

Cedar Valley Gems

Cedar Valley Rocks & Minerals Society

Cedar Rapids, Iowa

cedarvalleyrockclub.org

CEDAR VALLEY GEMS

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Next CVRMS Meeting Tuesday April 17

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

featured speaker:

Rockdoc Anderson

School of Hard Knocks

Crinoids and More Crinoids

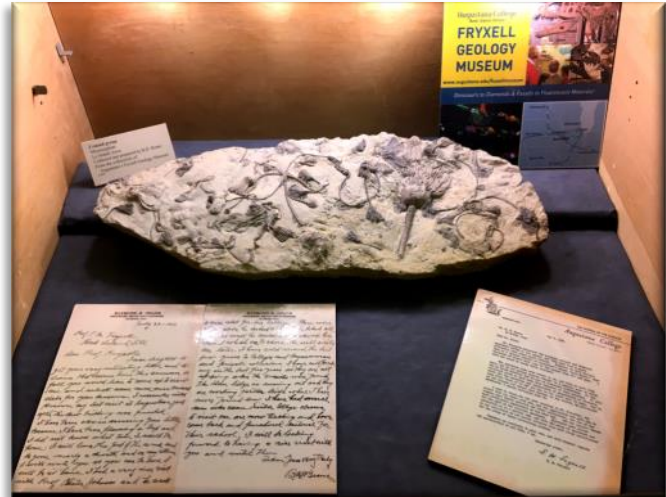


Your very own Rockdoc (Ray Anderson) will hit you with a crinoid *double header* during this program. First, he will preview the talk that he will present at the **Iowa Academy of Science** later in the week; **The Crinoid; Iowa's State Fossil ??** The presentation will discuss why the Crinoid should be Iowa's State Fossil and efforts to make it so. Following he will show a **PBS Video** spotlighting our 2018 Rock Show's featured speaker, Dr. Forest Gahn, in "**Living Fossils.**" The show, one of the "**Changing Seas**" series, documents Forest and his team of scientists in a submersible exploring the seas around Palau for living stalked crinoids. Preview the video at:

<https://www.youtube.com/watch?v=4sphfDHfrQI>

Off to a Chilly Start the 2018 Rock Show Finishes Strong

The theme of the 2018 CVRMS Rock, Fossil, and Mineral Show at Hawkeye Downs was "**Crinoids; Iowa's State Fossil?**" and it featured one of the most fantastic displays of spectacular crinoid fossils the State has ever seen! Museums from Beloit College, Augustana College, and the University of Iowa sent specimens of crinoids from Iowa and surrounding states, including slabs of Le



Slab of crinoids from Le Grand collected by Bernie Beane and displayed by the Augustana College Fryxell Museum with a letter of authentication from Beane himself.

Grand crinoids collected by the famed Bernie Beane. These displays were supplemented with fantastic displays from the private collections of Kark Stuckerjurgan (Burlington Crinoids) and Marv Houg (especially Gilmore City crinoids). Nature greeted the first day of the CVRMS 2018 Rock Show with a blizzard that spread icy slush and 8 inches of snow on Cedar Rapids by the end of the day. Only the hearty few ventured out into the storm, so our Saturday (Mar. 24) attendance was only 680 (only about 1/4 of last year's Saturday attendance). But many of those who braved the weather came to buy, so the vendors were not too upset. The sun came out on Sunday (Mar. 25) and so did the Rock Show visitors. The 2103 who attended the Sunday show was about equal to last year's Sunday attendance. Total show attendance ended up to be about 63% of last year's numbers. **TO ALL CVRMS FRIENDS WHO HELPED, THANKS FOR A GREAT SHOW !!**

CVRMS March 20 Meeting

Hiawatha Community Center

The meeting was called to order at 7:15 p.m. by Marv Houg, President. The minutes of the last Board meeting were reviewed as published and no questions or concerns were voiced.

The minutes of last club meeting reviewed. Motion to accept made by Dolores, second by Bill. Approved as published.

The treasurer's report was presented by Dale Stout. The current checking account balance is \$23,796.81. Motion to accept and record balance made by AJ, seconded by Tom. Report approved. Door prize was won by Matt Burns.

Program

Dr. Emily Walsh from Cornell and students who participated in field research studies in the Bahamas. Presented by Kira Fish, Matt Stiland(sp), Carlos Tellez.

Show report

Set up begins 8:30 a.m. Friday. Clean up crews needed for everything. Marv has sign up sheets for everything.

Sharon made a plea that since Hawkeye Downs counts every chair and table used, everyone needs to be sure that carts contain the correct number of chairs and tables. Must return the way we found them.

Desserts are needed for Saturday catered dinner. Dell will get drinks.

Floyd the Noid was presented for his debut.

Other Business

Marv reported that there are 600 to 700 items for auction with more possible.

Dell has new T-shirts available. \$10 each.

Adjournment

Motion to adjourn by AJ second by Jay.

Meeting adjourned 9:15 p.m.

Respectfully submitted,
Dell James, Secretary

board minutes (continued from right)

Sharon received a call regarding the Linn County Fair on June 29 Community Day and whether the club could do a hands on type display for our club. Any volunteers and what could be done? Petition and Floyd the Noid are possibilities.

Adjournment

Motion to adjourn by Bill, second by Dale.

