



Cedar Valley Gems



Cedar Valley Rocks & Minerals Society
Cedar Rapids, Iowa

CEDAR VALLEY GEMS

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**Next CVRMS Meeting
Tues. June 20**

**First Summer Potluck
Ellis Park Overlook Shelter**



“we eat at 6:30 pm”

evening’s entertainment: —**LAPIDARY**



**July 18
Potluck**

**Squaw Creek Park
Meadowlark Shelter**

evening’s entertainment: —**GEODE CRACKING**



**August 15
Potluck**

**Morgan Creek Park
Shelter**

evening’s entertainment: —**BINGO**



Last African Dinosaur

One of the last dinosaurs living in Africa before their extinction 66 million years ago has been discovered in northern Morocco. A study of the fossil suggests that following the breakup of the supercontinent Gondwana in the middle of the Cretaceous period, a distinct dinosaur fauna evolved in Africa. The new species, *Chenani-saurus barbaricus*, was one of the last dinosaurs on Earth and among those species wiped out when an asteroid hit 66 million years ago. It is the smaller African contemporary of the North American *T. rex*. Last year a rare fragment of a jaw bone was found in a phosphate mine at Sidi Chennane in the Oulad Abdoun Basin, Morocco. The phosphate beds were deposited on the margins of the African continent where upwelling brought deep, phosphate-rich water to the surface where it precipitated on a shallow sea floor, 66 million years ago. The find was unusual because it's a dinosaur, a land animal, recovered from marine rocks; it was an incredibly rare find. The bone was recently studied by paleontologists and identified as belonging to an *abelisaur*. *Abelisaur*s were two-legged predators like *T. rex* and other tyrannosaurs, but with a shorter, blunter snout, and even tinier arms. The teeth from the fossil were worn as if from biting into bone, suggesting that *Chenani-saurus* was a predator. However, unlike the partially feathered *T. rex*, *Chenani-saurus* had only scales and its brain was smaller. While the tyrannosaurs dominated in North America and Asia, the *abelisaur*s were the top predators at the end of the Cretaceous in Africa, South America, India, and Europe. Almost nothing is known about the dinosaurs that lived in Africa at the end of the Cretaceous.



Image of *Chenani-saurus barbaricus* with human silhouette for scale

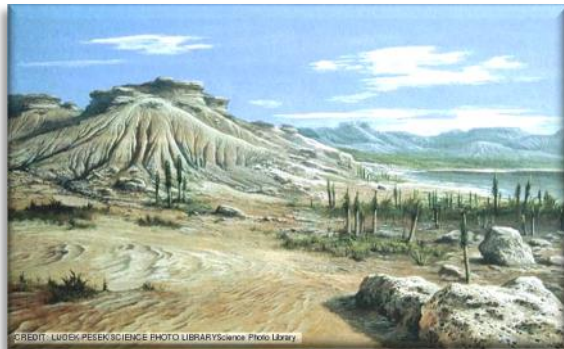
<https://www.sciencedaily.com/releases/2017/05/170503213550.htm>

CVRMS Board Meeting

MAY BOARD MEETING CANCELLED



One of the Big Five mass extinction events occurred some 200 million years ago, the Triassic–Jurassic extinction. Giant volcanic eruptions and an asteroid impact have been implicated for the disastrous change of climate, killing off at least half of the species now known to have been living on Earth, and vacating the ecological niches that allowed the dinosaurs to assume dominant roles on land in the Jurassic period. The hothouse conditions also depleted oxygen in the oceans, creating conditions in which many forms of marine species could not survive. The amounts of carbon dioxide released through the volcanic activity during that time were staggering, with concentrations of CO₂ in the atmosphere reaching 1000 ppm (today we have just reached 410 ppm of CO₂, and that concentration worries many scientists). Geologists suggest that in addition to the warming effects of the CO₂ releases, the massive amounts of methane hydrates freed by the warming intensified the global heating and the mass extinction. The new findings shed light on how the high greenhouse gas concentrations intensified the weathering of the Pangean bedrock. The heat increased the rate at which water reacted with the silicate mineral grains in rocks altering them to the clay mineral illite. These reactions were further intensified by the acidity of



Artist's interpretation of the Late Triassic Landscape.

rain water, which increased with high levels of CO₂. This alteration of silicate minerals to illite removes CO₂ gas from the atmosphere. Thick Illite deposits in deeply weathered crystalline bedrock across Scandinavia, which was a part of the supercontinent Pangea 200 million years ago, was precisely dated. The dates show that intensive and widespread chemical weathering occurred under hothouse conditions during the late Triassic. The high levels of CO₂ released into the atmosphere by the volcanic activity were slowly removed by the weathering silicate minerals. The fatal hothouse conditions were reversed by natural chemistry of weathering, but not before most species on Earth were driven to extinction.

