Cedar Valley Gems

Cedar Valley Rocks & Minerals Society

Cedar Rapids, Iowa

cedarvalleyrockclub.org

CEDAR VALLEY GEMS APRIL 2020 VOL. 46, ISSUE 4

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

Next CVRMS Meeting
Tues. April 21
<<VIRTUAL MEETING>>

The April 21 Rock Club will be held via **Zoom**, starting at 7:00. The only business will be 3 votes: (1) Approve cancellation of a Show for 2020; (2) Approve 2020 scholarships (Cornell $2,500, UI $3,000, VAST $1,000); (3) Approve holding a show in 2021. Also, we will debate the fate of our September Auction. The rest of the meeting will be talking, show and tell, and maybe a video

To join the meeting:

1) Go to **https://us04web.zoom.us/j/515054666**
(You can use your computer or phone/iPad or download an app) You do not have to join Zoom, and you don't have to sign in if you have already joined, to join the meeting

2a) If you signed in, clicking the URL above should take you right to the meeting. If it doesn't, follow 2b.

2b) If you did not join Zoom or are not signed in,

- Click **Join A Meeting**.
- Type in the **Meeting ID (515 054 666)** and follow the prompts

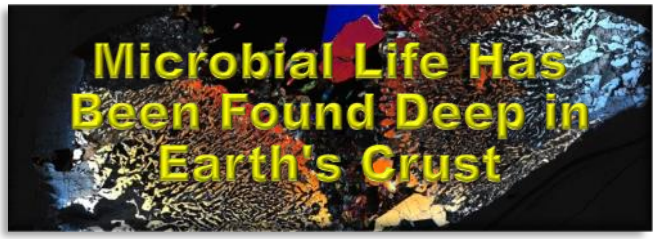
3) You can join about 15 min. in advance and be in a waiting room, where you should be able to talk to anybody else that is in the waiting room.

4) You will be able to see and hear everyone if you are in **Gallery View**. If you are in **Active Speaker View**, you can still hear everyone, but will only see the current speaker on your screen.
INFO FROM THE INTERNET (we have not tested this to make sure it works on all devices):

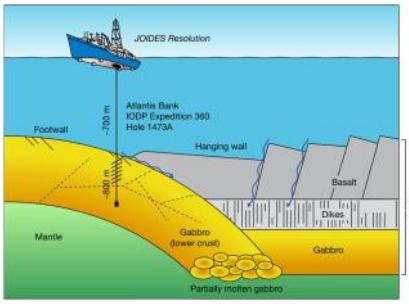
- **If you join from a phone:** The **Zoom** mobile app on Android and iOS supports active speaker or gallery view. J**oin** a meeting. By default, the **Zoom** mobile app displays the active speaker view. If one or more participants **joins** the meeting, you will **see** a video thumbnail in the bottom-right corner. Swipe left from the active speaker view to switch to gallery view.
- **If you join from a computer:** an icon at the upper right of the screen will say either **Gallery** (which means you're in active speaker view) or **Active Speaker** (which means you're in Gallery View). If you want to see everybody all the time, be sure you are in **Gallery View** (so Active Speaker is showing)

5) Be sure you are **away from TV**, radio and other noises .

Sharon Sonnleitner is inviting you to a scheduled Zoom meeting.
Topic: Rock Club April
Time: Apr 21, 2020, 07:00 PM Central Time (US and Canada)



Life can often seem rare and fragile, but we living things have well and truly infiltrated Earth. Chinese scientists analysed rock samples drilled from Atlantis Bank, an undersea ridge in the Indian Ocean. Here, a fault movement exposed the lower crust to the ocean above, allowing scientists easier access to a geological layer usually locked beneath upper-crust basalts. Nestled within the coarse, cooled magma called gabbro, 2,400 feet below the ocean floor, the researchers detected sparse but diverse microbes, somehow managing to cling on to existence in this harsh darkness. These organisms include *Chroococcidiopsis*, species of cyanobacteria known for their ability to live in extreme conditions (extremophiles), and *Pseudomonas* bacteria, known for the many different ways they can metabolize energy. A number of extremophiles are autotrophs (organisms that produce their own food like plants do by photosynthesizing sunlight). Some of the microbes also have the ability to store carbon in their cells, while others can extract it from tough molecules called polyaromatic hydrocarbons. Whether similar life is present elsewhere in this geological layer remains to be seen, since other regions of Earth's lower crust would not have such access to the same water-carried nutrients. However, evidence of life this deep does enlarge the scope of Earth's carbon cycle. https://www.sciencealert.com/microbes-survive-in-the-extremes-of-earth-s-lower-crust-by-recycling



Oceanic crust at the Atlantis Bank drill site

CVRMS Mar. 17 Meeting

»»» CANCLED «««

What Is Granite Rock & How Is It Formed?

