Cedar Valley Gems

Cedar Valley Rocks & Minerals Society

Cedar Rapids, Iowa

cedarvalleyrockclub.org

CEDAR VALLEY GEMS **JANUARY 2018** **VOL. 44, ISSUE 1**

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Next CVRMS Meeting

TUESDAY, January 16

Hiawatha Community Center

101 Emmons St., Hiawatha - 7:15 pm

Feature Video Program:

PBS PROGRAM DESCREPTION NOVA

Their beauty has captivated us for millennia. Their cost can be extraordinary–some are even considered priceless. Precious gems like diamonds, rubies, emeralds, opal, and jade are the ultimate treasures of the earth, and each one is made from a specific–and often torturous–recipe of chemistry, pressure, and heat. The secrets to their sparkle, color, and even strength lie deep inside the gems themselves, but could they also hold clues to one of the most enduring mysteries in the field of geology? From Tiffany's workshop in New York to the sapphire mines of Sri Lanka, from North Carolina's emerald fields to the jade-laden Forbidden City of China, join NOVA in the first episode of a 3-part series, "Treasures of the Earth," as we explore the fascinating science of gems

Ultra high precision analyses of some of the oldest rock samples on Earth by researchers provided clear evidence that the planet's accessible reserves of precious metals are the result of a bombardment of meteorites around 3.8 billion years ago when the Earth was hit by about 20 billion billion tons of asteroidal material. During the formation of Earth about 4.6 billion years ago, molten iron sank to its center to make the core. The iron took with it the vast majority of the planet's precious metals, such as gold and platinum. In fact, there are enough precious metals in the core to cover the entire surface of Earth with a 15 foot thick layer. The removal of gold to the core should leave the outer portion of Earth "bereft of bling." However, precious metals are tens to thousands of times more abundant in Earth's silicate mantle than anticipated. It has previously been argued that this serendipitous over-abundance results from a cataclysmic meteorite shower that hit Earth after the core formed. The full load of meteorite gold was thus added to the crust and mantle alone and not lost to the core. To test this theory, researchers analyzed rocks from Greenland that are nearly four billion years old. These ancient rocks provide a unique window into the composition of our planet shortly after the formation of the core but before the proposed meteorite bombardment. The researchers determined the tungsten isotopic composition of these rocks. Tungsten is a very rare element (one pound of rock contains only about one ten-millionth of a pound of tungsten) and, like gold and other precious elements, it should have sunk to the core when it formed. Scientists observed a 15 parts per million decrease in the relative abundance of the isotope 182W between the Greenland and modern day rocks. This small but significant change is in excellent agreement with concentrations required to explain the excess of accessible gold on Earth as the fortunate by-product of meteorite bombardment. The impacting meteorites were stirred into Earth's mantle by gigantic convection processes. Subsequently, geological processes formed the continents and concentrated the precious metals (and tungsten) in ore deposits which are mined today.

http://www.geologypage.com/2011/09/where-does-all-earths-gold-come-from.html

One of the most important questions gemstone dealers can answer for their customers is was the stone ethically mined and prepared. However, it is often notoriously hard to acquire stones from ethical and environmentally-friendly sources. *Gemstones Brazil* notes that the first thing to understand is that there is no industry-wide system of regulation for gemstones. The furor around blood diamonds (whereby diamond mining funds militias) led to the creation of the Kimberley Process, an initiative which aims to stem the flow of conflict diamonds. However, no equivalent exists for other gemstones, despite the fact that they are often used for the same horrific purposes. Most notorious are the Burmese ruby, used to finance the junta in Myanmar, and the Apartheid ruby, from Greenland, where Inuit peoples are being exploited for mining land without receiving any of the associated benefits. Other dangers associated with unethical mining are the catastrophic risks it can pose for the environment

Blood Diamonds from Sierra Leone

Blood Rubies from Berma

Apartheid Ruby from Greenland

(deforestation, chemical spills, river pollution), not to mention the possibility of dangers posed to local miners if health and safety regulations are not strictly adhered to. Unfortunately, the onus is still firmly on the consumer to check where their diamonds come from, but that's not an easy task, and even an experienced gemstone dealer can be deceived. *Gemstones Brazil* call themselves "*ethical producers*" because they comply with the very stringent Brazilian laws governing the industry, which require producers to earn certain certifications on a regular basis. Such natural resources are considered a state asset in Brazil, so any company, including *Gemstones Brazil*, has to prove that their extraction will be of benefit to the local people and not damage their environment in order to engage in the mining process. This includes not using child labor under any circumstances, and in fact, a 2003 Brazilian law to ensure children of low-income families are able to attend school made child labor virtually extinct in this industry.

https://www.gemstonesbrazil.com/blogs/news/117645511-what-is-an-ethical-gemstone

CVRMS Board Minutes Jan. 2

Called at 7:15 at the home of Marv Houg

Present: President Marv Houg, Dale Stout, Ray Anderson, Bill Desmarais, Sharon Sonnleitner, Bob Roper, Rick Austin

HOLIDAY PARTY: About 65 people attended the December Holiday Party. $450 was collected and split between HACAP and the Linn County Food Bank. Comments for next year: coordinate door prizes so there are only enough for 1 per person; set door prizes at tables as favors instead of drawing; run games down the middle aisle; don't use HyVee for catering; keep party social.

