Cedar Valley Gems

Cedar Valley Rocks & Minerals Society

Cedar Rapids, Iowa

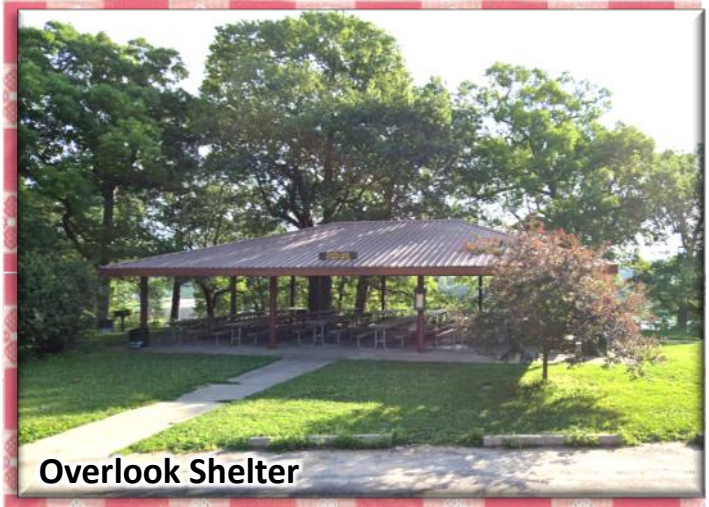
cedarvalleyrockclub.org

CEDAR VALLEY GEMS **JUNE 2022** **VOL. 49, ISSUE 06**

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

Next CVRMS Meeting
Tues. June 21
6:00 pm, Eat at 6:30
Pot-Luck Picnic!

at Ellis Park



Overlook Shelter

Rock Polishing
Rock Identification
Rock Show & Tell

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

'Fiona' the Pregnant Ichthyosaur, Chile's Oldest Marine Reptile Mom

In the shadow of a massive Patagonian glacier, paleontologists have unearthed a rare fossil find: an ancient marine reptile that died while pregnant. This dolphin-like creature, called an **ichthyosaur**, is the first of its kind to be discovered in Chile, where it was retrieved from a dig site near the Tyndall Glacier in the Southern Patagonian Ice Field. The paleontologists who found the ichthyosaur specimen dubbed it "**Fiona**" after actress Cameron Diaz's ogre character in the movie ***"Shrek."*** At 13 feet long, Fiona is a medium-sized specimen that dates to around 129 to 139 million years ago, in the early part of the Cretaceous. These formidable marine reptiles mostly ate ancient, hard-shelled squid relatives, as well as some types of fish and smaller ichthyosaurs. Specimens like Fiona, which fossilized during pregnancy, are especially useful for paleontologists because they offer a glimpse of multiple stages in the life cycle of that species. For instance, they can tell how many embryos those species might have had, and how large they were at birth. The first known pregnant ichthyosaur fossil, discovered in 1749 and scientifically described in 1842, confirmed that ichthyosaurs produce live young rather than laying eggs like most modern reptiles do. There is often a very large lag between discovery of the fossil and study of fossils from the Tyndall Glacier area, partly due to is extremely remote location. So every fossil from the site, including 23 other ichthyosaurs that were discovered alongside Fiona, had to be carefully airlifted out by helicopter after excavation. Sadly, many more of the nearly 100 ichthyosaurs discovered in the Tyndall Glacier fossil deposit will never be excavated, due to the difficulty of access (being very near a cliff edge), and lack of funds.

A paleontologist points out Fiona's skeleton in Chile

https://www.livescience.com/pregnant-ichthyosaur-fossil-chile

CVRMS Monthly Meeting, May 17 — Minutes —

MEETING CALLED TO ORDER: at 7:20 pm by Marv Houg, President, at Hiawatha Community Center.

GUESTS Cody Davidson from Manchester with Laker agate and his friend Dan.

SECRETARY'S REPORT as published. Motion to approve by Bill second by Ray. Approved as published.

TREASURER'S REPORT by Dale. Checking account balance $17,656.53. Dale recapped a few things from show. Karen made a motion to approve report and seconded by Carolyn. Report approved.

PROGRAM: 2 Videos about agates from the 2016 Agate Expo. Jamie Brezina lecture on *"Sedimentary Agates of the United States" and* Eugene Mueller on *"Agua Nueva Agate.*

2023 ROCK SHOW: Need specimens for Karen at pebble pit and Kim for silent auction. **Theme for next show** suggestions are welcome. The board has tossed around various thoughts including agates. Any ideas are welcome.

2022 AUCTION: The auction is fill with about 1,300 lots.

CORRESPONDENCE: Marv received a nice thank you note from River Products for our assistance at the 2022 TAKO at Klein Quarry. Next year's Klein Quarry TAKO event scheduled for May 20, 2023.

FIELD TRIPS: Future trip schedule;

Comanche Sand Pit -- May 21
4-County Quarry Trip—May 27;
Linn County Sand Pit— May 28
Belleview Sand Pit—June 11 or 12

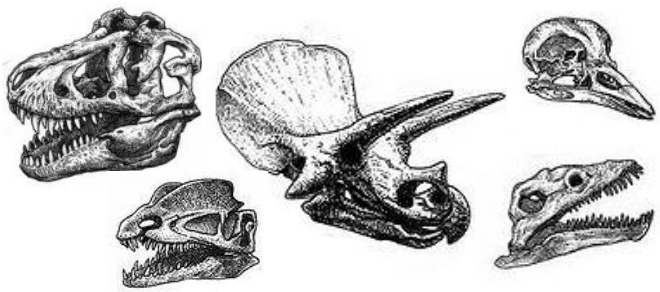
Dale Will send out notifications.