Granite is a common type of granular and phaneritic (made up entirely of crystals) felsic intrusive igneous rock. Granites, depending on their mineralogy, can be predominantly white, pink or gray in color. In reference to the coarse-grained structure of such a holocrystalline rock, the word "*granite*" comes from the Latin *granum*, a grain. Strictly speaking, granite is an igneous rock with a volume of between **20% and 60% quartz** and at least **35% of the total feldspar** consisting of **alkali feldspar**, although the term "granite" is commonly used to refer to a wider range of coarse-grained igneous rocks with quartz and feldspar. The term "*granite*" is used for granite as well as a group of intrusive igneous rocks with similar textures and slight variations in composition and origin. These rocks consist mainly of feldspar, quartz, mica, and amphibole minerals, forming an interlocking, somewhat equigranular feldspar and quartz matrix with dispersed darker biotite mica and amphibole (often hornblende) peppering the lighter minerals. Granite is almost always massive, hard and tough (i.e. without any internal structures). Throughout human history, these properties have made granite a widespread building stone. The average granite density ranges from 2.65 to 2.75 g / cm3 (165 to 172 lb / cu ft), its compressive strength is usually above 200 MPa, and its viscosity near STP is 3–6·1019 Pa·s. Granite is more common in continental crust than in oceanic crust and has a felsic composition. Granites are crystallized from felsic melts that are less dense than mafic (iron- and magnesium-rich) rocks and therefore tend to ascend to the surface. Mafic rocks, on the other hand, either basalts or gabbros, once metamorphosed at eclogite facies, tend to sink under the Moho into the mantle.

http://www.geologypage.com/2019/05/granite-rocks.html

CVRMS Board Minutes Mar. 31

Virtual Meeting

MEETING CALLED TO ORDER: by Marv Houg 7:15p.m.

MEMBERS PRESENT: Marv Houg, Dale Stout, Ray Anderson, Sharon Sonnleitner, Kim Kleckner, Jay Vavra, Del James, Bill Demarais, and Toby Jordan .

2020 SHOW-CANCELLED: **Should we reschedule?:** After a reschedule/cancel debate it was decided not to reschedule the 2020 show. Instead we will go with the same "Meteorites" topic for next year's show on March 27-28, 2020. motion by Ray, second by Dale, passed unanimously

2020 SCHOLARSHIPS: After a discussion it was decided to reduce our scholarships for 2020 to:

University of Iowa Geology—$2500
Cornel College Geology—$2000
V.A.S.T.—$1000

motion by Bill, second by Kim, passed unanimously
will be voted on by Members via email

FUTURE SOCIETY MEETINGS: after a discussion it was decided to try a virtual meeting on ***Zoom*** on Apr. 21 and if successful, continue that format for the future. Members will be contacted by email with instructions on how to join the online meeting

2020 BILL'S BUS TRIP: Plan to run the trip if "all clear". Start sign-up on May 1, non-members on Sept 1.

2020 PICNICS: Wait to see if "all clear" before deciding.

2020 AUCTION: Continue planning. Wait to see if "all clear" before deciding to deciding to cancel or not.

CRINOID AS STATE FOSSIL: No information.

OTHER ITEMS: River Products display case on hold for now.

ADJOURNMENT: Bill moved to adjourn, Del seconded, Meeting Adjourned 8:00 pm

Respectfully Submitted:
Ray Anderson, acting Secretary

Early Earth

A Message from CVRMS President Marv Houg

My first question is, how is everyone doing? I hope that everyone is taking care of themselves and making sure they are following all the recommendations to minimize your chance of exposure to the coronavirus.

By the time you read this, we should be celebrating another successful show, knowing that our hard work resulted in another great show with great attendance, great programs, and happy dealers. Unfortunately, we will never know how successful our show could have been. Based on what was happening with the rapid escalation of this virus, we had to make a quick and early decision to cancel the show in order to get everyone notified in time and cancel certain arrangements we had made. As it turned out, this was an appropriate and timely decision with many cancellations and banning of large gatherings coming shortly after. An enemy that is so small you need a good microscope to see it has wreaked havoc not only with our plans and those of our dealers and attendees but has caused widespread damage to our country and the world. For our members we can only speculate how the show would have gone and dream of those great finds that we might have had if the show continued.

The big question is, where do we go from here? Unlike businesses that must sell a product to survive, we are an organization that does not require a continuous stream of income to survive. Our biggest expenses, not counting building rentals for the show and auction, are our scholarships, MWF dues and insurance, printing and mailing of our newsletter, and the bus rental. With dues covering our MWF costs and printing costs and the show and auction covering our scholarships and bus trip, we are in good financial condition. The bottom line is we will survive this setback and come back strong. This comeback may not be on the time schedule we would hope for, but it will happen.