SHOW: Ray reported the geology chair of Beloit College would like to bring a display of the Beane crinoids to the show, but needs to talk to his department. Ray has also solicited a display from the State Museum but has not heard back yet. Ray will ask John McArdle to present a program on ZRS's collecting trip to Australia after Saturday night's catered dinner.

Bob reported he has contracts from Westside, JJ&L, ZRS, Jewel Burst, DeRosear, PV's Rocks, Crawford, Brushy Creek, Jewelry Forge, Rocks & Things, Aerie Artwork & Rockwork, Glass by Julie, Carved Opal & Obsidian, Bluestone, Hagar's Minerals & Fossils, Jeremy Dyer, and Agate & Wood. Eight are still out. Contracts are due mid-January.

There was discussion of a contract meeting Sharon had with Potique at Hawkeye Downs, which included: no food or drink may be brought in by ANYONE when their concessions stand is open; the electrical charge of $30 covers 2 plugs with 2 items per plug (i.e., 4 plugs for $30, and every device with a plug counts as an item); no beer unless it is purchased from the Downs at $3/can plus about $25 for their server (because the Downs holds the liquor license).

Suggested Raffle prizes to be secured, in addition to 2 zeolites we have, include an amethyst cathedral, large geode, mineral box, and fossil box (which includes a crinoid). Marv noted we need items for door prizes, silent auction, and pebble pit. The date for assembling egg carton collections will be set at the next Board meeting. It was the unanimous consensus of the Board that we want to have auction bid forms with a bottom tear-off to give the buyer so we can keep the rest of the form and track the amount items sell for. A form will be provided to the auction chair. It was also decided to have a pre-show meeting for all show workers Friday night before the potluck to go over expectations.

CRINOID AS STATE FOSSIL: Ray is waiting for Joe Bolkcom to produce a bill. Marv suggested having a petition at our show for people to sign.

AUCTION: The following have committed to the auction: Denny Fizer (25?), Bob Roper (30), Marv (50), Larry Krohn (150), Bob Blin (40?)

BUS TRIP: Bill will confirm the bus contract for the November Bus trip to the Milwaukee Museum. The $2236 cost for the bus will be paid by the club.

Dale made a motion to adjourn. Second by Ray. Adjourned at 9:35.

Respectfully submitted,

Sharon Sonnleitner, Acting Secretary

Voyager 1 fires thrusters for the first time in 37 years

On September 5, 1977, Voyager 1 was launched, forever changing our understanding of the solar system.

When Voyager 1's trajectory correction maneuver thrusters last fired, Ronald Reagan had *just* been elected president. Over 30 years ago, about a decade into the spacecraft's journey out to the edge of our solar system and beyond, the thrusters had officially served their purpose. The trajectory correction maneuver (TCM) thrusters sent

out little puffs of power to correct the object's course, allowing Voyager 1 to explore Jupiter, Saturn, and several moons orbiting them. After the last course correction for Saturn on November 8, 1980, the TCMs went silent. Late last year the Voyager flight team dug up decades-old data and examined the software that was coded in an outdated assembler language, to make sure we could safely test the thrusters. Late last November, NASA scientists fired them up again. And 37 years after being put out to pasture, the thrusters worked. They could even extend the mission of the invaluable space probe by several years. It took 19 hours and 35 minutes for a signal from Voyager 1 to bounce back to Earth, but after a day of waiting the scientists confirmed that the hardware had fired correctly. Although Voyager 1 won't reach another star for around 40,000 years, it remains an important vessel. It is the fastest spacecraft ever, traveling at around 11 miles per second (40,000 mph). It has traveled farther than any spacecraft. Its twin, Voyager 2, is nearly 11 billion miles away from the Sun, pushing through the last layer of our host star's influence on the space around our system. But, Voyager 1 is over 13 billion miles from the Sun, and has the incredible distinction of being the first human-made object to enter interstellar space. Voyager 1's extended mission is expected to continue until around 2025 when its radioisotope thermoelectric generators will no longer supply enough electric power to operate its scientific instruments. https://www.popsci.com/voyager-1-thrusters?CMPID=ene120517&spMailingID=32068113&spUserID=NTYxODU2MzIyMTg3S0&spJobID=1180633801&spReportId=MTE4MDYzMzgwMQS2

