



Cedar Valley Gems

Cedar Valley Rocks & Minerals Society

Cedar Rapids, Iowa

cedarvalleyrockclub.org

CEDAR VALLEY GEMS

JUNE 2019

VOL. 45, ISSUE 06

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

Next CVRMS Meeting Tues. June 18

First Summer Potluck
Ellis Park Overlook Shelter



"we eat at 6:30 pm"

evening's entertainment: —LAPIDARY

Cutting and Polishing Rocks Smaller Than 1½"



July 16 Potluck

Squaw Creek Park
Meadowlark Shelter

evening's entertainment: —GEODE CRACKING



August 20 Potluck

Morgan Creek Park
Shelter

evening's entertainment: —BINGO

Newsletter on Vacation



Cedar Valley Gems is headed out on its annual two-month summer vacation. We'll be back in September with a load of new information collected on our travels. Until then, enjoy your summer, especially the CVRMS park potlucks!!



Giant 'Pink Legacy' Diamond Fetches Over \$44 Million at Auction

The 18.96 carat *Pink Legacy* diamond sold at auction last November at Christie's in Geneva for more than \$44 million. The largest known cut-and-colored diamond, classified as "fancy vivid" (awarded to only 1 in 100,000 diamonds), was set in a platinum ring surrounded by smaller diamonds.

CVRMS May. 14 Meeting

Hiawatha Community Center

Order called by President Marv Houg at 7:15 pm

Introduction of new members or guests: Steve Vincent, Rick Easton, Nicky Clark.

Minutes of last meeting reviewed. Motion to approve by Julie, 2nd by Terry. Minutes approved.

Treasurer's report by Dale. Rock show proceeds and expenses show a current club balance of \$36,892.60. Motion to approve report by Bill, 2nd by Sherrie. Report approved.

Begin Bidding on Dennis Fiser Jewelry: 25 minutes of silent auction bidding then break for program.

Monthly program: video *"The Day the Mesozoic Died"*

Door Prize: won by Jay Vavra.

Break: for treats and continued bidding.

Old Business:

Field Trip: Bill reported on bus trip to the Henry Doorly Zoo in Omaha on Sunday October 6. The bus will leave at 6:00 a.m. and return about 9 p.m. Travel time about 4 1/2 hours each way. 35 seats reserved; 26 more available. More information at www.Omahazoo.com.

Scholarships: Marv reported the Board's proposal for distribution of 2019 rock show profits (as prescribed in club by-laws), U of IA=\$4900, Cornell=\$3500, VAST=\$2000. Becky seconded and the proposal passed unanimously.

TAKO Rockin' Rocks and Fossils: May 18 event at Klein Quarry drew about 200+ kids and parents, despite rain.

Summer potluck picnics. Review of plans and activities for June picnic at Ellis Park (lapidary), July picnic at Squaw Creek Park (geode cracking), and August picnic at Morgan Creek Park (bingo).

New business

No New Business:

Bidding on Jewelry Ended: bid winners announced, jewelry pieces awarded, and payments collected.

Adjournment: Motion to adjourn by A.J., 2nd by Jackie. Meeting adjourned 9:15 p.m.

Respectfully submitted,
Ray Anderson, very acting Secretary

CVRMS Board Minutes May 28

Called to Order at 7:12 pm at the home of Marv Houg

Members present: Marv Houg, Dale Stout, Kim Kleckner, Rick Austin, Ray Anderson, Bill Desmarais, Sharon Sonnleitner, Jay Vavra

Rock Show follow-up: Show is wrapped up except payment to speaker Jeremy Dyer, who will be paid soon.

2020 Rock Show: Discussion of potential displays, speakers (Brent Studer and Steve Spangler suggested), 1-2 additional dealers to be added (Marv and Sharon to send dealers info to Board for discussion next month), possible posters will describe types of meteorites, Iowa meteorites, Manson and Decora impact structures, origins and composition of comets vs asteroids; Ray will try to set up an exhibit of all Iowa meteorites by borrowing stones from colleges and libraries; and contract with Hawkeye Downs signed for 2020 show.

TAKO "Rockin' Rocks" May 18: 8 club members participated; large public turnout; one new CVRMS member signed up; next year's "Rockin Rocks" Klein Quarry May 9, 2020.

