

Cedar Valley Gems

Cedar Valley Rocks & Minerals Society

Cedar Rapids, Iowa

cedarvalleyrockclub.org

CEDAR VALLEY GEMS

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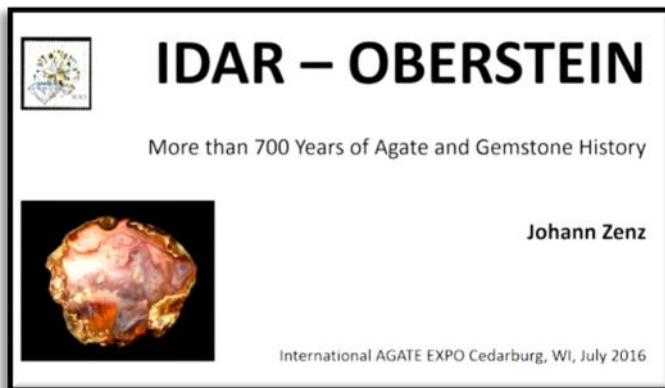
Next CVRMS Meeting (Annual Meeting)

Wed. November 16

7:15 pm

Hiawatha Community Center

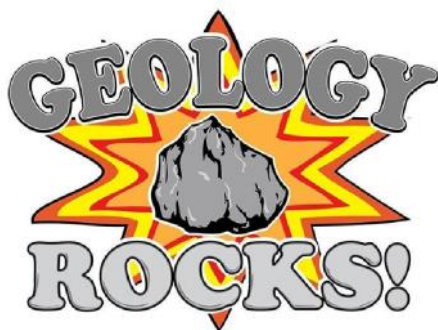
101 Emmons St., Hiawatha



Featured Video

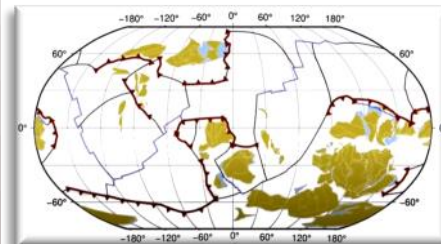
by Johann Zenz—Keynote Speaker

2016 Agate Expo Symposium



Watch 1 Billion Years of Shifting Tectonic Plates in 40 Mesmerizing Seconds

The tectonic plates that cover Earth like a jigsaw puzzle move about as fast as our fingernails grow, but over the course of a billion years that's enough to travel across the entire planet, as a fascinating video reveals. In one of the most complete models of tectonic plate movements ever put together, scientists in 2021 condensed **1 billion years of movement into a 40-second video clip**, so we can see how these giant slabs of rock have interacted over time. As they move, the plates affect climate, tidal patterns, animal movements and their evolution, volcanic activity, the production of metals, and more: they're more than just a covering for the planet, they're a life support system that affects everything that lives on the surface. On a human timescale, things move in centimeters per year, but as we can see from the animation, the continents have been everywhere in time. A place like



[click Image to view video](#)

Antarctica that we see as a cold, icy inhospitable place today, actually was once quite a nice holiday destination at the equator. The moving and sliding of the plates in the video is quite a sight, land masses that are near neighbors become distant cousins and vice versa, and you might be surprised at just how recently it was that the countries and continents settled into the positions that we know today. Plate movement is estimated through the study of the geological record of magnetism that provides data on historic positions in respect to Earth's spin axis and the types of material locked in rock samples that help match the pieces of past geological plate puzzles together. These plates move very slowly, but when a billion years is condensed into 40 seconds a mesmerizing dance is revealed. The scientists admit that their work lacks some finer detail, stretched as it is across the entire planet and a billion years, but they're hoping that it can act as a useful resource and foundation for the future study of these movements and the impact they have on everything else on the planet.

<https://www.sciencealert.com/watch-1-billion-years-of-shifting-tectonic-plates-in-40-mesmerizing-seconds>

CVRMS Monthly Meeting, Oct, 18 — Minutes —

MEETING CALLED TO ORDER: 7:15 p.m. by Marv Houg, President, 39 members and guests were present

GUESTS AND NEW MEMBERS INTRODUCED: Gary Lemke, Diane Stout, and Midwest representative Timothy Hill. Welcome to our meeting.

MINUTES FROM LAST MEETING: Motion to approve as published by Bill; 2nd by Julie. Approved as published.

TREASURER'S REPORT: presented by Dale. Checking account balance \$18,345.37. Dale gave a brief report on the auction results. We broke all records. **\$50,084.00 total sales 111 bidders.** Marv explained that the money raised combined with the Show proceeds goes to support programs and scholarships. Motion to approve by Julie, 2nd by Sherrie.

PROGRAM: 3 Iowa Geoscience Students with Dr. Jane Gilotti presented programs related to CVRMS scholarship funding. Students stated that our contributions are put to good use. Students included Zachary Vig, Samson Bruyvoort, and Kris Symaski. Thanks for the info.

MONTHLY DOORPRIZE went to Clara, who selected an agate from Marv's stash. Congrats!

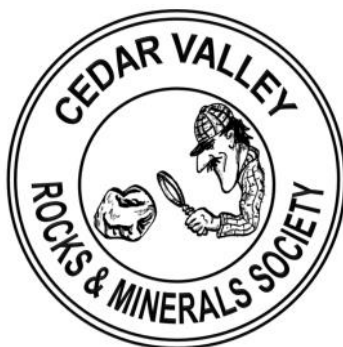
AUCTION RECAP:- Thanks from Julie for help in loading and unloading from truck. **Show report-**Sharon reported that 8 contracts have not been returned yet.