Meeting adjourned at 9:15 p.m.*

Respectfully submitted,

CVRMS Board Minutes Mar. 27

Members present-Marv Houg, Dale Stout, Rick Austin, Jay Vavra, Ray Anderson, Dell James, Bill Desmarais, Sharon Sonnleitner, Bob Roper,

Meeting called to order by Pres. Marv Houg 7:20p.m. at his home.

Show report : Overall a success even though the Saturday blizzard severely affected the attendance. Sunday strived to compensate. The total attendance, children and adults, amounted to 2783 which is about 1500 down from the average attendance. Income and expenses were not yet tallied. Dale will send a completed report by email and have ready for next club meeting. Various subjects discussed regarding the show. Quick hits to improve next year. **1.** Name tags for all dealers and their workers. **2.** Devise a system that will allow dealers to order lunch from concession stand and deliver to them since no one is allowed to bring in food or drink and the concession stand is slow to take orders and prepare food. **3.** Next year's layout will change since Hawkeye will build an office where the Gem Flume is currently located. Sharon has new layout designed. Many other miscellaneous items mentioned and any suggestions from members will be considered. Sharon will talk to Hawkeye Downs about future dates. The board is always on the lookout for a different venue but either expense or lack of accommodations prevents us from moving from Hawkeye Downs. Marv will make some calls. Places like Kirkwood, U.S. Cellular Center and any others that come to mind. The Crinoid for State Fossil movement had a good response. Over 500 signatures obtained on petitions. Ray thinks Floyd the Noid's demeanor should be softened. He may look a little frightening now. Ray will work on it.

Auction

About 1000 lots committed with at least 3 other interested who have yet to commit. There will be plenty for a 2 day auction. This year's auction is on **September 15 and 16.**

Discussion followed regarding selecting future dates that will avoid the Denver show.

Projector

The board is still working on it.

Other business

MAPS show at Sharpless Auction Barn on April 6-8.

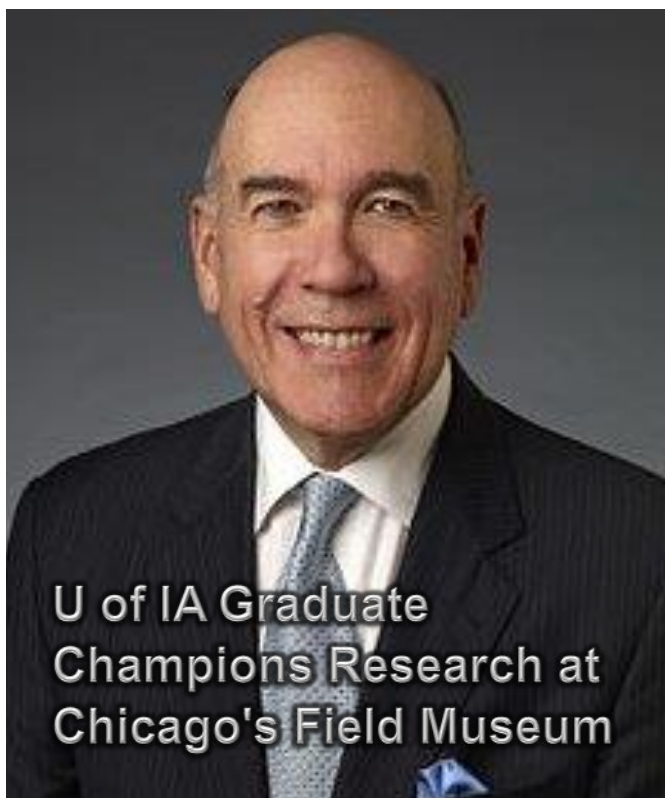
T-shirts-The club can set up a store site through our T-shirt vendor which will allow members to select color, design, style of shirts and order and pay through the store site.

This will allow us to design a shirt for the 2019 show which will include American Federation and Midwest Federation shows. All ideas and designs ideas for logo etc. can be submitted to the Board. The Board will have final say.

Bill reported nothing new for field trip in November.

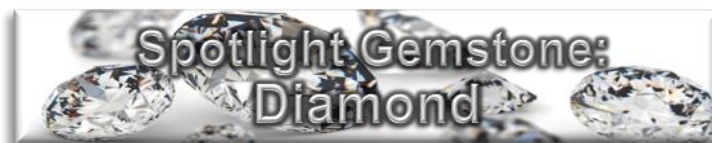
Ray and Bill are still busy with talks for Library Rocks programs.

←—— *board minutes (continued on left)*



University of Iowa graduate Richard Lariviere says there is much more to Chicago's iconic natural history museum than what its 1.5 million annual visitors (including the CVRMS Field Trip last year) see when they visit. Although he has been president and CEO of Chicago's Field Museum since 2012, he still can't pick his favorite exhibition. After a long career in academia, the 1972 University of Iowa graduate was tapped to lead Chicago's iconic museum. He says there is much more to the museum, which was established in 1893 and named for benefactor Marshall Field, than what its 1.5 million annual visitors see when they visit. Behind the scenes is the work of 150 scientists, many of whom travel the world to conduct research. *"We have a record of life on Earth, in this building, that is really rare in the entire world. It's a huge responsibility to preserve it, to cultivate it, to share it with the rest of the scientific community."* Lariviere says the solid foundation in liberal arts and sciences that he got at the University of Iowa prepared him well for leading one of the largest natural history museums in the world. *"When I was in high school, I wanted to go someplace where literature and the humanities were highly valued, and that meant only one place for me: the University of Iowa,"* says Lariviere, who was born in Chicago and raised in Marshalltown, Iowa. *"All of the skills and the insights that I've had to develop in the course of my career, I saw manifested for the first time at the University of Iowa by people whose values and passions were exactly the values and passions that I aspired to. I think it shaped my entire career."*

https://uiowa.edu/stories/ui-grad-champions-research-chicagos-field-museum?utm_source=IANowFaculty&utm_medium=lariviere&utm_campaign=IANowFaculty-3-8-2018



