Cedar Valley Gems

Cedar Valley Rocks & Minerals Society

Cedar Rapids, Iowa

cedarvalleyrockclub.org

CEDAR VALLEY GEMS **JANUARY 2022** **VOL. 49, ISSUE 01**

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

Next CVRMS Meeting

Tuesday Jan. 18

Hiawatha Community Center

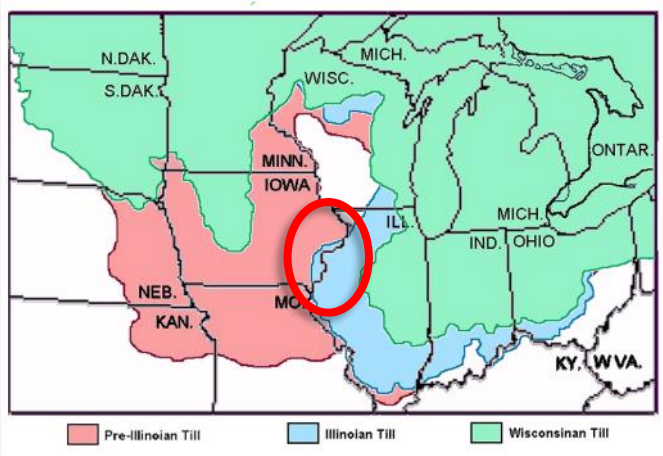
101 Emmons St., Hiawatha - 7:15 pm

featured speaker

Ray Anderson, CVRMS

"Where Was the Mississippi River When Early Illinoian Glacial Ice Was in Southeast Iowa ??"

The Illinoian glacier moved west across the Mississippi River Valley and into southeast Iowa about 300,000 years ago. How did the Mississippi River get past this ice sheet at that time??



—-Pandemic Precautions —-

to attend we recommend that you *BE VACCINATED*

in the building you *MUST BE MASKED*

and *PRACTICE SOCIAL DISTANCING*

If you have a cough or cold STAY HOME

Three-toed, meat-eating dinosaurs may have sprinted as fast as a car driving on city streets, new research shows. That finding comes from analyzing the footprints these theropods left behind as they dashed over squishy lake-bed mud tens of millions of years ago. Two sets of fossilized footprints at a site in La Rioja, Spain, show that the makers of the tracks were galloping along at **speeds up to 27.7 mph,** reaching "*some of the top speeds ever calculated for theropod tracks*," according to the new study. According to researchers' analysis of the tracks, one dinosaur sped up steadily and consistently as it ran, while the other quickly changed its speed while still on the move. Together, these two sets of footprints from the early part of the Cretaceous period (145 million to 66 million years ago) offer a unique snapshot of dinosaur mobility and behavior. Paleontologists use several methods to calculate running speeds in extinct dinosaurs. One method builds biomechanical models based on dinosaur bones and limb proportions, the other main one is the speed estimation from tracks. One set of the La Rioja tracks, dubbed La Torre 6A-14, preserves five three-toed footprints that were each about 12.9 inches long and 11.9 inches wide. The other trackway, La Torre 6B-1, includes seven three-toed footprints that were a little smaller, measuring 11.4 inches long and 10.6 inches wide. Based on the size of the prints, hip height of the theropods would have been between 4 to 5 feet, so the animals would have stood about 7 feet tall and measured around 13 to 16 feet long from the snout to the tip of the tail. While it isn't possible to tell what genus of theropod made the tracks, similarities between the footprints hinted that the two dinosaurs belonged to the same taxonomic group, were non-avian and were "very agile," according to the study. They found that the dinosaur that made the 6A-14 trackway reached just over 23 mph, while the speedier 6B-1 dinosaur scampered into the lead with a top speed of nearly 28 mph. By comparison, the fastest speed ever clocked in a human runner (Usain Bolt in 2009) is **27.5 mph**. https://www.livescience. com/fossil-tracks-speedy-dinosaurs

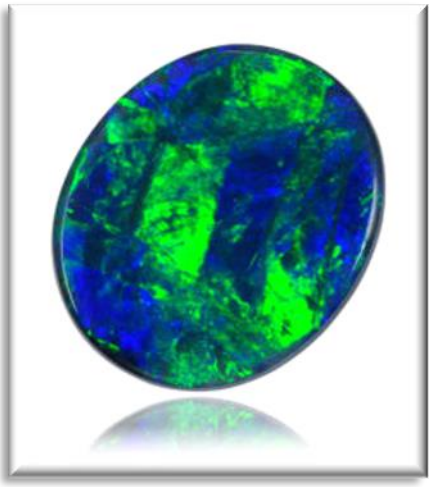
CVRMS Monthly Meeting, Dec. 16 — Minutes —

Hiawatha Community Center

MEETING CANCELLED DUE TO WEATHER

What is Black (Dark) Opal?

"***Black opal***" is a term used for opal that has a dark body color, often black or dark gray. The term is also used for opal that has a dark blue or dark green body color. The dark body color often makes the fire of black opal more obvious. This contrast of fire color to body color makes black opals very desirable and sell for high prices. Unlike ordinary opals, black opals have carbon and iron oxide trace elements present, which cause the unusual darkness of the stone. Because of their dark body tone, the rainbow colors in a black opal stand out much better than lighter opals. This vibrancy of color makes black opal the most valuable form of all opals. Often a black opal will have a natural layer of potch (colorless opal) left on the back of the stone, which can give the stone an extra darkness and vibrancy of color. The darker this potch backing is, the darker the body tone, which usually makes for greater vibrancy of color and a higher value black opal. This is the principle upon which doublets and triplets are based, which are an imitation of solid black opals. Black opals are generally cut into an oval shape, however this depends on the natural shape of the stone. Sometimes black opals are cut into freeform or teardrop shapes in order to maximize the size and carat weight of the stone. Black opals are normally cut with a low cabochon, due to the opal color bar often being much thinner in black opal than in white or crystal opals. If the color bar in an opal is thin, it is impossible to create a domed surface. By comparison, black opals are the most valuable form of opal, due to their dark body tone and the resulting vibrant play of color. Top of the range gem quality black opal can fetch prices up to $11,000 per carat. However, just because an opal is black doesn't make it valuable. There are many factors including brightness and pattern which determine the overall value of opal. Black opals are mostly mined in Lightning Ridge, in northern New South Wales. Lightning Ridge is famous for the black opal and hundreds of millions of dollars worth of black opals have been found there. In 2008, the black opal was named as the "*gemstone emblem"* for New South Wales. Black opals have also been found at Mintabie in South Australia.
https://www.opalsdownunder.com.au/learn/black-opals/



