Cedar Valley Gems

Cedar Valley Rocks & Minerals Society

Cedar Rapids, Iowa

cedarvalleyrockclub.org

CEDAR VALLEY GEMS JANUARY 2020 VOL. 46, ISSUE 1

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

Next CVRMS Meeting Tues. Jan. 21

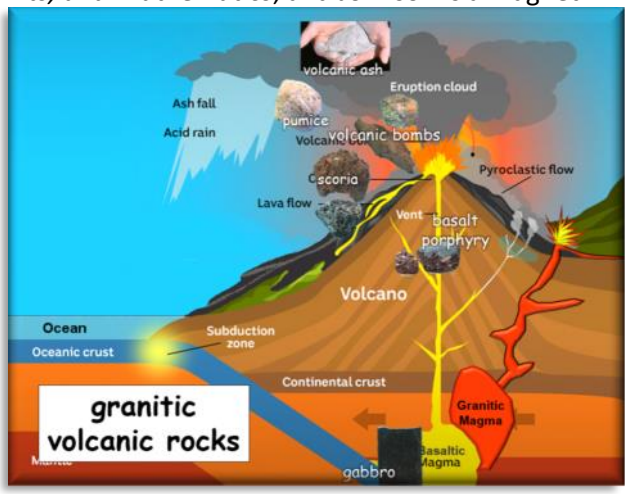
Hiawatha Community Center
101 Emmons St., Hiawatha - 7:15 pm

featured speaker:

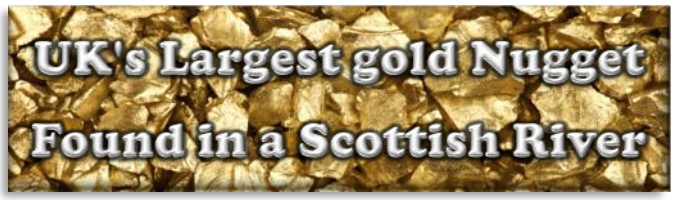
Ray Anderson
CVRMS

"Volcanoes and Volcanic Rocks"

Ray will be presenting a program that he premiered last September to a group of 3rd, 4th and 5th graders at the Johnson STEAM Academy in Cedar Rapids. **STEAM** stands for ***S**cience, **T**echnology, **E**ngineering, **A**rts, and **M**athematics*, and Johnson is a magnet



school dedicated to project-based infusion of STEAM into all aspects of learning. *"Volcanoes and Volcanic Rocks"* is a discussion of how and where volcanoes develop and the type of volcanic and intrusive rocks that they produce. The talk includes a hands-on examination and discussion of samples of a variety of the volcanic rocks discussed. This presentation is a sample of the types of educational outreach programs presented by CVRMS members.



A gold-hunter claims to have found the United Kingdom's largest gold nugget, weighing a hefty 121.3 grams (4.28 ounces), in a Scottish river. The metal lump, found in two pieces and dubbed "***The Reunion Nugget,***" was discovered by a treasure hunter in May. If proven to be from Scotland, it would usurp the "*Douglas Nugget*," weighing 85.7 grams and found in 2016, as the largest gold nugget found in the UK. Lee Palmer, who had been writing a book on the origins of gold in the UK, reported that he was approached by the anonymous gold-hunter, who wanted his find recorded. The prospector discovered the metal using a technique called "*sniping*," which involves scraping out the crevices at the bottom of a river. The two pieces, 89.6 grams and 31.7 grams, "*fit perfectly like a jigsaw*," and could have been broken apart by rock strike or glacial damage. A UK gold expert noted that gold can be found at more than 300 locations in Scotland. But, since only one isotope of gold is found naturally, proving the gold actually came from there would be difficult. Scottish gold ownership laws could also complicate the situation -- the majority of gold falls under the ownership of the Crown, or certain estates in Scotland. It is hoped that the "priceless" nugget will be exhibited in London's Natural History Museum, or the National Museum of Scotland.

https://www.cnn.com/style/article/biggest-gold-nugget-intl-scli-gbr-scn/?iid=ob_article_footer_expansion

Staff T-Shirts for Workers

Working at the Rock Show or Auction in 2020??