April's Birth Stone



On almost all modern birthstone lists, diamond is recognized as the birthstone for April. Diamond is also the gem that marks the 60th and 75th wedding anniversaries. Diamonds are thought to have been first recognized and mined in India, where significant alluvial (river) deposits of the stone could be found many centuries ago along the rivers Penner, Krishna and Godavari. Diamonds have been known in India for at least 3,000 years, and probably 6,000 years. Diamond is the only gem composed of one single element: carbon. Each carbon atom shares electrons with 4 other carbon atoms in a face-centered cubic crystal structure called a diamond lattice. Because of the extreme rigidity of this lattice, diamonds can be contaminated by only a very few types of impurities, such as boron and nitrogen. Small amounts of defects or impurities (about one per million of lattice atoms) color diamond blue (boron), yellow (nitrogen), brown (lattice defects), green (radiation exposure), purple, pink, orange or red. Diamond also has relatively high optical dispersion (ability to disperse light of different colors). Diamonds are the hardest material on earth (9 on the Mohs hardness scale): 58 times harder than anything else in nature. Most diamonds formed more than a billion years ago, at high temperature and pressure found only at depths deep in the Earth's mantle, about 90 to 120 miles beneath the surface). Diamonds are brought close to the Earth's surface through deep volcanic eruptions by magma, which cools into igneous rocks known as kimberlites and lamproites. They are recovered by mining deep into these "pipes" or from rivers and near-shore deposits that include diamonds that nature eroded from the rocks. Diamonds are graded in quality based on the "4Cs", clarity, color, cut, and carat weight. **Clarity** grades assess the number, size, relief, and position of inclusions and blemishes. The less **color**, the higher the grade. Even the slightest hint can make a dramatic difference in value. **Cut** (proportions, symmetry, and polish) is a measure of how a diamond's facets interact with light. **Carat Weight**, larger diamonds of the same quality are much rarer than smaller ones and are worth more per carat. Although diamonds are made synthetically, their cost of production averages \$2500 per carat, as compared to a cost of \$40 to \$60 per carat to mine the stones.

See additional information on Diamonds on page 7.

What in the World?



What in the World is the geologic feature behind the stone wall ??

February's Photo



Bill D. got it right! Last month's **What in the World** photo was a volcanic bomb. Thrown out of an erupting volcano as a blob of molten magma greater than 2.5 inches, this rock assumed this aerodynamic shape by the resistance of the air as it cooled. Volcanic bombs can be thrown miles from a volcano and can present a real danger to people within their range. Numerous human deaths have been attributed to being hit by volcanic bombs.

Rock Calendar 2018 CVRMS EVENTS OF INTEREST

April 6-April 8—MAPS National Fossil Expo 39
"Permian AND Triassic Periods"
Sharpless Auctions Facility, Iowa City

April 15 - BHGMS Rock Show
225 Commercial St.
Waterloo Center for the Arts
Waterloo, Iowa

April 17 - CVRMS Monthly Meeting
Feature Program
"Crinoids and More Crinoids"
"Rockdoc" Ray Anderson
Hiawatha Community Center 7:015 pm

May 15 - CVRMS Monthly Meeting
Feature Program
"To Be Announced"
Hiawatha Community Center 7:15 pm

June 19 - CVRMS Monthly Meeting
Picnic at Ellis Park Overlook
"rock cutting and polishing"

July 17 - CVRMS Monthly Meeting
Picnic at Squaw Creek Meadowlark Pavilion
"geode cracking"

August 21 - CVRMS Monthly Meeting
Picnic at Morgan Creek
"bingo"