AWARDS FOR SCHOLARSHIP will be figured out by Board and reported to members for their approval at June Meeting..

MISC: Bill did a kids' program at Truman Elementary for 65 kids. All children sent Bill thank you notes for the program.

MOTION TO ADJOURN: 9:15 by Kim, second by Ray. Meeting adjourned.

Respectfully submitted,
Dell James, Secretary



CVRMS Board Minutes May 24

MEETING CALLED TO ORDER: 7:15 by Marv at his house. Board members present Matt Burns, Kim Kleckner, Marv Houg, Dale Stout, Ray Anderson, Jay Vavra, Bill Desmarais, Dell James, Sharon Sonnleitner

SECRETARY'S REPORT reviewed as published. Motion to accept by Bill second by Dale. Approved as published.

TREASURER'S REPORT by Dale. Motion to accept by Bill and second by Jay. Report accepted as reviewed.

SHOW WRAP UP. All a success.

NEXT SHOW IN 2023. **Suggestions for theme is Agates**, with title of Wonderful World of Agates. Title suggestions are welcome. Will bring this to regular meeting for general approval. **Vendors** are all in from last year.

AUCTION: Contracts are not all in. Food lined up for Saturday.

FIELD TRIPS: Matt reported **next trip 4 County Quarry** May 27, 3-6 pm. Prefer 10 experienced people. **Marv will handle** a complaint received from last trip. **Marv shared** a thank you card about the **TAKO**. Suggestions to River Products provide more fossiliferous rocks for kids. Also we can get some eye protectors for kids. Marv will talk to Deb from River Products.

SCHOLARSHIPS: After all the proceeds from last show and auction, in keeping with by laws, 2022 show profits totaled $11,250 to be divided up between University of Iowa, Cornell College, and VAST. Proposed 2022 CVRMS scholarships, U of I=$5375, Cornell=$3687 and VAST=$2187. These will need general approval from membership. Motion to approve the designated amounts by Ray second by Jay. All approved.

MARV RECEIVED A LETTER FROM MIDWEST FEDERATION about the receipt of the healthy sum of money honoring Thomas Whitlatch. Ray will summarize in Newsletter.

OUTREACH PROGRAMS: Bill and Ray have Hiawatha program on June 8, Springville and Ely programs scheduled, **Kim also** has some programs lined up. **Kim needs some coprolite** samples, and Marv agreed to sniff some out of his stash. **Ray** needs pictures from digs and education programs for Newsletter.

SUMMER PICNICS: **Ellis Overlook** June 21 pot luck or bring your own. People with lapidary tools and skills will be on display. **Wanatee Park** July 19 geode cracking bring your own or club will have some, too. **Morgan Creek** August 19 is Rock Bingo and always a good time. **Feed bag goes** on at 6:30pm. Be sure if you partake of pot luck to bring plenty. Also bring your own drinks and table service. **We need** someone who can teach wire wrapping class and flint knapping. Kim working on flint knapping.

MOTION TO ADJOURN by Bill and second by Jay. 9:13 meeting adjourned.

Respectfully submitted,
Dell James, Secretary

Gift Presented to Friend of the CVRMS Dr. Phil Currie

Dr. Phil Currie, Professor at the University of Alberta and founder of the Royal Tyrrell Museum of Paleontology at Drumheller, Alberta, Canada, and friend of the CVRMS was in Beloit, Wisconsin, on April 29 to accept the **2022 Roy Chapman Andrews Society Distinguished Explorer Award.** Bill Desmarais, CVRMS Board member and dinosaur exploration colleague of Dr. Currie, attended. As a child Currie had read the book *"All about Dinosaurs"* by Roy Chapman Andrews and credits Andrews as a *"big influence"* in his career as a dinosaur paleontologist. In 1986 Currie participated in the Canada-China Dinosaur Project which brought him into the Flaming Cliffs area of the Gobi Desert, an area that Andrews named and where he discovered some of the first dinosaur eggs.

Dr. Phil Currie pictured at his home with the amethyst cathedral presented to him by the CVRMS.

On at least three occasions Phil has provided epic lectures to large crowds in eastern Iowa, helped get the CVRMS name in newspapers, TV, and magazines, and out to the public. He has done the same for M.A.P.S. His last Iowa lecture entertained an audience of over 250. His world renowned work has increased our strong scientific perception around the Midwest. In the past we have provided Phil and his wife Eva Kappelhus small honorariums to assist them with the cost of their transportation from Canada to Iowa, but we thought that Phil deserved a more personable token of our appreciation. The gift we chose was an amethyst cathedral, purchased at a discount from club President Marv Houg with club funds and a sizable contribution by Bill Desmarais. Conveniently, Bill Desmarais and his wife Karen were invited to attend the Chapman Award Ceremony for Phil in Beloit, so they took that opportunity to personally present a gift to Dr. Currie. Bill said that Phil was delighted with the Gift. **Thank you Phil.**

Phil Currie making his acceptance lecture at the 2022 Roy Chapman Andrews Society Distinguished Explorer Award ceremony in Beloit, Wisconsin

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?