At this time planning is difficult simply because no one knows for sure how long this coronavirus will last. A big question is: do we try to reschedule the show for later in the year or do we wait a year for our 2021 show? Our auction is our 2nd biggest event behind our show, so planning a show and auction close together could be somewhat of a challenge. At this time, we are hoping that we can still go ahead with the auction. Obviously, the effect this pandemic has on our economy could also have an impact on our auction if people are reluctant to buy things. But we need hope and optimism that things will get better, so we will keep up our planning for the auction and monitor the situation over the next few months.

Another big question is the status of our regular meetings and picnics. We still have the April and May meetings before we start the summer picnics in June. With the Hiawatha Community Center closed through April, our April meeting will be held online using ***Zoom***. The only business will be to vote on the following three items: **(1.)** Approve cancellation of a Show for 2020; **(2.)** Approve 2020 scholarships (Cornell $2,000, UI $2,500, VAST $1,000); **(3.)** Approve holding a show in 2021, and to discuss whether or not to cancel our auction. The rest of the meeting will be talking, show and tell, and maybe watching a video. At this time, I would speculate that the corona virus problem will not be resolved before the May meeting scheduled for our Hiawatha location. We will wait for a few weeks before we decide what to do for the May meeting and the picnics we normally hold in the summer months.

As noted earlier, planning is very difficult. Things may change for the good or get worse. We can only hope that things will improve, and we can start returning to some semblance of normalcy. In the mean- time, please observe the social separation that the medical personnel are recommending. I hope we can stay in contact through either emails or Facebook or whatever platforms you use. Your Board will keep meeting via ***Zoom*** so we can continue our planning for future events, but if anyone has any questions please feel free to email a Board member or call me at 319-350-9435.

Thanks, and stay safe

Marv

What in the World?

What in the World is this ferocious looking creature?

March's Photo

March's **What in the World?** photo was the 15.5 ton Willamette Meteorite. Found in the Upper Willamette Valley near present-day Portland, Oregon, the iron-nickel stone is the world's 6th largest meteorite and the largest ever found in the US. The meteorite is believed to have been transported to the valley about 13,000 years ago by the Missoula Floods, the massive glacial floods that created the Channeled Scablands. The Clackomas Indians named the stone "*Tomanowos*" (a revered spiritual being that has healed and empowered the people of the valley since the beginning of time). They believed that *Tomanowos* came to the valley as a representative of the Sky People. Rainwater that collected in its natural basins served the people as a powerful purifying, cleansing, and healing source, and tribal hunters dipped their arrowheads it the water to gain power. After being moved to several sites the meteorite was donated it to the American Museum of Natural History in New York City, where it has been on display since 1906. In 1999 a confederation of Native American Tribes sued to have the sacred meteorite moved back to Oregon, but a settlement was reached that provides the tribe access to the stone once a year for religious ceremonies.

Rock Calendar
CVRMS EVENTS OF INTEREST

2020

Apr. 17-19 —MAPS Expo. XLII
"World's Largest Fossil-Only Show"
»»» CANCELLED «««
Sharpless Auctions
Iowa City

Apr. 17 —CVRMS Monthly Meeting
Virtual Meeting
see Page 1 for information

May 17 —CVRMS Monthly Meeting
?? Virtual Meeting ??

June. 18 - CVRMS Pot Luck Picnic
Ellis Park Overlook Shelter
???? CANCELLED ????

Sept. 19-20—CVRMS Rock Auction
Amana RV Park and Event Center
Amana, Iowa
https://www.cedarvalleyrockclub.org/auction.html

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.

The other day I polished a sample of amethyst in matrix that my friend Ryan Clark collected east of Thunder Bay for me. Rona liked is so much that she said I could bring it in the house (most of my rocks have been exiled to my shop in the barn). So I thought that it might be interesting to discuss the geology of amethyst and its occurrence near Thunder Bay.

Ray's polished sample of Thunder Bay amethyst on Hilma Lake Granite collected by Ryan Clark.