<https://www.sciencedaily.com/releases/2017/05/170505092607.htm>

CVRMS May. 16 Meeting

Indian Creek Nature Center

Meeting called to order by Marv Houg, president-7:10 p.m.

Introduction of new members or guests - Gene Wehr, Rick Lein, Carol Dickison, Rona Bradshaw. Welcome to all.

Program by Craig Johnson. "Weather Forecasting: From Weather Lore to Supercomputers"

Social time with various treats (thanks Dell).

Door prize with Denny Fiser winning

Minutes of last meeting reviewed as published. Motion to accept as written by Julie, 2nd by Terry Baty., *Motion passed.*

Treasurers report Dale Stout. Checking account balance \$32,488.13. Scholarships not yet paid. Motion to accept report by Lisa and second by Tom. *Motion passed.*

Old Business

Show report- nothing new to report. Bills are paid and income accounted for.

Auction-Marv reported that we will have a two day auction with about 1150-1200 lots.

New Business

Two recommendations made to general membership regarding scholarship amounts. **First recommendation** -Increase our current scholarship amounts by \$500 each (U. of Iowa and Cornell) and keep VAST at current amount. Motion seconded by Tom W. Discussion followed with some questions regarding where the money is spent after the recipients receive it. Ray will look into obtaining a better accounting. *Motion passed.* **2nd recommendation** Approximately 90% of show profits will be donated to scholarships and VAST. Base donations raised (U. of Iowa-\$4000, Cornell-\$3000,VAST \$1500). Excess money will be divided 50%, 25%, and 25% among the three respectively. Second by Bill. Discussion. This will result in an additional \$1000 to the U of IA, \$500 each to Cornell and VAST. This equals \$10,500, approximately 90% of our profits. Award can change each year depending on our show profits. *Motion passed.* Dale will disburse the scholarship money.

Other Business

The next three meetings, (June, July, August) will be picnic potlucks. Watch the newsletter for locations, etc.

Bill has lined up the fall bus trip and is taking names. Either email or call. The date is October 22. Free to members. Motion by Jay to charge \$25 for nonmembers. Second by Tom. *Motion passed.*

Julie reported on the Midwest Federation show. It was busier than usual with about 3000 attendees. Insurance rates may change because of the way they will calculate the membership totals. More to come.

We are committed to the 2019 show combined with ours, the Midwest and the American Federation. We need to get info from the American Federation regarding what their needs will be.

Tom and Julie will be attending the American Federation show next month in Ventura, CA.

MSHA training will be held on May 27. 2:pm at the Marion Library. 40 people signed up and if you want to change or sign up you must let Marv know.

Field trip Saturday, May 21, at Waterloo South Quarry. 9:00 a.m. You must be a member of the Waterloo club but you can join at the site. Dale will send email.

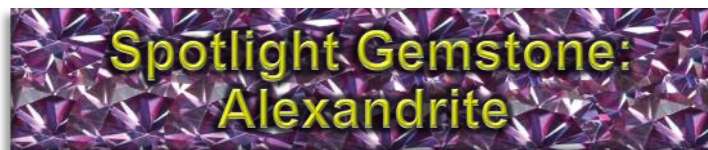
Motion to adjourn by AJ. second by Bill. 9:35 meeting adjourned.

Respectively Submitted, Dell James, secretary



More than 90% of Earth's continental crust is made up of silica-rich minerals, such as feldspar and quartz. But where did this silica-enriched material come from? And could it provide a clue in the search for life on other planets? Conventional theory holds that all of the early Earth's crustal ingredients were formed by volcanic activity. Now, however, Earth scientists have published a theory with a novel twist: some of the chemical components of this material settled onto Earth's early surface from the steamy atmosphere that prevailed at the time. Around 4.5 billion years ago a Mars-sized planetoid plowed into the proto-Earth, melting the Earth and turning it into an ocean of magma. Following the impact, which also created enough debris to form the moon -- the Earth's surface gradually cooled until it was more or less solid. The atmosphere following that collision, consisted of high-temperature steam that dissolved rocks on the Earth's immediate surface -- much like how sugar is dissolved in coffee. These dissolved minerals rose to the upper atmosphere and cooled off, and then these silicate materials started to separate out and fall back to Earth in what we call a "silicate rain." This theory was tested in a series of laboratory experiments designed to mimic the steamy conditions on early Earth. A mixture of bulk silicate earth materials and water was melted in air at 1,550 degrees Celsius, then ground to a powder. Small amounts of the powder, along with water, were then enclosed in gold palladium capsules, placed in a pressure vessel and heated to about 727 degrees Celsius and 100 times Earth's surface pressure to simulate conditions in the Earth's atmosphere about 1 million years after the moon-forming impact. After each experiment, samples were rapidly quenched and the material that had been dissolved in the high temperature steam analyzed. The dissolved silicate material produced by the experiments were "surprisingly similar" to the early Earth's crust. Researchers coined the term "aerial metasomatism" to describe the process by which silica minerals condensed and fell back to earth over about a million years, producing some of the earliest rock specimens known today. This process set the stages for the appearance of life on Earth.