Front **Back**

What in the World is this silicified eastern Iowa fossil?? and what are the features we see in it??

May's Photo

Last month's **"What in the World"** image showed a prehistoric petroglyph of a bison carved into the Cherokee sandstone rock face in Boneyard Hollow at Doliver State Park in Webster County, Iowa.

ROCK CALENDAR
CVRMS EVENTS OF INTEREST

2022

June 21— CVRMS Picnic Pot Luck
Ellis Park Overlook Shelter 6:00 pm
Rock Identification and Show & Tell

July 19 — CVRMS Picnic Pot Luck
Wanatee Park Meadowlark Shelter 6:00 pm
Geode Cracking

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

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

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

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

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

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

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.

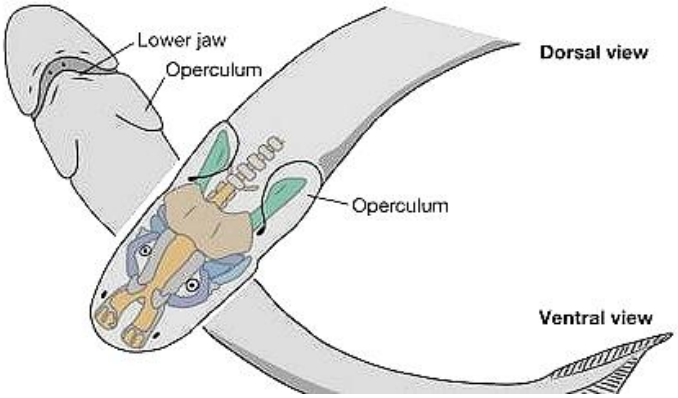
No one came around to ***"Ask a Geologist"*** a question for a couple of weeks, so I thought I would go with a question that my nephew asked me many years ago; ***"What color were dinosaurs??"***

I read a good article in ***Livescience*** on-line that addresses that question. No animals have experienced a more dramatic makeover in the past few decades than the nonavian dinosaurs. Animals we used to think had nothing but drab gray and brown scales are now believed to have flaunted feathers in bright colors and patterns. **So what colors were the dinosaurs, really? And how do we know?** One scientist we have to thank for the answers to both questions is Jakob Vinther, an associate professor in macroevolution at the University of Bristol in the United Kingdom. Ever since the first fossilized dinosaur feathers were reported in 1996, scientists had noticed round microscopic structures within them — structures that many had assumed were fossilized bacteria. But as a doctoral student studying a completely different animal, Vinther realized that these structures might be something more. "*I was looking at fossilized ink in squid- and octopus-like ancestors,*" Vinther told Live Science. *"It was remarkably well preserved. "You can take ink from a squid you bought down at the fishmonger and put it under an electron microscope, and you see perfect little round balls,"* Vinther said. "*And then when you take fossilized ink, it looks exactly the same: perfect little round balls." Those balls are melanosomes — microscopic blobs of melanin, the pigment that colors hair, skin, feathers and eyes across the animal kingdom. These round structures turned out to be the same ones being mistaken for bacteria in dinosaur feathers. Scientists had largely believed that pigment couldn't survive the fossilization process, but discoveries by scientists such as Vinther have shown not only that pigment survives but that it can tell us the actual colors of extinct animals. That's because melanin comes not only in "perfect little round balls"* but also in many different shapes, each of which produces a different color. *"If you look at a person with black hair or a bird with black feathers, [those melanosomes] are sausage-shaped,"* Vinther said. *"Whereas if you're ginger — if you're a North American robin with a ginger chest or you've got ginger hair like Carrot Top — they're shaped like little meatballs. "So basically, you just look for sausages and meatballs, and then you can actually put colors on extinct animals,"* Vinther said. Big, fat melanosomes indicate gray or blue pigment. Melanosomes that are long and skinny, flat or hollow are a sign of iridescence. "*That's actually generated by ordering melanin in a specific way inside the feather in order to create structures that can interact with light,*" Vinther said. The flat or hollow shape of the individual melanosomes helps them fit together in a way that creates the metallic sheen of iridescence. Once you know the shape of the melanosomes in a fossil, you can learn all sorts of things about the animal. For example, some dinosaurs with fearsome reputations were incredibly showy. "*Many of the close relatives of Velociraptor — you know, that was chasing the kids around in the kitchen [in "Jurassic Park"]?*" Vinther said. "*First of all, that was covered in feathers. It was really bird-like, not like this naked thing that we see there. But furthermore, most of the relatives that we looked at that were close to it, they were iridescent. So they would have had a metallic sheen, like hummingbirds or peacocks.*" Other dinosaurs had complex camouflage. The first dinosaur Vinther ever studied was a small, bird-like animal called ***Anchiornis***. Based on the melanosomes, Vinther and his team concluded that it had a gray body, white wing feathers with black splotches at the tips and a red crown like a woodpecker's. Another dinosaur called ***Sinosauropteryx***, the first dinosaur to be discovered with feathers, had a striped tail and a bandit mask, sort of like a raccoon. It also had countershading, a kind of natural camouflage in which the parts of an animal that would usually be in shadow have a lighter pigment than the parts that would usually be in sunlight. A classic example of this is the white-tailed deer (*Odocoileus virginianus*), which has a white belly and a brown backside. This coloring tells scientists about the creatures' habitat; if the countershading is sharp and high on the body, as it was in *Sinosauropteryx*, the animal probably lives out in the open. Countershading that's more gradual and low on the body suggests a forest environment where the light is more diffuse. Camouflage also distinguishes predators from prey. The huge armored dinosaur ***Borealopelta markmitchelli*** seems like it would have had zero predators, but its countershading suggests otherwise. *"If you look at large animals today, they don't have any color patterns, like elephants [*and*] rhinos,"* Vinther said. "*And that's because nobody messes with them. So, based on the fact that this animal was covered in armor, really huge, but it was countershaded tells us that 'Jurassic Park' would have been scary,*" Vinther said. *"You're still vulnerable even if you're that big and that armored."* https://www.livescience.com/what-color-dinosaurs