OLD BUSINESS: No old business to report

NEW BUSINESS: Our next meeting will be on **Wednesday November 16.** Note the change. A brief discussion about **Holiday Party.** Will be held on **Tuesday December 6.** at our Hiawatha Meeting Site. Note the early date. Board will discuss party details. More to follow.

MOTION TO ADJOURN by Dell; 2nd by Ray. Meeting adjourned at 9:15p.m.

Respectfully submitted,
Dell James, Secretary



CVRMS Board Meeting Oct, 25 — Minutes —

MEETING CALLED TO ORDER: by Marv at his home.

MEMBERS PRESENT:- Kim Kleckner, Marv Houg, Dale Stout, Ray Anderson, Matt Burns, Sharon Sonnleitner, Dell James, Bill Desmarais, Jay Vavra

MINUTES FROM PREVIOUS MEETING REVIEWED. Motion to accept by Matt; second by Bill. Approved as published.

TREASURER'S REPORT: by Dale. Unable to give final totals since a lot of bills are still outstanding from the auction.

AUCTION FOLLOW UP. General discussion about comments, complaints and whatever. Kim has developed a form for bidders to write down their lot numbers and some clip boards.

2023 ROCK SHOW: Theme "*Wonderful World of Agates*". All is well with vendors. Sharon has talked to them and 7 are still out. **Poster ideas** if you have any, give Ray a call. **Fluorescent booth** idea, Mike and Diane Rose want to set up their booth as dealers. Sounds like a good idea for the club. **Kim has lots of stuff** and organized for pebble pit, silent auction and door prizes.

2023 AUCTION SEPT 9-10, 2023: Time to start talking about stuff like potential consigners. Jay will get contact people on the list to see how many lots they want, so we can determine how many each consigner can have before sending contracts.

FIELD TRIPS: Matt will work on it

OLD BUSINESS: Nothing to report.

NEW BUSINESS: Sharon will contact Karen about when VAST needs Show flyers to include in the science kits.

PAUL STULTZ asked about the club manning a booth at the Blairstown show on Nov 19. Since there will be some club members there with info, like Marv, there will be no need for a separate set up.

BILL'S BIG BUS BOOGIE 2023: Bill is working on getting a bus trip lined up for next year. Hopefully, it will be a reincarnation of the one that was canceled because of COVID.

BILL REPORTED that he is on a current Linn County committee involving the Mazel Bridge project, where rock hunting will be allowed. Bill will follow up.

2022 HOLIDAY PARTY DEC 6: Club will supply drinks. Sharon will prepare turkeys and dressing, and Dell will do mashed potatoes and gravy. The rest will be potluck. Reminders of what will be needed. Salads, rolls, appetizers, cranberry sauce, vegetables, desserts. Whatever favorite recipe you choose.

2022 ELECTION: Marv named Sharon, Kim, and Jay to the Nominating Committee, and one Director spot is up for election. Matt graciously accepted. The nomination will be recommended to the general membership at the Annual Meeting.

KIM WILL CHECK on spring or summer for flint knapping.

MOTION TO ADJOURN by Bill; second by Matt.

Respectfully submitted,
Dell James, Secretary



CVRMS

ELECTION OF CVRMS 2023 OFFICERS AT NOVEMBER ANNUAL MEETING

The November 16 CVRMS meeting is our official **Annual Meeting for 2022**, which means that it is time for members to elect club officers. Officers other than Directors serve 2-year terms, and 2023 will be their 2nd year. Directors serve staggered 3-year terms, so one is elected each year. *The Nominating Committee suggest electing Matt Burns to a full term as **Director**, after he served the last year of Toby Jordan’s term ending 2022.

President	Marv Houg
Vice President	Ray Anderson
Treasurer	Dale Stout
Secretary	Dell James
Editor	Ray Anderson
Liaison	Kim Kleckner
Director '23	Jay Vavra
Director '24	Bill Desmarais
*Director '25	Matt Burns
Webmaster	Sharon Sonnleitner

Anyone else interested in serving as Director through 2025 may enter their name at the November 16 meeting, and club members present will vote to elect the Director.



Spotlight Gemstones: Citrine & Topaz

November's Birth Stones



citrine



topaz

Citrine is a member of the large quartz family (SiO₄), which, with its multitude of colors and structures, offers gemstone lovers almost everything their hearts desire in terms of adornment and decoration, from absolutely clear rock crystal to black onyx. The name citrine is derived from its color, the yellow of the lemon (although the most sought-after stones are a clear, radiant yellowish to brownish red). Like all crystal quartzes, the citrine has a hardness of 7 on the Mohs scale and is relatively resistant to scratches. With no cleavage, it is also resistant to fracturing. Although citrine’s refractive index is relatively low, the yellow stones have a mellow, warm tone that seems to have captured the last glow of autumn. Natural citrines are rare, and most good quality stones are found in Minas Gerais Brazil, Madagascar, and Hasawarka in the Ural mountains of Russia. Most commercial citrines are heat-treated amethyst or smoky quartz.