Sept. 15-16—CVRMS Rock Auction
Amana RV Park and Event Center
Amana, Iowa

Sept. 27-29—Geode Fest 2018
Chaney Creek Boat Access
Hamilton, Illinois

Nov. 4—CVRMS Fall Field Trip
Milwaukee Public Museum
Milwaukee, Wisconsin

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

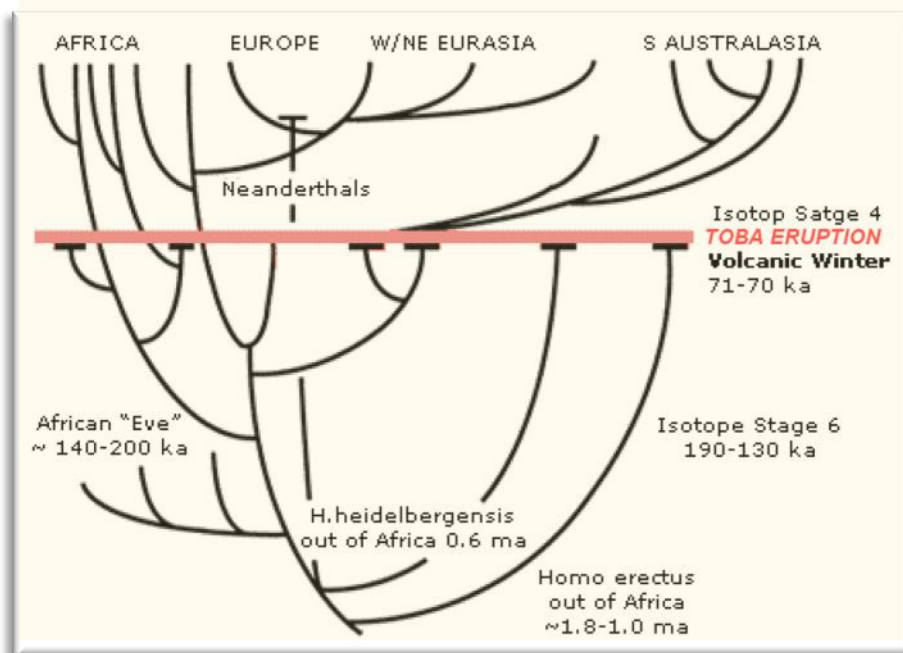
Ask a Geologist is a monthly column that gives CVRMS members an opportunity to learn more about a geologic topic. If you have a question that you would like addressed, please send it to rockdoc.anderson@gmail.com, and every month I will answer one in this column. Please let me know if you would like me to identify you with the question. I will also try to respond to all email requests with answers to your questions.

Rona asked: "I read the story on Page 6 about the Toba volcano and the South African population that was barely affected. What do you know about the human bottleneck at the time the volcano blew, 74 million years ago?"

Rock Doc replied: In 1993, science journalist Ann Gibbons proposed that the eruption of the Toba volcano in Indonesia produced a "genetic bottleneck" in human evolution about 70,000 years ago. The volcano may have triggered a severe reduction in the size of the total human population due to the effects of its eruption on the global climate. As I understand it, between 50,000 and 100,000 years ago the human population sharply decreased to 1,000–10,000 surviving individuals. This is supported by genetic evidence suggesting that today's humans are descended from a very small population of breeding pairs that survived the "nuclear winter" climate about 70,000 years ago. Similar evidence points to genetic bottlenecks in other animals in the wake of the Toba eruption. The populations of the Eastern African chimpanzee, Bornean orangutan, central Indian macaque, the cheetah, the tiger, and the separation of the nuclear gene pools of eastern and western lowland gorillas, all recovered from very low numbers around 70,000–55,000 years ago. Although some estimates vary, scientists agree that a super-eruption of the scale at Toba (the largest eruption known in human history) must have led to very extensive ash-fall layers and the release of noxious gases into the atmosphere, with worldwide effects on weather and climate. The huge quantities of aerosols injected high into the atmosphere would have severely diminished sunlight, with estimates ranging from a 25 to 90 percent reduction in light. The Greenland ice core data also display an abrupt climate change around this time, and the last of the Pleistocene glaciations began about then. However, conclusive evidence that the Toba eruption directly generated the 1,000-year cold period seen in Greenland ice or triggered the last glaciation has not been demonstrated. However, scientists estimate that the eruption injected six billion tons of sulphur dioxide into the atmosphere, and computer simulations concluded that a maximum global cooling of approximately 27° F occurred for three years after the eruption, and that this cooling trend would last for decades, devastating life. This amount of cooling would have lowered the tree line and the snow line around 9,900 ft. at this time. The fact that the climate recovered after a few decades probably means the eruption did not initiate the last ice age.

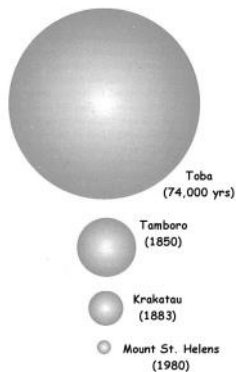
The Toba eruption would have impacted some ecosystems more than others, creating areas called refugia in which some human groups were not so seriously affected.

Coastal resources, like shellfish, are highly nutritious and less susceptible to the effects of the eruption than the plants and animals of inland areas. The *Spacedaily* article (reviewed on page 6) describes how scientists have proven that the Pinnacle Point 5-6 site on the South African coast was inhabited at the time of the Toba eruption and that this group of humans was not seriously impacted by the blast. From these refugia, humans continued to evolve and spread over the Earth (see illustration on right). It is hard to imagine what humans would look like today or how they would be distributed around the world if the Toba volcano had not erupted so spectacularly 74,000 years ago, but it is certain that things would be different.



Humans Thrived in S Africa Following Toba Eruption 74,000 Years Ago

Imagine a year that summer never arrives. The sky takes on a gray hue during the day and glows red at night. Flowers don't bloom, trees die in the winter, large mammals like antelope become thin, starve and provide little fat to the predators, including humans, that depend on them. Then, this cycle repeats itself, year after year. This is a picture of life on earth after the eruption of the super-volcano, Mount Toba in Indonesia, about 74,000 years ago, as described in a paper published this March in *Nature*.