The crow-size *Anchiornis* had black and white wings and a red crest atop its head when it was alive during the Jurassic period.

Scientists Think This Strange Fish-Like Creature May Be One of Our Ancient Ancestors

A mysterious, extinct creature that has puzzled scientists for more than a century may have finally found its place in the tree of life. The small, fish-like animal is named *Palaeospondylus gunni*, first discovered in fossils in Scotland in 1890, which lived approximately 390 million years ago during the Middle Devonian. Now, according to a new analysis of well-preserved fossils, scientists think that it was one of the earliest ancestors



of tetrapods – animals with four limbs, including humans. "*This strange animal has baffled scientists since its discovery in 1890 as a puzzle that's been impossible to solve*," say scientists. *"Morphological comparisons of this animal have always been extremely challenging for scientists. However, recent improvements in high-resolution 3D segmentation and visualization have made this previously impossible task possible. Finding a specimen as well preserved as the ones we used is like winning the lottery, or even better!"* There are several reasons why classifying this animal has been so problematic. Fossils of it are plentiful, but because *Palaeospondylus* was so small, and its fossils so damaged, reconstructing its cranial anatomy was enormously difficult. Plus, its anatomy shares features with both jawed and jawless fish, in addition to a complete lack of teeth and dermal bones preserved in the fossil record. The research team chose exceptional specimens, with the heads still firmly embedded, and hidden, in the rock. They then investigated the fossils with synchrotron radiation X-ray micro-computed tomography, which allowed them to image the fossils in exquisite resolution without destroying them, to conduct a thorough examination and reconstruction. The team found three curved canals, consistent with the inner ears of jawed vertebrates. Looking ahead, the researchers say they'll continue to investigate the strange creature, in order to more definitively confirm its position in the animal family tree. "*Taking this into consideration, we will continue to study the developmental genetics that brought about this and other morphological changes that occurred at the water-to-land transition in vertebrate history*." https://www.sciencealert.com/this-fish-like-creature-could-be-one-of-your-oldest-known-ancestors

The Origin of Earth's Helium

In the beginning, all was dust and gas. For a while, anyway, until a great gas cloud, called the solar nebula, in what would become our solar system gradually condensed. Then came the Sun. Eventually, the closer, hotter protoplanets collected heavy metals floating around and became the terrestrial planets (Mercury, Venus, Earth and Mars) and the more distant protoplanets, in turn, became the gas giants (Jupiter, Saturn, Uranus and Neptune). How Earth ended up with its volatile chemicals, composed of elements like hydrogen that can easily transform into lightweight gases and vapors, has therefore been something of a mystery. In particular, Earth's persistent supply of a rare form of helium, called helium-3, has posed a challenge. Most helium-3 was created shortly after the Big Bang, and its supply isn't replenished on Earth. Yet mid-ocean ridges steadily leak about 4 pounds of it into the atmosphere each year. The prevailing theory states that Earth's volatiles were delivered by asteroids or comets. But there is an older and more controversial theory: *The solar nebula itself may have delivered primordial helium-3 into the planet's core*. If the Earth had acquired over a third of its final mass while the solar nebula was still intact, it would have formed an atmosphere dense in hydrogen and helium. Under high pressures, however, those gases might have dissolved in the molten lava that covered the planet's surface. From there, the helium-3 could've diffused through the Earth, even reaching down into the planet's core. Because volatile helium-3 is so easily lost to space, its continued presence could be a vital clue about Earth's history. If asteroids or comets had delivered it, the helium would just be lost to space and would never make it to the core. If we have helium leaking from the core, it's kind of a smoking gun that we had that high-pressure solar nebular atmosphere. What makes the core a promising reserve of helium-3 is its relative stability. Unsurprisingly, over the course of over 4 billion years, Earth has survived some major traumas and, on a geological scale, is in constant flux. But its core doesn't participate in tectonic plate cycling and has remained liquid since the planet first formed. Of course, this isn't the only theory going. Researchers have also pointed to the large low shear velocity provinces, or superplumes, that reside within Earth's deep mantle as being possible helium-3 reserves. The superplumes, which can extend laterally for more than a thousand miles, share some of the characteristics that make the core a promising candidate. For example, the structures have been stable for hundreds of millions of years. Additionally, mantle plume trajectories that contain high levels of helium-3 tend to converge around these superplumes, but simulations suggest that this may be a coincidence. Mantle plumes likely pull little material from the larger superplumes; instead, they draw from the hottest part of the basal thermal boundary layer, exactly where researchers suggest you'd find helium-3 leaking from the core. The researchers concluded that their results indicate that much of the helium-3 now in the mantle once resided in the core.
https://www.discovermagazine.com/the-sciences/the-origin-of-earths-helium