Topaz (Al₂SiO₄(F,OH)₂) is one of the few gem minerals that contains fluorine. The gem can be found in many varieties; colorless, pink, and shades of yellow to sherry-brown are most common, but blue and green-blue stones can resemble aquamarine, and natural red and pink colors are extremely rare. Sherry colored crystals can be heat-treated before cutting, producing pink topaz, a process called “pinking.” Its hardness of 8 makes it very resistant to scratching. **Orange topaz**, also known as **precious topaz**, is the traditional November birthstone (and the state gemstone of Utah), while blue topaz is the birthstone for December. Topaz is commonly associated with silicic igneous rocks (granite and rhyolite.) It typically crystallizes in granitic pegmatites or in vapor cavities in rhyolite lava flows including those at Topaz Mountain in western Utah. The American Golden Topaz is the largest piece of cut yellow topaz in the world. It is sized at 22,892 carats (10 lbs) and has 172-facets (flat-faced cuts applied to gems, in order to help them reflect light.) The gem was cut from a piece of yellow topaz that was 26 lbs in size, discovered in the Minas Gerais, Brazil. It was donated to the Smithsonian Institute, and put on display in the National Museum of Natural History in Washington, D.C.

What in the World?



What in the World is this unusual object and why was it recently in the news??

October's Photo



Last month's *What in the World* photograph was taken by an astronaut onboard the International Space Station on September 23, 2021 while passing over Mount Ruapehu on the North Island of New Zealand. Ruapehu is an active stratovolcano that stands 9,177 feet at its highest point, and is the tallest mountain on North Island. It was the setting used to film **Mount Doom** in "The Lord of the Rings" movies.

ROCK CALENDAR CVRMS EVENTS OF INTEREST

2022

NOV. 16 — CVRMS Monthly Meeting

Hiawatha Community Center 7:15 pm

Video lecture by Johann Zenz

"Idar-Oberstein; More than 700 years of Agate and Gemstone History"

Keynote address: 2016 Agate Expo Symposium

Nov. 19 — Blirstown Rock & Mineral Show

M.J. Kirby Post 170 American Legion Hall

102 Benton Street NE

Blirstown, Iowa

9 am -4 pm

free will offering

Dec. 6 — CVRMS Holiday Party

Hiawatha Community Center 6:30 pm

CVRMS will provide Turkey, Ham, Mashed Potatoes, Dressing, Gravy and Drinks

Please Bring an Appetizer, Buns, Side Dish, or Dessert

2023

Jan. 17 — CVRMS Monthly Meeting

Hiawatha Community Center 7:15 pm

Program To Be Announced

Feb. 21 — CVRMS Monthly Meeting

Hiawatha Community Center 7:15 pm

Program to be announced

Mar. 21 — CVRMS Monthly Meeting

Hiawatha Community Center 7:15 pm

Cornell College Students

Mar. 25 - 26 — CVRMS Rks, Fos, & Min Show

Hawkeye Downs

Cedar Rapids, Iowa

"Wonderful World of Agates"

Sept. 9 - 10 — CVRMS Rock Auction

Amana RV Park and Event Center

Amana, Iowa

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

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

Once again I didn't receive any Ask a Geologist question this month so I have an opportunity to include a recent article that I thought was especially interesting. I remember reading that about 250 different minerals form in space. But here on Earth we recognize almost 6,000 minerals. So where do so many Earth minerals come from? This interesting article (edited) addresses that question and discusses a newly developed way of categorizing minerals on our planet.

Life Helps Make Almost Half of All Minerals on Earth

by Joanna Thompson

The impact of Earth's geology on life is easy to see, with organisms adapting to environments as different as deserts, mountains, forests and oceans. The full impact of life on geology, however, can be easy to miss. A comprehensive new survey of our planet's minerals now corrects that omission. Among its findings is evidence that about **half of all mineral diversity is the direct or indirect result of living things and their byproducts**. It's a discovery that could provide valuable insights to scientists piecing together Earth's complex geological history, and also to those searching for evidence of life beyond this world. In a pair of papers published today in *American Mineralogist*, researchers Robert Hazen, Shauna Morrison and their collaborators outline a new taxonomic system for classifying minerals, one that places importance on precisely how minerals form, not just how they look. In so doing, their system acknowledges how Earth's geological development and the evolution of life influence each other. Their new taxonomy, based on an algorithmic analysis of thousands of scientific papers, recognizes more than **10,500 different types of minerals**. That's almost twice as many as the roughly 5,800 mineral "species" in the classic taxonomy of the *International Mineralogical Association*, which focuses strictly on a mineral's crystalline structure and chemical makeup. "That's the classification system that's been used for over 200 years, and the one that I grew up with and learned and studied and bought into," said Hazen, a mineralogist at the Carnegie Institution for Science in Washington, D.C. To him, its fixation on mineral structure alone has long seemed like a monumental shortcoming. Back in 2008, he began digging into the literature on every species of known mineral, looking for data about how they formed. The data quickly got murky because many mineral species turned out to arise from multiple distinct processes. Take, for example, pyrite crystals. "Pyrite forms in 21 fundamentally different ways," Hazen said. Some pyrite crystals form when chloride-rich iron deposits heat up deep underground over millions of years. Others form in cold ocean sediments as a byproduct of bacteria that break down organic matter on the seafloor. Still others are associated with volcanic activity, groundwater seepage or coal mines. "Each one of those kinds of pyrite is telling us something different about our planet, its origin, about life, and how it's changed through time," said Hazen. For that reason, the new papers classify minerals by "kind," a term that Hazen and Morrison define as a combination of the mineral species with its mechanism of origin (think volcanic pyrite versus microbial pyrite). Using machine learning analysis, they scoured data from thousands of scientific papers and identified 10,556 distinct mineral kinds. Morrison and Hazen also identified 57 processes that individually or in combination created all known minerals. These processes included various types of weathering, chemical precipitations, metamorphic transformation inside the mantle, lightning strikes, radiation, oxidation, massive impacts during Earth's formation, and even condensations in interstellar space before the planet formed. They confirmed that *the biggest single factor in mineral diversity on Earth is water*, which through a variety of chemical and physical processes helps to generate more than 80% of minerals. But they also found that **life is a key player**: One-third of all mineral kinds form exclusively as parts or byproducts of living things, such as bits of bones, teeth, coral and kidney stones or feces, wood, microbial mats and other organic materials that over geologic time can absorb elements from their surroundings and transform into something more like rock. Thousands of minerals are shaped by life's activity in other ways, such as germanium compounds that form in industrial coal fires. Including substances created through interactions with byproducts of life, such as the oxygen produced in photosynthesis, life's fingerprints are on about half of all minerals. Historically, scientists have *artificially drawn a line between what is geochemistry and what is biochemistry*. The boundary between animal, vegetable and mineral is much more fluid. Human bodies, for example, are around 2% minerals by weight, most of it locked away in the calcium phosphate scaffolding that reinforces our teeth and bones.