Spotlight Gemstones: Garnet

January's Birth Stone

Garnet, is the name used for a large group of rock-forming minerals. These complex minerals share a common crystal structure and a generalized chemical composition of $X_3Y_2(SiO_4)_3$. In that composition, "X" can be Ca, Mg, Fe^{2+} or Mn^{2+}, and "Y" can be Al, Fe^{3+}, Mn^{3+}, V^{3+} or Cr^{3+}. Despite their variable appearance, garnets are usually easy to identify by their hardness, crystal habit and occurrence in metamorphic rock. Garnets usually form at high temperature and pressure, so they typically occur in their crystal form as rounded dodecahedrons (twelve-sided) or twenty-four sided trapezohedrons with a Mohs hardness of 6.5 -7.5. The birthstone of **January**, garnets are mined in a rainbow of colors (except blue). From the fiery orange of *Mandarin Garnets* to the rich green of *Tsavorite Garnets* and to the most widely recognized color, the deep red of *Pyrope Garnets,* the garnet is considered a great gift to symbolize friendship and trust. Garnets have been used as gemstones and abrasives since the Bronze Age. All species of garnets possess similar physical properties and crystal forms, but differ in chemical composition. The different species are pyrope, almandine, spessartine, grossular (varieties of which are hessonite or cinnamon-stone and tsavorite), uvarovite and andradite. The garnets make up two solid solution series: pyrope-almandine-spessartine and uvarovite-grossular-andradite. These minerals are found throughout the world in metamorphic, igneous, and sedimentary rocks. Most garnet found near Earth's surface forms when a sedimentary rock with a high aluminum content, such as shale, is subjected to heat and pressure intense enough to produce schist or gneiss. Garnet is also found in the rocks of contact metamorphism, subsurface magma chambers, lava flows, deep-source volcanic eruptions, and the soils and sediments formed when garnet-bearing rocks are weathered and eroded. In the United States, the major industrial uses of garnet in 2012 were waterjet cutting (35%), abrasive blasting media (30%), water filtration granules (20%), and abrasive powders (10%).

What in the World?

What in the World are we looking at here,
Where in the World is it, and What's Special About It ??

December's Photo

Last month's *What in the World* image was a carved piece of cinnabar, a deep red mercury sulphide (HgS) mineral that provides much of the world's elemental mercury. Despite the brilliant color and history of use in art, trading, and as a coloring agent, cinnabar is deadly. Mercury toxicity from cinnabar has historically been a source of death in many mines around the world. Heating cinnabar results in release of mercury vapor, which is especially toxic. Absorbed mercury from cinnabar is mainly accumulated in the kidney. Long-term exposure to mercury from cinnabar may cause renal dysfunction.

Rock Calendar 2018
CVRMS Events of Interest

Jan. 16 - CVRMS Monthly Meeting
Feature Video Program
"Treasures of the Earth: Gems"
Hiawatha Community Center 7:15 pm

Feb 20 - CVRMS Monthly Meeting
Feature Program
"To Be Announced"
Hiawatha Community Center 7:15 pm

March 20- CVRMS Monthly Meeting
Feature Program
Cornell College Field Students
Hiawatha Community Center 7:15 pm

March 24-25 - CVRMS Gem, Mineral, and Fossil Show
"Crinoids; Iowa's State Fossil?"
Hawkeye Downs, Cedar Rapids

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

April 17 - CVRMS Monthly Meeting
Feature Program
"To Be Announced"
Hiawatha Community Center 7:00 pm

May 15 - CVRMS Monthly Meeting
Feature Program
"To Be Announced"
Hiawatha Community Center 7:00 pm

Sept. 15-16—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 the question. I will also try to respond to all email requests with answers to your questions, regardless of if it is chosen.

***Rona asked*:** *"Hey, Rock Doc, what are the oldest rocks in Iowa??*

Rock Doc replied: Well, that depends on how you define a "rocks in Iowa." The oldest stones in Iowa are the meteorites that have be found (or not yet found) within the State. Meteorites from 7 falls have been recovered in Iowa to date. While none of these has been age dated, many meteorites have, and most date back to the formation of the Solar System about 4.567 billion years ago. The oldest terrestrial rock in Iowa is undoubtedly an erratic stone somewhere in Iowa's glacial drift, a rock that was carried into Iowa by the glaciers from northern Minnesota or Canada. One of the oldest rocks on Earth was dated to 4.031 ±0.003 billion years, and is part of the Acasta Gneiss of the Slave craton in northwestern Canada.

Amana Meteorite 4.567 billion

Morton Gneiss 3.8 billion

While a rock from this unit has not yet been identified in Iowa, it is possible that the glaciers carried a chunk of the gneiss into the State. We have identified erratic rocks from the Morton Gneiss formation in Iowa. The Morton is exposed in the Minnesota River Valley and has been dated at 3.524 ± .009 billion years. The oldest rocks (we know about) that were actually formed within the limits of what is now Iowa were encountered in a drill core in Sioux County, northwest Iowa. Pieces of banded iron formation (BIF), called the Matlock BIF, were found within an intrusive rock, the Otter Creek Mafic Complex, the oldest Iowa rock that has actually been dated. The Otter Creek has yielded an age of 2.890 ± .009 billion, so the Matlock Banded Iron Formation must be older. Based on age determinations on BIFs in Minnesota, the Matlock BIF could be as old as 3.8 billion years.

Matlock BIF ~3.8 billion

Otter Creek 2.89 billion

Sioux Quartzite 1.62 billion

The oldest rock that was deposited in Iowa and you can see at the surface is the Sioux Quartzite, exposed at Gitchie Manitou State Preserve in northwest-most Lyon County. It is estimated that the Sioux Quartzite was deposed as a beach sand about 1.68 billion years ago. A related unit, the Washington County Quartzite was encountered in drilling near Keota. Iowa also boasts a variety of Paleozoic (530-250 million years old) rocks, including rocks deposited in the Cambrian, Ordovician, Silurian, Devonian, Mississippian, and Pennsylvanian. Mesozoic rocks in Iowa (250-65 million years) are from the Jurassic and Cretaceous, and Cenozoic rocks (65 million to present), including Neogene "Salt and Pepper" sands (usually poorly cemented) and Pleistocene (calcite cemented gravel), have been found in several areas).