CVRMS Board Minutes Nov. 23

CALL TO ORDER: 7:10 pm by Marv Houg at his house.

MEMBERS PRESENT: Marv Houg, Bill Desmarais, Ray Anderson, Matt Burns, Sharon Sonnleitner, Kim Kleckner, Dell James.

MINUTES OF LAST MEETING: Move to approve by Ray and second by Kim. Minutes approved as published.

SCHOLARSHIPS: Move to approve by Bill, second by Matt According to new by laws, University of Iowa $4000, Cornell $3000 Vast $1500. Payment will be made by Dale following vote by the membership.

SHOW 2022 MARCH 26-27: Review of vendors and spaces available. Ray will get on posters as well as lining up speakers. Reminder that the theme is "*Iowa's Industrial Minerals."* Marv reminded everyone that pebble pit stuff and door prizes are needed. Bill, Sharon and Kim will work on busting some materials that Bill has for pebble pit and egg cartons.

AUCTION OCTOBER 8-9: Marv will send out a list of consignors and materials to board members.

BY-LAWS: Revisions to bylaws in progress. Watch for them in newsletter *[pages 10 & 11].*

QUESTIONS ABOUT 501c3 STATUS: Need treasurer's report for last century or at least 5 years.

MSHA TRAINING: Dale will call available sites either Ladd or new Marion libraries.

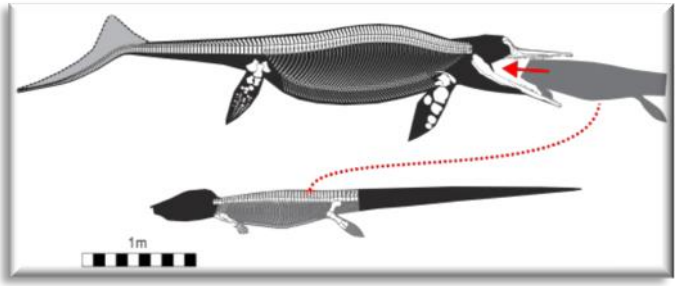
FIELD TRIPS: Marv will talk to Glen about possible sites. Matt volunteered to put together a list of possible dig sites. Anyone with suggestions, let him know.

MOTION TO ADJOURN: 9:10 pm by Kim, second by Matt. Meeting adjourned.

Respectfully submitted,
Dell James, Secretary

Fossilized "Ocean Lizard" Found Inside Corpse of Ancient Sea Monster

About 240 million years ago, one giant sea monster ate another, and then died with chunks of the beast in its belly. Researchers in China have now discovered and analyzed the fossilized corpses of these beasts, which they are calling the oldest evidence of megapredation (when one large animal eats another) on record. It remains a mystery, however, exactly how the larger predator (an ichthyosaur, a dolphin-like marine reptile that lived during the dinosaur age) came



to feast on the slightly smaller sea monster, a thalattosaur, a fearsome lizard-like marine reptile that lived during the latter part of the Triassic period. The ichthyosaur may have attacked and killed the thalattosaur before eating it, but it's also feasible that the ichthyosaur was simply scavenging the thalattosaur's remains, the researchers said. Whatever happened, the ichthyosaur, likely a new species from the genus *Guizhouichthyosaurus*, never took another bite. Researchers found the remarkable fossil in the fall of 2010, while digging at a quarry in the province of Guizhou, China. As they prepared the 16-foot-long specimen to study, they realized it held the bones of the ichthyosaur's last meal bulging out of its abdomen. The head and tail of the more slender thalattosaur, identified as *Xinpusaurus xingyiensis*, were not swallowed by the ichthyosaur, so it appears that the ichthyosaur took four enormous bites of the thalattosaur's midsection, based on the pieces the researchers found in the predator's abdomen. Researchers often guess what ancient predators ate by analyzing their tooth shape and body size. Surprisingly, this genus of ichthyosaur, which usually measured between 13 and 20 feet long, or just smaller than a killer whale (*Orcinus orca*), was not previously thought to be an apex predator. This predator did not have a typical dentition of the top predator (its teeth look like they are good for grasping squids). So, it was a surprise to find such large prey in its stomach. The finding changes the view of other large reptiles with teeth like *Guizhouichthyosaurus*'s. They may have also been megapredators, although they were not considered as such before. In other words, fierce megapredators didn't necessarily need sharp, slicing teeth to be dangerous. Perhaps *Guizhouichthyosaurus* used its blunt teeth to grip prey, possibly breaking the spine with the force of its strong bite, just as modern apex predators such as orcas, leopard seals and crocodiles do today, the researchers said. https://www.livescience.com/triassic-sea-monster-ate-huge-reptile.html