<https://www.quantamagazine.org/life-helps-make-almost-half-of-all-minerals-20220701/>



Fossilized treasures entombed in golden, glassy amber capture countless stories of ancient forested landscapes through which the dinosaurs roamed. Sometimes these prized fossils are part of a very different story. One such instance is in Myanmar. While embroiled in political turmoil, the country has also enchanted the field of paleontology with spectacular amber specimens that are **sourced by unethical or illegal means**. According to a new study, described as "one of the most important papers in paleontology you'll read this year," research on fossils encased in Myanmar amber is booming, **a direct result of ongoing violent conflicts in parts of the country where amber is mined**. Amber sourced from Myanmar has in recent years yielded a wealth of dazzling specimens, preserved in exquisite detail. From feathered dinosaur tails to fossilized flowers and metallic insects, the burnt-orange blobs of hardened tree resin have trapped life that flourished some 99 million years ago during the mid-Cretaceous. But those finds come with a cost. Since 2019, reports have emerged that the trade of lucrative amber, and the fossils it often contains, is fueling conflicts in Myanmar, representing an "ethical minefield" for paleontologists wishing to study the specimens. Since 2015, exporting fossil materials from Myanmar has been prohibited. But because the amber can be exported legally, fossils contained within it fall into a legal gray area. Yet research on Myanmar amber fossils is roaring, according to the new analysis. The researchers scrutinized nearly 1,000 scientific papers published over the past 30 years on Myanmar amber fossils and found that the explosion in papers since 2014 tracks closely with major political, legal, and economic events occurring at that time in the country. Most of the amber is mined in northern Myanmar, in the conflict-ridden Kachin state, where rival political factions have been warring for control of the area and profiteering off the amber trade. The gemstones smuggled across the border into China are sold in markets, often to private collectors and paleontologists, which means local scientists in Myanmar have little opportunity to study the ancient remains. Until 2022, no authors based in Myanmar have contributed to a scientific paper that describes a fossil embedded in Myanmar amber; however, since 2014, China has published more papers on Myanmar amber fossils than any other country, followed by the United States. Despite calls from paleontological societies for scientific journals not to publish papers on fossils in Myanmar amber, progress to curb unethical or illegal research practices in paleontology has, on the whole, been slow. The latest analysis found that only 2 out of 222 papers published since 2020 describing fossils in Myanmar amber detailed how their specimen was legally and ethically acquired. "Myanmar amber is beautiful. The fossils inside are stunning. I get the excitement and desire to study them," University of Edinburgh paleontologist Steve Brusatte tweeted upon reading the study. "But to me, while war still rages, no fossil is worth a single human life." <https://www.sciencealert.com/the-wondrous-beauty-of-myanmar-amber-hides-a-very-dark-secret>



Reports indicate that a lithium mine located in Sonora is the largest deposit with proven and probable reserves of 243.8 million tons, containing 4.5 million ton of lithium-carbonate equivalent. Construction of the mine was first announced by Sonora Governor Claudia Pavlovich in May 2018 and was completed in the first quarter of 2020. Production capacity in its first stage of operations is 15,500 tons per year of lithium carbonate; capacity will double to 35,000 tons per year in a second stage. The mine is being developed by Canada's Bacanora Minerals and China's Ganfeng Lithium. Potential lithium re-



erves have also been identified in Baja California, San Luis Potosí and Zacatecas. The metal, is the base not just of computers but also batteries for cell

phones and electric cars, among other products. Therefore, "Mexico should be capable of making electric cars in public factories," experts said. Mexico is also one of the richest countries in solar radiation, and we're going to be a country that exports energy to the United States and Latin America. The two most important areas in Latin America for solar radiation are the northeast of Mexico, the deserts, and the border between Chile and Bolivia. The Sonora government has met with the Chinese capital mining company Ganfeng Lithium, who are looking to invest in that area. "They have more than seven thousand employees and are very interested in coming in January; they come on a commercial mission to Sonora, because they are interested in being here seeing the possibility of installing to set up a battery factory." Another application is in the military industry, since the use of lithium oxyhalide batteries were selected for use in air defense missiles and other programs in the United States. A large pharmacological market has been potentiated, since the incorporation of metallic lithium and some compounds are used as catalysts in the production of analgesics, anti-cholesterol agents, antihistamines, contraceptives, sleep inducers, some types of steroids, tranquilizers, vitamin A and other products. This puts Mexico in a very beneficial position regarding the future since these technologies are in the middle of technological and economic progress currently. Multinational corporations are also sure to set their sights on Mexico's lithium deposits and are unlikely to have missed the resource's importance for the future. <https://southfront.org/all-sights-on-mexico-as-it-discovers-worlds-largest-lithium-deposit/>