Comparative scales of selected volcanic eruptions based on volumes of ejected ash

A more recent eruption a hundred times smaller than Mount Toba (Mount Tambora in 1815) was responsible for the "year without summer" in 1816, and human populations suffered crop failures in Eurasia and North America, famine and mass migrations. The Toba super-eruption 74,000 years ago was much bigger than Tambora, spreading some 1,000 cubic kilometers of ash over all of South Asia. The blast from Mount Toba, which dwarfed even the massive Yellowstone eruptions, would have had a much larger, and longer-felt, impact on people around the globe. Huge quantities of aerosols injected high into

the atmosphere would have severely diminished sunlight, with estimates ranging from a 25 to 90 percent reduction in light. Plant die-off, wildfires, and changes in the plant community have been documented after the Toba eruption, pushing life to the brink of extinctions. The Toba eruption would have impacted some ecosystems more than others, creating areas called refugia in which some human groups did better than the general populous. Coastal resources, like shellfish, are highly nutritious and less susceptible to the effects of the eruption than the plants and animals of inland areas. A single shard of glass from the Toba eruption was discovered at the Pinnacle Point 5-6 site on the South African coast near the town of Mossel Bay. The scientists used chemical fingerprinting to trace the shard to Toba. An archaeological investigation of the site showed no evidence that the eruption had impacted the daily lives of the inhabitants. People lived at the site from 90,000 to 50,000 years ago. The eruption of Mount Toba, the most powerful in the last two million years, caused a long-lived volcanic winter that devastated the ecosystems of most of the world and caused widespread population crashes, a near-extinction event in our own lineage, a so-called bottleneck. This study shows that along the food-rich coastline of southern Africa, people thrived through this mega-eruption. http://www.spacedaily.com/reports/Humans_thrived_in_South_Africa_through_the_Toba_super_volcanic_eruption_74000_years_ago_999.html



Fossilized lizard footprints dating back to the Cretaceous indicate the little scaly beasts could get up and run on two legs. 110 million years ago, in the late Cretaceous, lizards schlepped through muddy lagoons in what we now call South Korea. Predatory pterosaurs swooped in every so often, hoping for a little treat, but the lizards got up on two legs and dashed away in the muck. At least, this is what researchers *think* happened, based on a set of fossilized footprints detailed in a new study in a February volume of *Scientific Reports*. The researchers excavated a rock slab embedded with footprints from a quarry



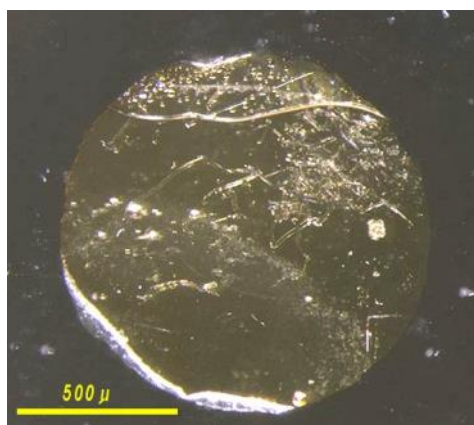
in South Korea while looking for bigger dinosaur fossils. The team didn't initially think much of the tiny prints (they were all just under an inch long) but had a eureka moment when discussing them after the dig. They realized that 25 out of the 29 prints were made by lizards' **back feet**, rather than their front. That evidence, along with stride length and the differing angles the lizard toes made, told them that some ancient lizards must have been able to get up and run bipedally. They were also able to estimate that the lizards would have stood only about two and a half inches tall. Today we see a handful of lizards run on two legs to escape predators. The common basilisk, for example (often called the Jesus Christ lizard for its ability to dash across water on two legs for as long as 15 seconds when being pursued by predators like snakes). These miniature prehistoric lizards also probably got up and ran to escape predators, and the researchers found pterosaur footprints nearby in the quarry, suggesting that the winged beasts might have enjoyed the occasional dinosaur hatchling or lizard snack. Whatever their reason for running, the fact that the reptiles could do it at all surprised the researchers, who didn't realize this sophisticated behavior first happened over a hundred million years ago.

<https://www.popsci.com/prehistoric-lizards-could-sprint-on-two-legs#page-3>



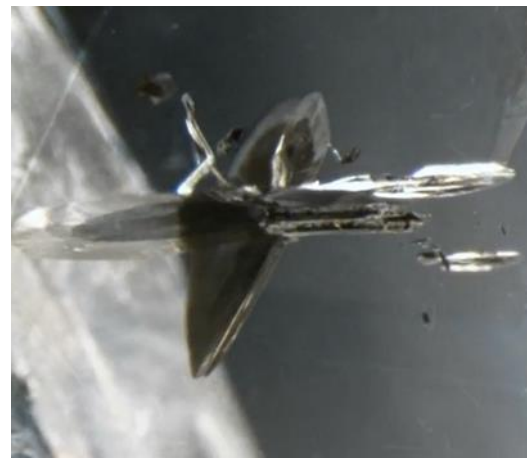
Diamonds are windows into the heart of the Earth