Get Your Official Staff t-Shirts

If you are a CVRMS member and are planning to work at the **2020 Rock Show on March 28-29** or at the **Rock Auction on Sept 19-20** you are encouraged to get a **CVRMS Staff T-Shirt** so you will ***Stand Out From The Crowd***. If you don't have one, you can order **at no charge** from Ray or Sharon (*find their email addresses on page 12*) or at the monthly club meeting. Just tell us the size you want and **wear it with pride at CVRMS official events!**

CVRMS Dues are Due

CVRMS MEMBERS, its time to pay your yearly dues. Annual dues are $15.00 per family per calendar year. Dues can be paid at our monthly meetings or **Dues can be sent to:**

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

CVRMS Board Minutes Dec 30

MEETING CALLED TO ORDER: by Marv Houg at his home, 7:10p.m.

MEMBERS PRESENT: Marv Houg, Dale Stout, Ray Anderson, Sharon Sonnleitner, Bill Desmarais, Jay Vavra, and Rick Austin.

MINUTES OF LAST MEETING (Nov. 26, 2019): move to approve-Ray; second-Bill; approved unanimously

2020 SHOW:

Programs: Five speakers scheduled, two more to be contacted by Ray

Raffle Prizes: Geode Cracker, Set of Rock Specimens, Wooden Dinosaur, Agate Slab, Gary Peavy??, ZRS??

Posters: Nothing New

New Dealers: Marv working on meteorite dealer, several possibilities discussed (Quad Cities shop??)

Staff T-Shirts: Ray will announce availability in Newsletter

Displays: Ray reserved case, Marv trilobites and crinoids; A.J. lakers:; Geodes? Kim cold waters? Bill dinosaurs? Jeff Groff? Dave Malm?

2020 AUCTION: No Changes

2020 BILL'S BUS TRIP: West Bend Grotto, maybe Rockford (rain concerns), Iowa Nat. Hist. Museum (closed Sundays), 2021-Field Museum, 2022-Lizzrado's and Burpee Museum?

CRINOID AS STATE FOSSIL: Marv suggested continuing efforts. Discussion then Board agreed

OTHER ITEMS: Marv suggested that Dale provide a detailed monthly hard copy of CVRMS financial records so we would have a backup of that information. Discussion of setting up Board-accessible, on-line financial records, Rick and Jay will make recommendations at next Board Meeting.

ADJOURNMENT: Ray moved to adjourn, Bill seconded, Meeting Adjourned 9:05 pm

Respectfully Submitted:

Ray Anderson, acting Secretary

Do You Have Some Rocks To Show Off??

We are looking for some additional displays for the **CVRMS 2020 Gem, Mineral, & Fossil Show** at Hawkeye Downs on March 28-29. Some cases are available for loan. If you have something to show, please contact Marv, Sharon, or Ray.