Oct 6 Bus Trip to Omaha: Bill said we have 31 of 56 seats filled for the bus trip to the Henry Doorly Zoo and Aquarium, he thinks it will fill. We leave at 6:00 am. Next year suggestion, Grotto of the Redemption and another stop along the way.

Summer Potluck Picnics: Ellis Overlook Shelter (June) Squaw Creek (July) and Morgan Creek (August) all booked. June lapidary activity will include equipment for cutting and polishing stones 1½" or smaller. Marv will try to organize geode collecting trip before July geode cracking (possibly to Jesup). Sharon has prizes for August bingo winners.

Other Items: (1) Auction of Dennis Fiser Jewelry at May club meeting yielded \$350 for scholarships. After Sharon's motion the Board voted to allocate \$205 to U of IA, \$150 to Cornell; (2) Marv received several Member Outreach Reports on presentations and other activities by club members; (3) Ray relayed request from Cornell to assist in redesign of Anderson Geology Museum-details to come; (4) Ray set up a display on Meteorites at the Iowa City Library (will be up June—July) and it will be discussed on library website and CVRMS web page.

Motion to adjourn by Ray, second by Bill.

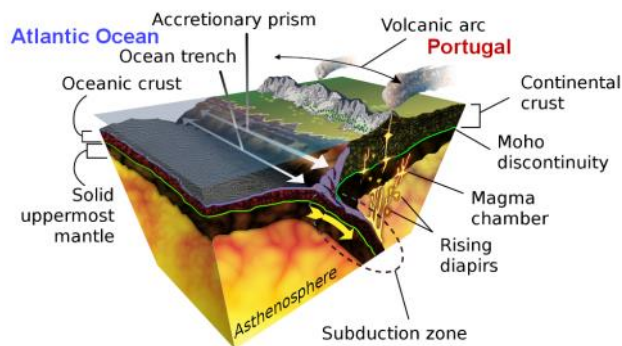
9:15 p.m. meeting adjourned

Respectfully submitted
Ray Anderson, very acting secretary



A Tectonic Plate May Have Peeled Apart—and That Could Shrink the Atlantic Ocean

For years scientists have puzzled about the featureless nature of the seabed off Portugal's coast, an area that in 1969 spawned a massive (magnitude 8.5-9.0) earthquake that rattled the shore and sparked a tsunami. There are no obvious signs of faults, contorted landscapes, or underwater mountains that show tectonic activity. Now they may finally have an answer: computer simulations suggest that the bottom of the tectonic plate seems to be peeling away from its top. This action may be providing the necessary spark for one plate to start grinding beneath another, what is known as a subduction zone. If confirmed, this would be the first time an oceanic plate has been caught in the act of peeling, and it may be the earliest stage of the closing of the Atlantic Ocean, sending Europe inching toward Canada. The Earth's tectonic plates are constantly in a slow-motion march, with some edges pulling apart and others colliding. Numerous times in our planet's 4.54-billion-year history most of its landmasses smashed together to form supercontinents, only to eventually reverse course and break apart. Subduction zones are major driving forces behind this tectonic conveyor belt, as they pull oceanic crust and upper mantle down to depth, recycling the rocks and drag-



ging continents around in the process. This may be the first stage of the forming of the next supercontinent, already named Pangaea Proxima. In 2012, a team of researchers first used seismic waves (in a method similar to ultrasound) to identify a curiously dense mass directly under the site of the 1969 earthquake that appears to be the start of the subduction zone. They also identified tiny earthquakes sourced just above this deep body, 155 miles below the surface. Their modeling revealed a drip-like shape that formed beneath the ocean plate as its bottom layers began peeling away. This peeling may expand north and south allowing the Atlantic ocean to eventually close as the new supercontinent forms.