CVRMS News and Information:

CVRMS Contributes Over $3000 to the AFMS Scholarship Foundation in honor of Tom Whitlatch:

Midwest Federation of Mineralogical and Geologic Societies Scholarship Committee Chair Marge Collins recently contacted the CVRMS to thank us for the contribution of more than $3000 to the American Federation of Mineral Societies (AFMS) scholarship fund in honor of deceased club member Tom Whitlatch. She said that ***"These contributions are the most significant I can remember being made for a single memorial — a testament to Tom and all he did for our hobby!"***

CVRMS Participates in 2022 TAKO Event at Klein Quarry

On Saturday May 14 ten CVRMS members assisted in this year's Take A Kid Outdoors (TAKO) "***Rockin Rocks and Fossils***" event at the River Products Klein Quarry in Coralville. Club members manned fossil and rock displays, distributed plaster casts of fossils, and assisted young future geologists to identify and collect rocks and fossils. TAKO's Executive Director and Johnson County Events Chair Judy Joyce reported that more than 200 children and parents participated in the event.

Field Trip Takes CVRMS Members to 4 County Quarry

Ten CVRMS members participate in a collecting field trip to the Wendling Quarries, Inc. 4 County Quarry in northwest Johnson County on May 15. The quarry is well-known fossil collecting locality, especially for trilobites and it did not disappoint. Numerous trilobites, corals, and other Middle Devonian marine fossils were found. The CVRMS participants were joined by 5 members of the Waterloo club and Wendling Quarries' Property Manager and ace trilobite finder Jim Tuthill.

Sharon Sonnleitner, Marv Houg, and Kim Kleckner help TAKO kids identify fossils.

CVRMS and Waterloo club members in the Wendling 4-County Quarry on May 15. Photo by John Tuthill

Do You Have an Apatite for Apatite ?

Apatite is the name of a group of phosphate minerals with similar chemical compositions and physical properties. They are an important constituent of phosphorite, a rock mined for its phosphorus content and used to make fertilizers, acids, and chemicals. Apatite has a relatively consistent hardness and serves as the index mineral for a **hardness of five** in the Mohs Hardness Scale. Specimens with excellent clarity and color are sometimes cut as faceted gemstones. Those with good color and translucence are cut as cabochons. Apatite is usually green in color, but can be yellow, brown, blue, purple, pink, or colorless. These colors are often quite vivid, one of the reasons that apatite is cut as a gemstone. Apatite is a brittle hexagonal material. It breaks by both fracture and cleavage, but the cleavage is generally indistinct. Apatite forms under a wide variety of conditions and is found in igneous, metamorphic, and sedimentary rocks. The most important deposits of apatite are in sedimentary rocks formed in marine and lacustrine (lake) environments. There,

Natural Apatite crystals (left) and faceted apatite (right)

phosphatic organic debris (such as bones, teeth, scales, and fecal material) accumulates and is mineralized during diagenesis. Some of these deposits contain enough phosphorus that they can be mined and used to produce fertilizers and chemical products. Apatite occasionally occurs as well-formed hexagonal crystals in hydrothermal veins and pegmatite pockets. These crystals often have a very high clarity and a vivid color and have been cut into gems for collectors. Mineral collectors also enjoy these well-formed apatite crystals, and the prices paid for them often exceeds their value as gem rough. Transparent specimens of apatite with vivid green, blue, yellow, or pink color and excellent clarity are often cut into faceted gemstones. Some stones are heat treated to improve their color. Attractive translucent stones of excellent color are cut en cabochon. Rarely, translucent apatite contains a fine silk of parallel rutile crystals. When cut en cabochon with the silk oriented parallel to the bottom of the stone, these specimens will often exhibit a chatoyance known as "cat's eye." As a gemstone, apatite is more popular with gem collectors than it is with jewelry buyers. With a Mohs hardness of 5, breaking by parting, and its brittlness, apatite can be too fragile for use in most types of jewelry.

https://geology.com/minerals/apatite.shtml

The Largest Meteorite Ever Found in the United States

The **Willamette Meteorite**, originally known as **Tomanowos** by the Clackamas Chinooks native American tribe, is an iron-nickel meteorite that was found in the Upper Willamette Valley of Oregon, near the present-day city of Portland. It is the largest meteorite found in North America and the sixth largest in the world The Willamette Meteorite weighs about 32,000 pounds (15.5 tons). It is classified as a type III iron meteorite, being composed of over 91% iron and 7.62% nickel, with traces of cobalt and phosphorus. The approximate dimensions of the meteorite are 10 feet tall by 6.5 feet wide by 4.25 feet deep. The smooth surface melted during its blazing entry into the atmosphere, while the pits formed on the Earth's surface. Thousands of years ago, this meteorite, traveling some 64,000 kilometers per hour, crashed into Earth's surface. Over many centuries, rainwater interacting with its iron sulfide deposits produced sulfuric acid, which slowly etched and carved large cavities. The lack of an impact crater at the discovery site was only explained after the 1920s, with the new understanding about the Missoula Floods, one of the largest floods documented, caused by the collapse of an ice barrier during the last deglaciation. The meteorite presumably landed on an ice cap in what is now Montana or western Canada, and was dragged by the glacier ice to the vicinity of an ice barrier that formed across the Clark Fork River. This barrier had ponded a huge amount of water at the Lake Missoula right at the time when the meteorite reached the area and the ice barrier became unstable and breached. The resulting flood involved up to 10 million cubic meters per second of water discharge, with large blocks of ice rafting down the Columbia River and the Willamette Valley at the end of the last Ice Age (~13,000 years ago). Some of these ice rafts included boulders (known as *glacial erratics* by geologists) like the Willamette meteorite, which eventually sank in the flood waters and settled where they were found by humans. The Willamette Meteorite was originally located within the Upper Willamette Valley of Oregon, near the present-day city of Portland. Before the arrival of European settlers the Clackamas Indians lived ;where the meteorite was found. The Clackomas named the meteorite "Tomanowos." According to the traditions of the Clackamas, Tomanowos is a revered spiritual being that has healed and empowered the people of the valley since the beginning of time. The rainwater that collected in the pits of the meteorite was considered as a powerful purifying, cleansing and healing source for the Clackamas and their neighbors. In 1905, the meteorite was purchased by William E. Dodge for $26,000 (around $680,000 in 2011). After being displayed at the Lewis and Clark Centennial Exposition, it was donated to the American Museum of Natural History in New York City, where it has since been on display since.