Spotlight Gemstones: Garnet

January's Birth Stone

Garnet, is the name used for a large group of rock-forming minerals. These complex minerals share a common crystal structure and a generalized chemical composition of $X_3Y_2(SiO_4)_3$. In that composition, "X" can be Ca, Mg, Fe^{2+} or Mn^{2+}, and "Y" can be Al, Fe^{3+}, Mn^{3+}, V^{3+} or Cr^{3+}. Despite their variable appearance, garnets are usually easy to identify by their hardness, crystal habit and occurrence in metamorphic rock. Garnets usually form at high temperature and pressure, so they typically occur in their crystal form as rounded dodecahedrons (twelve-sided) or twenty-four sided trapezohedrons with a Mohs hardness of 6.5 -7.5. The birthstone of **January**, garnets are mined in a rainbow of colors (except blue). From the fiery orange of *Mandarin Garnets* to the rich green of *Tsavorite Garnets* and to the most widely recognized color, the deep red of *Pyrope Garnets,* the garnet is considered a great gift to symbolize friendship and trust. Garnets have been used as gemstones and abrasives since the Bronze Age. All species of garnets possess similar physical properties and crystal forms, but differ in chemical composition. The different species are pyrope, almandine, spessartine, grossular (varieties of which are hessonite or cinnamon-stone and tsavorite), uvarovite and andradite. The garnets make up two solid solution series: pyrope-almandine-spessartine and uvarovite-grossular-andradite. These minerals are found throughout the world in metamorphic, igneous, and sedimentary rocks. Most garnets found near Earth's surface formed when a sedimentary rock with a high aluminum content, such as shale, was subjected to heat and pressure intense enough to produce schist or gneiss. Garnet is also found in the rocks of contact metamorphism, subsurface magma chambers, lava flows, deep-source volcanic eruptions, and the soils and sediments formed when garnet-bearing rocks are weathered and eroded. In the United States, the major industrial uses of garnet in 2012 were waterjet cutting (35%), abrasive blasting media (30%), water filtration granules (20%), and abrasive powders (10%).

What in the World?

What in the World? Is nature doing to this city and what city is it??

December's Photo

December's ***What in the World?*** photo showed the ***Immortal Bridge***. Believed to have formed during the Ice Age, the rock formation on Mount Tai in the Shandong province of China is composed of three huge boulders and several smaller ones. Mount Tai is a sacred mountain in China; perhaps the sacred connection led to this amazing formation being named the *immortal bridge*.

ROCK CALENDAR
CVRMS EVENTS OF INTEREST

2022

Jan. 18— CVRMS Monthly Meeting
Hiawatha Community Center 7:15 pm
Ray Anderson, CVRMS
"Where Was the Mississippi River When Early Illinoian Glacial Ice Was in Southeast Iowa ??"

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

Mar. 15— CVRMS Monthly Meeting
Hiawatha Community Center 7:15 pm
Cornell College Students

Mar. 26-27 — CVRMS Rks, Fos, & Min Show
Hawkeye Downs
Cedar Rapids, Iowa
"Iowa's Industrial Minerals"

Apr. 19— CVRMS Monthly Meeting
Hiawatha Community Center 7:15 pm
Program to be determined

May 17— CVRMS Monthly Meeting
Hiawatha Community Center 7:15 pm
Program to be determined

Oct. 8-9 — CVRMS Rock Auction
Amana RV Park and Event Center
Amana, Iowa

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.

Last week I was "***mining***" some of the boxes of rocks in my barn and came across a great specimen of lime grain stone (a rock composed entirely of fragments of fossils (coquina) and originally deposited in a shallow tidal surge channel). Unfortunately, secondary calcite was deposited on many of the grains, from movement of rainwater leaching calcium from soil and depositing it on the underlying rocks. I have to figure out a way to remove the caliche without damaging the fossils. But, I thought it would be interesting to talk about this secondary calcite, frequently called **Caliche** (*pronounced ca-leech'-ee).*

"**Caliche**" is a shallow layer of soil or sediment in which the particles have been cemented together by the precipitation of mineral matter in their interstitial spaces. The cement is usually calcium carbonate; however, cements of magnesium carbonate, gypsum, silica, iron oxide, and a combination of these materials are known. Caliche is a common feature of arid or semiarid areas throughout the world. In the United States, caliche is a familiar deposit in many parts of the Southwest, especially in Arizona, California, Nevada, New Mexico, and Texas and was deposited in Iowa numerous times in the geologic past. The name "caliche" originates from a Spanish word for porous materials that have been cemented by calcium carbonate. The name is used to refer to a piece of the material or the layer from which it was broken, or the cement itself that binds the materials together. Caliche is known by many other names, the more common of which are calcrete, hardpan, duricrust, and calcic soil. Typical caliche colors are white, gray, brown and reddish-brown. Well-developed caliche can have an appearance that resembles conglomerate, breccia, **coquina**, or sandstone and sometimes take forms that may be confused with fossils. Caliche can be a very hard, dense, heavy, and durable material if it is firmly bound by a cement that completely fills the interstitial voids between the soil or sediment particles. It can also be a weak and friable material if it is poorly cemented. In excavations and outcrops, a well-developed caliche usually stands out as a competent, well-cemented sediment or soil with loose friable material below. Sometimes it is overlain by uncemented surface material. Plant roots might not penetrate a well-developed caliche. Caliche has a diversity of origins. The major process of forming caliche begins when calcium carbonate is leached from upper soil horizons by downward-percolating solutions. Dissolved calcium carbonate might also be delivered to the site in runoff and then percolate into the soil. The calcium carbonate then precipitates in a deeper soil horizon to form the caliche layer. At first the calcium carbonate precipitates as small grains or thin coatings on sediment grains or soil particles. As the grain coatings thicken, adjacent grains will be cemented together, and nodules consisting of multiple grains and their surrounding cement will form. As cementing continues, a continuous subsurface layer might form. In an advanced stage, a solid caliche layer can develop. These can become so dense and impermeable that they can resist the downward percolation of water and erosion by wind or water. The caliche layer generally has a higher density at the top and decreases downward. Advanced caliche formation can produce a layer that is over one meter thick and have a lateral extent of hundreds of square miles or more. Some caliche forms by the upward movement of water through capillary action. As the water evaporates, dissolved materials precipitate, and, over time, can cement the soil or sediment. Caliche can also form beneath vegetation that extracts water from the ground and transpires it into the atmosphere. As large amounts of water are removed by the plants, mineral materials that the plants do not remove become concentrated in the subsurface waters. When the concentration becomes high enough, or evaporation occurs, precipitation begins and can form caliche over time. Caliche can be a host rock for a variety of secondary minerals, including metallic ores and gem materials. Caliche layers in terraced sediments can strongly influence topography. Caliche layers in aquifers can result in the stratified flow of groundwater. Caliche development can incorporate gold, gemstones, and other valuable minerals. Caliche porosity can serve as the deposition site of valuable secondary minerals, including ores of uranium and vanadium, and gem materials such as turquoise and malachite. Caliche deposits can be correlated and used as relative age and stratigraphic markers. Caliche development indicates a time interval of tectonic, sedimentary, erosional and hydrologic stability. Caliche is often a challenge to agriculture. It interferes with proper soil drainage, the formation of plant roots, and it also can contain soluble minerals that are not beneficial to the plants. Caliche is sometimes crushed and used as fill, aggregate, or as a raw material for making portland cement. It is usually used when higher grade materials are not available or when minimal quality material is sufficient. https://geology.com/rocks/caliche.shtml