Pleistocene calcite-cemented gravel ~1.8 million

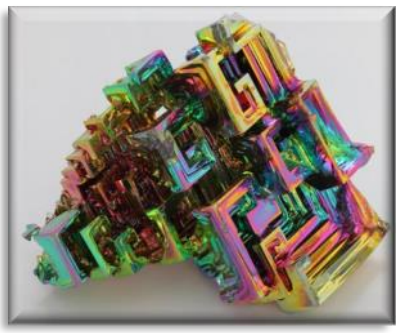
100s of Ancient Flying Reptile Eggs Found

A life reconstruction of *Hamipterus tianshanensis*, a species of pterosaur that lived in what's now China.

On the left is an artist's rendition of a family of pterosaurs. Pterosaurs terrorized the skies for more than 160 million years until they went extinct alongside the dinosaurs some 66 million years ago. They were the largest animals to have ever flown, with some like the colossal *Quetzalcoatlus* having wingspans as large as fighter jets. A cache of hundreds of eggs discovered in Lower Cretaceous rocks in China have shed new light on the development and nesting behavior of these fearsome-looking prehistoric, winged reptiles. This particular species was believed to have a massive wingspan of up to 13 feet, and likely ate fish with their large teeth-filled jaws. Researchers working in the Turpan-Hami Basin in northwestern China collected the eggs over a 10-year span from 2006 to 2016. A single sandstone block held at least 215 well-preserved eggs, most of which have kept their shapes. Prior to this discovery, only five other well-preserved pterosaur eggs had been found in this area and one had been found in Argentina. The fossils in that area are so plentiful that scientists refer to it as "Pterosaur Eden". Sixteen of those eggs contain the embryonic remains of the pterosaur species *Hamipterus tianshanensis* at different stages of growth, revealing new information about how the reptiles developed as reported in *Science* (Dec 01, 2017). The scientists used computed tomography scanning to view what was inside the eggs and determined that none of the embryos are complete. The eggs appear to have been moved from the nests in which they were originally laid, and may have been carried by water after a series of storms hit the animals' nesting ground. Many more mysteries remain about pterosaurs, such as whether the eggs were buried as they developed and how many eggs were in each clutch. Hopefully additional finds of equally spectacular fossils will help us answer such questions for pterosaurs and allow us to paint an increasingly complete picture of reproduction in these extinct species. https://news.nationalgeographic.com/2017/11/largest-pterosaurs-eggs-discovered-embryos-fossils-paleontology-science/

Facts About Bismuth

Bismuth is a brittle, crystalline, metal that is white with a slight pink tinge. It has a variety of uses, including cosmetics, alloys, fire extinguishers and ammunition. It is probably best known as the main ingredient in stomach ache remedies such as Pepto-Bismol. Bismuth, element 83 on the periodic table of elements, is a transition metal, the largest group of elements (including copper, lead, iron, zinc, and gold). However, bismuth's electric and thermal conductivity is unusually low for a metal, and it also has a particularly low melting point, which enables it to form alloys that can be used for molds, fire detectors, and fire extinguishers. Compared to other metals, bismuth is the most diamagnetic; that is, it resists being magnetized and is repelled by a magnetic field. It also has low electric conductivity; its greatest electrical resistance is when placed in a magnetic field, a trait called the Hall effect. It has a very low thermal conductivity (lower than any other metal except mercury). Bismuth burns with a blue flame and clouds of yellow oxide. When liquid bismuth freezes, it expands rather than contracts because it forms a crystalline structure similar to water. At ambient conditions bismuth shares the same layered structure as the metallic forms of arsenic and antimony, crystallizing in the rhombohedral lattice. High-purity bismuth, virtually unseen in nature, can form distinctive, colorful stair step hopper crystals with iridescent refractive hues (see photo above) and is easily grown on a kitchen stove. Until recently, bismuth was considered the heaviest element that still had a stable nucleus (non-radioactive). However, in 2003, researchers discovered that bismuth does decay into thallium, but it has an extremely long half-life: ***about 20 billion billion years (that's 20 followed by 18 zeroes)!*** Though bismuth had been known since as early as 1400, it was frequently confused with lead because it is a similarly heavy metal with a low melting point. French chemist Claude Geoffroy the Younger was in 1753 the first to prove that bismuth was distinct from lead. Naturally occurring bismuth is found in small quantities throughout Earth's crust both as a pure metal and combined with other elements in various compounds. Most bismuth is found in the mineral bismuthinite, or bismuth sulfide (Bi_2S_3). It is typically obtained as a by-product in the refining of lead, copper, tin, silver, and gold ores found in Bolivia, Peru, Japan, Mexico, and Canada.