<https://www.nationalgeographic.com/science/2019/05/tectonic-plate-peeled-apart-could-shrink-atlantic-ocean-geology/#/image.jpg>

Spotlight Gemstone: Alexandrite

June's Birth Stone

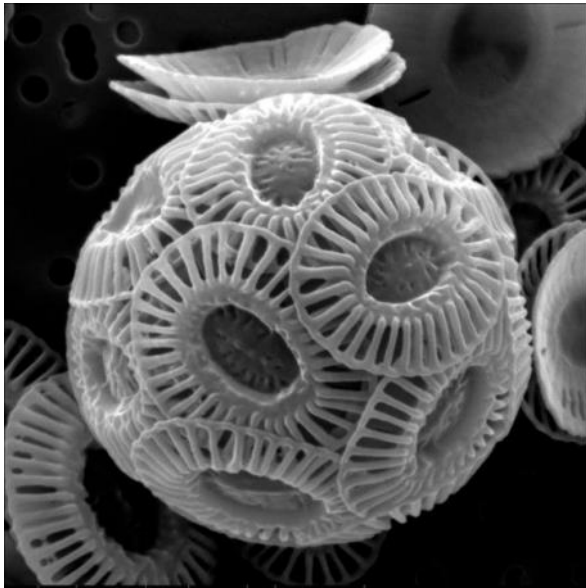


June has three official birthstones, moonstone, pearl, and alexandrite. Of these, I think that alexandrite is the most interesting, so that is the birthstone that will be discussed this month. A relatively modern gem, alexandrite was discovered in Russia's Ural Mountain emerald mines. Legends claim that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

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

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

What in the World?



What in the World is this beautiful piece of sediment (viewed under an electron microscope) and what rock does it form!!

May's Photo

Last month's "What in the World" photo is Ammolite, considered by some to be the world's most valuable gemstone. Ammolite is an opal-like organic gemstone found primarily along the eastern slopes of the Rocky Mountains of North America. It is made of the fossilized shells of ammonites, which in turn are composed primarily of aragonite, the same mineral contained in nacre, with a microstructure inherited from the shell.



Rock Calendar CVRMS EVENTS OF INTEREST

2019

June 18 —CVRMS Potluck Picnic
Ellis Park Overlook Shelter
"Lapidary—rock cutting and polishing"
we will be set up for stones <1½"
we eat at 6:30 pm

July 16—CVRMS Potluck Picnic
Squaw Creek Park Meadowlark Shelter
"Geode cracking"
we eat at 6:30 pm

Aug. 20 —CVRMS Potluck Picnic
Morgan Creek Park Shelter
"Bingo night"
we eat at 6:30 pm

Sept 18 —CVRMS Monthly Meeting
Hiawatha Community Center 7:15 pm
Feature Speaker
To Be Announced

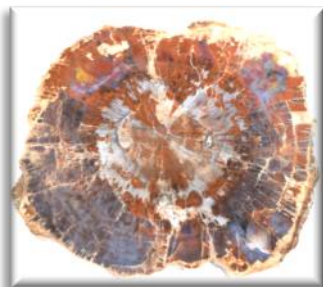
Sept. 21-22—CVRMS Rock Auction
Amana RV Park and Event Center
Amana, Iowa
<http://www.cedarvalleyrockclub.org/auction.htm>

Sept. 27-29 - Geode Fest and Rock Show
Chaney Creek Boat Access
Illinois Highway 96 N
Hamilton, Illinois
<http://www.keokukiowatourism.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.