Modern calcium carbonate caliche developing in arid Arizona soil

Woolly Mammoths Survived in North America until 5,000 years ago

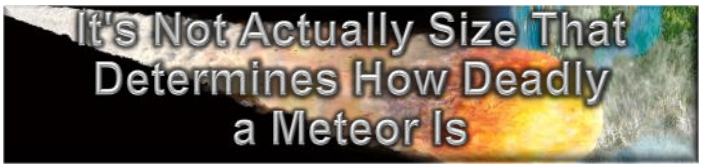
Woolly mammoths may have survived in North America thousands of years longer than scientists previously thought, vials of Alaskan permafrost reveal. A new study suggests that the hairy beasts might have persisted in what is now the Yukon, in Canada, until around 5,000 years ago, 5,000 years longer than experts previously estimated. That conclusion comes from snippets of mammoth DNA that were found in vials of frozen dirt that had been stored and forgotten in a laboratory freezer for a decade. Organisms are constantly shedding cells throughout their life (a person sheds roughly 40,000 skin cells per hour, on average) meaning they are constantly ejecting bits of their DNA into our surroundings. That is also true of nonhuman animals, plants, fungi, and microbes that are constantly leaving microscopic breadcrumb trails everywhere. The vast majority of the DNA bits are consumed by microbes, but the fraction that does remain can bind to mineral sediment and be preserved. Though only a tiny proportion of what was initially shed remains centuries later, it can nevertheless provide a window into a vanished world teeming with strange creatures. Soil samples taken from permafrost in the central Yukon dated to the Pleistocene-Holocene transition (14,000-11,000 years ago), a period marked by rapidly changing climatic conditions in which many large mammals (such as saber-toothed cats, mammoths and mastodons) vanished from the fossil record. Although the samples were small, scientists were able to isolate roughly 2 million DNA fragments per sample. By analyzing DNA from soil samples of known ages, they indirectly observed the evolution of ancient ecosystems over this turbulent period. The soil samples, spanning a period of time from 30,000 years ago to 5,000 years ago, revealed that mammoths and horses persisted in this Arctic environment much longer than previously thought. Mammoths and horses were in steep decline by the Pleistocene-Holocene transition, the DNA data suggest, but they didn't disappear all at once due to changes in climate or overhunting. In fact the new study is the first to determine that small populations of mammoths coexisted with humans on the mainland of North America well into the Holocene, as recently as 5,000 years ago. Analyzing ancient DNA from dirt has the potential to tell us a lot about ancient life; and Arctic permafrost is ideal for these types of ancient DNA studies because freezing preserves ancient DNA very well. But that might not be possible forever: As ice in the Arctic melts due to rapid increases in temperature, we're going to lose a lot of that life history data. https://www.livescience.com/woolly-mammoths-in-north-america-longer

What are Ant Hill Garnets?

Some gemstones derive a large portion of their appeal because they are found in an unexpected locality or have an unusual origin. "**Ant hill garnets**" are one of the more interesting of these "*novelty gems.*" They are called *"ant hill garnets"* because they are found on and around the margins of ant hills. The ants encounter the garnets while excavating their underground passages. The ants haul the stones to the surface and discard them. The rain washes the garnets clean and moves them down the flank of the ant hill, where they can accumulate in large numbers. This concentrates the little gems and makes them easy for people to collect. Their brilliant luster and red color contrasts strongly with the surrounding soil. A few areas in Arizona are well known for ant hill garnets. These are beautiful bright red chromium pyrope garnets with a very high color saturation. The Native Americans discovered them long ago and marveled at their color and beauty. They regarded them as special and sometimes sewed them into ceremonial rattles or gave them as tokens of appreciation. Today, Native Americans and rockhounds collect the garnets and sell them in parcels to lapidaries who cut them into cabochons and faceted stones. The finished stones and attractive pieces of rough are sold to gem collectors and mounted into jewelry. The novelty origin of the stones adds to their appeal and can elevate their price to a higher level than what is paid for similar-quality stones from other localities. The typical ant hill garnet is a tiny stone - almost always less than one carat when cut into a cabochon or faceted stone. The ants are smart enough to excavate around larger stones rather than haul them to the surface. This small size can actually be a blessing because many of the stones have a very high color saturation. If they were larger in size, the stones would have a very dark, almost black appearance; but in small sizes, enough light passes through them to reveal their desirable deep red color. Ants delivering small mineral particles to the surface is not unique to Arizona. It is known in many parts of the world. In a few instances, ant hill minerals have been used as a prospecting tool. In prospecting for diamonds, geologists use *"indicator minerals"* to determine if they are on or near a kimberlite pipe, the host rock of many diamond deposits. There are often only a few carats of diamonds in many tons of kimberlite. but the kimberlite can be loaded with mantle-source minerals such as pyrope, garnet, and olivine. So, instead of looking for diamonds, geologists look for these more abundant minerals to locate a pipe. Geologists who do this type of work will often stop at any ant hill that they encounter to take a quick look for colorful bits of mantle minerals. The ants provide evidence of the geology below. https://geology.com/gemstones/anthill-garnet/