The World's Oldest Forest Has 385-Million-Year-Old Tree Roots

At three trillion strong, Earth's trees are estimated to outnumber the stars in the Milky Way. These woody wonders sponge carbon dioxide out of the skies, brace soil against erosion, cycle water through ecosystems and support countless forms of life. And we largely have their sophisticated root systems to thank. Sprouting from the base of tree trunks, roots are the arboreal equivalent of a digestive tract, exchanging water and nutrients with surrounding soils. Roots literally anchor a plant, and the more extensive they are, the bigger and stronger the stuff above ground can grow. In their modern forms, they helped trees dominate their habitats—and spread across the globe. New research suggests the modern versions of these stupendous structures are more deeply rooted in the arboreal family tree than ever thought before. Scientists have uncovered Earth's oldest known forest outside Cairo, New York. At 385 million years old, the ancient woodland predates the rise of seed-producing plants, a group that includes almost all living trees. The Paleozoic forest is also home to the remnants of intricate tree root systems that bear an uncanny resemblance to those still around today. The discovery pushes the origins of this kind of root system back in time to the mid-Devonian, proving that by then we had pretty sophisticated trees. Splaying out some 18 feet from the base of their trunks and digging deep into the soil, the roots were sturdy, branched, and intricate, with delicate rootlets splaying from their tips. The fossilized roots, the researchers realized, belonged to *Archaeopteris* (*not to be confused with the unrelated bird-like dinosaur* ***Archaeopteryx***), a genus that researchers think produced the first "modern tree." Like today's oaks and maples, *Archaeopteris* boasted flat, green leaves ideal for absorbing sunlight and girthy, lumber-worthy trunks that helped the plant grow out as well as up. The massive roots revealed at Cairo now added another contemporary characteristic to *Archaeopteris*, giving the trees a trifecta of resource-utilizing features that likely helped them take over the world's forests toward the end of the Devonian. Collectively, these forests and others like them went on to reshape the entire planet. Woody trunks sopped carbon from the air, before dying and depositing the molecules underground to fertilize new life. Leaves shaded the soil, protecting its residents from the sun's relentless rays. Roots wrestled into the dirt, altering its chemistry and shuttling carbonic acid toward the sea. Drained of carbon dioxide, the atmosphere cooled dramatically, likely helping to plunge the globe into a prolonged period of glaciation. https://www.smithsonianmag.com/science-nature/385-million-year-old-fossils-reveal-worlds-oldest-forest-had-modern-tree-roots-180973810/?fbclid=IwAR3IKwEpg5447XJdoktgNv-cEeaj4xsnQ5QhaNFvDzWQR5nzG_YP6XhLwEA

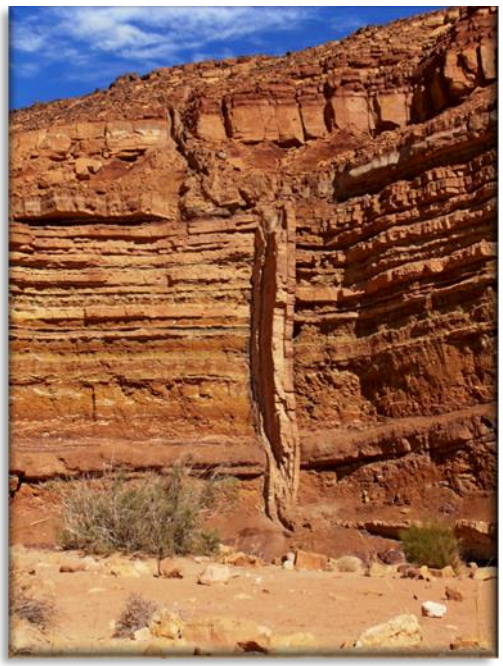
Archaeopteris

Spotlight Gemstones: Garnet

January's Birth Stone

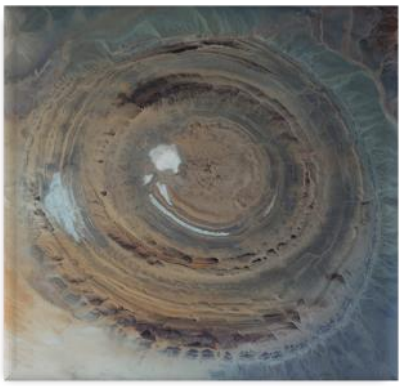
Garnet, is the name used for a large group of rock-forming minerals. These complex minerals share a common crystal structure and a generalized chemical composition of $X_3Y_2(SiO_4)_3$. In that composition, "X" can be Ca, Mg, Fe^{2+} or Mn^{2+}, and "Y" can be Al, Fe^{3+}, Mn^{3+}, V^{3+} or Cr^{3+}. 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 garnets found near Earth's surface formed when a sedimentary rock with a high aluminum content, such as shale, was 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 is the vertical feature cutting these beds and where is it?