Diverse microbial life existed on Earth at least 3.75 billion years ago, suggests a new study led by UCL researchers that challenges the conventional view of when life began.

For the study, published in *Science Advances,* the research team analyzed a fist-sized rock from Quebec, Canada, estimated to be between **3.75 and 4.28 billion years old**. In an earlier *Nature* paper the team found tiny filaments, knobs and tubes in the rock which appeared to have been made by bacteria. However, not all scientists agreed that these structures, dating about 300 million years earlier than what is more commonly accepted as the first sign of ancient life, were of biological origin. Now, after extensive further analysis of the rock, the team have discovered a much larger and more complex structure, a stem with parallel branches on one side that is nearly a centimeter long, as well as hundreds of distorted spheres, or ellipsoids, alongside the tubes and filaments. The researchers say that, while some of the structures could conceivably have been created through chance chemical reactions, the *"tree-like*" stem with parallel branches was most likely biological in origin, as no structure created via chemistry alone has been found like it. The team also provided evidence of how the bacteria got their energy in different ways. They found mineralized chemical by-products in the rock that are consistent with ancient microbes living off iron, sulfur and possibly also carbon dioxide and light through a form of photosynthesis not involving oxygen. These new findings, according to the researchers, suggest that a variety of microbial life may have existed on primordial Earth, potentially as little as 300 million years after the planet formed. Lead author Dr Dominic Papineau (UCL Earth Sciences, UCL London Centre for Nanotechnology, Centre for Planetary Sciences and China University of Geosciences) said: *"Using many different lines of evidence, our study strongly suggests* ***a number of different types of bacteria existed on Earth between 3.75 and 4.28 billion years ago****." "This means life could have begun as little as 300 million years after Earth formed. In geological terms, this is quick -- about one spin of the Sun around the galaxy." "These findings have implications for the possibility of extraterrestrial life. If life is relatively quick to emerge, given the right conditions, this increases the chance that life exists on other planets."* For the study, the researchers examined rocks from Quebec's **Nuvvuagittuq Supracrustal Belt (NSB)** that Dr Papineau collected in 2008. The NSB, once a chunk of seafloor, contains some of the oldest sedimentary rocks known on Earth, thought to have been laid down near a system of hydrothermal vents, where cracks on the seafloor let through iron-rich waters heated by magma. The research team sliced the rock into sections about as thick as paper (100 microns) in order to closely observe the tiny fossil-like structures, which are made of hematite, a form of iron oxide or rust, and encased in quartz. These slices of rock, cut with a diamond-encrusted saw, were more than twice as thick as earlier sections the researchers had cut, allowing the team to see larger hematite structures in them. They compared the structures and compositions to more recent fossils as well as to iron-oxidizing bacteria located near hydrothermal vent systems today. They found modern-day equivalents to the twisting filaments, parallel branching structures and distorted spheres (irregular ellipsoids), for instance close to the Loihi undersea volcano near Hawaii, as well as other vent systems in the Arctic and Indian oceans. As well as analyzing the rock specimens under various optical and Raman microscopes (which measure the scattering of light), the research team also digitally recreated sections of the rock using a supercomputer that processed thousands of images from two high resolution imaging techniques. The first technique was micro-CT, or microtomography, which uses X-rays to look at the hematite inside the rocks. The second was focused ion beam, which shaves away miniscule (200 nanometer-thick) slices of rock, with an integrated electron microscope taking an image in-between each slice. Both techniques produced stacks of images used to create 3D models of different targets. The 3D models then allowed the researchers to confirm the hematite filaments were wavy and twisted, and contained organic carbon, which are characteristics shared with modern-day iron-eating microbes. In their analysis, the team concluded that the hematite structures could not have been created through the squeezing and heating of the rock (metamorphism) over billions of years, pointing out that the structures appeared to be better preserved in finer quartz (less affected by metamorphism) than in the coarser quartz (which has undergone more metamorphism). The researchers also looked at the levels of rare earth elements in the fossil-laden rock, finding that they had the same levels as other ancient rock specimens. This confirmed that the seafloor deposits were as old as the surrounding volcanic rocks, and not younger imposter infiltrations as some have proposed. Prior to this discovery, the oldest fossils previously reported were found in Western Australia and dated at 3.46 billion years old, although some scientists have also contested their status as fossils, arguing they are non-biological in origin. The new study involved researchers from UCL Earth Sciences, UCL Chemical Engineering UCL London Centre for Nanotechnology, and the Centre for Planetary Sciences at UCL and Birkbeck College London, as well as from the U.S. Geological Survey, the Memorial University of Newfoundland in Canada, the Carnegie Institution for Science, the University of Leeds, and the China University of Geoscience in Wuhan. The research received support from UCL, Carnegie of Canada, Carnegie Institution for Science, the China University of Geoscience in Wuhan, the National Science Foundation of China, the Chinese Academy of Sciences, and the 111 project of China https://www.sciencedaily.com/releases/2022/04/220413141532.htm