Earth's Early Magma Oceans Detected in 3.7 Billion Year-Old Greenland Rocks

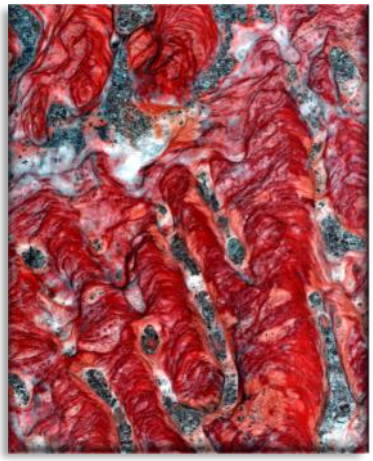
Earth hasn't always been a blue and green oasis of life in an otherwise inhospitable solar system. During our planet's first 50 million years, around 4.5 billion years ago, its surface was a hellscape of magma oceans, bubbling and belching with heat from Earth's interior. The subsequent cooling of the planet from this molten state, and the crystallization of these magma oceans into solid rock, was a defining stage in the assembly of our planet's structure, the chemistry of its surface, and the formation of its early atmosphere. These primeval rocks, containing clues that might explain Earth's habitability, were assumed to have been lost to the ravages of plate tectonics. But now, scientists have discovered the chemical remnants of Earth's magma oceans in 3.7 billion year-old rocks from southern Greenland, revealing a tantalizing snapshot of a time when the Earth was almost entirely molten. Earth is the product of a chaotic early solar system, which is believed to have featured a number of catastrophic impacts between the Earth and other planetary bodies. The formation of Earth culminated in its collision with a Mars-sized impactor planet, which also resulted in the formation of Earth's moon some 4.5 billion years ago. These cosmic clashes are thought to have generated enough energy to melt the Earth's crust and almost all of our planet's interior, creating planetary-scale volumes of molten rock that formed "*magma oceans*" hundreds of miles in depth. Today, in contrast, Earth's crust is entirely solid, and the mantle is seen as a "*plastic solid,*" allowing slow, viscous geological movement, a far cry from the liquid magma of Earth's early mantle. As the Earth recovered and cooled after its chaotic collisions, its deep magma oceans crystallized and solidified, beginning Earth's journey to the planet we know today. The volcanic gases which bubbled out of Earth's cooling magma oceans may have been decisive in the formation and composition of our planet's early atmosphere, which would eventually support life. Finding geological evidence for the Earth's former molten state is extremely difficult. This is because magma ocean events are likely to have taken place over 4 billion years ago, and many of the rocks from that period of Earth's history have since been recycled by plate tectonics. But while rocks from this period no longer exist, their chemical traces may still be stored in Earth's depths. Solidified crystals from Earth's cooling period would have been so dense that they'd have sunk to the base of Earth's mantle. Scientists even believe that these mineral residues may be stored in isolated zones deep within Earth's mantle-core boundary. If they do exist, these ancient crystal graveyards are inaccessible to us, hiding far too deep for us to take direct samples. And if they were to ever rise to the Earth's surface, the magma ocean crystals would naturally undergo a process of melting and solidifying, leaving only traces of their origins in the volcanic rocks that make it to Earth's crust. Scientists knew Greenland would be a good place to search for these traces of Earth's molten past. The researchers samples originated from the **Isua supracrustal belt** in southwestern Greenland, which is a famous area for geologists. At first glance, Isua's rocks look just like any modern basalt you'd find on the seafloor. But these rocks are some of the oldest in the world, believed to be **between 3.7 and 3.8 billion years old**. On analyzing Isua's rocks, they discovered unique iron isotope signatures. These signatures showed that the region of the mantle from which the rocks had formed had been subjected to very high pressure, over 435 miles below Earth's surface. That's exactly where minerals formed during magma ocean crystallization would have been located. But if these rocks did indeed bear traces of crystallized magma ocean, how did they find their way to the Earth's surface? The answer lies in how the Earth's interior melts, producing volcanic rocks on the planet's surface. When regions of the Earth's semi-solid mantle heat up and melt, they rise buoyantly towards the Earth's crust, ultimately producing volcanic rocks when the magma reaches the surface and cools. By studying the chemistry of these rocks on the surface, scientists can probe the composition of the material that melted to form them. The isotopic makeup of Isua rocks revealed that their journey to Earth's surface involved several stages of crystallization and remelting in the interior of the planet, a kind of distillation process on their way to the surface. But the rocks that emerged, located in present-day Greenland, still retain chemical signatures that connect them to Earth's magma-covered past. The results of their work provide some of the first direct geological evidence for the signature of magma ocean crystals in volcanic rocks found on Earth's surface. Now, they are attempting to determine if other ancient volcanic rocks across the world can tell us more about Earth's former magma oceans, or whether they instead stumbled upon a geological oddity: more of a one-off clue. If other volcanoes may have spewed similar geological artifacts, they may examine modern eruption hotspots such as Hawaii and Iceland for further isotopic novelties that speak of Earth's ancient past. It's possible that more primordial rocks may be found in the future which could help us to understand more about the Earth's violent, magma-covered past. https://www.geologyin.com/2021/12/earths-early-magma-oceans-detected-in.html?utm_source=feedburner&utm_medium=email