<https://www.sciencedaily.com/releases/2017/05/170505121013.htm>



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 scarcely available, 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>

May Photo



What in the World is this unusual mineral??



Last month's **What in the World** was a May 2004 aerial photograph of Winnebago County by Guy Zenner (DNR) showing water-filled depressions (sometimes called "pot holes." Most of these are intricately connected by sand channels that were deposited by water flowing "on and in" glacial ice sheets that covered the region in the Pleistocene. These rivers deposited sediment on their beds, much like modern rivers. As the glacier melted, these sand channels became incorporated in the glacial till left behind. Where the sand channels reach the surface they are winnowed by the wind forming depressions which are connected by the subsurface sand, forming an excellent conduit for the transmission of surface contamination. They are referred to as Linked Depression Systems.



Rock Calendar 2017

CVRMS Events of Interest

June 20 - CVRMS Monthly Meeting
Picnic at Ellis Park Overlook
"rock cutting and polishing"

July 18 - CVRMS Monthly Meeting
Picnic at Squaw Creek Meadowlark Pavilion
"geode cracking"

Aug 15 - CVRMS Monthly Meeting
Picnic at Morgan Creek
"bingo"

Sept. 16-17—CVRMS Rock Auction
Amana RV Park and Event Center
Amana, Iowa

Oct. 21-22 - Des Moines Lapidary Society Show
3000 E Grand Ave
Des Moines, 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, regardless of if it is chosen.

Merle Ayres commented: "The Sioux quartzite in NW Iowa and SW Minnesota is known to be very hard. I roamed the place called Red Rock Ridge in SW Minnesota in my early days. I have seen the symbols of early humans and my question is how did this happen without early modern hand tools?"

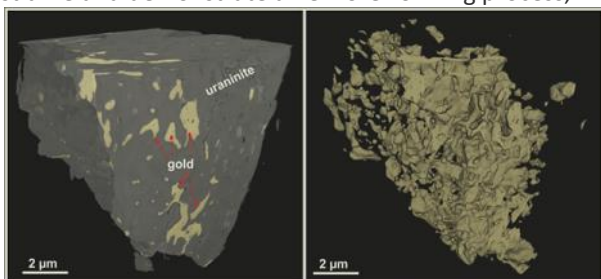
Rock Doc replied: "The Sioux Quartzite, exposed at the bedrock surface in northwest-most Iowa and adjacent areas of Minnesota and South Dakota, is a nearly pure quartz sandstone that was deposited in rivers and along the shore of an ocean about 1.65 billion years ago. The sand grains were then cemented by quartz that was leached from ash erupted from nearby volcanoes, one of which is known in northwest Iowa. The quartz-cemented quartz sandstone is one of the most weathering-resistant rocks known, so over hundreds of millions of years, as the landscape of North America was deeply eroded, the resistant quartzite was little affected. The area of the Sioux Quartzite became a regional high (the Sioux Ridge) as the rocks around it eroded down. As the Paleozoic and Mesozoic seas advanced onto the continent on numerous occasions in the last 500 million years, the Sioux ridge was among the last areas to be inundated. The regional erosion that dominated the last 50 million years removed the thin Mesozoic rock cover exposing the quartzite at numerous locations, then the mile-thick glacial ice sheets that moved into the region in the last 2.5 million years scoured and smoothed the quartzite surface. Humans moved into the region as the climatic conditions improved with the departure of the glaciers. Between about 7,000 -9,000 years ago Native American ancestors began a series of carvings in the naturally-polished quartzite. The area of southwest Minnesota once owned by an immigrant family named Jeffers contains over 2,000 of these petroglyphs including images of snakes and birds, turtles and stick figures, bison, weapons and abstract designs, all with significant meaning to the American Indian tribes who visited the area. Merle is correct that these petroglyphs were carved into Sioux Quartzite that is harder than the stone-tipped darts and sharpened antler tools that the carvers would have been expected to use. Scientists who studied the carvings believe that they were carved with quartzite tools. But the tools probably weren't made of local quartzite, but were likely obtained by trade. The similarities in the style of the Jeffers Petroglyphs to carvings found in the Black Hills of South Dakota, and in Washington State and Southwest Canada suggest possible sources for the tools. The carving could have also been facilitated by surface weathering of the quartzite. Although the rock is hard, small cracks and irregularities in the surface would have provided pathways for freeze thaw cycles and plants to further crack the quartzite, which may have made it easier to carve. In-fact, rock toughness tables (toughness being defined as the ability of a material to absorb energy and plastically deform without fracturing) indicate that a number of rock types are tougher than quartzite. So perhaps the techniques employed by the early carvers were important in their ability to carve the Sioux Quartzite."