Diamonds have been in the news quite a bit last month, and not because of any celebrity engagement news. Instead, it's what's inside that counts. In separate studies, published in [Science](#) and [Nature](#), researchers announced that they had found some unusual inclusions in diamonds. An inclusion is exactly what it sounds like, something (usually a rock or mineral) *included* in another rock or mineral. In this case, both studies found that the diamonds had trapped strange forms of minerals that had only been synthesized at the Earth's surface before (neither are naturally occurring at the mild temperatures and pressures we experience at the Earth's surface. Diamonds are naturally born in the upper mantle, around 100 miles under the surface of our planet. It's impossible to observe that environment directly, since our deepest hole only extends 7.5 miles into the ground. But we do get some information about what is going on at those depths from messengers that have been there. Some of the most reliable of these messengers are diamonds, which are born in intense heat and pressure of the upper mantle and then blasted to the surface in spectacular volcanic eruptions. The qualities advertisers use to sell diamonds to the public - their insane strength, hardness, and staying power—are the same things that make them reliable witnesses for geologists looking to understand the composition of the inner reaches of the planet. But geologists aren't looking for perfect, flawless diamonds favored by jewelers; geologists find some of these flaws priceless. In [Science](#), researchers announced they'd found an incredibly rare form of ice trapped in diamonds from China and Africa. Yes, you read that right, *Ice*. Good, old-fashioned H₂O in a crystal state. But this isn't your typical ice. This is **Ice-VII**. Last year scientists produced Ice-VII in a lab by zapping water with lasers and watching the molecules line up into this specific form. Ice-VII is thought to be common on other planets where the temperatures and pressures are very different from those on Earth's surface. The water was trapped in the growing diamond crystal deep in the Earth. Then, when the diamonds ascended to the surface, that pocket of water reacted to the change in depth by freezing into Ice-VII. The strength and robustness of the surrounding diamond kept samples of ice from melting back into water, even at the surface. The diamond is part prison, part time machine. Its crystal cage prevents escape, preserving material in conditions experienced in the past. This isn't the first time researchers have found evidence of liquid water deep under ground, but it's still pretty cool. And ice isn't the only thing that diamonds can trap. In [Nature](#) this week, re-



Inclusion of crystalline ice VII trapped in a diamond as imaged by a microscope

searchers reported finding tiny pockets of a common but elusive mineral in diamonds from South Africa. Calcium silicate perovskite (CaSiO₃) is believed to be common in Earth's mantle, but it is not found in the low temperature/pressure conditions on the surface. Its presence, the paper suggests, indicates one of the most massive recycling projects in the world: both the carbon for the diamond and the calcium and silicate for the perovskite originated in a subducting ocean plate that sunk into the Earth's mantle, transformed by heat and pressure,



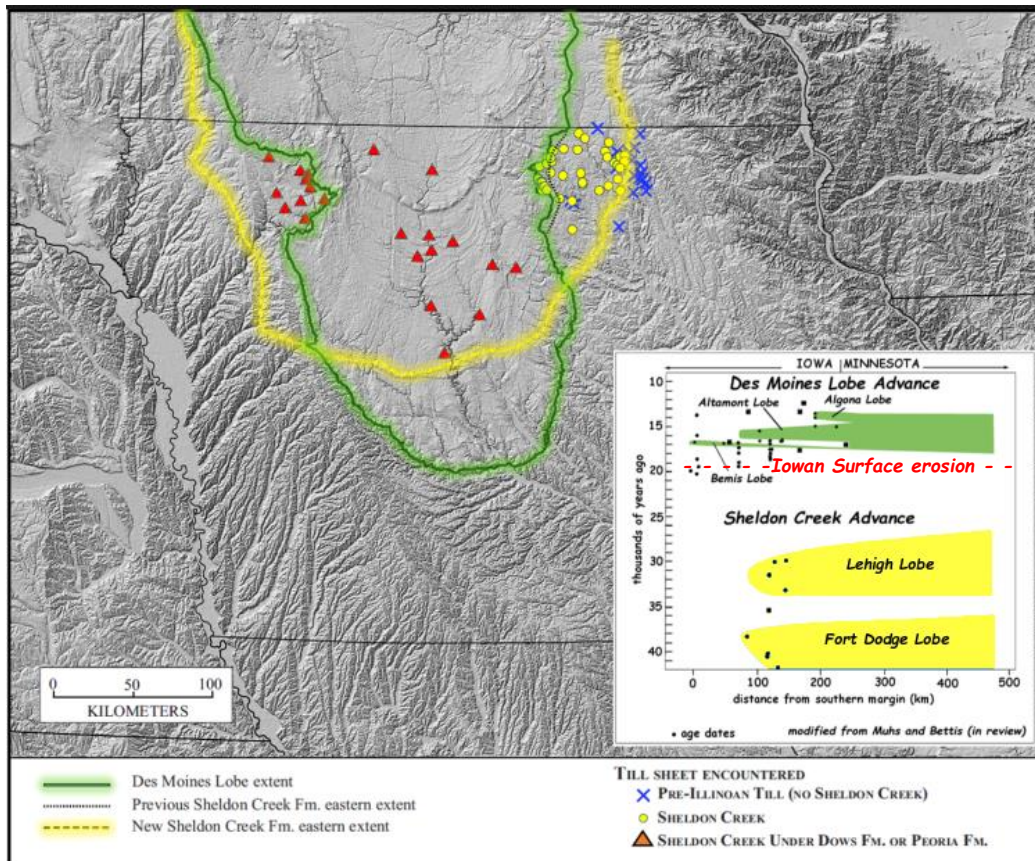
Inclusions of crystalline perovskite trapped in a diamond as imaged by a microscope

then delivered to the surface. Nobody has ever managed to keep this mineral stable at the Earth's surface; the only possible way of preserving calcium silicate perovskite at the Earth's surface is when it's trapped in an unyielding container like a diamond.

<https://www.popsci.com/diamonds-ice-vii-perovskite?3RwdAQID3F4VccUE.01>

What's New In Iowa Geology ??