We have a lot to thank meteorites for. Had they not instigated several mass extinction events, including wiping out non-avian dinosaurs, we probably wouldn't be here today. But some things still don't add up about the massive scale of decimation they can cause. For decades scientists have puzzled over why some meteorites cause mass extinctions, and others, even really big ones, don't. Such mass extinctions are usually attributed to impact winters (where huge volumes of exploded ground smothers out sunlight, starving plants and algae and plunging the planet into coldness). This would suggest larger meteorites, with the capacity to propel greater dust blankets into the sky, would have a bigger effect on the global biosphere than smaller ones. But this is not what's been observed in Earth's geological records. It's surprising when we put together the data. Life carried on as normal during the 4th largest impact with a crater diameter of ~30 miles, whereas an impact half the size was associated with a mass extinction only 5 million years ago. Impact winters usually last for only a few years, but the lighter up-flung dust can persist up to 100,000 years. So scientists analyzed this ejected dust from 44 meteor impacts over 600 million years. Using this new method for assessing the mineral content of the meteorite ejecta blankets, they showed that every time a meteorite, big or small, hits rocks rich in potassium feldspar it correlates with a mass extinction event. This has been consistent over the last 600 million years. Meteorite impacts that hit potassium feldspar-poor rocks only correspond to background extinction intensities, the scientists said. Feldspars are aluminum-silicate rocks, crystallized from magma, making up around 60 percent of Earth's crust. Potassium feldspar is common in many soils, and it is a safe and un-reactive chemical. However, potassium feldspar is a powerful ice-nucleating aerosol, meaning it can massively alter cloud composition. So the team proposed that once the immediate effects of blasting Earth's ground into the atmosphere (impact winters) wane, the chemistry of what lingers in the air starts to come into play. If it's normal clay dust, the climate system will rebalance, but if it's potassium feldspar it continues to disrupt Earth's clouds. More ice-nucleating minerals in the air mean clouds will contain a higher proportion of ice crystals as opposed to dense water droplets usually found in lower, warmer regions of the sky, making these clouds more transparent. This reduces the reflective effect water droplet clouds usually have (their albedo), allowing more light through to heat up the planet. The weakened albedo also suppresses cloud cooling feedback mechanisms, increasing climate sensitivity. This in turn makes the whole climate system more vulnerable to other disturbances such as increased emissions from volcanic eruptions. Some of the world's largest volcanic events are not associated with mass extinctions, but others are. And these ones also happen to be linked to more potassium feldspar in our atmosphere. It's incredible how powerful something that is not at all directly harmful to us can be when it's in the wrong place. This strongly suggests that the driver of severe extinction episodes is a critical change in atmospheric function. https://www.sciencealert. com/it-is-not-bolide-size-that-determines-how-deadly-a-meteor-is

MARY ELLEN JASPER

Mary Ellen jasper is a beautiful rock, “made of life,” consisting of a banded iron formation (1.88 billion years old) and composed of microcrystalline silica containing red hematite inclusions sandwiched between the grey hematite of the precipitated iron. What makes this rock so interesting is that the red jasper is the fossilized remnant of stromatolites, some of the earliest complex organisms in geological history. They were formed by cyanobacterial microbial mats, growing sinuously over and through layers of precipitated sediments. These stacks continually grew higher as the sediments rose and fell rhythmically, creating the lovely shapes of the red jasper. Mary Ellen Jasper was first discovered within Biwabik iron formation in the Mary Ellen Iron Mine in St. Louis County, Minnesota, in the early 1900's. The rock was originally precipitated in shallow seas soon after the melting of the ice that covered the entire Earth during a Snowball Earth event. During the ice cover, submarine volcanos saturated the seas with reduced iron, which was oxidized when the ice melted exposing the waters to an oxygen-rich atmosphere. Being insoluble, the oxidized iron precipitated on the sea bottom, accompanied by abundant silica that fossilized the algal mats into jasper as they grew. The wiggling of the columns is thought to represent the tracking of the sun’s position through the seasons, showing that the strategy adopted by modern sunflowers has a long evolutionary history. Similar formations elsewhere have been used to prove the theory that the number of days in the year has shrunk through time as the Earth’s rotation has slowed. The Mary Ellen Stone Co. is the only supplier of tumble rough, slabs, whole rocks, and even fabricated Mary Ellen jasper countertops, which come directly from the mine in which it was discovered. https://the-earth-story.com/post/183498462472/mary-ellen-jasper-a-beautiful-rock-made-of



Jasperized algal stromatolites in the Mary Ellen jasper.

Jasperized algal coatings on iron ooids in the Mary Ellen jasper.

Oldest-known Fossils of Mysterious Human Lineage Uncovered in Siberian Cave

Scientists have unearthed the oldest fossils to date of the mysterious human lineage known as the **Denisovans**. With these 200,000-year-old bones, researchers have also for the first time discovered stone artifacts linked to these extinct relatives of modern humans, a new study finds. First identified a little more than a decade ago, the Denisovans (an extinct branch of the human family tree) are the closest known relatives of modern humans, along with Neanderthals. Analysis of DNA extracted from Denisovan fossils suggests they might have once been widespread across continental Asia, island Southeast Asia and Oceania, and revealed that at least two distinct groups of Denisovans interbred with ancestors of modern humans. Until now, scientists had only discovered half a dozen Denisovan fossils. Five were unearthed in Denisova Cave in Siberia, and one was found in a holy site in China, Live Science previously reported. Now, researchers have discovered another three Denisovan fossils in Denisova Cave. Scientists estimated that they are about 200,000 years old, making them the oldest known Denisovans ever found. Previously, the earliest known Denisovan specimens were about 122,000 to 194,000 years old. In the new study, researchers examined 3,791 bone scraps from Denisova Cave. They looked for proteins they knew were Denisovan, based on previous DNA research on the extinct lineage. Among these scraps, the scientists identified five human bones. Four of these contained enough DNA to reveal their identity, one was Neanderthal, and the other three were Denisovan. Based on genetic similarities, two of these fossils may either come from one person or from related individuals. "*We were extremely excited to identify three new Denisovan bones amongst the oldest layers of Denisova Cave,*" said study senior author Katerina Douka, an archaeological scientist at the University of Vienna in Austria. "*We specifically targeted these layers where no other human fossils were found before, and our strategy worked.*" The researchers estimated the age of these Denisovan fossils based on the layer of earth in which they were uncovered. This layer also contained a slew of stone artifacts and animal remains, which may serve as vital archaeological clues on Denisovan life and behavior. Previously, Denisovan fossils were only found in layers without such archaeological material, or in layers that might also have contained Neanderthal material. *"This is the first time we can be sure that Denisovans were the makers of the archaeological remains we found associated with their bone fragments,"* Douka said.