December 2019's Photo



Last month's **What in the World?** photo was an aerial view of the ***Eye of the Sahara***. Also known as the Richat Structure, it is a deeply eroded, slightly elliptical dome with a diameter of 25 miles. The sedimentary rock exposed in this dome ranges in age from Late Proterozoic within the center of the dome to Ordovician sandstone around its edges. Investigations of the structure in 2005 and 2008 confirmed earlier conclusions that it is not an impact structure. The circular distribution of ridges and valleys is explained as the formation of cuestas by the differential erosion of alternating hard and soft rock layers uplifted as a dome by an underlying alkaline igneous complex of Cretaceous age.

Rock Calendar
CVRMS EVENTS OF INTEREST

2020

Jan. 21 —CVRMS Monthly Meeting
Hiawatha Community Center 7:15 pm
Featured Presentation
"Volcanoes and Volcanic Rocks"
by Ray Anderson—CVRMS

Feb. 18 —CVRMS Monthly Meeting
Hiawatha Community Center 7:15 pm
Featured Presentation
to be announced

Mar. 17 —CVRMS Monthly Meeting
Hiawatha Community Center 7:15 pm
Feature Presentation
Cornell College Field Activities
by Cornell College Geology Students

March 28-29 - CVRMS Gem, Mineral, and Fossil Show
"Meteorites: Earth's Oldest Rocks"
Hawkeye Downs
Cedar Rapids

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

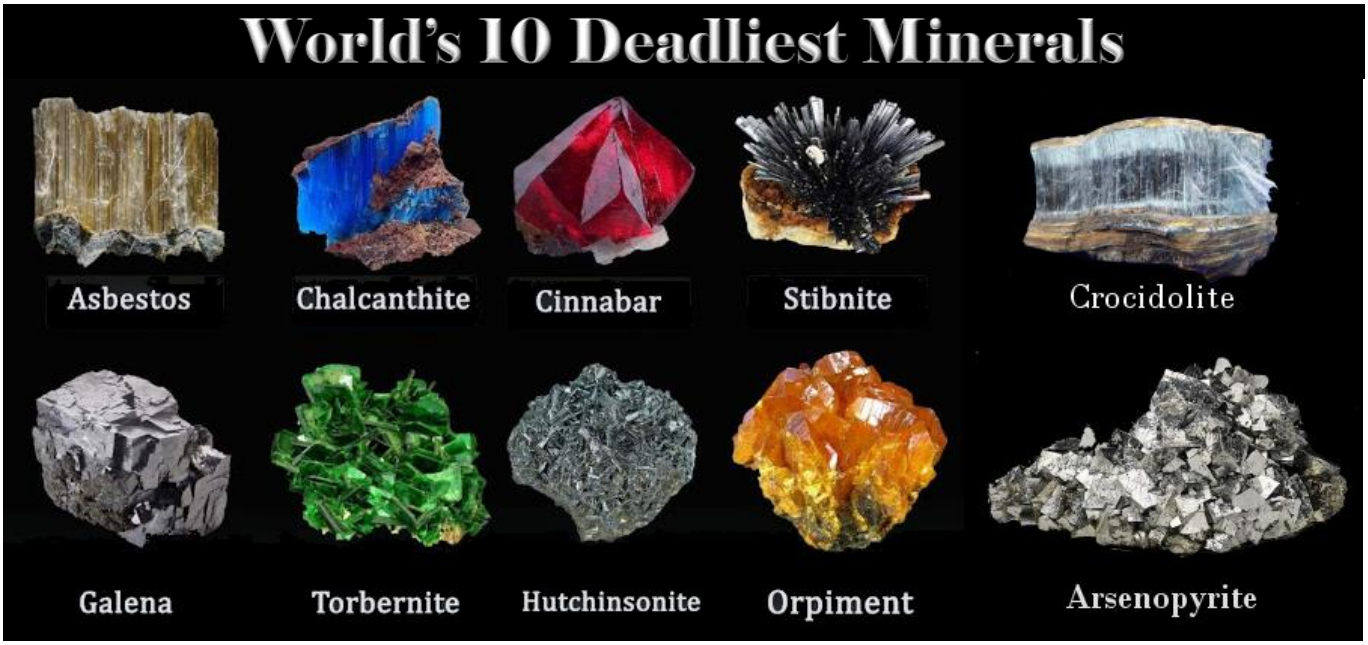
Ask a Geologist is a monthly column that gives CVRMS members an opportunity to learn more about a geologic topic. If you have a question that you would like addressed, please send it to rockdoc.anderson@gmail.com, and every month I will answer one in this column. Please let me know if you would like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