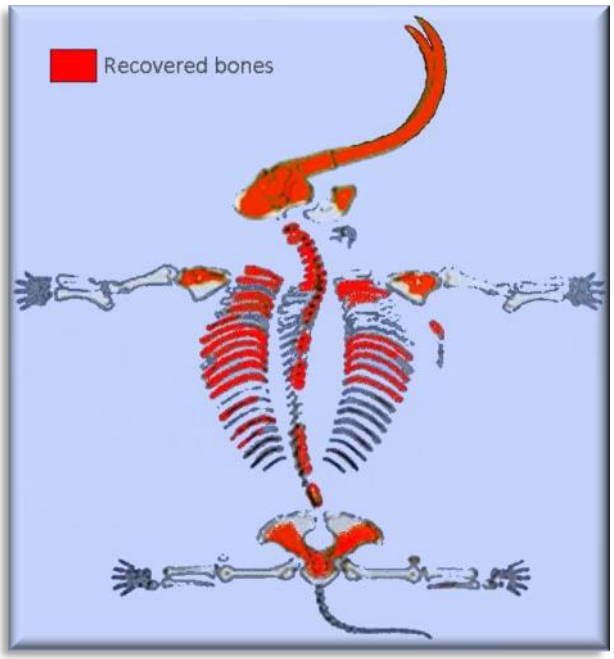


Bismuth Crystals

Evidence of Earliests North Americans Unearthed in Michigan

James Bristle operates a farm near a small town in Michigan. Early in October of 2015 he was using a backhoe to dig a trench for a drainage tile on his farm. After hitting something hard he discovered a bone, unlike any he had ever seen. It looked like a rib bone, but it was very large, larger than those of even a cow or a horse. Digging for more clues he found a second rib bone, much longer than the first one. Paleontologist Daniel Fisher from the University of Michigan Museum of Paleontology quickly identified the bones as the remains of an ice-age Mammoth. "*What's so interesting about the Bristle site is that there's a mammoth with evidence of human association at a very early date—well before Clovis times*," said Fisher, who led the Bristle dig and who is overseeing the analysis of the remains. (The Clovis culture ~13,000 years ago, are generally considered to be the earliest humans in the New World). First, they found intentional breakage of multiple skull bones *"targeted toward removal of nutritious tissues that humans might wish to harvest.*" Second, the bones and numerous boulders were preserved in fine-grained pond sediments, with no signs of a stream or other natural geologic process that could have carried the boulders or the mammoth carcass into the pond. Fisher suspects early humans butchered the carcass and placed selected portions at the bottom of the pond for storage, then used the boulders to anchor their meat stash. The third

Head with tusks of Bristle Mammoth being recovered.