Limits of Middle Wisconsinan Glaciation in Iowa Mapped



For about a dozen years Iowa Geologists have known about evidence of a Wisconsinan glacial ice advance prior to the series of advances and retreats that left behind the materials of the Des Moines Lobe (DML). But these materials were known from only a few sites, mostly just east of the DML near the Minnesota border. As a part of his Master's thesis at the U of IA, Phil Kerr has delineated the limits of this middle Wisconsinan glacial ice advance into Iowa. Combining detailed studies of glacial materials recovered during new drilling with old information from earlier drilling, studies of sparse exposures, and new radiocarbon age dates, Phil and his colleagues mapped the limits of the advance of this early glacier. They identified two distinct advances of this glacial ice sheet, sometimes referred to as the "Tazewell" glacier but formally known as the **Sheldon Creek Formation (SC)**. The earliest advance of the SC into Iowa, named the "**Fort Dodge Lobe**," occurred between about 41 and 37 thousand years ago and advanced to the Fort Dodge area (see yellow line on map). A second advance, known as the "**Lehigh Lobe**" advanced as far as the Lehigh area between about 34 and 28 thousand years ago. The development of the Iowan Surface between about 21 and 16.5 thousand years ago eroded the SC tills. The subsequent advance of the Des Moines Lobe between about 17 and 13 thousand years ago (see green line on map) scraped off or buried most of the remaining SC glacial materials beneath it, and produced the Peoria loess that buried the SC west of the Des Moines Lobe. The path of the SC as it moved through Minnesota has not yet been identified. For additional information on the Sheldon Creek in Iowa, contact Phil Kerr at the Iowa Geological Survey.

Fossilized Mammal Blood Preserved with an Ancient Tick in Amber

A specimen of amber, found in the mines of the Cordillera Septentrional, a mountain range that runs through the Dominican Republic, contains a very unusual specimen. Inside the amber is a tick, along with blood cells from the tick's last meal—the first fossilized red blood cells from a mammal ever discovered. This discovery, reported in a new paper in the *Journal of Medical Entomology*, comes from George Poinar, Jr., an entomologist and professor



emeritus at Oregon State University. If an insect preserved in amber along with ancient blood cells sounds like a scenario out of *Jurassic Park*, that's in part because Poinar's research helped inspire the premise of Michael Crichton's famous book. How were these blood cells preserved with such clarity? The tick has two puncture marks on its back, which could have come from another creature picking the tick off its victim. That's consistent with the grooming behavior of monkeys known to be living 20 to 30 million years ago in the area where the fossil was found. Imagine this sequence: the tick bit a monkey; another monkey picked the tick off while it was still full of blood; the tick landed in a bit of tree sap; the tree sap fossilized into amber. Because the blood cells were so well preserved, Poinar was able to observe another feature: inside the blood cells, there are ancient parasites. Being able to study this ancient parasite, which is still around today, can help scientists understand the evolution and longevity of these diseases. Don't expect (or worry) about an effort to reanimate ancient monkeys from the blood cells' DNA, though. Poinar said that while he'd love to extract DNA from the cells, the procedure would ruin the specimen. <https://www.atlasobscura.com/articles/found-an-ancient-tick-preserved-in-amber-with-fossilized-mammal-blood/>

99 Million-Year-Old-Bird that Lived with Dinosaurs Found Trapped In Ancient Amber

A piece of amber found in Myanmar, originally destined to become a piece of jewelry, contains the most well-preserved dinosaur-era bird fossil ever found. The amber didn't contain an entire bird—only part of the skull, the spine, a wing, a foot, and a pelvis—the rest had been cut off by a local miner cutting and polishing the piece of amber so it would look better to buyers.



The partial remains of a bird (**left**) trapped in amber millions of years ago, either before or after it died. **Right** what the bird might have looked like in life.

Furthermore, something had squashed and distorted the animal before tree resin encased it. However, as tree resin has such incredible preservative properties, those body parts contained much more information than simple fossilized bones would have. Like the ancient mosquitos in the *Jurassic Park* franchise, animals that get trapped in tree resin can be preserved in a near-perfect fashion for millions of years. The yellowish brown shininess of amber makes it ideal to fashion into earth-inspired jewelry. However, some of this amber also encapsulates ancient animals and plants with vital information about the history of life. Luckily, a paleontologist bought this bird specimen and examined it. By using Micro-CT scanning and 3D Reconstruction, the researchers were able to see inside the specimen and document its shape and internal organs. From the outside it's not easy to see the specimen very clearly because debris and insects, also caught in the amber, cloud a clear view of the bird. The specimen helps illustrate the evolution of birds in the Cretaceous, 99 million years ago. This individual, thought to be of the genus *Enantiornithes*, already had complete flight feathers, despite being a hatchling, *National Geographic* reports.

<http://www.newsweek.com/99-million-year-old-bird-lived-dinosaurs-found-trapped-ancient-amber-829175>