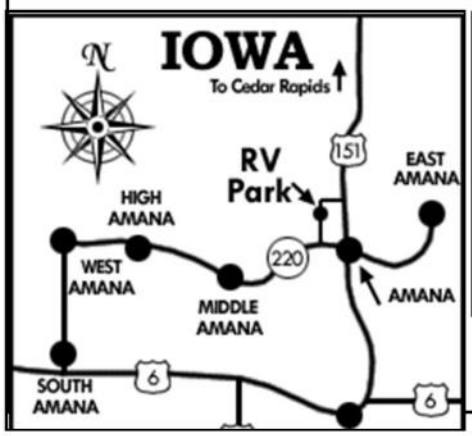
2022 Auction Venue - Amana, Iowa

The CEDAR VALLEY ROCKS & MINERALS SOCIETY Presents

A TWO-DAY ROCK and MINERAL AUCTION

Amana RV Park and Event Center, 3850 C St, Amana, Iowa 52203

Saturday, October 8 – 9:00 a.m. - 7 p.m.?
Sunday, October 9 – 9:00 a.m. – 3 p.m.?
Viewing Hours: Fri., Oct. 7, from 5:00 to 7:30 p.m.; Sat. at 7:30 a.m.; Sun at 8:00



APPROXIMATELY
1,300 LOTS
From Several Collections

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

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

THE FOLLOWING IS A PARTIAL LIST OF ITEMS TO BE AUCTIONED

EQUIPMENT WILL SELL AT 2:00 ON SATURDAY

ROCKS & MINERALS

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

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

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

FOSSILS

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

MISC.

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

BOOKS

The Fabulous Keokuk Geodes
The Wilmington Coal Flora

JEWELRY.

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

I.D. will be required to obtain buying number. Cash, credit card (2.75% convenience fee) or good check. Two forms of I.D. required for all checks.
7% tax added to all sales. Buyers who provide proof of tax permits are exempt.
No items removed until settled for on day of sale. Not responsible for accidents, theft or damage.
Announcements day of sale take precedence over advertising.
CONTACTS: Marvin Houg 319-350-9435, m_houg@yahoo.com or Sharon Sonnleitner 319-310-0085, sonnb@aol.com; cedarvalleyrockclub.org