Perhaps the questions that I am most frequently asked relate to what to call a specific rock that is composed almost exclusively of quartz, especially fine grained quartz, such as "is this an agate or jasper or chert or flint?" etc. Sometimes I'm confused myself. But, today most geologists recognize 2 large "groups" of quartz, **Macrocrystalline** (larger visible crystals) and **Chalcedony**—sometimes called **cryptocrystalline** or **microcrystalline** (small crystals that can only be seen with a microscope). You don't need a thin section and a microscope to tell microcrystalline quartz from coarsely crystalline quartz. A conchoidal fracture surface on macrocrystalline quartz will be extremely smooth and reflect enough light to produce a vitreous luster; however, a conchoidal fracture surface on microcrystalline quartz will not be as smooth and will scatter more light, thus its luster will be dull or subvitreous. **Macrocrystalline quartz** can be found in many varieties, including *rock crystal, citrine, prase, rose quartz, smoky quartz, pink quartz, ametrine, ferruginous quartz, amethyst, prasiolite, milky quartz, tiger's eye, aventurine, cat's eye, blue quartz, and hawk's eye*. **Chalcedony quartz** has even more varieties, including *chalcedony, agate, carnelian, heliotrope, flint, plasma, chrysoprase, chert, jasper, sard, and onyx*. These varieties of **macrocrystalline** and **chalcedony quartz** are simply a consequence of the way they form. How about **Agate vs Jasper**? The term **Agate** describes a translucent to semitransparent **chalcedony**. (*If it is semitransparent you will be able to hold a very thin piece up and see distorted or foggy images through it. If its translucent and you hold it up to a source of light you will see a small amount of light passing through the thin edges.*) **Agate** is generally a banded material, so if you see bands in a specimen of **chalcedony** you have an agate. However, some agates do not have obvious bands, but are often translucent agates with plume-shaped, dendritic or mossy inclusions. There are more than 40 named types of agates. **Jasper** is an opaque variety of **chalcedony** (*meaning that light does not pass through*). It is opaque because it contains enough non-chalcedony material inclusions to interfere with the passage of light. There are more than 25 named types of jasper. Some of these quartz rocks are especially confusing. **Petrified Wood** is an opaque form of chalcedony. Maybe it should be called "*jasperized wood*." **Ocean Jasper** is a form of chalcedony that may actually be a silicified rhyolite (an igneous rock). It frequently contain concentric orbs, translucent banded agate, opaque jasper, and vugs lined with druzy quartz crystals. either a round concentric "*eye*" pattern or a round "*poppy flower*" pattern. It occurs in a wide variety of colors, but green, red, yellow, brown, white and orange are common. **Green moss agate** is a semitransparent agate with green mossy inclusions inside. **Green tree agate** is a white jasper with green mossy inclusions inside - however they are only visible where they are exposed at the surface. **Opal** is a hydrated cryptocrystalline to amorphous form of silica that contains 3-21% water (by weight). Due to its great physical and chemical resistance, large parts of the Earth's surface are literally covered with quartz, sand left over from the weathering of quartz-bearing rocks. However, the greatest amount of quartz is hidden in granites and related rocks, which contain about 5-50% quartz. The earth's crust as a whole contains about 12% quartz. The earth's mantle and core are completely void of quartz.



petrified wood



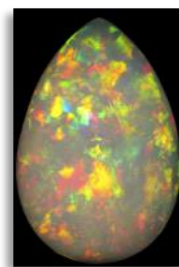
ocean jasper



moss agate



tree agate



opal



Collectors prize the copper mineral *linarite* for its intense blue color, but specimens with crystals large enough to truly show off this hue are rare. Linarite, which also contains lead, typically shows up in the form of microcrystals. At a public minerals auction in 2013 a specimen containing a 1-inch-long crystal brought \$158,500 at auction. This blue behemoth, found in a New Mexico mine in 1979, is the largest such crystal ever offered for sale publicly, and it is unclear if a larger specimen



This specimen of a copper mineral called linarite contains unusual large crystals brought \$158,500 at auction .

exists. For this particular specimen of linarite (above), the crystals' large size, deep-blue color and semi-metallic sheen contribute to its value. Also important is the specimen's aesthetic composition, with blue- and green-tinted quartz crystals surrounding the linarite crystals, and the lack of damage. Aside from the find in 1979, all linarite crystals from this particular mine, the Blanchard Mine, have been relatively small specimens. This piece also comes with a story: In December 1979, a group of geology students arrived in the mine. "*They were doing what sometimes geology students do, which is go to mines that they are not supposed to be in, without permission, and doing what is referred to as midnight collecting.*" In this case, the students that originally found the specimen were apprehended by the owners and the local sheriff, who hustled them off to the local pokey. Apparently a second group of midnight miners arrived later the same evening and removed the sample from the mine. After passing through several owners the specimen was put up for auction with the proceeds going to Dallas's Perot Museum of Nature and Science.