A banner image with a landscape background of a river and hills. The text is overlaid in a bold, white, sans-serif font with a slight shadow effect. The title is split into two lines: "A North Dakota Excavation Had One Paleontologist" on the top line and "Rethinking the Dinosaurs' Extinction" on the bottom line.

A North Dakota Excavation Had One Paleontologist Rethinking the Dinosaurs' Extinction

Dinosaurs continue to fascinate, even though they became extinct 65 million years ago. These powerful creatures prowled the Earth for about 165 million years before mysteriously disappearing. Still, people's ardor for this group of reptiles is so passionate that 12% of Americans surveyed would resurrect T. rexes and the rest of these mysterious creatures if it were possible. There is still much unknown about these prehistoric animals. In fact, there are probably dinosaur types that still remain unidentified. Despite more than 200 years of study, paleontologists have named only several hundred species. Though this might seem like a large number, a study in the Proceedings of the National Academy of Sciences said it's possible that more than **1,800 different kinds of dinosaurs** walked the earth. The study of these creatures is limited to the fossils they left behind, and those provide an incomplete picture. A fossil, after all, is only created under precise circumstances, with the dinosaur dying in a place that could preserve its remains in rock. While some lived near a river, lake, lagoon, or another place where sediment was found, many thrived in other habitats. Another question about dinosaurs is what caused their extinction, and there are many theories about that, too. What we do know is that during the Jurassic period, great global upheaval occurred with increases in temperature, surging sea levels, and less humidity. Some scientists say this destroyed the dinosaurs; others believe they thrived during the period. Many theories exist about why the dinosaurs disappeared from the Earth. Could it be a meteor that crashed into the planet, and the reverberations ended the reign of the dinosaurs? Was it a fierce volcanic eruption that toppled these creatures? **Robert DePalma**, a curator at the Palm Beach Museum of Natural History, found some rare fossils close to Bowman, North Dakota, in 2013 that led to a hypothesis of his own. The site, dubbed "**Tanis**," first underwent excavation in 2012, with DePalma and his team digging along a section known as the Hell Creek Formation. Underneath a freshwater paddlefish skeleton, a mosasaur tooth appeared. This dinosaur, a giant reptilian, lived during the Early Cretaceous period in oceans. DePalma and his group knew the creature could not have survived in North Dakota's fresh waters during the prehistoric age. But there were other inconsistencies at the excavation site. The fossils they found seemed out of place, with some skeletons located in vertical positions. Plus, tektites, pieces of natural glass formed by a meteor's impact, were scattered amid the soil. All of these factors seemed strange and confused the paleontologists. Could this provide evidence to the theory that an asteroid did indeed cause the mass extinction of the dinosaurs? This explanation was proposed long before DePalma's discovery. Some scientists cite the KT layer, a 66-million-year-old section of earth present through most of the world, with a high iridium level, as proof that this is so. The 112-mile **Chicxulub crater**, located on the Yucatán Peninsula, is often cited as further proof that a giant asteroid was responsible for killing dinosaurs. DePalma believed that the fossils found in Tanis, which sat on the KT layer, became collected there just after the asteroid struck the earth. He suggested that the impact caused huge *seiches* (or tsunamis), which allowed the mosasaur tooth to travel from fresh water to that spot, along with freshwater sturgeon that may have choked on glassy pieces from the collision. "*That's the first ever evidence of the interaction between life on the last day of the Cretaceous and the impact event,*" a team member noted. Some scientists were not happy with this proposal. "*I hope this is all legit, I'm just not 100% convinced yet,*" said Thomas Tobin, a geologist at the University of Alabama in Tuscaloosa. Some scientists question Robert DePalma's methods. The site, after all, does not conclusively prove that the asteroid's impact actually caused the dinosaurs' demise. It could be just one factor in a series of environmental events that led to their extinction. "*I'm suspicious of the findings. They've been presented at meetings in various ways with various associated extraordinary claims,*" a West Coast paleontologist reported. "*He could have stumbled on something amazing, but he has a reputation for making a lot out of a little.*" DePalma was incorrect in 2015 when he believed he discovered a bone from a new type of dinosaur. He had already named the genus *Dakotaraptor* when others identified it as belonging to a prehistoric turtle. While DePalma corrected his claim, his reputation still took a hit. Others defend DePalma, like his co-author, Mark Richards, a geophysicist at the University of California, Berkeley. "*That some competitors have cast Robert in a negative light is unfortunate and unfair.*" Some of the gripes occurred because DePalma first shared his story with a mainstream publication, *The New Yorker*, instead of a more academic-based journal. He later wrote a piece for the *Proceedings of the National Academy of Sciences*. Robert DePalma made headlines again in 2021 with the discovery of a leg from a *Thescelosaurus* dinosaur at Tanis. The paleontologist believed that this new information further supported the theory that an asteroid killed the dinosaurs, along with 75 percent of the animals and plants on Earth 66 million year ago. "*We're never going to say with 100 percent certainty that this leg came from an animal that died on that day,*" the scientist said. "*The thing we can do is determine the likelihood that it died the day the meteor struck. When we look at the preservation of the leg and the skin around the articulated bones, we're talking on the day of impact or right before. There was no advanced decay.*" Since Tanis became an excavation site, several other fossils were found, including a pterosaur embryo and petrified fish with glass ejecta spheres. DePalma purported that these animals died during the asteroid's impact since the glass's chemical makeup indicates an extraordinary explosion, something similar to the detonation of 10 billion bombs. "*I've been asked, 'Why should we care about this? Dinosaurs have been dead for so long,'"* DePalma told *The Washington Post*. "*It's not just for paleo nerds. This directly applies to today. We're seeing mass die-offs of animals and biomes that are being put through very stressful situations worldwide. By looking through this window into the past, we can apply these lessons to today.*" <https://www.grunge.com/1031665/a-north-dakota-excavation-had-one-paleontologist-rethinking-the-dinosaurs-extinction/>