TYPICAL ROCK HARDNESS

Rock:	Toughness:	Rock:	Toughness:
Fresh Diabase (Trap)	3.0	Chert	1.5
Pyroxene Quartzite	2.7	Calcareous Sandstone	1.5
Sandstone	2.6	Granite	1.5
Altered Diabase	2.4	Slate	1.2
Fresh Basalt	2.3	Peridotite	1.2
Hornblende Schist	2.1	Granite Gneiss	1.2
Diorite	2.1	Andesite	1.1
Hornblende Granite	2.1	Limestone	1.0
Rhyolite	2.0	Mica Schist	1.0
Quartzite	1.9	Amphibolite	1.0
Biotite Gneiss	1.9	Dolomite	1.0
Augite Diorite	1.9	Biotite Granite	1.0
Altered Basalt	1.7	Augite Syenite	1.0
Feldspathic Sandstone	1.7	Hornblende Gneiss	1.0
Gabbro	1.6		

Formation of South African Gold: A New Theory

At a first glance, the Witwatersrand basin, the largest known gold resource on our planet, shouldn't be related to ocean processes. However, in its 3 billion year old geological history, the Witwatersrand basin in South Africa has been repeatedly covered by seawater, dried out, and eroded by rivers, then flooded by seawater again. In 1852 gold was first discovered in the Witwatersrand, leading to the South African gold rush and the discovery of many more gold deposits within the basin. Although the Witwatersrand has been the subject of decades of research, the genesis of gold and uranium ore is still unclear. Recently scientists successfully unraveled some mechanisms of the ore-forming process using complex analytical techniques. Scientists have recently analyzed samples from the Witwatersrand ore deposits with high-resolution scanning- and transmission-electron microscopes, and processed their data using new 2D and 3D software. They were able to determine that fossil oil formed by organic matter from the earliest organisms living on Earth mobilized the uranium. Uraninite nanoparticles flocculated in the oil and formed uranium ore. Hot hydrothermal fluids, similar to those fluids that we find today in modern seafloor Black Smoker systems, transported dissolved gold, and formed oil-in-water emulsions at the site of the deposits. The oil droplets in the hydrothermal fluids initiated the chemical precipitation of gold and the formation of the complex-structured gold and uranium ore." Using high-resolution imaging techniques, the researchers were able to show remnants of fossil oil entrapped in gold for the very first time and demonstrate a new ore-forming process, in



The left picture shows uraninite (uranium ore) around gold. In the right picture, a computer program removed the uraninite to show the large volume of gold hidden in the uranium ore.

which migrating oil plays the dominant role in the distribution and concentration of metals. "We are surprised to see such an intimate spatial relationship between the oil products and the metals," the researchers reported. "We hope that our study gives new impulses to industry and science to explore new mineral deposits. Perhaps it is possible at some day to extract gold and other metals from mined crude oil."

<https://www.sciencedaily.com/releases/2017/04/170420113804.htm>

Dirty Door Stop to Multi-Million-Dollar Stone

In 1938, 12-year-old Roy Spencer uncovered the dull looking half-pound black stone on a hillside near his home in central Queensland, Australia, and brought it home to his dad. Dad displayed it as a doorstop at their home where it remained for a decade, until jeweler Harry Kazanjian discovered it for what it really was. Harry had learned to polish stones while apprenticed with his uncle, who was a stonecutter in Paris, when he was separated from his family who were fleeing Turkey to escape the Armenian genocide. Somehow Harry discovered the black stone at the Spencers' home, and when he looked at it more closely, he spied a copper-colored