<https://www.livescience.com/31954-blue-mineral-auction.html>



Water arrived on Earth at exactly the same time that the moon was created over 4 billion years ago, according to a new study. This phenomenon is thought to have happened when an "*ancient planet*" called Theia smashed into Earth. Planetologists at the University of Münster in Germany have collected evidence to suggest that Theia, a Mars-sized celestial object from the outer solar system, collided with Earth and enabled life on the planet. The results were published in [Nature Astronomy](#). This collision is said to have resulted in large quantities of water being transferred from Theia onto the Earth, forming the oceans. Theories suggest that Earth actually formed as a dry planet in the inner solar system, so shouldn't have had any water on it at all. Before this "*Theia water hypothesis*," a lot of scientists thought that water was brought to Earth by watery meteorites from the outer solar system, called "*carbonaceous*" meteorites. Earlier studies have suggested that when the solar system was formed about 4.5 billion years ago, "*dry*" materials were separated from the "*wet*" materials with the dry objects, such as Earth, being in the inner solar system and therefore the "*carbonaceous*" meteorites theory would make sense. Meteorites from the inner solar system at this time wouldn't have been wet and are called "*non-carbonaceous*" meteorites. The German scientists used a substance called molybdenum isotopes to distinguish between carbonaceous and non-carbonaceous materials on Earth to create a "*genetic fingerprint*" for the planet and identify whether materials came from the inner or the outer solar system. Through this method, they found that wet "*carbonaceous*" material arrived on Earth late and from the outer solar system. They argue that the only collision that could explain the amount of carbonaceous material on the planet, meaning the entire amount of water on Earth, is the Theia impact, which is thought to have also created the moon. Both water and the moon, which stabilizes the Earth's axis, were essential to the creation of life on Earth. Thorsten Kleine, Professor of Planetology at the University of Münster, concluded: "*Our approach is unique because, for the first time, it allows us to associate the origin of water on Earth with the formation of the moon.*" "*To put it simply, without the moon there probably would be no life on Earth.*" https://nypost.com/2019/05/23/earths-water-came-from-a-collision-4-billion-years-ago/?utm_source=quora&utm_medium=referral

Finding the Secret History of Continents In Diamonds' Flaws

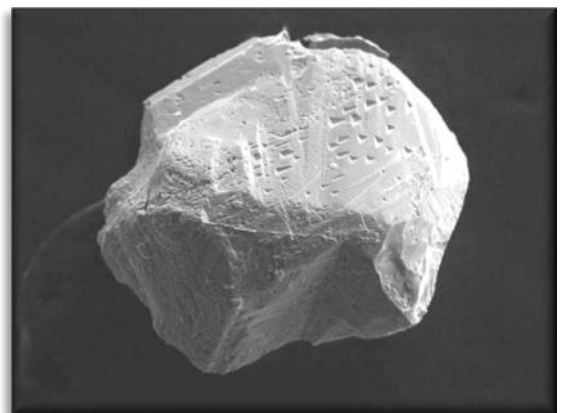
Tiny flaws in diamonds hold the secret to the formation of the first continents. In a new study, researchers used inclusions (imperfections derided by jewelers but valuable to scientists) to trace diamond formation. They found that the sulfide minerals inside the inclusions were last at the surface of the planet 2.5 billion years ago, before the rise of oxygen in the atmosphere. *"The findings reveal the history of the continents and mantle where the diamonds form"*, said study leader Karen Smit, a research scientist at the nonprofit Gemological Institute of America. The diamonds in the study, found in West Africa, indicate that the ancient continents in that region formed by subduction, a process in which one slab of crust pushes under another. *"We can track through 2.5 billion years of Earth history just through this one sulfide inclusion,"* Smit said. Diamonds form deep in the mantle. *"Most,"*



A sulfur-containing mineral inclusion within the diamond.

Smit said, *"form around 125 miles deep, and some form even deeper, around 250 to 435 miles down."* The deepest hole ever drilled, the Kola Superdeep Borehole in Russia, only penetrated 7.6 miles. Diamonds are then brought to the surface fairly rapidly via deep volcanic eruptions. Smit and her colleagues were studying the nitrogen in diamonds from the Zimmi region of Sierra Leone when they noticed that the speck-size inclusions of sulfides in the diamonds showed signs of having existed in the mantle before the diamonds formed, meaning they were trapped within the crystallizing diamonds and carried up to the surface with them. They began investigating the isotopes of sulfur within the inclusions. Isotopes are variations of atoms with differing numbers of neutrons in their nuclei. What they found revealed that the inclusions were very old indeed. Oxygen shields the sulfur from certain reactions with ultraviolet light, so researchers can tell whether sulfur formed in an oxygen-rich or low-oxygen environment. *"These isotopes formed in the atmosphere before there was much oxygen in the atmosphere, around 2.5 billion years ago,"* Smit said. The diamonds themselves are much younger than that, and formed around 650 million years ago. The researchers then examined similar inclusions in diamonds from Canada's Ekati mine. These inclusions are 3.5 billion years old and do not have the same isotope signals as the West African diamonds. *"The contrast tells a story about how the continents formed,"* Smit said. *"Early on, continents probably formed from melting mantle that oozed upward in the form of basalt, similar to how Iceland or Hawaii form today. The minerals in this crust formed in the mantle, not in contact with the atmosphere. Later in Earth history, though, subduction became important for forming stable continents. One chunk of crust would grind under another; denser material would sink and less-dense material would rise to form continental crust. This is how the sulfur in the West African diamonds would have gotten deep beneath the surface"*, Smit said. The most stable, long-lasting crust is attached to portions of the mantle called "keels," so named because they stabilize crust just as a keel stabilizes a ship. *"More studies of inclusion-rich diamonds could help explain how and why these keels form,"* Smit said. *"So far, there are only four locations around the world, including West Africa and Canada, with diamonds that contain both sulfide inclusions and minerals used to date the diamonds' formation. More locations would help trace Earth's history in more detail,"* Smit said, *"but these studies are challenging because the diamonds are destroyed in the process of analysis. We need diamonds,"* Smit said, *"to destroy for science."*