Scientists Pinpoint How Ocean Acidification Weakens Coral Skeletons

The rising acidity of the oceans threatens coral reefs by making it harder for corals to build their skeletons. A new study details how ocean acidification affects coral skeletons, enabling scientists to predict more precisely where corals will be most vulnerable. Corals grow their skeletons upward toward sunlight, thickening and reinforcing them. The new research shows that ocean acidification impedes the thickening process, decreasing the skeletons' density and leaving them more vulnerable to breaking. The research incorporates the nuances of coral skeletal growth, enabling more precise projections of how, where and by how much ocean acidification will affect tropical reef-building corals. The scientists developed a numerical model simulating the skeletal growth mechanism and coupled it with projected changes in ocean acidity. Coral skeletons are made of aragonite, a form of calcium carbonate. Corals grow their skeletons upward by stacking bundles of aragonite crystals on top of each other. They thicken the bundles with additional crystals, strengthening the skeletons and helping them withstand breakage from currents, waves, storms and the boring and biting of worms, mollusks, and parrotfish. Rising levels of



carbon dioxide in the atmosphere, mostly from burning fossil fuels, cause ocean acidification. When carbon dioxide is absorbed by seawater, it's harder for corals to accrete their aragonite skeletons. Reefs face multiple stresses,

including rising sea levels, changing nutrient regimes and warmer ocean temperatures, but unlike ocean warming which causes visible bleaching, the impact of ocean acidification is more difficult to detect and harder to predict. Laboratory experiments and field studies have been ambiguous, showing clear impacts of ocean acidification on skeletal growth in some cases but not in others. The new research suggests this inconsistency reflects the complexity of coral skeleton growth. The researchers examined the coral growth process and showed that the corals can't produce as much aragonite to thicken their skeletons. The corals continue to invest in upward growth, but thickening suffers. As a result, corals build thinner skeletons that are more susceptible to damage from pounding waves or attacks by eroding organisms. The results show that by the start of the next century, declines in coral skeletal density will occur on many coral reefs. The researchers note that other changes, such as ocean warming, will also affect coral growth.

https://www.nsf.gov/discoveries/disc_summ.jsp?cntn_id=244292&org=NSF&from=news

A Mineral Blueprint for Finding Burgess Shale-Type Fossils

Scientists have identified a mineral signature for sites that are more likely to contain rare fossils that preserve evidence of soft tissue (essential information to understanding ancient life). Much of what we know about the earliest life on Earth comes from the organic remains of organisms without hard parts. Yet the vast majority of fossils rely on hard tissue such as shells, teeth, and bones for their preservation. Soft tissue parts, such as eyes and internal organs, tend to decay before they can fossilize. This also is true for organisms made up entirely of soft tissue, such as worms. A major exception to this is the Burgess Shale in Canada, a 508 million-year-old deposit that contains a trove of fossils, some with shells but the majority without, from the Cambrian explosion of animal diversity on Earth. The Burgess Shale and similar deposits have provided the basis for a wellspring of scientific research. In a new study published in the journal *Geology*, researchers suggest that the sedimentary rocks that contain these fossils carry a specific signature, which can be used to find other



Marrella, the most common fossil from the Cambrian Burgess Shale in British Columbia (508 million years old) is a small arthropod (i.e., relative of shrimps, horseshoe crabs) less than 2 cm

Burgess Shale-type deposits. The researchers examined more than 200 Cambrian rock samples using powder X-ray diffraction analysis to determine their mineralogical composition, comparing rocks containing Burgess Shale-type fossils that include preserved soft-tissues with those that only contained their fossilized shells or skeletons. The findings revealed that Burgess Shale-type deposits are generally found in rocks rich in the mineral **berthierine**, one of the main clay minerals identified by a previous study as being toxic to decay bacteria. "Berthierine is an interesting mineral because it forms in tropical settings when the sediments contain elevated concentrations of iron. This means that Burgess Shale-type fossils are likely confined to rocks that were formed at tropical latitudes and that come from locations or time periods that have enhanced iron." The researchers identified a mineral signature that enabled them to predict with 80% accuracy whether a particular Cambrian sedimentary rock is likely to contain Burgess Shale-type fossils. In addition, the researchers said their findings may have applications beyond our own planet. Mars probes and other space missions looking for evidence of life on other planets could use the mineral blueprint in the search for types of rocks that might be more conducive to preserving delicate, decay-prone fossils. <https://news.yale.edu/2018/02/16/mineral-blueprint-finding-burgess-shale-type-fossils>

"Bill's Big Bus Boogie" 2018

Milwaukee County Museum



The 2018 incarnation of **"Bill's Big Bus Boogie"** will take CMRS members on a field trip to the **Milwaukee County Museum** on Saturday, **November 3, 2018**. The museum features the **Hebior Mammoth**, a fossil found less than 30 miles from the Museum on a farm in the small town of Paris in Kenosha County and among a group of important finds that help date the early presence of humans in North America. One popular display is **"Continents, Oceans and Life in Motion: A New View of the Third Planet,"** the first museum display in North America to use plate tectonics as a central theme for the presentation of earth science to the public. The Museum's 150,000 square feet of exhibit space also includes an opportunity to visit **Africa**, stroll through the bustling **Streets of Old Milwaukee** of a century past, witness a **modern-day pow-wow**, stroll amid free-flying butterflies from around the world in **The Puelicher Butterfly Wing**, and **more!** The temporary exhibit **"Maya: Hidden Worlds Revealed"** is open allowing visitors to rediscover this ancient civilization, view hundreds of authentic artifacts, and participate in hands-on activities such as exploring tombs or building an arch, & more. The club will pay for the bus, for those whose membership dues are paid up as of May 1, 2018, and they need only pay museum admission. If the bus is not full by September 15, the trip will be opened to the public for \$25/seat. Registration for the trip is **now open**, so contact **Bill Desmarais** at **319-365-0612** or desmarais_3@msn.com if you are interested in participating. It should be another great **"Bill's Big Bus Boogie"** field 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., at the Hiawatha Community Center in the Hiawatha City Hall, [101 Emmons St., Hiawatha IA](http://www.hiawathacity.org). The December meeting is a potluck dinner held the 2nd Tuesday. 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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