glimmer that he recognized as a sign of something special buried deep within. So Harry bought the giant stone from Roy's dad for \$18,000 and transported it to his Los Angeles shop. There, after polishing it, he discovered it was a stunning, six-pronged star, eventually called the *Black Star of Queensland*. Harry shaped it into a cabochon that weighed 733 karats. At the time, it was valued at \$300,000. That copper-colored glimmer Harry first spied is actually an impurity that can grow along a sapphire's crystal axis to create an optical star-shaped effect known as an asterism. Soon after, the Kazanjian family business boomed, and they became one of the leading gem dealers in the world. The family attributed the success achieved in their business to the luck brought in by the black star sapphire. In 1969, the Kazanjians displayed the sapphire at the Natural History Museum of the Smithsonian Institution, in Washington DC, alongside the famous Hope Diamond, until 1986. It was subsequently worn by singer Cher during a TV appearance, and then featured at the Royal Ontario Museum in Toronto. The stone was finally sold in 2002 to fund a scholarship at the **Gemological Institute of America**. It was purchased by Jeweler (and former male model) Jack Armstrong and his partner/girlfriend Gabrielle Grobe-Guiton. After a tumultuous relationship, Armstrong tried selling it to other buyers without Grobe-Guiton's knowledge, and from there, everything went down hill. The giant beautiful stone, then valued at \$100,000,000, ended up in L.A. County Superior Court amidst allegations of deception between two lovers. It awarded custody to Grobe-Guiton who currently has it in her private possession. In 2008 the *Black Star of Queensland* was exhibited at Harry Winston's Jewelry salon in Beverly Hills, but it is now in a private collection. Can you believe this astounding story, from dirty door stop to highly sought-after multi-million-dollar stone?

<https://www.storiesoftheday.net/zL2wO625>

The Fossil that Inspired Alien: 300-Million-Year-Old Relic Inspired Extra-Terrestrials in Sci-Fi Classic

Most of us do not believe in aliens but looking at this strange fossil might just make you stop and think. This relic is in fact the ancient fossil that inspired the extra-terrestrial antagonists in Ridley Scott's classic sci-fi horror, *Alien*. The creator of *Alien* was Swiss surrealist artist, Hans Rudolf Giger, who was sought out by Ridley Scott to design the creatures after he saw Giger's artwork *Necronom IV*, one among his many designs that are said to have been based on the fossils. Giger's designs, one of which was all too memorably seen bursting out of a character's chest on screen, went on to win his team a 1979 Academy Award for Best Achievement for Visual Effects and a Hugo Award for Best Dramatic Presentation for film as well as creating a franchise of 9 sequels or spin-off movies, novels, and video games.



This Pennsylvanian crinoid and starfish fossil inspired the artist who designed the extra-terrestrial antagonist of the *Alien* films.

But the stranger-than-fiction fossil is actually the remains of an early form of life that existed on our own planet an incredible 300 million years ago. And the extremely rare fossil starfish on the calyx of a crinoid captured the public imagination so much when it went on display in Switzerland that it not only attracted plenty of visitors, it also tempted a thief. Police believe the thief, who broke into the case and stole the Aathal Dinosaur Museum's prize exhibit, is a fossil collector. Last week police released the photo in a bid to find the fossil and track down whoever who took it. And now the priceless piece has been returned after it was put into the museum's post box tucked inside a padded envelope. Museum curator Dr. Thomas Bolliger said: *"It was comparatively undamaged - although one of the arms had broken off. It really is a remarkable fossil and shows two separate species of a spineless animal that lived at the bottom of the sea around 300 million years ago."* A museum spokesman added: *"It is a very valuable but also a very unique fossil and it would be very difficult for anybody to sell or indeed to keep secret given the publicity around the theft."*



The iconic scene in Ridley Scott's film when one of the alien's wrapped itself around John Hurt's face.

<http://www.dailymail.co.uk/news/article-2269655/The-300-million-year-old-fossil-inspired-Alien.htm>

What's New In Iowa Geology ??

Study of Nitrate and Phosphorus at Iowa Golf Courses

Keith E. Schilling and Matthew Streeter, Iowa Geological Survey, University of Iowa

Ryan Adams, Department of Horticulture, Iowa State University



Nonpoint source pollution from nitrate-nitrogen (N) and phosphorus (P) contributes to nutrient enrichment in local streams and lakes and development of hypoxic (dead) zones in regional water bodies, including the Gulf of Mexico. In response to both increased scientific understanding of the causes and consequences of hypoxia, and increased public concern over water quality degradation at local and regional scales, the Iowa Nutrient Reduction Strategy (INRS) was developed to reduce N and P delivered to Iowa rivers and the Gulf of Mexico from point and nonpoint sources. An objective of the strategy was to evaluate potential conservation practices needed to reduce N and P from nonpoint sources by 45% through in-field, edge-of-field and land management practices.