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This image of a sulphide inclusion was taken with an electron microscope.

<https://www.livescience.com/65327-diamond-flaws-reveal-early-geology.html>

Rare Metal from the Dinosaur-Killing Asteroid Can Cure Cancer

Iridium, the world's second densest metal, can kill cancer cells by filling them with a deadly version of oxygen, while leaving healthy tissue unharmed. First discovered in 1803, iridium gets its name from the Latin for "rainbow." Hard, brittle, and yellow, the metal comes from the same family as platinum and is the world's most corrosion-resistant metal. Iridium is rare on Earth, but is abundant in meteoroids, and large amounts of iridium have been discovered in the Earth's crust from around 66 million years ago, leading to the theory that it came to this planet with an asteroid which caused the extinction of the dinosaurs. Researchers created a compound of iridium and organic



Iridium, Earth's second densest metal.

material, which they can directly target towards cancerous cells, transferring energy to the cells to turn the oxygen (O₂) inside them into singlet oxygen, which is poisonous and kills the cell without harming any healthy tissue. Shining visible laser light through the skin onto the cancerous area triggers the process by reaching the light-reactive coating of the compound activating the metal to start filling the cancer with singlet oxygen. Photochemotherapy (using laser light to target cancer) is fast emerging as a viable, effective, and non-invasive treatment. Patients are becoming increasingly resistant to traditional therapies, so it is vital to establish new pathways like this for fighting the disease. The researchers found that after attacking a model tumor of lung cancer cells, which the researchers grew in the laboratory to form a tumor-like sphere, the red laser light, capable of penetrating deeply through the skin, activated the organic-iridium compound which penetrated and infused into every layer of the tumor to kill it. This demonstrated how effective and far-reaching this treatment is. They also proved that the method is safe to healthy cells by conducting the treatment on non-cancerous tissue and finding it had no effect. Furthermore, the researchers used state-of-the-art ultra-high resolution mass spectrometry to gain an unprecedented view of the individual proteins within the cancer cells, allowing them to determine precisely which proteins are attacked by the organic-iridium compound. https://www.geologyin.com/2017/12/heavy-metal-found-in-meteoroids-kills.html?fbclid=IwAR3hku7imZLunL2wSE2_Xoy9iqeQvYb-b9x8zT1ZSjgM41KdcNBR40yUvIUHc

Adorable Little Tyrannosaur Fills a Large Gap in T. rex Evolution

Two tiny tyrannosaurid skeletons have just filled in the fossil record, elucidating the humble origins of the Cretaceous' mightiest predator, *Tyrannosaurus rex*. Dating back to around 92 million years ago, the two tyrannosaurs hail from the Zuni Basin in New Mexico. They stood just 3 feet tall and have been named *Suskityrannus hazelae*. Researchers describe this taxon as a small-bodied species phylogenetically intermediate between the oldest, smallest tyrannosauroids and the gigantic, last-surviving tyrannosaurids. The large tyrannosaurs appeared on the scene in the Late Cretaceous, about 81 million years ago. Prior to that, there had been some medium-sized tyrannosaurids up to about 150 million years ago, but the fossil record was shockingly sparse for the 70 million years in between. Palaeontologists think this is the result of high sea levels that



flooded the continents, eroding sediment and decreasing the potential for bones to be preserved. A 'missing link' tyrannosaur called *Timurlengia euotica* from 90 million years ago was recently found in Uzbekistan. It was about the size of a horse. Another, dating back 96 million years ago, was just described in a paper earlier this year. *Moros intrepidus* was a little smaller than a kangaroo, and ran around what is now Utah. Including *S. hazelae*, these three species are all from the Middle Cretaceous, which makes them unlikely to be direct ancestors of *T. rex*. Instead, palaeontologists believe all these animals diverged from a common ancestor sometime in the Early Cretaceous, which ended roughly 100 million years ago.