The word "*amethyst*" comes form the Greek word "*amethystos*" meaning not-drunken. According to Greek legend the god Dionysus was angered by an insult and vowed to set tigers on the first person he encountered. That person turned out to be a young girl named Amethyst who was on her way to the shrine of the goddess Diana. When the tigers attacked, Amethyst prayed to Diana for assistance, so the goddess turned her into rock crystal to protect her. Ashamed of his anger Dionysus poured an offering of wine to the rock-crystal maiden, turning the crystal purple. The legend fostered the belief that amethyst prevented drunkenness, so Greeks drank their wine from amethyst cups. Today, spiritualists believe that amethyst also controls evil thought and promotes love; it increases intelligence and shrewdness in business, protects soldiers from harm, assists hunters, and protects the wearer from contagious diseases. Thunder Bay amethyst has been known since the mid-1800s when deposits were discovered by silver prospectors. It has been mined in the area since the early 1880s, and today numerous small mines produce amethyst. In the Thunder Bay area amethyst is associated with a series of vein and fracture systems within Archean rocks of the Quetico and Wawa subprovince (~2700 million years old—Ma) and in rocks of the Proterozoic Animikie (2200-1900 Ma) and Sibley (1339 Ma) groups. The age of the amethyst mineralization is not well understood. Recent research suggests that the mineralization is associated with diagenesis and settling of the Sibley Group sediments, with metal-bearing brines formed when expelled connate waters mobilized metals from the Sibley Group sediments and (or) from the weathered granitic basement rocks below the Archean-Proterozoic unconformity. At least two phases of amethyst crystallization, separated by a period of brecciation, are present. The older sequence, deposited by fluids ~132°C, contains five stages of quartz growth, the latter two of which were originally amethyst, but were thermally bleached to prasiolite (green quartz) by the influx of hot solutions that deposited the younger sequence of quartz. The younger sequence contains five and occasionally six stages of deposition, beginning with a stage of chalcedony and a stage of colorless quartz, followed by amethyst, deposited by ~68°C fluids. The final growth zone in many areas contains abundant hematite inclusions, sometimes as scattered blotches but often as a blood-red coating. This material with the hematite inclusions has been called "*Thunder Bay red*". Milky white chalcedony may also coat the amethyst. The purple coloration of the quartz in amethyst is due to the presence of iron in the mineral. But it is not that simple. The iron is present in interstitial positions with respect to the SiO_2 framework and the presence of aluminum and sodium or lithium atoms is required. Also, uranium, thorium, or ^{40}potasium is required to produce the radiation that created defects in the iron. The source rocks for these mineralizing fluids must be deposited an a shallow environment to insure that the iron is in Fe^{3+}, then the mineralizing fluids must be mobilized by hot fluids that transform the iron to Fe^{4+} required to produce the purple color. In some areas the amethyst veins may be spatially associated with silver-calcite veins that may include calcite, barite, galena, sphalerite, fluorite, and silver minerals. The amethyst samples that Ryan collected from an exposure along the Trans-Canada highway east of Thunder Bay were from brecciated Archean granite (the Hilma Lake Granite—actually a monzonite) that crystallized about 2700 Ma. Mineralization on the brecciated Hilma Lake began with a layer of clear quartz overlain by amethyst crystals.

"I hope that everyone stays safe and sane in these isolating times. Stay home and enjoy your rocks!" . . . . . Rockdoc Ray

Topaz is a silicate mineral composed of aluminium and fluorine with the chemical formula $Al_2SiO_4(F, OH)_2$. Topaz crystallizes in the orthorhombic system, and its crystals are mostly prismatic terminated by pyramidal and other faces. Topaz is usually colorless in the absence of impurities. It is one of the hardest naturally occurring minerals (Mohs hardness of 8) and is the hardest of any silicate mineral. The common impurity found in topaz is iron, but iron does not impart any color directly to topaz as chromium impurities do in rubies, which impart the red color. In rubies the chromium atoms are excited directly by absorbing visible photons of light. The chromium atoms that jump to an excited state emit light in the red region of the visible spectrum when they return to their ground states. In the case of topaz the iron atoms create an-

other unstable species in the crystal, and this new species jumps to an excited state by absorbing a visible photon of light, which emits light from different regions of the spectrum depending on their wave length, when they return to the ground state, giving rise to the variety of colors found in topaz, including the golden yellow or golden brown color of the "*American Golden Topaz*." The unstable species created by the iron atoms are known as "*Color Centers*." Naturally colored topaz such as yellow, orange and brown topaz contain color centers that are stable to light. If a colorless topaz is irradiated by ultraviolet light, x-rays, gamma rays or high energy electrons, it may become a yellow, orange or brown color, but this color is usually unstable and fades in a few days in light. However blue topaz produced by irradiation produces color centers which are stable like the color centers of natural blue topaz, and therefore does not fade in light. These color centers can only be destroyed by heating, when the topaz becomes colorless again.
http://www.geologyin.com/2019/10/what-causes-color-in-topaz.html