The goal of our new project is to measure N and P concentrations in surface and groundwater at a subset of Iowa golf courses to assess the risk posed by these facilities to contribute N and P loads to Iowa rivers. We randomly selected six courses for this initial reconnaissance study that will include three 18-hole courses and three 9-hole courses. Monitoring wells are being installed within managed turfgrass areas at each course, and water samples from the wells and local surface water sources will be analyzed for N and P on a quarterly basis for two years. We are working with the course superintendents to track land management practices at the selected courses including the timing, rate and formulation of fertilizer applications so that we can relate nutrient concentrations to golf course practices. Project updates from the research and a final report will be published in *Golf Course Management* and a peer-reviewed journal.

Funding is being provided, in part, by the United States Golf Course Superintendents Association, Iowa Golf Course Superintendents Association, and the Iowa Turfgrass Institute.

http://www.ihr.uiowa.edu/igs/study-of-nitrate-and-phosphorus-at-iowa-golf-courses/?doing_wp_cron=1494897260.5570170879364013671875

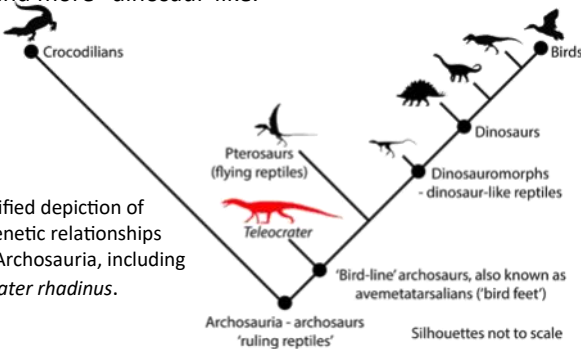
Discovery of early, "croc-like" reptile sheds new light on evolution of dinosaurs

A new species of ancient reptile has been described by scientists at the University of Birmingham, filling a critical gap in the fossil record of dinosaur cousins and suggesting that some features thought to characterize dinosaurs evolved much ear-



A life reconstruction of the new species *Teleocrater rhadinus*, a close relative of dinosaurs, feasting on an ancient mammal relative, *Cynognathus*, in the Triassic of Tanzania. The large dicynodont *Dolichuranus* is seen in the background

lier than previously thought. The carnivorous reptile, *Teleocrater rhadinus*, was approximately 7-10 feet in length, had a long neck and tail, and walked on four crocodile-like legs. It roamed the Earth during the Triassic Period more than 245 million years ago, pre-dating the first true dinosaurs by around ten million years, and appears in the fossil record just after a large group of reptiles, known as archosaurs, split into a bird branch (leading to dinosaurs and eventually birds) and a crocodile branch (eventually leading to today's alligators and crocodiles). *Teleocrater* and its kin are the earliest known members of the bird branch of the archosaurs. The discovery overturns widely-held preconceptions by paleontologists about the morphology of early dinosaur relatives, with many scientists anticipating that such creatures would be smaller, bipedal and more "dinosaur-like."



A simplified depiction of phylogenetic relationships within Archosauria, including *Teleocrater rhadinus*.

<https://phys.org/news/2017-04-discovery-early-croc-like-reptile-evolution.html>

"Baby Dragon" Found In China Is The Newest Species Of Dinosaur

The name means "baby dragon from China." The dinosaur had massive feathered wings and a birdlike skull. It probably looked most like a cassowary, a flightless bird slightly smaller than an ostrich.



In an artist's rendering, a gigantic, cassowary-like dinosaur named *Beibeilong*, which lived 90 million years ago, incubates its eggs

But the *Beibeilong* was much bigger than any currently living bird. Based on comparisons with close relatives, the birdlike dinosaur probably weighed about 3 tons and could grow up to 26 feet long. In 1993, farmers in China found a *Beibeilong* embryo and eggs in Henan province. The fossils were sold to an American fossil company and brought to the United States. A model of

an embryo curled inside an egg was famously featured on the May 1996 cover of *National Geographic* and was nicknamed "Baby Louie."

But nobody knew what kind of dinosaur Baby Louie was. The eggs weighed about 11 pounds, making them some of the largest dinosaur eggs ever uncovered. The eggs were studied in the 1900s and were thought to belong to Tyrannosaurs, but these 4- to 5-kilogram eggs were 8 to 10 times the volume of other known oviraptorosaur eggs known at that time. Then, in 2007, scientists in China discovered the first species of giant oviraptorosaur, a species that could have laid these giant eggs. If *Beibeilong* nested like its



This image shows the curled embryo of a *Beibeilong* amid eggshells, which are dark gray in color.

smaller oviraptorosaur cousins did, it would be the largest known dinosaur to have sat protectively on its eggs. Studying these dinosaurs is difficult because there are only three known sets of skeletal remains of giant oviraptorosaurs. So there's a lot more to learn about *Beibeilong*, but at least we know what "Baby Louie" really was. http://www.npr.org/sections/thetwo-way/2017/05/09/527440895/baby-dragon-found-in-china-is-the-newest-species-of-dinosaur?utm_source=facebook.com&utm_medium=social&utm_campaign=npr&utm_term=nprnews&utm_content=20170509