In the new study, researchers looked for Denisovan DNA within 3,791 bone scraps from Denisova Cave .

The new findings suggest these newfound Denisovans lived during a time when, according to previous research, the climate was warm and comparable to today, in a locale favorable to human life that included broad-leaved forests and open steppe. Butchered and burnt animal remains found in the cave suggest the Denisovans may have fed on deer, gazelles, horses, bison and woolly rhinoceroses. *"We can infer that Denisovans were well-adapted to their environments, utilizing every resource available to them,"* Douka said. The stone artifacts found in the same layer as these Denisovan fossils are mostly scraping tools, which were perhaps used for dealing with animal skins. The raw material for these items likely came from river sediment just outside the entrance to the cave, and the river likely helped the Denisovans when they sought to hunt, the scientists noted. *"The site's strategic point in front of a water source and the entrance of a valley would have served as a great spot for hunting,"* Douka said. The stone tools linked with these new fossils have no direct counterparts in north or central Asia. However, they do bear some resemblance to items found in Israel dating between 250,000 and 400,000 years ago, a period linked with major shifts in human technology, such as the routine use of fire, the researchers noted. The new study found that Denisovans may not have been the only occupants of the cave at this time. Bones of carnivores such as wolves and wild dogs suggest Denisovans may have actively competed with these predators over prey and perhaps the cave itself. *"At the moment our team continues to work at Denisova Cave and several other Asian sites and hope to report some interesting new stuff very soon,"* Douka said. https://www.livescience.com/oldest-denisovan-fossils-in-siberian-cave

Proposed Changes to the CVRMS Bylaws January 18, 2022

The Committee on Bylaws has conducted a thorough review of the CVRMS Bylaws and has proposed changes to the club's bylaws. These changes will be voted on by Members at the January 18 monthly meeting at the Hiawatha Community Center. Please review these changes documented below and on Page 11 prior to that meeting. The complete bylaws are available for review on the CVRMS website at https://www.cedarvalleyrockclub.org/Downloads/Bylaws.pdf

CEDAR VALLEY ROCKS AND MINERALS SOCIETY
BYLAWS
PROPOSED REVISIONS JANUARY 18, 2022

[***Change all:*** HE, HIM, HIS *to* HE/SHE, HIM/HER, HIS/HER, *except one* HIS *to* THE PRESIDENT'S *because it refers to the President.*]

ARTICLE II

MEETINGS: [***Change:*** *day for Regular Meetings from* SECOND *to* THIRD *Tuesday and Board Meetings from* LAST *to* FOURTH *Tuesday*]

ORDER OF BUSINESS: The order of Business shall be: Call to order; Introduction of guests; Secretary's Report; Treasurer's Report; Program; Correspondence; Executive Committee Report; Standing Committee Reports; Old Business; New Business; ~~Program~~; Adjournment.

ARTICLE V

EXECUTIVE COMMITTEE DUTIES:

DUTIES OF THE VICE-PRESIDENT: … Honorarium for guest speakers shall be ~~$25.00~~ $50.00. ~~(May schedule program first in order of business if we have an out-of-town guest.)~~

DUTIES OF THE SECRETARY: … the Secretary shall provide an attendance book for members and guests to sign in at every Regular meeting if the Hospitality Chair is not in attendance; the Secretary shall maintain ….

DUTIES OF THE TREASURER: … he/she shall inform the Editors and the Membership Chairman of the names, addresses, and phone numbers and email addresses of all new members… Whenever the Society's gross annual revenue reaches or exceeds ~~$25,000~~ $50,000, he/she shall prepare an annual report (IRS Form 990) and file with the IRS not later than the 15th day of the fifth month following the close of the fiscal year - May 15th …

DUTIES OF THE LIAISON OFFICER: The Liaison Officer shall conduct all interclub and AFMS and MWF correspondence, and inform members of all AFMS and MWF activities; ~~he/she shall order membership cards from the MIDWEST Federation for each member in good standing and have them available for the January Regular meeting or as soon after that meeting as possible~~; …

ARTICLE VI

MEMBERSHIP:

… Prospective members shall fill out applications ~~and attend three meetings and have approval of membership before joining the Society.~~

~~Any person professing an interest in rocks and minerals and who pays dues and assessments and complies with such conditions as are required by the Articles of Incorporation and the Bylaws shall be eligible for membership.~~ [*THIS SENTENCE IS A DUPLICATE*]

DUES: *References to dues changed from* $10 *to* $15

PROCEDURE FOR REMOVING AN UNDESIRABLE MEMBER: A written complaint shall be presented to the Executive Committee stating reasons for wishing a member removed. …

ARTICLE VII

SHOWS AND SWAPS

SHOW AND SWAP PLANNING MEETINGS: …. The Annual Show will be held the ~~third~~ fourth weekend of March unless Easter falls on that weekend or the venue is not available that date. In the event of extraordinary circumstances, the Executive Committee has the authority to postpone or cancel a show or swap.