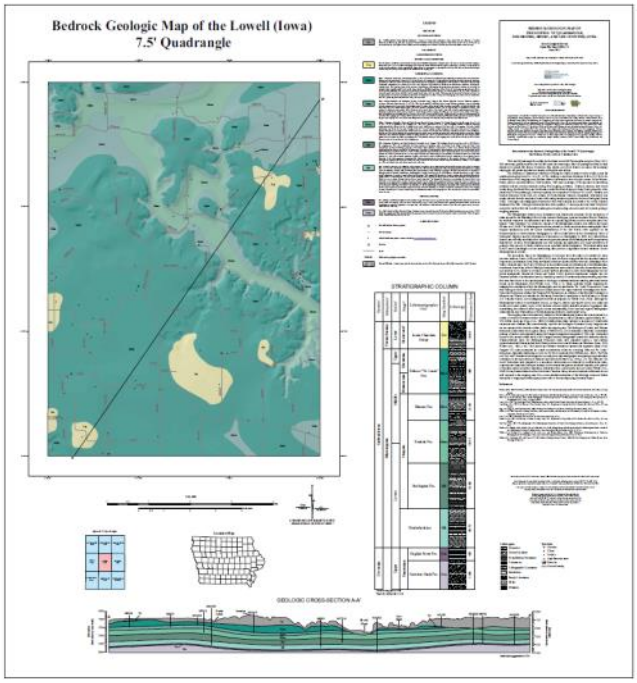
Recovered parts of Bristle Mammoth

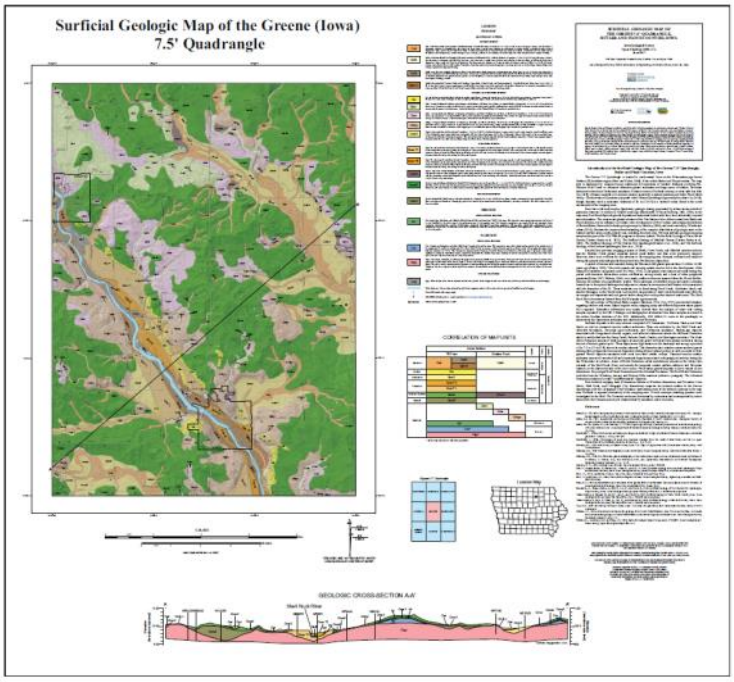
line of evidence for human involvement fits into the meat-storage scenario. Some of the recovered bones were fully articulated when found, meaning they remained in the same positions, relative to each other, as when the animal was alive. But some of these fully articulated sections were separated from other parts of the carcass, as if placed in separate piles. Such a pattern is unlikely to occur naturally but could happen if humans placed chunks of the carcass in the pond for storage. The published evidence for humans in Michigan is about 13,000 years ago, the age of the spear-wielding Clovis hunters. A single radiocarbon dating from the Michigan mammoth points to it being more than 15,000 years old. During the 2015 Bristle dig, 55 to 60 nearly complete bones from this 9 ton, mid-40s age male mammoth were found, and last October researchers returned to the site and excavated 40 more bones and bone fragments, including several vertebrae, skull fragments, an intact rib, part of a shoulder blade, a piece of the pelvis, and what appears to be part of the mandible. Over the decades, pieces from about 300 mastodons and 30 mammoths have been recovered in Michigan. The University of Michigan Museum of Natural History currently displays two mounted mastodon skeletons but has not previously exhibited mammoth bones before receiving the Bristle Mammoth.

http://ns.umich.edu/new/mammoth

What's New In Iowa Geology ??

Iowa Geological Survey 2017 STATEMAP Project Maps





Surficial and bedrock geologic maps and summary reports completed in 2017 are now available on the IGS publications page. These maps were produced as part the IGS's ongoing participation in the USGS STATEMAP program. 1:24,000 scale bedrock and surficial geologic maps were produced for two quadrangles in Floyd County and two quadrangles in southeast Iowa. These maps (as well as maps from previous years) can be found on the IGS Publications page at https://www.iihr.uiowa.edu/igs/publications/search

OFM-17-1 Bedrock Geologic Map of the Greene 7.5' Quadrangle, Butler and Floyd Counties, IA map report

OFM-17-2 Surficial Geologic Map of the Greene 7.5' Quadrangle, Butler and Floyd Counties, IA map report

OFM-17-3 B G Map of the Colwell 7.5' Quadrangle, Chickasaw, Floyd, Howard, and Mitchell Counties, IA map report

OFM-17-4 S G Map of the Colwell 7.5' Quadrangle, Chickasaw, Floyd, Howard, and Mitchell Counties, IA map report

OFM-17-5 Bedrock Geologic Map of the Lowell 7.5' Quadrangle, Des Moines, Henry, and Lee Counties, IA map report

OFM-17-6 Surficial Geologic Map of the Lowell 7.5' Quadrangle, Des Moines, Henry, and Lee Counties, IA map report

OFM-17-7 Bedrock Geologic Map of the Danville 7.5' Quadrangle, Des Moines, Henry, and Lee Counties map report

OFM-17-8 Surficial Geologic Map of the Danville 7.5' Quadrangle, Des Moines, Henry, and Lee Counties, IA map report

China Ends Ivory Trade

China's commitment to close down its ivory industry has thrown a lifeline to African elephants and brought new hope in the battle to end the poaching of tens of thousands of animals every year for their tusks. The Chinese government shut down 67 ivory carving workshops and retail outlets in March, 2017, and will have closed the remaining 105 by the end of this year, honoring a commitment President Xi Jinping first made alongside President Obama back in 2015. "*China's ban is one of the most important things that has happened to elephants in the last 10 years,"* said Iain Douglas-Hamilton, one of the world's leading elephant conservationists and founder of Save the Elephants. *"It's a highly significant step and I think the impact is increasingly being felt in parts of Africa. But although the net is tightening, the battle is not won at all*," he said. Poaching levels have dropped slightly in each of the past five years, according to research for the Convention on Trade in Endangered Species, but the total number of elephants in Africa is still thought to be declining because of illegal killings. Stronger law enforcement efforts have also pushed ivory seizures up to a record high. The wholesale price of raw ivory in China is reported to have fallen by almost two thirds in the past three years, from $1,000 per pound in 2014 to $325 in February 2017. China had been the world's biggest ivory market. Until this year, craftsmen were legally allowed to work with ivory from a stockpile imported in 2008, but that business provided cover for a vast illegal trade. Rising wealth, a growing appreciation of ivory as part of Chinese cultural heritage, its value as a status symbol and popular gift, a sense that it was an inflation-proof investment, and its use in Buddhist beads, pendants or figurines, had all combined to create a boom in the industry and a huge opportunity for global crime syndicates to exploit. At the peak of the ivory boom, in 2010-2012, more than 30,000 elephants were slaughtered every year. But the global conservation movement fought back: Instead of pointing fingers, advocates made China feel part of a joint effort to end the trade, involving source countries, transit countries and destination countries. It helped that Xi wanted to curb corruption. An intricately carved tusk in one outlet was recently reduced from nearly $1 million to around $600,000, and other items were offered with similar discounts. Ivory carving in China traces its origins to the Ming and Qing dynasties, from the 14th to the early 20th centuries, when its main consumers came from the imperial court and elite scholar-officials . https://www.msn.com/en-us/news/world/ivory-sales-in-china-finally-end-this-month-but-elephants-aren't-yet-safe/ar-BBGKU4a?li=AA4Zpp&OCID=ems.display.welcomeexperience

World's second-largest Meteorite Found in Argentina

Gancedo Meteorite being recovered in 2016.