The earliest known ancestor of most familiar forms of animal life living on the planet today appears to have been identified in outback Australia, revealing a strange, worm-like organism that deserves our respect and gratitude. *Ikaria wariootia*, a sluggish blob about the size of a grain of rice, might not look like much, but scientists think it could be the oldest example

ever discovered of bilaterians; animals with bilaterally symmetrical bodies (mirrored left and right sides) and a front side and back side, usually sporting a mouth and an anus. Like us, in other words. In recent years, scientists have learned a lot about the spongy, slimy multicellular organisms that make up what's known as the Ediacaran biota – a mysterious group of ancient life-forms who existed before the Cambrian explosion. One of these creatures in particular, called *Dickinsonia*, has drawn a lot of attention among researchers, being identified a couple of years ago as the world's earliest known animal in the fossil record. Not everything that emerged in this period is directly related to humans, though, nor to all the other animals with bilateral physiology. *Dickinsonia* and other big things were probably evolutionary dead ends. *Ikaria wariootia*, takes its name from the Adnyamathanha language used by the indigenous custodians of the Flinders Ranges region, with '*Ikara*' meaning 'meeting place', and '*wariootа*' being named for Warioota Creek, which runs in the area. 3D scans of the Australian rocks containing *Ikaria wariootia*, revealed impressions made by over a hundred of the ancient animals, ranging in between 2-7 millimeters long and about 1-2.5 millimeters wide. *Ikaria* morphology implies a potentially modular body construction, which would have aided in muscular organization required for peristalsis [digestive system contractions]. Sediment displacement and scavenging reveal that *Ikaria* likely had a coelom, mouth, anus, and through-gut, although these are unlikely to be reproduced in the fossil record. *I. wariootia*'s trace fossils occur stratigraphically lower than other Ediacaran biota records in the Ediacara site, suggesting this simple, worm-like creature, with a cylindrical body and distinct head and tail ends, pre-dates other animals in the region, let alone anything with this kind of bilaterian complexity. Because humans are bilaterians, we can say that this was a very early relative and possibly one of the first on the diverse bilaterian tree of life.
https://www.sciencealert.com/strange-worm-like-blob-may-be-earliest-known-ancestor-of-all-animals-like-you-and-me

Earth May Have Been a 'Waterworld' Without Continents 3 Billion Years Ago

"An early Earth without emergent continents may have resembled a 'water world,' providing an important environmental constraint on the origin and evolution of life on Earth as well as its possible existence elsewhere," geologists Benjamin Johnson and Boswell Wing. wrote in a paper just published online by the journal *Nature Geoscience.* Their work on the project started when they learned about the well-preserved, 3.2-billion-year-old ocean crust from the Archaean eon in a remote part of the state of Western Australia. After sampling the rock and examining existing data, they created a cross-section grid of the oxygen isotope and temperature values found in the rock. With two-dimensional grids based on whole-rock data, they created an inverse model to come up with estimates of the oxygen isotopes within the ancient oceans. The result: Ancient seawater was enriched with about 4 parts per thousand more of a heavy isotope of oxygen (oxygen with eight protons and 10 neutrons, written as ^{18}O) than an ice-free ocean of today. The scientists suggest two possible explanations for the anomaly: Water cycling through the ancient ocean crust was different than today's seawater with a lot more high-temperature interactions that could have enriched the ocean with the heavy isotopes of oxygen. Or, water cycling from continental rock could have reduced the percentage of heavy isotopes in ocean water. The idea that water cycling through ocean crust in a way distinct from how it happens today, causing the difference in isotope composition "*is not supported by the rocks,*" Johnson said. "*The 3.2-billion-year-old section of ocean crust we studied looks exactly like much, much younger ocean crust.*" Johnson said the study demonstrated that geologists can build models and find new, quantitative ways to solve a problem -- even when that problem involves seawater from 3.2 billion years ago that they'll never see or sample. And, he said that these models inform us about the environment where life originated and evolved: "*Without continents and land above sea level, the only place for the very first ecosystems to evolve would have been in the ocean.*"

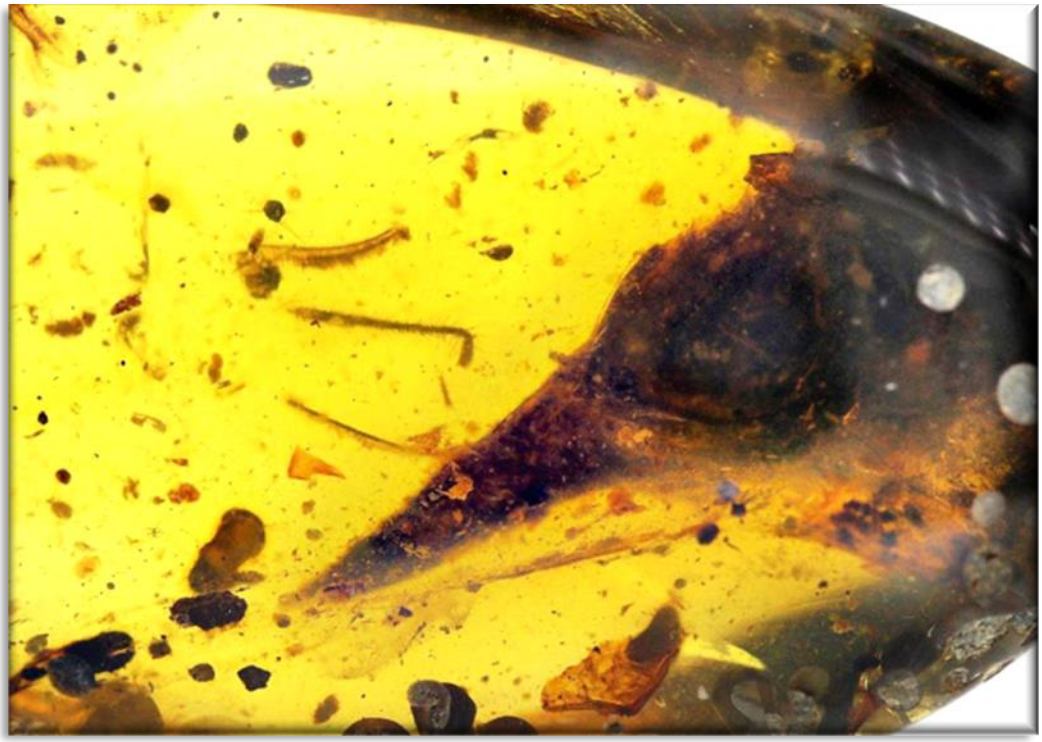
http://www.geologyin.com/2020/03/earth-may-have-been-waterworld-without.html