The *S. hazelae* skeletons recovered show a tyrannosaurid that was about coyote-sized (hence the name - *suski* is the Zuni word for coyote), weighing no more than between 44 to 88 pounds. Its skull was between 10 to 12.5 inches in length, and its entire body was just a little bigger than the mere skull of a *T. rex*. Both skeletons were juveniles, so it's possible they would have grown a little bigger, but probably not by much - the palaeontologists believe these pipsqueaks were already teenagers. *S. hazelae* certainly wouldn't have reached the 11,000 to 15,500 pound weight class of *T. rex*, whose rapid gain in size remains to be something of a mystery. By filling in the fossil record, it could help palaeontologists figure out why tyrannosaurids changed so dramatically, and so fast.

<https://www.sciencealert.com/missing-link-tyrannosaur-connects-the-dots-between-teeny-and-titanic>

Incredible Fossil Discovery Shows an Entire School of Fish From 50 Million Years Ago

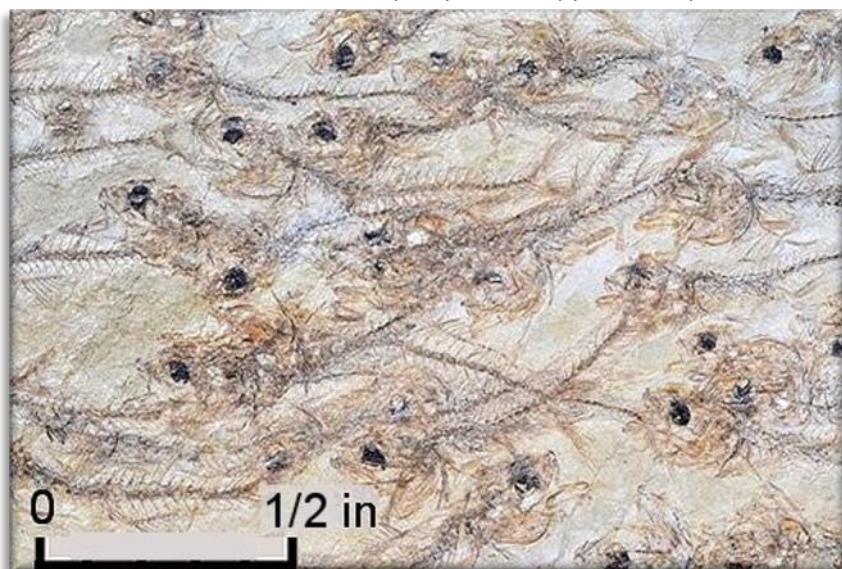
For a species as young and puny as humans, every ancient fossil is a most extraordinary gift from our planet's vast history. Even so, this 50-million-year-old bunch of dead fish might just be the coolest fossil we've ever seen. An unassuming slab of limestone from the Green River Formation in North America became the final resting place of not one, not two, but a whopping 259 fish of the extinct *Erismatopterus levatus* species. We don't know how they all got



flattened so suddenly, but researchers from Arizona State University and Mizuta Memorial Museum in Japan hypothesize that a sand dune in shallow water could have collapsed right on top of the tiny creatures. These fish used to live in the Green River region's mountain lakes during the Eocene, which occurred 56 to 34 million years ago. An adult *E. levatus* should be roughly 2.5 inches, but these were babies - many of the pipsqueaks barely exceed $\frac{3}{4}$ inches. No matter how tiny the fish are, though, for scientists the finding is still huge. Fossils are a beautiful glimpse into Earth's living past, but they rarely give us a sense of how ancient animals behaved, or how their behaviors may have changed over time. In this case, it's

one thing to assume fish have been banding together into shoals for a long time – but it's a different thing altogether to see proof of this ancient behavior, perfectly frozen in stone. Jumping on this rare opportunity to examine the schooling movements of a long-lost species, the team measured each and every tiny fish, mapped their positions, and ran 1,000 different simulations of the shoal's movement. The discovery reveals that fish really have schooled together for at least 50 million years. What's even more fascinating is that the species that do it today are evolutionarily distinct from these Eocene fish. Still, much like many fish living in the world now, these tiny swimmers were probably trying to reduce their chances of being swallowed by a predator - until a sudden tragedy swallowed them all at once.