https://www.cedarvalleyrockclub.org/auction.html

A New Origin Story for King Tut's Meteorite Dagger

When archaeologists peered inside Tutankhamun's tomb for the first time in the early 1920s, they found antechambers packed to the brim with thousands of artifacts: statues, furniture, jewelry, clothes, chariots, paintings. Among these possessions was an iron dagger, just over one foot in length and crafted from an iron meteorite that would puzzle researchers for nearly a century. It's easy to see why the researchers might be confused. The Iron Age, a period when people across Europe, Asia and Africa began making tools from iron ore through a process called smelting, is generally thought to have begun no earlier than 1200 B.C., some 150 years after King Tut's death. If smelting was off the table, archaeologists wondered, how might the dagger have been made? Takafumi Matsui, Director of the Chiba Institute of Technology's Planetary Exploration Research Center in Japan, and his colleagues visited the weapon at the Egyptian Museum of Cairo in 2020 to find out. *"A number of manufacturing processes are possible,"* they wrote in a recent study in *Meteoritics & Planetary Science*, *"such as cold working, in which an iron meteorite is cut and polished; hot working, involving high-temperature melting and subsequent casting; or low-temperature heating and subsequent forging."* But their chemical analyses of the dagger's blade and gold hilt, combined with historical knowledge of ancient manufacturing techniques, now cast doubt on whether it was crafted in ancient Egypt at all. Instead, Matsui and his colleagues propose that the king of the nearby Mitanni empire gave the dagger to King Tut's grandfather as a wedding gift. Although some prehistoric iron artifacts are known to have been forged from meteorites, the cosmic source of the iron in the late pharaoh's dagger wasn't confirmed until a team of Italian researchers analyzed its elemental composition for the first time in 2016. While Earth-based iron contains about 4 percent nickel, the team found that the blade's higher nickel concentration (and trace amounts of cobalt) was instead consistent with space rock. Four years later, aided by the Grand Egyptian Museum's conservation center, Matsui and his colleagues used a portable scanning X-ray fluorescence instrument to map out the elements on the surface of the blade; not just iron, nickel and cobalt, but also chlorine and manganese, among others. They found that the bumpy, black spots along its edges and center, for example, likely originated from troilite, a mineral commonly found in iron meteorites, but had lost a large amount of sulfur after being heated around 1,300 degrees Fahrenheit. And just as informative as the abundance of these elements is their arrangement. *"In some places, discontinuous banded arrangements with cubic symmetry and bandwidth of about 1 [millimeter] are observed,"* the authors wrote. This three-dimensional, cross-hatched texture, known as a Widmanstätten pattern, occurs in some meteorites if their iron-nickel mixtures separate into bands upon cooling. The pattern is only visible after the rock has been cut, polished and acid-etched, but its near-hidden and lasting presence on King Tut's dagger reveals that the blade was never heated above 1,700° F. Through the process of elimination, the researchers threw both cold working and hot working techniques out the window: *"These lines of evidence lead to a conclusion that the Tutankhamen iron blade was made by low-temperature heat forging,"* Matsui and his colleagues write. But they had yet to solve the mystery of who made it. The team turned to the dagger's gold hilt, decorated with intricate patterns of fine gold grains and stones of lapis lazuli, carnelian and malachite. During King Tut's reign, ancient Egyptians commonly used organic glue to attach gold powders and gold leaf on wood. This is true of the gilded wood samples found in the pharaoh's tomb. But high amounts of calcium detected on his dagger's hilt suggest that its artisans used a stronger adhesive instead: lime plaster, composed of sand, water and calcium oxide (lime). This was somewhat surprising. After all, much like smelting, the use of lime plaster in ancient Egypt only began to take off after King Tut's death, during the Ptolemaic period. Both iron processing technology and lime plaster, however, were already prevalent in the northerly Mitanni and Hittite regions. *"The [calcium]-bearing, sulfur-lacking plaster used on the gold hilt may support the idea that the Tutankhamen meteoritic iron dagger was brought as a gift from Mitanni, as recorded in the Amarna letters,"* conclude the researchers. The 3,400-year-old Amarna letters, hundreds of clay tablets considered to be the oldest documents of diplomacy ever found, consist of correspondences written between Egyptian pharaohs and nearby kings. One such letter mentions a list of gifts made of iron, including an iron dagger with "an inlay of genuine lapis lazuli" and a gold sheath, that the king of Mitanni sent to King Tut's grandfather, Amenhotep III, when the pharaoh married a princess from the region. Although it would seem the various puzzle pieces have fallen perfectly into place, it will be the job of future studies to confirm whether the family heirloom mentioned in the Amarna letter is indeed the very dagger currently sitting in the Museum of Cairo. Until then, we can all agree on one thing: The bar for wedding gifts has certainly been raised.

The iron dagger of Tutankhamun with its gold sheath

Widmanstätten pattern on a meteorite from Namibia.

https://astronomy.com/news/2022/05/a-new-origin- story-for-king-tuts-meteorite-dagger

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 (mlburnsmars@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

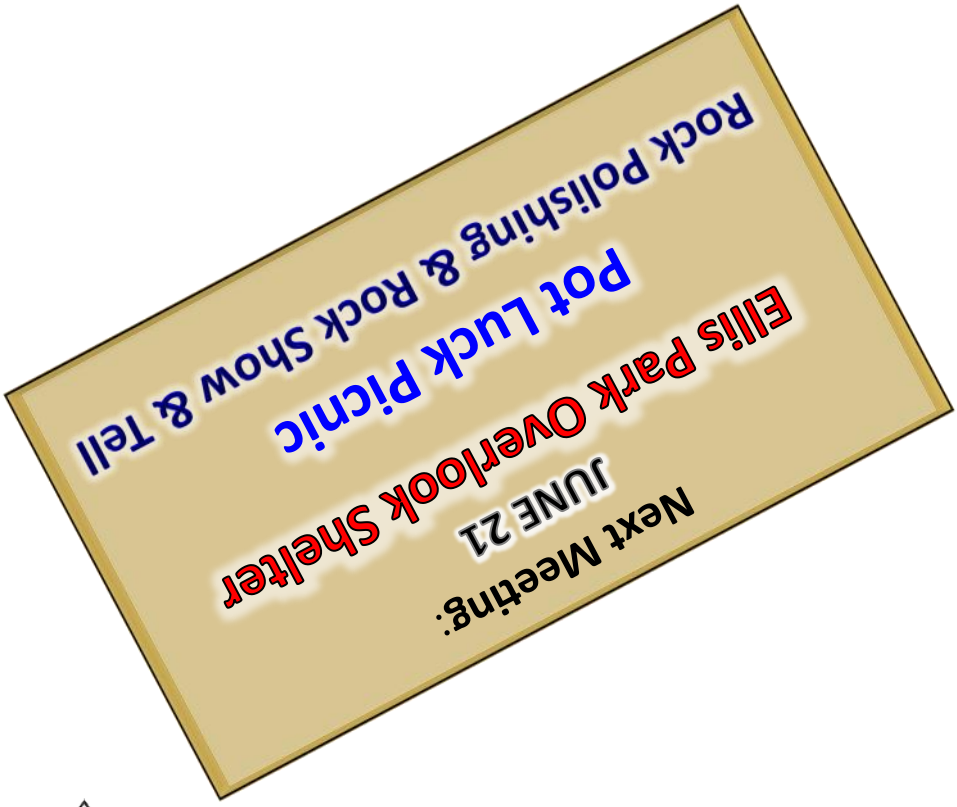
CEDAR VALLEY ROCKS & MINERAL SOCIETY

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