Spotlight Gemstone: Diamond

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

Smallest-ever Fossil Dinosaur Found Trapped in Amber

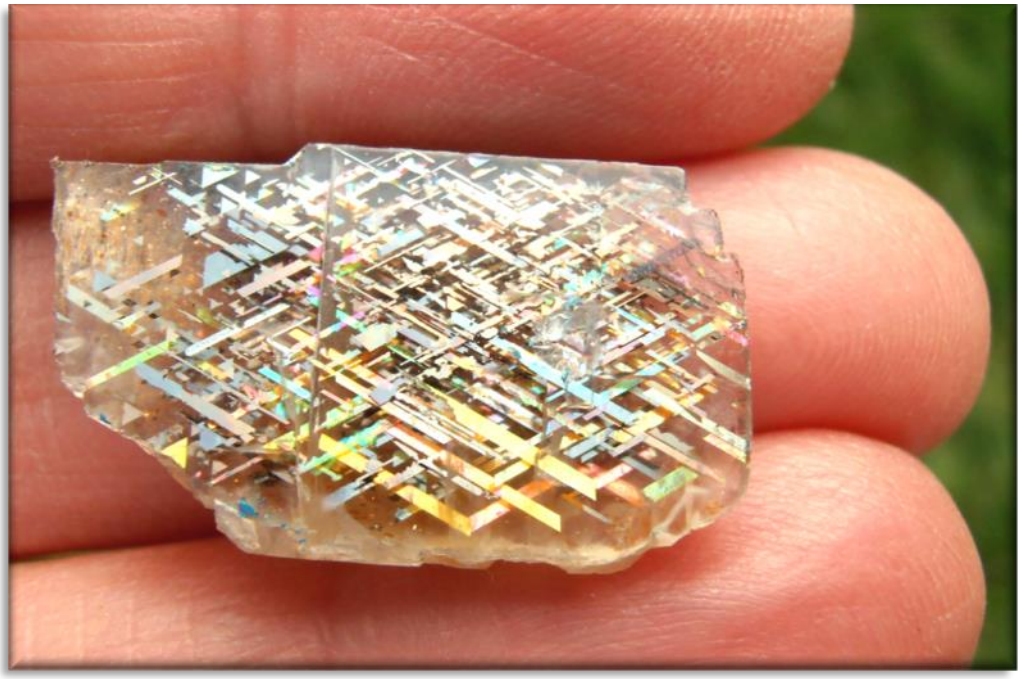
The world's smallest dinosaur was discovered, preserved in 99-million-year-old amber, in northern Myanmar. The head of a flying dinosaur that is hardly bigger than a bee hummingbird has been discovered in 99-million-year-old amber. The piece of polished amber, just 1¼" by ¾" by ⅓", was found in Kachin Province of northern Myanmar, an area becoming increasingly well-known for its remarkable amber-encased fossils. This exciting little fossil micro-dinosaur named *Oculudentavis khaungraae* is from the middle of the Cretaceous period, from a stage known as the Cenomanian. The skull looks remarkably bird-like and a number of features suggest *Oculudentavis* is related to the early ancestors of modern birds. The fossil also appears to have preserved some of the dinosaur's original bodily material. The researchers from China and the US who studied the fossil subjected it to CT analysis (computed tomography, which uses X-rays to produce a series of cross-section images of a specimen) to examine the internal structure. But the amber is sufficiently clear that many of the features can be seen with the naked eye and a hand lens. *Oculudentavis* has a long slender beak, a mouthful of needle-sharp teeth and massive eyes. Unlike most fossils, in which the original material is replaced by other minerals, the skull still appears to be composed of actual bone, although its microstructure and possible cell content have yet to be analyzed. Some of the skin of the palate and the tongue is also preserved, including the small pointed papillae on its surface. In modern passerine birds such as the robin, these tongue bumps are directed backwards and prevent prey escaping from the mouth. There do not appear to be any feathers preserved, but some of the organic material decayed to produce what is now a yucky mess (who would think that such things could be fossilized?) Sadly the rest of the animal's body is not preserved. Perhaps it exists in another amber fragment awaiting discovery. One particularly revealing feature is the skull's huge orbit (eye socket). A circle of tiny bony plates known as a sclerotic ring is arranged within the orbit, forming a cone with an inner circle that indicates the creature would have had a very small pupil. This kind of eye is typical of many lizards of today that are active during the day and sleep at night, suggesting that *Oculudentavis* had a similar "diurnal" schedule. The discovery is incredibly exciting for a number of reasons. Without a doubt this is a dinosaur, but one that sits on the early part of the evolutionary tree that leads to modern birds. In fact, the authors' analysis suggests that it is quite close to the most famous of all bird-dinosaurs, Archaeopteryx, which dates to the earlier Late Jurassic period around 150 million years ago and has been called the first bird. *Oculudentavis* is also incredibly small. In fact, with a skull just ½" long, it must rank as the smallest of any dinosaur. The discovery of *Oculudentavis* is all the more fascinating because it was found in amber. Almost all fossils are formed from the hard remains of animals and plants: bones, teeth, shells and wood. But the amber has preserved some of the soft tissues of the dinosaur, making it a very unlikely fossil. The fossilized remains of *Oculudentavis* will be rich in all sorts of chemical decay products that can often be traced back to original biomolecules. But unfortunately it is doubtful that any DNA remains. DNA is such a delicate molecule that it rarely survives more than a few thousand years in humans, perhaps as much as 17,000 years in other animals and just maybe around a million years in fossilized bacteria. One day a complete dinosaur might be found in amber. Well, we now have a head and a tail. It's just a body that is missing. http://www.geologyin.com/2020/03/smallest-ever-fossil-dinosaur-found.html