https://www.sciencealert.com/this-absolutely-stunning-fossil-shows-an-entire-school-of-fish-from-50-million-years-ago?utm_source=ScienceAlert+-+Daily+Email+Updates&utm_campaign=af416e4919-MAILCHIMP_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_fe5632fb09-af416e4919-365948861





Cedar Valley Rocks & Minerals Society will hold its **2019 consignment Auction on September 21st - 22nd** in the Morton Building at the Amana RV Park, Amana, IA. The auction assists collectors or families of collectors dispose of their collections. Knowledgeable club members act as auctioneers. Auctions typically attract about 100 bidders and about 1200 lots will be auctioned.

Viewing is Friday night Sept. 20 from 5:00 - 7:30 pm , Saturday morning Sept 21 from 7:30 - 9:00 am. and Sunday morning Sept 22 from 8:00 - 9:00 am. The **Saturday Auction** runs from 9:00 a.m. to about 8:00 pm, with hot food available during the day and a dinner offered from 5:30 - 6:00 pm. The **Sunday Auction** runs from 9:00 am to about 3:30 pm, again with hot food available.

Cash, good checks, and credit cards are accepted for payment. If you can't stay for those special lots you want, you can leave a maximum bid, and a club member will bid for you up to your maximum.

Motel rooms are available in Amana, but they are sometimes sold out. Motels are also available in Little Amana (15 minutes away), Cedar Rapids & Iowa City (each about 25 minutes away).

Since each sale has several consigners, the sale rotates among the consigners. All lots are numbered, and an order of sale is available at viewing on Saturday morning. **Equipment sales** begins at **2:00 pm on Saturday**.

If you have a collection to dispose of, please contact [Marv Houg](#) or [Sharon Sonnleitner](#) (*see contact information on page 12*). The club does all the advertising and sets up the Friday before the auction. A 25% commission is charged for non-members, and 20% is charged for members or families of members who have belonged to the club for at least 2 years.

Profits from the auction provide scholarships for University of Iowa and Cornell College geoscience students and to assist VAST (the Grant Wood AEA Van Allen Science Teaching Center).



"Bill's Big Bus Boogie" 2019

Omaha's Henry Doorly Zoo and Aquarium



The 2019 "Bill's Big Bus Boogie" adventure will take CVMRS members on a field trip to the **Omaha's Henry Doorly Zoo and Aquarium** on **Sunday, October 6, 2019**. Consistently ranked one of the world's best zoos, Omaha's Henry Doorly Zoo and Aquarium is the ultimate interactive zoo experience and a biological park leading the nation's conservation efforts. Visit the world's largest indoor desert and nocturnal exhibits along with one of North America's largest indoor rainforests. Other world-class exhibits include the **Scott Aquarium, Hubbard Orangutan Forest and Gorilla Valley, Lozier IMAX® Theater, Durham's Bear Canyon, Berniece Grewcock Butterfly and Insect Pavilion**, and more. Explore **Kingdoms of the Night** featuring the world's largest indoor swamp, a canyon and massive caves. Experience **Skyfari**, the aerial tram that transports guests to a new view of Omaha's Henry Doorly Zoo and Aquarium. Plan your visit in advance by downloading our free mobile app - available through Apple's App Store and Google Play. The club will pay for the bus, for those whose club membership dues were paid up as of **May 1, 2019**, and they need only pay museum admission. If the bus is not full by **September 1**, 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. Departure and arrival times and details of the trip will follow in future club meetings, newsletters, and on the club website.

It will be another great and memorable "Bill's Big Bus Boogie" field trip!



[Click for link to downloadable zoo map](#)

2019 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
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Director '20	Jay Vavra (vavrjij@gmail.com).....	447-9288
Director '21	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., at the Hiawatha Community Center in the Hiawatha City Hall, [101 Emmons St., Hiawatha IA](#). The December meeting is a potluck dinner held the 2nd 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



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