The second-largest meteorite ever found was exhumed outside the small Argentinian town of Gancedo in September 2016. The 30-ton rock, named after the town, was discovered on September 10 and dug up by an excavation team which was shocked by its massive size. "*While we hoped for weights above what had been registered, we did not expect it to exceed 30 tons,"* Astronomy Association of Chaco president Mario Vesconi said. It is believed to have crashed to earth about 4,000 years ago as part of an iron meteorite shower covering hundreds of square miles, 600 miles northwest of Buenos Aires at a site now known as Campo del Cielo. The original asteroid is estimated to have weighed about 600 tons and entered Earth's atmosphere at 10,000 miles per hour, where it broke up into a shower of smaller meteorites, according to Scientific American. Many of the smaller meteorites have been stolen from Campo del Cielo by tourists collecting souvenirs and meteorite traffickers. Scientists say Gancedo will be reweighed to get an exact measurement. The largest meteorite ever discovered, called Hoba, crash-landed in Namibia about 80,000 years ago and weighed 66 tons. Hoba was discovered in 1920 by a farmer ploughing his field with an ox, and it remains in place as it was too large to relocate.

http://www.geologypage.com/2016/09/worlds-second-largest-meteorite-discovered-argentina.html

Rocks Needed for March Rock Show

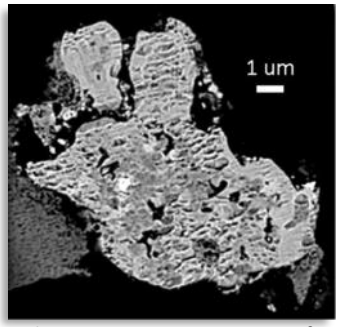
We are in need of rocks and fossil specimens for the **March 24-25 CVRMS Rock Show**. Rocks are needed for the following programs:

- **Silent Auction**—rock and fossil specimens to be auctioned
- **Door Prizes**—rock and fossil specimens to be door prizes
- **Pebble Pit**—rock and fossil specimens for children to discover

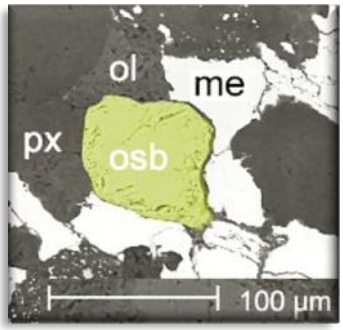
If you have specimens that you would be willing to donate for these programs please contact Marv Houg at **319-364-2868** or at **m_houg@yahoo.com**. Your help will help us to present another excellent show.

Amazing Alien Mineral Discovery

Scientists have discovered '*alien*' minerals at the site of a prehistoric meteor strike on Scotland's remote Isle of Skye.
A team of geologists examining volcanic rocks on Skye identified a mineral that has never been found on Earth before in apparent volcanic rocks. Specifically, the team found **osbornite**, (TiVN) which had previously only been seen in meteorites



Electron microscope image of osbornite collected from comet Wild 2 by the NASA Stardust.



Microscope image of osbornite (**osb**) , **ol**=olivine; **px**=pyroxene; **me** = nickel iron metal

and collected as space dust from comet Wild 2 and returned to Earth in 2006 by the NASA Stardust mission. Initially, the geologists thought that they were looking at a 60-million-year-old ignimbrite volcanic flow until they examined the rocks with an electron microprobe and found the rare space material. Because the mineral was unmelted it is believed to have originally been a piece a meteorite in impact ejecta, according to the geologists. However, they don't know where the meteorite hit. Two forms of the mineral were discovered, a vanadium-rich osbornite (TiVN) and a previously unreported, niobium-rich variety (TiNbN). An extraterrestrial origin for these minerals was strongly supported by the presence of reidite (a high-pressure zircon polymorph), which is only found naturally at sites of meteorite impacts. Barringerite [$(Fe,Ni)_2P$], baddeleyite (ZrO_2), alabandite (MnS), and carbon-bearing native iron spherules, together with planar deformation features (pdfs) and diaplectic glass in quartz, were further evidence of an impact origin. Osbornite forms at temperatures near 3,000 degrees Kelvin (5,000° F), which means it originally formed close to the hot infant sun. Since comet West 2 formed in the cold outer regions of the Solar System, the osbornite must have been collected during one of the comet's passes near the Sun. Osbornite has also been identified in meteorites. It was reported in the Isheyevo carbonaceous chondrite (CB3b), found in the Ishimbai region of Bashkortostan, Russia, in 2003. For more information see https://pubs.geoscienceworld.org/gsa/geology/article/525169/discovery-of-a-meteoritic-ejecta-layer-containing%E2%80%AC.