*My good friend and new CVRMS member, Jack Gilmore, commented the other day that fossil snails in **"Turritella Agate"** really weren't Turritellas. I remembered hearing that some time ago, so I thought I would check it out.*

The organic gem material called **Turritella Agate** is a brown, translucent to semi-transparent, fossiliferous agate found in certain beds within the *Eocene Green River Formation*. The rock was incorrectly named decades ago when the christener thought that the spectacular spiral-shaped gastropod (snail) fossils in the stone were members of the marine *Turritella* genus. Instead, the fossils are the freshwater snail, ***Elimia tenera***, a member of the Pleuroceridae family. So the rock could be more correctly referred to as **Elimia agate**. It is very easy to recognize this rock because it contains concentrations of large fossil snails that stand out in a white-to-tan color that contrasts with the brownish agate. The rock was formed between about 53 to 42 million years ago as the young Rocky Mountains were almost finished growing, and the landscape of what is now parts of Colorado, Utah, and Wyoming consisted of rugged mountains separated by broad intermountain basins. Rains falling on the slopes of these mountains ran in streams that carried sand, silt, mud, and dissolved materials down into the huge lakes that occupied these intermountain basins, collectively called Lake Gosiute and Lake Uinta. Abundant plants and algae grew on the margins of these lakes, providing a perfect habitat and food source for ***Elimia tenera***. When the snails died, their shells sank to the bottom of the lake. The snails were so prolific that entire lenses of sediment were composed almost entirely of their shells. Over time, the sediments began filling the lakes, burying and preserving beds of these snails. After these layers were buried, groundwater containing small amounts of dissolved microcrystalline silica moved through the sediments and the silica began to precipitate, possibly in the form of a gel, within the cavities of the snail shells and the empty spaces between them. Over time, the entire mass of fossils was silicified, forming the brown fossiliferous agate (also known as chalcedony) that we know today as Turritella agate. For at least the past fifty years, Turritella agate has been prized as a unique and beautiful gem material. When it is completely silicified, it can be sawn into slabs that are polished and used for bookends, desk sets, clock faces, and other lapidary craft items. Many lapidaries mark ovals, circles, squares and other shapes on the slabs and cut them into cabochons. These make great pendants, belt buckles, bolos, ring stones, and earrings. Scraps and pieces too small to slab or make other items with can be placed in a rock tumbler to produce some of the most interesting tumbled stones. People who see these beautiful projects marvel that so many spectacular fossils are preserved in the rock. They are also surprised by the cross-sections of the fossils that are visible in great detail on the slabs, cabs, and tumbled stones. Turritella is one of the most fascinating gem materials and a lesson in snail anatomy. The rock material that contains the fossil snails ranges from a shale to a sandstone. Only a small portion of this rock unit has been silicified into the dense agate that is needed to serve as a gem material. The rest of the rock unit is only somewhat silicified, or unsilicified. When purchasing or collecting turritella agate for lapidary work, you must carefully inspect it and make sure that it is fully silicified and that the fossils are firmly cemented into the rock. Some of the vendors who sell it do not know the qualities that are needed for lapidary work. Incompletely silicified material is a waste of time and money. It is frustrating to cut, yields a low-quality product, and doesn't even make nice tumbled stones. It is very easy to recognize because it contains large fossil snails that stand out in a white-to-tan color that contrasts with the brownish agate. The chalcedony that fills the *Elemia* snails shells sometimes fluoresces a light blue color. Thanks to https://geology.com/gemstones/turritella for some good information.

polished Turritella (*Elimia)* Agate Slab

eroded surface of Turritella (*Elimia)* slab



Precious minerals make the modern world go 'round—they're used in everything from circuit boards to tableware. They're also some of the most toxic materials known to science, and excavating them has proved so dangerous over the years, some have been phased out of industrial production altogether. Listed below are the 10 most deadly minerals on earth.

