pearl was genuine and also the largest one she'd ever seen outside of a museum. She helped him submit



the pearl to GIA in New York. GIA scientists confirmed that the pearl formed in a *Merccaria mercenaria* (northern quahog)

"clam." It weighed 27.78 carats and measured 0.75 x 0.44 inches. To put that in perspective, many cultured pearls in jewelry stores range from 0.3— 0.5 inches, meaning that this natural pearl is extraordinarily large. It is also a near perfect button shape, with an attractive white and purple color. Unlike many pearls valued for jewelry, it is non-nacreous, meaning its surface structure is different and has a more porcelain appearance. Quahog ("koh-hawg") clams like the one that produced this pearl are found on the Eastern shore of North America, especially along the coast of the New England states, and can also be found along California's Pacific coast. The pearls range in color from white and light gray to varied shades of purple, with purer colors being the most sought-after. Finding a quahog pearl is uncommon, not least because cleaning and shucking clams is often done mechanically, so most pearls are lost or destroyed in the process. The rare few pearls that make it into an unsuspecting patron's food have been cooked, which can damage them. How fortunate that this pearl was discovered early and remained intact! "What is it really worth? I don't know," Gosman said of the pearl. "It's not about the money, it's just kind of cool." Gosman reported that he intends to raffle off the pearl to raise money for the Montauk Food Pantry.

<https://www.gia.edu/gia-news-research/clam-chowder-with-side-of->

Meet Shanidar Z: 75,000-Year-Old Neanderthal Woman's Face Reconstructed

A UK team of archaeologists on Thursday revealed the reconstructed face of a 75,000-year-old Neanderthal woman, as researchers reappraise the perception of the species as brutish and unsophisticated. Named **Shanidar Z** after the cave in Iraqi Kurdistan where her skull was found in 2018, the latest discovery has led experts to probe the mystery of the forty-something Neanderthal woman laid to rest in a sleeping position beneath a huge vertical stone marker. The lower part of her skeleton is believed to have been excavated in 1960 during groundbreaking excavations by American archaeologist Ralph Solecki in which he found the remains of at least 10 Neanderthals. His discovery



of a cluster of bodies with one surrounded by clumps of ancient pollen led him to controversially argue that this was evidence of funerary rituals with the dead placed on a bed of flowers. Political difficulties meant it took around five decades for a team from Cambridge and Liverpool John Moores universities to be allowed back to the site in the Zagros mountains of northern Iraq. The last Neanderthals mysteriously died out around 40,000 years ago, just a few thousand years after humans arrived. Shanidar Z's skull, thought to be the best preserved Neanderthal find this century, had been flattened to a thickness of two centimeters (0.7 inches), possibly by a rockfall relatively soon after she died. Professor Graeme Barker from Cambridge's McDonald Institute for Archaeological Research, who led the excavations at Shanidar cave, said that the team had "never expected to get more Neanderthals". "We wanted to try and date these burials... to use the site to contribute to the big debate about why the Neanderthals died out, and then we started finding these bits," he said. Shanidar Z is the fifth body to be identified in the cluster buried over a period of at least several hundred years right behind the rock in the center of the cave. Archaeologists believe the stone was used as an identifier to allow itinerant Neanderthals to return to

the same spot to bury their dead. Latest research by team member Professor Chris Hunt of John Moores now suggests the pollen that gave rise to Solecki's contentious "flower burial" theory might in fact have come from bees burrowing into the cave floor. But Hunt said there was still evidence, such as the remains of a partially paralysed Neanderthal found by Solecki, that the species were more empathetic than previously thought. "There's been this huge reappraisal which was actually started by Ralph Solecki in this cave with 'Shanidar 1' with his withered arm and his arthritis and his deafness who must have been looked after. That tells us there was compassion," he said. The positioning of the bodies in the cluster in the same spot, in the same position and facing in the same direction implied "tradition" and the "passing of knowledge between generations", he said. "It looks much more like purposeful behavior that you wouldn't associate with the text book stories about Neanderthals which is that their lives were nasty, brutish and short," he added. Emma Pomeroy, the Cambridge paleo-anthropologist who uncovered Shanidar Z, said finding her skull and upper body had been both "exciting" and "terrifying." The skeleton and the surrounding sediment had to be strengthened in situ with a glue-like consolidant before being removed in dozens of small foil-wrapped blocks. Lead conservator Lucia Lopez-Polin then pieced together the over 200 bits of skull as the first step in the facial reconstruction for the just-released Netflix documentary "Secrets of the Neanderthals." Pomeroy said the task had been like a "high stakes 3D jigsaw puzzle" especially as the fragments were very soft "similar in consistency to a biscuit dunked in tea". The rebuilt skull was then 3D-printed allowing paleoartists and identical twins Adrie and Alfons Kennis in The Netherlands to complete the reconstruction with layers of fabricated muscle and skin for the documentary, which was produced by the BBC Studios Science Unit. Pomeroy said Neanderthal skulls looked very different to those of humans "with huge brow ridges and lack of chins." But she said the recreated face "suggests those differences were not so stark in life," highlighting the interbreeding between Neanderthals and humans "to the extent that almost everyone alive today still has Neanderthal DNA."

<https://www.sciencelert.com/meet-shanidar-z-75000-year-old-neanderthal-womans-face-reconstructed/>

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Next Meeting:
JUNE 18
Thomas Park—Marion
Pot-Luck Picnic
Begley #2 Pavilion

CEDAR VALLEY GEMS

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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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