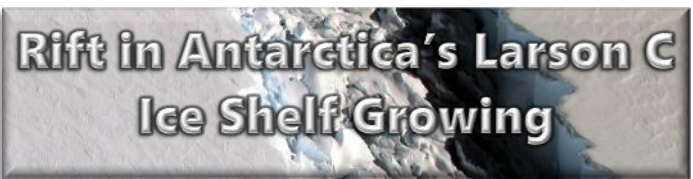
Changes to the rate of wastewater injection in disposal wells may have contributed to conditions that led to last year's Pawnee earthquake in Oklahoma, according to a new report published May 3 as part of a focus section in *Seismological Research Letters*. The September 3, 2016, magnitude 5.8 Pawnee earthquake, felt widely across Oklahoma, is the largest earth-



The September 3, 2016 Pawnee earthquake caused significant damage around Oklahoma and was felt throughout the Midwest.

quake recorded in the state since the 1950s. Most Oklahoma earthquakes since 2009 are thought to have been triggered by the injection of wastewater, produced by oil and gas drilling, back into the ground. The Pawnee earthquake occurred in a region with active wastewater disposal wells, and is potentially the largest such induced earthquake to have occurred in Oklahoma so far, according to University of Oklahoma seismologists. U.S. Geological Survey seismologists examined new injection data from nearby disposal wells in Osage County, and they found a significant increase in injection rates in the years leading up to the Pawnee main-shock. Some wells injected wastewater at a constant rate, while others injected the water at a variable rate. The overall injected volume was roughly the same between these two types of wells. Models of water injection indicate, however, that it may have been the variable-rate wells that were most significant for the Pawnee event. Their findings suggest that "***long-term injection may have been responsible for a gradual loading of the fault to the point where it primed the fault for failure triggered by the short-term high-rate injection...***" the authors write. They note that in the absence of these variable rate injections, however, ***the fault may have still failed at a much later time.***

<https://www.sciencedaily.com/releases/2017/05/170502142403.htm>



On Nov. 10, 2016, NASA scientists photographed a massive rift in the Antarctic Peninsula's Larsen C ice shelf. The rift now has a second branch, which is moving in the direction of the ice front, according to the latest satellite data. The rifts which are likely to produce one of the largest icebergs ever recorded, are currently 120 miles long and are growing fast. Now, just 12 miles of ice is keeping the 2,000 square-mile piece from floating away. While the previous rift tip has not advanced, a new branch of the rift is approximately 6 miles behind the previous tip, heading towards the ice-front. This is the first



Aerial view of the rift in the Larsen C ice shelf

significant change to the rift since February of this year. Although the rift length has been static for several months, it has been steadily widening, at rates in excess of a yard per day. It is currently winter in Antarctica, therefore direct visual observations are rare and low resolution. The new observations of the rift are based on synthetic aperture radar (SAR) interferometry from ESA's Sentinel-1 satellites that allow a very precise monitoring of the rift development. The researchers say the loss of a piece the size of Delaware will leave the whole shelf vulnerable to future break-up. Larsen C is approximately 1,200 feet thick and floats on the seas at the edge of West Antarctica, holding back the flow of glaciers that feed into it. The scientists say that when it calves, the Larsen C Ice Shelf will lose more than 10% of its area, leaving the ice front at its most retreated position ever recorded. This event will fundamentally change the landscape of the Antarctic Peninsula. The researchers had previously shown that the new configuration of the ice sheet will be less stable than it was prior to the rift, and that Larsen C may eventually follow the example of its neighbor Larsen B, which disintegrated in 2002 following a similar rift-induced calving event. For an explanation of why the crack is currently growing so fast see: <https://www.facebook.com/BusinessInsiderScience/videos/1196135993828408/>

CVRMS FIELD TRIP TO FRYXELL GEOLOGY MUSEUM AND LIZZADRO MUSEUM OF LAPIDARY ARTS

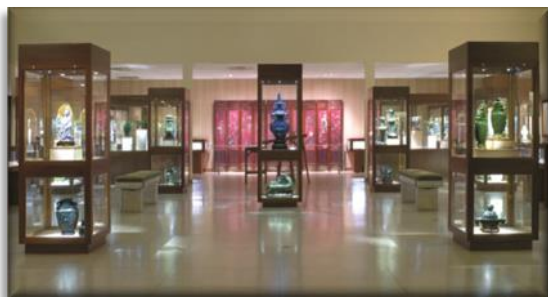
Following last year's superb field trip to the Field Museum of Natural History, CVRMS Director Bill Desmarais is organizing another field trip by bus, this year to the **Fryxell Geology Museum** in Rock Island and **Lizzadro Museum of Lapidary Art** in Elmhurst, Illinois, scheduled for **Saturday, October 21st**. The charter bus will depart from Cedar Rapids and also pick up passengers in Iowa City enroute to Rock Island's Augustana College and the Fryxell Geology Museum, then to Elmhurst and the Lizzadro Museum of Lapidary Art. **The Fryxell Museum**, named after Dr. Fritiof Fryxell, was started in the late 1880s with a modest natural history