The Asteroid that Created Earth's Largest Crater May Have Been Way Bigger than We Thought

At roughly 62 miles in diameter, the **Vredefort crater**, located near the present-day city of **Johannesburg, South Africa**, is the largest and oldest-known impact crater on the planet. About 2 billion years ago, an impactor (most likely an asteroid) crashed into the Earth, forming the giant hole in the ground that was an estimated 111 to 186 miles wide soon after impact. A study published last month in the *Journal of Geophysical Research* found that the impactor may have been bigger than previously estimated. If so, this impact would have had devastating consequences across the entire planet. This new research allows scientists to better simulate impact events on Earth and other planets. The Vredefort crater has eroded over the past 2 billion years, which makes it difficult for scientists to accurately estimate both how large the crater was upon impact, not to mention the size and velocity of the impactor that made the crater. The study team conducted simulations to match the updated size of the crater. Their results showed that an impactor would have to be much larger: about 12 to 15 miles in diameter and traveling at a velocity of about 33,500 to 44,000 miles per hour. These new findings show it is possible that it was larger than the asteroid that struck 66 million years ago, causing the extinction of most species of dinosaurs and forming the Chicxulub crater in Mexico. In addition to this mass extinction, Earth was plagued by major effects after the hit, including widespread forest fires, acid rain, and destruction of the ozone layer. If the Vredefort crater was created by an even larger and faster moving impactor than the one that formed the Chicxulub crater, the Vredefort impact possibly caused even greater catastrophic global consequences. The Vredefort impact did not leave a record of mass extinction or forest fires given that there were only single-cell lifeforms and no trees existed two billion years ago; however, the impact would have affected the global climate potentially more extensively than the Chicxulub impact did. Dust and small particles from the Vredefort impact may have spread across the planet blocking sunlight, cooling the Earth's surface, with a devastating effect on photosynthetic organisms. After the dust and aerosols settled (which could have taken anywhere from hours to a decade) greenhouse gases such as carbon dioxide that were emitted from the impact would have raised the global temperature potentially by several degrees for a long period of time. Previous research into this event determined that material from the impactor was ejected as far away as present-day Karelia, Russia, at that time about 1,200 to 1,500 miles from the crater in South Africa. Clarifying evidence such as this ejecta [material thrown out by the asteroid] layer mapping may allow researchers to test their models and help complete the view into the past."

<https://www.popsci.com/science/earths-largest-crater/>

Dumortierite Quartz: Rare Blue Quartz

Dumortierite quartz is blue-colored quartz containing abundant dumortierite inclusions. Dumortierite quartz is one of the rarer



Dumortierite in quartz From Brazil.

and more unusual blue varieties of quartz gemstones. It is a gemstone-quality combination of quartz aggregate, intergrown with the mineral known as dumortierite. Although quartz can occur in a wide range of colors, blue-colored quartz is surprisingly quite rare. The traces of dumortierite are responsible for its distinct color, which can range from light to dark blue and in some cases reddish-brown. Dumortierite is an aluminum borosilicate ($Al_7BO_3(SiO_4)_3O_3$) with a hardness that can range from



Dumortierite in quartz From Brazil.

7.0 to 8.5 on the Mohs scale. In aggregate form, mainly when cut, its hardness is 7.0. (the same as quartz), while crystal forms have a hardness rating of 8.5. The mineral was first described in 1881 and was named after French paleontologist, Eugene Dumortier (1803-1873). Dumortierite also

has a few industrial purposes other than jewelry. Since it is known to turn remarkably pure white in color when fired, it is often used for the production of porcelain and ceramics. It is sometimes mistaken for sodalite and has been used as imitation lapis lazuli. The major source of gemstone quality Blue Dumortierite Quartz is in eastern France. Other important sources of this stone include Colorado, Washington, and Nevada in the USA. There are also Dumortierite crystals in Austria, Russia, and Madagascar.

<http://www.geologyin.com/2020/05/dumortierite-quartz-rare-blue-quartz.html>

Spectacular T. Rex Skeleton May Fetch \$25 Million at Auction (the New Owner Gets to Name it, Too)

The mighty *Tyrannosaurus rex* once stalked western North America, but now, in a first, the fossil remains of the dinosaur king are hitting an auction block in Asia, where the prehistoric beast's bones might sell for as much as \$25 million, according to Christie's



A *Tyrannosaurus rex* specimen, nicknamed Shen for now, is the first *T. rex* to hit the auction block in Asia.