CONTINUED ON PAGE 11

Proposed Changes to the CVRMS Bylaws

CONTINUED FROM PAGE 10

ARTICLE VIII

YOUTH GROUP: ... The Youth Group shall be called "Pebble Pups" and they shall make … One page of the Society Bulletin shall be assigned to the ~~"Pebble Pups"~~ Youth Group to publish such news or articles as they may require. ~~"Pebble Pups"~~ Youth members may receive …

ARTICLE IX

PERMANENT COMMITTEE RULES:

MEMBERSHIP COMMITTEE: …; ~~assist the Treasurer in making out membership cards;~~ provide the Editor and the ~~Phone~~ Communications Committee Chairman with a current membership list; and provide an Application for Membership form to prospective members; and keep a file of membership application forms. All new members shall be given copies of the Articles of Incorporation and Bylaws and Code of Ethics card~~; keep a file of membership application forms~~.

HOSPITALITY COMMITTEE: Provide an attendance book for members and guests to sign in at every Regular meeting; introduce guests attending Regular meetings,; ~~give assistance to the Membership Chairman in compiling membership list for the Directory;~~ contact members to serve as hosts and hostesses for Regular meetings and ask them to provide refreshments for the Regular meetings; ~~all liquid refreshments,~~ cups, and napkins and serving supplies shall be paid for by the Society.

~~HOSPITALITY COMMITTEE: Introduce guests attending Regular meetings; contact members to serve as hosts and hostesses for Regular meetings and ask them to provide refreshments for the Regular meetings; all cups, napkins and other serving supplies shall be paid for by the Society.~~

~~MAGAZINE AND LIBRARY: Bring new magazines and other new publications from the Society's library to Regular meetings and provide a list of all publications currently available from the library; keep a list of borrowers; give list of magazines or books donated in Society's name to the Liaison Officer for inclusion in the Annual Report. Prepare a list of the contents of the club library and give to the Editor once a year for publication.~~

FIELD TRIPS: …; notify ~~Phone Committee~~ Communications Chairman …

T~~ELEPHONE~~COMMUNICATONS, PUBLICITY AND SUNSHINE COMMITTEES: The Chairman of ~~Telephone~~ Communications ~~shall establish a Telephone Committee to~~ shall notify members ~~by phone~~ in emergency situations ~~(find out if out-of-town members will accept reversed charges so they may be notified)~~. …

~~BEGINNERS RESOURCE: The Committee shall compile and publish a list with names, addresses and costs of publications including pamphlets, inexpensive books, maps, Geological Survey publications, etc., for Society members; keep the list up to date; inform new members that this list is available.~~

SUPPLIES: The Chairman shall keep supplies of ~~calling cards, decals, shoulder patches (Society logo printed on), books, etc~~ merchandise. …

~~CHRISTMAS BASKET COMMITTEE: The Committee shall contact HACAP to secure a family or families who will receive the baskets and inform the Editor so such information may be published to guide members in choosing appropriate gifts, food, etc.; they shall collect donations of money, canned goods, staples and gifts at the Christmas meeting; with the funds collected, they shall buy groceries and staples to supplement the donations and sort them (and apportion, if there is more than one basket); they shall deliver the basket or baskets and at the January meeting report to the members on the family or families; give a copy of the report to the Editor for inclusion in the newsletter and to the Liaison Officer for inclusion in the Annual report.~~ HOLIDAY DONATION COMMITTEE: The Committee shall determine two or three nonprofit food-providing organizations to be the recipients of donations collected at the holiday party; donations shall also be accepted via mail; and all donations shall be equally divided among the designated recipients.

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SCHOLARSHIP AWARDS: …the Executive Committee shall decide if money shall be awarded to the University of Iowa Geology Department and Cornell College (in Mount Vernon) for scholarships for geology students to use for the Summer Field Trip Course necessary for their degree; additionally, an award will be considered for the Van Allen Science Teaching Center (VAST). ~~the Executive Committee shall recommend the amount of the awards with the amount to be around $2500 for the University of Iowa and $2000 for Cornell College;~~ The Executive Committee shall designate approximately 90% of Show profits be donated to scholarships and VAST. If sufficient funds are available, the donation base amounts shall be awarded as follows: $4,000 to the University of Iowa, $3,000 to Cornell College, and $1,500 to VAST, with the excess money being divided 50%, 25% and 25% among the three respectively. ~~at~~ At the next Regular meeting the membership shall approve or modify … the recipient shall be asked to either present a program at a Society meeting, or to prepare a written report for publication in the Society's Bulletin; he/she shall receive an honorarium of ~~$25~~ $50 for either a program or a report.

2022 Officers, Directors, and Committee Chairs

President	Marv Houg (m_houg@yahoo.com)	(319)364-2868
Vice President.	Ray Anderson (rockdoc.anderson@gmail.com)	337-2798
Treasurer	Dale Stout (dhstout55@aol.com)	365-7798
Secretary	Dell James (cycladelics@msn.com)	446-7591
Editor	Ray Anderson (rockdoc.anderson@gmail.com)	337-2798
Liaison	Kim Kleckner (ibjeepn2@gmail.com)	560-5185
Imm. Past Pres.	Sharon Sonnleitner (sonnb@aol.com)	396-4016
Director '22	Matt Burns (mlburnsars@gmail.com)	329-4046
Director '23	Jay Vavra (vavrajj@gmail.com)	447-9288
Director '24	Bill Desmarais (desmarais_3@msn.com)	365-0612
Sunshine	Dolores Slade (doloresdslade@aol.com)	351-5559
Hospitality	Karen Desmarais (desmarais_3@msn.com)	365-0612
Webmaster	Sharon Sonnleitner (sonnb@aol.com)	396-4016

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

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