Chalcanthite ($CuSO_4 \cdot 5H_2O$) is a hydrated water-soluble copper sulfate. The mineral is a copper ore, however the mineral can easily dissolve and recrystallize in a wet environment, and will crystallize out again from solution. The copper in this mineral is very bio-available and is toxic to plants and in high quantities toxic to humans.

Stibnite (Sb_2S_3) is a toxic antimony sulfide mineral with an orthorhombic crystal lattice and a source of metalloid antimony. Stibnite paste has been used for thousands of years for cosmetics to darken eyebrows and lashes. The mineral was also used to make eating utensils, causing poisoning from antimony ingestion.

Asbestos ($Mg_3Si_2O_5(OH)_4$) is not one mineral but six defined separate minerals. This silicate mineral grows thin fibers crystals that can easily break off and form dust particles. And it was once widely used for a variety of commercial and industrial applications thanks to its strong, fire-resistant and flexible nature—from ceiling tiles and roofing materials to flooring and thermal insulation. The fibers can cause lung cancer, mesothelioma, and asbestosis.

Torbernite ($Cu(UO_2)_2(PO_4)_2 \cdot 8 - 12\ H_2O$) is a dangerous mineral composed of hydrated green copper, phosphate, and uranyl. The mineral is often found in granites that contain uranium and is dangerous due to its radioactive nature. The mineral releases radon naturally and can cause lung cancer if exposure is long enough. This is one mineral you do **not** want on your display cabinet shelf.

Cinnabar (HgS) is a deep red mercury sulphide mineral that provides much of the world's elemental mercury. When oxidized, this element will produce methyl mercury and dimethyl mercury, two toxic compounds that cause irreparable harm to the nervous systems of children. It is deadly in small concentrations and can be absorbed through the respiratory tract, intestines, or skin.

Galena (PbS) is one of the most abundant and widely distributed sulfide minerals. Galena is the principle ore of lead, and forms glistening silver cubes with almost unnaturally perfect shapes. Although lead is normally extremely flexible, the sulfur content of galena makes it extraordinarily brittle and reactive to chemical treatment. Lead doesn't get flushed out of your system, but accumulates over the years, eventually reaching toxic levels. Lead toxicity is carcinogenic and causes severe birth defects.

Hutchinsonite ($(Tl,Pb)_2As_5S_9$) is a form of arsenic sulfide with thallium and lead that can be found in hydrothermal vents. Thallium salts are nearly tasteless and highly toxic and have been used in rat poison and insecticides. The thallium inclusion in this arsenic sulfide combines two extremely dangerous and deadly minerals. Exposure to this mineral can potentially lead to death.

Orpiment (As_2S_3) is another arsenic sulfide mineral with a stunning orange-yellow color. The mineral is found naturally in hydrothermal vents, hot springs, and fumaroles. The arsenic, especially if it is allowed to oxidize, can cause arsenic poisoning.

The finely fibrous variety of Riebeckite, known as **Crocidolite, ($Na_2(Fe^{2+}{}_3Fe^{3+}{}_2)Si_8O_{22}(OH)_2$)** usually originates from altered metamorphic rocks. It was once widely used for a variety of commercial and industrial applications thanks to its strong, fire-resistant, and flexible nature. The fibers can cause lung cancer, mesothelioma, and asbestosis.