Hong Kong. The 3,000-pound (1,400 kilogram) specimen — nicknamed Shen for now; whoever buys it gets exclusive naming rights — was uncovered in Montana's Hell Creek Formation, a region renowned for its fossils dating to the late Cretaceous period, which ended about 66 million years ago. Shen measures about 40 feet (12.2 meters) long, 15 feet (4.6 m) tall and 6.8 feet (2.1 m) wide, according to Christie's. Shen's auction, planned for Nov. 30, marks the dinosaur specimen as one of many to be auctioned in recent years, including Stan the *T. rex*, which in 2020 shattered records as the most expensive dinosaur fossil ever when it sold for \$31.8 million. "After the unforgettable, record-breaking sale of Stan at Christie's New York in 2020, it is a thrill and an immense privilege for us to be trusted with the sale of another wonderful *T. rex* skeleton," James Hyslop, the head of Science and Natural History at Christie's, said in a statement. While Shen isn't expected to bring in as much cash as Stan, this fossil is still expected to fetch a higher price than the near-complete *T. rex* known as Sue, which sold in 1997 for \$8.36 million (\$15.4 million in today's dollars, given inflation) to the Field Museum of Natural History in Chicago, which bought the apex predator with the support of private donors. But while auctioneers may be excited about the upcoming sale, paleontologists are less than thrilled. "The auction of Shen is terrible news for science: although it isn't clear how complete the specimen really is, its sale will be another loss for science," Thomas Carr, a vertebrate paleontologist and an associate professor of biology at Carthage College in Wisconsin, who is not involved with the sale, told Live Science in an email. Although Hyslop called Shen "one of the most scientifically studied *T. rex* skeletons to come to auction, Carr, a *T. rex* specialist, said that he had never heard of the specimen before. Even so, every *T. rex* specimen is valuable, as each sheds light on the evolution and biology of rare dinosaurs, he said. If Shen is sold into private hands, rather than to a museum, it would be unethical for paleontologists to study it, Carr added. Science requires replication, and because a private collector could pull Shen from the science world at any time, future researchers might not be able to study it to replicate previous work. "After the auction, Shen the *T. rex* will almost certainly languish unstudied and out of sight," Carr said. Although the Field Museum rallied to buy Sue 25 years ago, the growing popularity of dinosaur fossils among wealthy individuals is making it harder for public institutions to compete at the auction block. "Multimillion dollar fossils are absolutely out of reach of the purchasing ability of museums, limiting the market to the rich who have no scientific expertise," Carr said, adding that "this fossil belongs in a museum, not in an auction house overseas where ordinary Americans can't see it."

https://www.livescience.com/tyrannosaurus-rex-shen-auction?utm_campaign=368B3745-DDE0-4A69-A2E8-62503D85375D

CVRMS News and Information:

CVRMS Table at Sunday At The Quarry at Raymond Quarry

CVRMS members manned a table at the Basic Materials Company's "Sunday at the Quarry" event at the Raymond Quarry just east of Raymond on October 4. Held in association with Earth Science Week, the yearly event provided an opportunity for about 3,000 people to see how a working limestone quarry operated and for the younger set to hit a rock with a hammer and collect a sample. Kim Kleckner, Kim Long, Allen (AJ) Johnson, Matt Barns and Ray Anderson were present with a display of polished rocks and agates and a variety of rock and mineral samples to pass out. People seemed to have a good



AJ Johnson, Kim Long, and Kim Kleckner educating visitors at the CVRMS table at *Sunday at the Quarry*.



The geocurious with hard hats and eye protection got to hammer rocks and collect samples at the Raymond Quarry.

CVRMS Rock Auction Records Record Sales

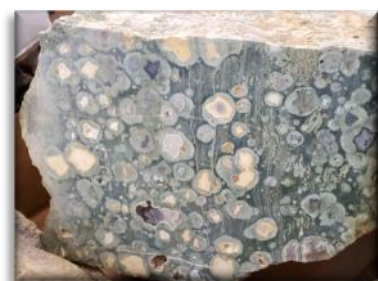
The annual CVRMS rock auction held on October 8-9 at the Amana RV Park set a new record with the sales of over \$50,000 worth of rocks and lapidary equipment. With a record 111 participating bidders, we saw a number of very nice specimens change hands. Thanks to all club members who participated in making this year's auction a success.



The crowd closely watching the bidding as another lot of rocks is auctioned off.



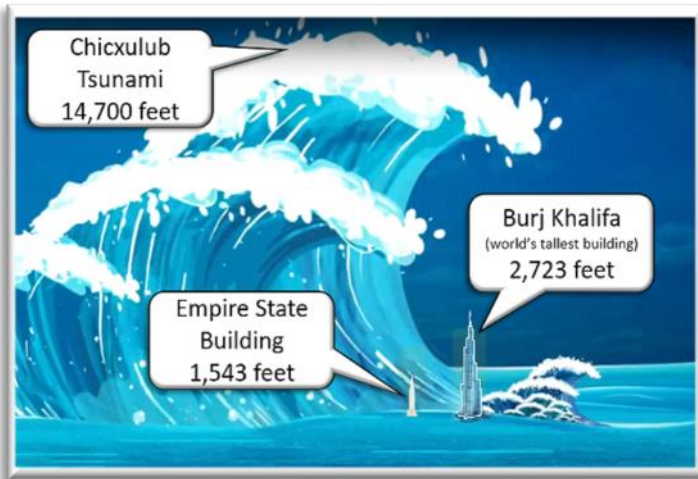
A table full of lapidary equipment waiting to go on the auction block.