The head of *Oculudentavis khaungraae*, the world's tiniest dinosaur, preserved in amber.

Rainbow Lattice Sunstone

The feldspars are a family of silicate minerals which occur in igneous rocks. They contain variable amounts of Na, K and Ca and are divided in two solid solution series: *plagioclase* (albite – anorthite) and *alkali feldspar* (orthoclase – albite). Both orthoclase and plagioclase include a sunstone feldspar variety, however, the name '*sunstone*' refers to the gem's appearance rather than to its chemical makeup.



"Rainbow Lattice Sunstone" is a type of orthoclase feldspar (75% orthoclase and 25% albite), a rare gem feldspar that exhibits both optical effects of ***aventurescence*** and ***adularescence***, with the added presence of oriented elongate and triangular mineral platelets. These elongate and triangular mineral platelets (made of hematite, ilmenite, magnetite, native copper or goethite) can make up geometric patterned inclusions. The minerals form very thin blades that occur within planes of a single orientation at different levels in the feldspar (like pages in a book). The magnetite iron oxide which creates the lattice effect forms as very thin blades that occur on one plane but oriented in different directions by a process known as lamellar twinning and "sagenitic twinning. The magnetite inclusions in many cases have been naturally oxidized or altered to give the iridescence or rainbow effect across the lattice patterning. The magnetite that has no alteration remains black with a metallic sheen. The magnetite also forms equilateral triangles and the triangular terminations on the lattice patterns. The scattered reddish-brown platelets show pseudo hexagonal and rhomb-shaped morphology. Small particles produce a reddish or golden sheen, while larger inclusions create an attractive, glittery appearance. When properly oriented, these inclusions take on a visible iridescence that give them a rainbow type coloration. *Aventurescence*, is a 'sparkly, metallic-looking luster caused by flat, reflective inclusions. *Adularescence* is the term applied to gems such as moonstone that exhibit a sheen or schiller effect caused by the intergrowth of two different feldspars. The colors seen in such material depend on the thickness of the layers involved, with the thicker ones giving rise to colors from the red end of the spectrum and the thinner ones colors from the blue end. The typical *aventurescence* or "sunstone effect" can often best be seen with magnification. The lattice-forming inclusions in the sunstone consisted of orangey brown to black elongate and triangular plates. It is rare for *aventurescence* to occur together with *adularescence*, and the material is made even more interesting when you add the presence of the colorful lattice. This unique mineral is from a rather small discovery in the Hart Range Area, in Australia's Northern Territory. The Harts Range comprises a complex assemblage of granite gneiss, marble, calc-silicate, amphibolite, psammite and pelite that have been metamorphosed to upper amphibolite to granulite facies. The metamorphosed sedimentary rocks are intruded mainly by granite, granodiorite and metamorphosed mafic rocks of uncertain origin. Rainbow Lattice Sunstone was first discovered in late 1985 by Darren Arthur and Sonny Mason, on a small claim owned by Mason. The original source is located at what is now known as the "Rainbow Serpent Mine", in a remote area of desert named the Mud Tank Zircon Field, located in in the Harts Range northeast of Alice Springs in the Northern Territory of Australia. There is reportedly another rainbow lattice sunstone occurrence a little more than 4 miles away, but it produces lower-quality material. The owner of the mining lease on the Rainbow Lattice Sunstone property called it a "*very finite deposit*" that "*rarely*" provides good size and the fine quality needed to cut the best gems. "*Indications are that over 90 percent of what we will mine will only suit the metaphysical and collector's market,"* with only a small amount of gem quality being produced per day.