Fryxell museum visitors are greeted by a 22-foot-long skeleton of a *Cryolophosaurus*, a large carnivorous dinosaur.

collection. Today it is one of the largest and finest collections of rocks, minerals and fossils in the Midwest, with more than 1,500 rock, mineral, and fossil specimens, and a fluorescent mineral display. It includes a cast of a *Tyrannosaurus rex* skull and a complete 22-foot long skeleton of *Cryolophosaurus*, a large crested carnivorous dinosaur collected in 1991 in Antarctica by Professor Bill Hammer and his students. One display shows a rare amphibian fossil from the famous Mazon Creek area. This fine specimen shows nice preservation of the skull, body and limb material. Also on display is a quarter-ton piece of the Canyon Diablo meteorite, a planetarium show with images and information on the wonders of the night sky, and a newly acquired piece of the Chelyabinsk meteor that exploded over Russia on Feb. 15, 2013.

The **Lizzadro Museum of Lapidary Art** in Elmhurst (a western suburb of Chicago) is dedicated to the art of cutting and polishing stones. The museum was founded by Italian immigrant Joseph F. Lizzadro, Sr., an electrical engineer with a life-long interest in



The Lizzadro Museum of Lapidary Art

lapidary and a special fondness for jade. As his collection grew he desired to display it to the public, and was granted permission to build a museum within the city's Wilder Park. The museum's doors opened in November, 1962, and it include displays gemstone treasures, antiques to modern, with a blending of earth science exhibits.

The building itself is designed to resemble a jewelry box in a park setting and features more than 200 exhibits including the **Castle Lizzadro**, which is carved out of gold. Housed within the museum are rare pieces such as a jade imperial altar set completed during the Ming Dynasty, (1368-1644) and a cinnabar screen encrusted with gemstones that was a gift to the Chinese emperor, Qianlong, in 1791. Both pieces were originally housed in the imperial palace of China. The lower floor of the museum is an interactive earth science center containing unusual rocks, fossils and hands-on exhibits. The field trip will be free to club members, with a minimal charge of \$25 to non-members if unclaimed seats remain. To register for the field trip contact Bill Desmarais at 319-365-0612 or desmarais_3@msn.com.



Carved cinnabar statue in the Lizzadro Museum of Lapidary Art.

Seats are limited so don't delay and miss this great trip!

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Club meetings are held the 3rd Tuesday of each month from September through November and from January through May at 7:00 p.m., temporarily at a location to be announced. The December meeting is a Christmas dinner held near the usual meeting night. June, July, and August meetings are potlucks held at 6:30 p.m. at area parks on the 3rd Tuesday of each month.

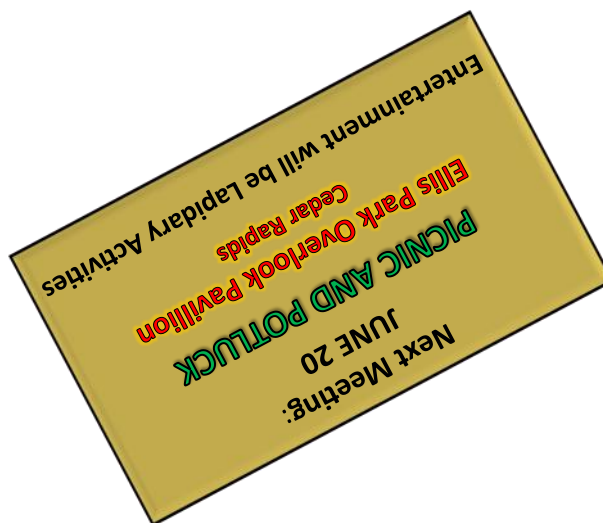
CEDAR VALLEY ROCKS & MINERAL SOCIETY

CVRMS was organized for the purpose of studying the sciences of mineralogy, geology, and paleontology and the arts of lapidary and gemology. We are members of the Midwest (MWF) and American (AFMS) Federations. Membership is open to anyone who professes an interest in rocks and minerals.

Annual dues are \$15.00 per family per calendar year. Dues can be sent to:

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