A beautiful slab of Ocean Jasper was one of the many lots that was sold at the CVRMS auction.

Dinosaur-Killing Asteroid Produced Global Tsunamis Up to 2.8 Miles High

The dinosaur-killing asteroid that slammed into Earth **66 million years ago** also triggered a jumbo-size tsunami with mile-high waves in the Gulf of Mexico which traveled halfway around the world, a new study finds. Researchers discovered evidence of this monumental tsunami after analyzing cores from more than 100 sites worldwide and creating digital models of the monstrous waves after the asteroid's impact in Mexico's Yucatán Peninsula.



The research on the mile-high tsunami was published online Tuesday (Oct. 4) in the journal *AGU Advances*. Based on earlier findings, the team modeled an asteroid that measured **8.7 miles across** and was zooming **27,000 mph, or 35 times the speed of sound**, when it struck Earth. After the asteroid hit, many lifeforms died; the non-avian dinosaurs went extinct (only birds, which are living dinosaurs, survive today) and about three-quarters of all plants and animal species were wiped out. Researchers are aware of many of the asteroid's pernicious effects, such as sparking raging fires that cooked animals alive and pulverizing sulfur-rich rocks that led to lethal acid rain and **extended global cooling**. To learn more about the resulting tsunami, researchers analyzed the Earth's geology, successfully analyzing 120 "boundary sections," or marine sediments laid down just before or after the mass extinction event, which marked the end of the Cretaceous period. These boundary sections matched the predictions of their model of wave height and travel. The initial energy from the impact tsunami was up to **30,000 times larger** than the energy released by the December 2004 Indian Ocean earthquake tsunami that killed more than 230,000 people, the researchers found. Once the asteroid struck Earth, it created a 62-mile-wide crater and kicked up a dense cloud of dust and soot into the atmosphere. Just 2.5 minutes after the strike, a curtain of ejected material pushed a wall of water outward, briefly making a **2.8-mile-tall** wave that crashed down as the ejecta plummeted back to Earth, according to the simulation. At the 10 minute mark, a **5,000 ft-high** tsunami wave about **137 miles** away from the impact site swept through the gulf in all directions. An hour after the impact, the tsunami had left the Gulf of Mexico and rushed into the North Atlantic. Four hours following the impact, the tsunami passed through the Central American Seaway, a passage that separated North from South America at the time, and into the Pacific. A full day after the asteroid's collision, the waves had traveled through most of the Pacific and the Atlantic, entering the Indian Ocean from both sides, and touching most of the globe's coastlines 48 hours after the strike. After the impact, the tsunami radiated mostly to the east and northeast, gushing into the North Atlantic Ocean, as well as to the southwest via the Central American Seaway flowing into the South Pacific Ocean. Water traveled so quickly in these areas that it likely exceeded 0.4 mph, a velocity that can erode the seafloor's fine-grained sediments. Other regions largely escaped the tsunami's power, including the South Atlantic, the North Pacific, the Indian Ocean and what is now the Mediterranean sea, according to the team's models. The team even found outcrops, or exposed rocky deposits, from the impact event on eastern New Zealand's north and south islands, a distance of more than **7,500 miles** from the Chicxulub crater in Mexico. Originally, scientists thought that these outcrops were from local tectonic activity. But due to their age and location in the tsunami's modeled route, the study's researchers pinned it to the asteroid's massive waves. While the models didn't assess coastal flooding, they did reveal that open-ocean waves in the Gulf of Mexico would have exceeded 328 feet, and waves would have reached heights of more than 32.8 feet as the tsunami approached the North Atlantic's coastal regions and parts of the South America's Pacific coast, according to the statement. As the water became shallow near the coast, wave heights would have risen dramatically. Depending on the geometries of the coast, most coastal regions would be inundated and eroded to some extent. Any historically documented tsunamis pale in comparison with such global impact

<https://www.sciencealert.com/dinosaur-killing-asteroid-produced-global-tsunamis-up-to-2-8-miles-high>

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Webmaster.....	Sharon Sonnleitner (sonnb@aol.com)	396-4016

Club meetings are held the 3rd Tuesday of each month from September through November and from January through May at 7:15 p.m. Meetings are held at the Hiawatha Community Center in the Hiawatha City Hall, [101 Emmons St., Hiawatha IA](http://101EmmonsSt.com). The December meeting is a potluck dinner held on the 1st Tuesday at 6:30. June, July, and August meetings are potlucks held at 6:30 p.m. at area parks on the 3rd Tuesday of each month

CEDAR VALLEY ROCKS & MINERAL SOCIETY

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

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

**Dale Stout
2237 Meadowbrook Dr. SE
Cedar Rapids, IA 52403**

CVRMS website:
cedarvalleyrockclub.org

**Next Meeting:
NOVEMBER 16
Hiawatha Community Center
featured video:
"Icar-Oberstein: More Than 700 Year
of Agate and Gemstone History"
by Johann Zenz
2016 Agate Expo Symposium**

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