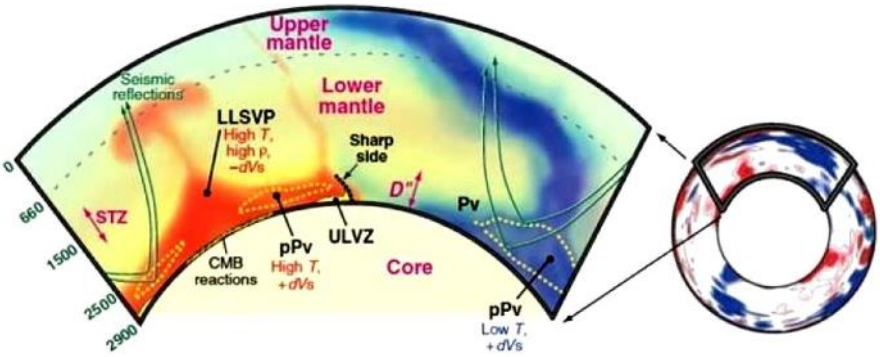
Researchers Find 'Oldest Ever Eye' in Fossil

An "exceptional" 530-million-year-old fossil contains what could be the oldest eye ever discovered, according to scientists. The remains of the extinct sea creature includes an early form of the eye seen in many of today's animals, including crabs, bees and dragonflies. Scientists made the find while looking at a well-preserved trilobite fossil. These ancestors of spiders and crabs lived in seas during the Palaeozoic era, between 541-251 million years ago. The ancient creature had a primitive form of compound eye, an optical organ that consists of arrays of tiny visual cells, called ommatidia, similar to those of present-day bees. The team's findings suggested that compound eyes had changed little over 500 million years. This exceptional fossil reveals how early animals saw the world around them hundreds of millions of years ago. Remarkably, it also revealed that the structure and function of compound eyes has barely changed in half a billion years. The right eye of the fossil, which was unearthed in Estonia, was partly worn away, giving researchers a clear view inside the organ. This revealed details of the eye's structure and function, and how it differs from modern compound eyes. The species had poor vision compared with many animals today but it could probably identify predators and obstacles in its path. Its eye consists of approximately 100 ommatidia, which are situated relatively far apart compared to contemporary compound eyes. Unlike modern compound eyes, the fossil's eye does not have a lens. Researchers believe this is likely to be because the primitive species, *Schmidtiellus reetae*, lacked parts of the shell needed for lens formation. This may be the earliest example of an eye that it is possible to find. Older specimens in sediment layers below this fossil contain only traces of the original animals, which were too soft to be fossilized and have disintegrated over time. The team also revealed that only a few million years later, improved compound eyes with higher resolution developed in another trilobite species from the present-day Baltic region.

http://www.bbc.com/news/uk-scotland-edinburgh-east-fife-42264946

Mysterious Deep-Earth Seismic Signature Explained

New research on oxygen and iron chemistry under the extreme conditions found deep inside the Earth could explain a longstanding seismic mystery called ultralow velocity zones. Published in *Nature*, the findings could have far-reaching implications on our understanding of Earth's geologic history, including life-altering events such as the Great Oxygenation Event, which occurred 2.4 billion years ago. Sitting at the boundary between the lower mantle and the core, 1,800 miles beneath Earth's surface, ultralow velocity zones (UVZ) are known to scientists because of their unusual seismic signatures. Although this region is far too deep for researchers to ever observe directly, instruments that can measure the propagation of seismic waves caused by earthquakes allow them to visualize changes in Earth's interior structure; similar to how ultrasound measurements let medical professionals look inside of our bodies. These seismic measurements enabled scientists to visualize these ultralow velocity zones in some regions along the core-mantle boundary, by observing the slowing down of seismic waves passing through them. But knowing UVZs exist didn't explain what caused them. The recent findings about iron and oxygen chemistry under deep-Earth conditions provide an answer to this longstanding mystery. It turns out that water contained in some minerals that get pulled down into the Earth by plate tectonic activity could, under extreme pressures and temperatures, split up, liberating hydrogen, and enabling the residual oxygen to combine with iron metal from the core to create a novel high-pressure mineral, *iron peroxide*. The research team believes that as much as 300 million tons of water could be carried down into Earth's interior every year and generate deep, massive reservoirs of iron peroxide, which could be the source of the ultralow velocity zones that slow down seismic waves at the core-mantle boundary. Argonne National Laboratory tested the propagation of seismic waves through samples of iron peroxide that were created under deep-Earth-mimicking pressure and temperature conditions. They found that a mixture of normal mantle rock with 40 to 50 percent iron peroxide had the same seismic signature as the enigmatic ultralow velocity zones. For the research team, one of the most-exciting aspects of this finding is the potential of a reservoir of oxygen deep in the planet's interior, which if periodically released to the Earth's surface could significantly alter the Earth's early atmosphere, potentially explaining the dramatic increase in atmospheric oxygen that occurred about 2.4 billion years ago according to the geologic record.



The movement of seismic waves through the material of the mantle allows scientists to image Earth's interior, just as a medical ultrasound allows technicians to look inside a blood vessel.

https://www.sciencedaily.com/releases/2017/11/171122131429.htm

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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. 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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