https://www.nationaljeweler.com/blog/6540-5-things-to-know-about-rainbow-lattice-sunstone

Fossil of 67m-year-old Raptor Dinosaur Found in New Mexico

A new feathered dinosaur that lived in New Mexico 67 million years ago is one of the last known surviving raptor species, according to a new publication in the journal ***Scientific Reports***. *Dineobellator notohesperus* adds to scientists' understanding of the paleo-biodiversity of the American Southwest, offering a clearer picture of what life was like in this region near the end of the reign of the dinosaurs. In 2008, geologists found fossils of the new species in Cretaceous rocks of the San Juan Basin, New Mexico. The team collected the specimen on U.S. federal land under a permit issued by the Bureau of Land Management. The entire specimen was recovered over four field seasons. The scientists gave the species its official name, *Dineobellator notohesperus*, which means "Navajo warrior from the Southwest," in honor of the people who today live in the same region where this dinosaur once dwelled. *Dineobellator,* as well as its Asian cousin *Velociraptor*, belong to a group of dinosaurs known as the dromaeosaurids. Members of this group are commonly referred to as "raptor" dinosaurs, thanks to movies such as "Jurassic Park" and "Jurassic World." But unlike the terrifying beasts depicted in film, *Dineobellator* stood only about 3.5 feet at the hip and was 6 to 7 feet long--much smaller than its Hollywood counterparts. Features of the animal's forelimbs, including enlarged areas of the claws, suggest this dinosaur could strongly flex its arms and hands. This ability may have been useful for holding on to prey--using its hands for smaller animals such as birds and lizards, or perhaps its arms and feet for larger species such as other dinosaurs. Its tail also possessed unique characteristics. While most raptors' tails were straight and stiffened with rod-like structures, *Dineobellator's* tail was rather flexible at its base, allowing the rest of the tail to remain stiff and act like a rudder. Think of what happens with a cat's tail as it is running. While the tail itself remains straight, it is also whipping around constantly as the animal is changing direction. A stiff tail that is highly mobile at its base allows for increased agility and changes in direction, and potentially aided *Dineobellator* in pursuing prey, especially in more open habitats. This new dinosaur provides a clearer picture of the biology of North American dromaeosaurid dinosaurs, especially concerning the distribution of feathers among its members. "As we find evidence of more members possessing feathers, we believe it is likely that all the dromaeosaurids had feathers," the researchers said. The discovery also hints at some of the predatory habits of a group of iconic meat-eating dinosaurs that lived just before the extinction event that killed off all the dinosaurs that weren't birds.

Illustration of three *Dineobellator* near a water source, with the *ceratopsid Ojoceratops* and sauropod *alamosaurus* in the background.

http://www.geologyin.com/2020/03/fossil-of-67m-year-old-raptor-dinosaur.html


BILL'S BIG BUS BOOGY 2020
CVRMS Field Trip • October 3
GEOLOGY MUSEUM
U. of Wisc Geology Museum
Madison, WI
Geology Museum
Burpee Museum of Natural History
Rockford, IL
Sign Up Begins May 01
Non-Members Sept 01

2020 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
Treasurer	Dale Stout (dhstout55@aol.com)	365-7798
Secretary	Dell James (cycladelics@msn.com)	446-7591
Editor	Ray Anderson (rockdoc.anderson@gmail.com)	337-2798
Liaison	Kim Kleckner (ibjeepn2@gmail.com)	560-5185
Imm. Past Pres.	Sharon Sonnleitner (sonnb@aol.com)	396-4016
Director '20	Jay Vavra (vavrajj@gmail.com)	447-9288
Director '21	Bill Desmarais (desmarais_3@msn.com)	365-0612
Director '22	Toby Jordan (rejordan79@msn.com)	360-2762
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 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

Ray Anderson, Editor
2155 Prairie du Chien Rd. NE
Iowa City, Iowa 52240-9620