Arsenopyrite (FeAsS) is an iron arsenic sulfide with a brilliant steel metallic color often found in hydrothermal vents and pegmatites. The arsenic leads to a number of environmental and human damages and can sometimes be associated with gold deposits. Oxidation of arsenopyrite leads to soluble arsenic in water and subsequent acid mine drainage.

http://www.geologyin.com/2015/01/killer-minerals-worlds-10-most-deadly.html

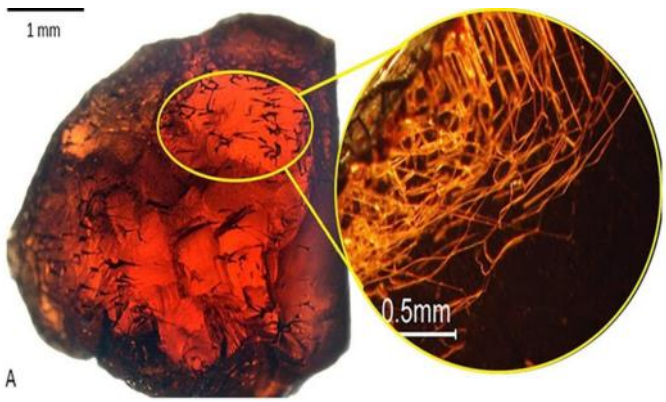
Five people have been confirmed dead, 31 remain in hospital with injuries and eight are still missing after sudden volcanic eruptions on Whakaari/White Island off the east coast of New Zealand. The island is a tourist destination, and 47 people were on it when it erupted on December 9. Three of those rescued have now been discharged from hospital. Volcanologists at GeoNet, which operates a geological hazard monitoring system, described the eruption as impulsive and short-lived, with an ash plume that rose to more than three kilometers above the vent. White Island is one of several volcanoes in New Zealand that can produce sudden explosive eruptions at any time. In this case, magma is shallow, and the heat and gases affect surface and ground water to form vigorous hydrothermal systems. In these, water is trapped in pores of rocks in a superheated state. Any external process, such as an earthquake, gas input from below, or even a change in the lake water level can tip this delicate balance and release the pressure on the hot and trapped water. The resulting steam-driven eruption, also called a hydrothermal or phreatic eruption, can happen suddenly and with little to no warning. The expansion of water into steam is supersonic in speed and the liquid can expand to 1,700 times its original volume. This produces catastrophic impacts. The expansion energy is enough to shatter solid rock, excavate craters and eject rock fragments and ash out to hundreds of meters away from the vent. We know of sites in New Zealand where material has been blasted out over three kilometers from the vent by such eruptions. The eruptions are short-lived, but once one happens, there is a high chance for further, generally smaller ones as the system re-equilibrates. White Island is an acute location for such activity, but it is not the only location in New Zealand where this can happen. Mount Ruapehu (crater lake), Mount Tongariro (Te Maari and Ketetahi) and geothermal areas of the central North Island all have the potential to cause such events. We know there have been more than 60 hydrothermal eruptions in the last 100 years in New Zealand. Some of these have caused loss of life. Monitoring and warning for hydrothermal eruptions is a huge challenge. We don't normally see these eruptions coming, no matter how much we would like to. Many systems are already "primed" for such events, but the triggers are poorly understood. The warning periods, once an event gets underway, are likely in the order of seconds to minutes. Our only hope for anticipating these events is to track potential vapor and liquid pressure in hydrothermal systems and to learn from their long-term behavior when they are at a super-critical state. Unfortunately there are no simple rules that can be followed and each hydrothermal system is different. In this age of technology and instrumental monitoring, it seems irrational that there should be little or no warning for such eruptions. The eruption is not caused by magma, but by steam, and this is much harder to track in our current monitoring systems. We have seen several other fatal hydrothermal catastrophes unfold in other parts of the world, such as the 2014 eruption of Mount Ontake in Japan. New Zealand has been luckier than many other parts of the world, until now.

https://www.sciencealert.com/why-there-was-no-warning-before-new-zealand-s-white-island-s-fatal-eruption?utm_source=ScienceAlert+-+Daily+Email+Updates&utm_campaign=39ae908271-MAILCHIMP_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_fe5632fb09-39ae908271-365948861

Bajadasaurus is a genus of sauropod dinosaur from the Early Cretaceous epoch (late Berriasian to Valanginian stages—about 140 million years ago) of northern Patagonia, Argentina. It sported bifurcated, extremely elongated neural spines extending from the neck vertebrae. Similar elongated spines are known from the closely related and more completely known *Amargasaurus*. Various possible functions have been proposed

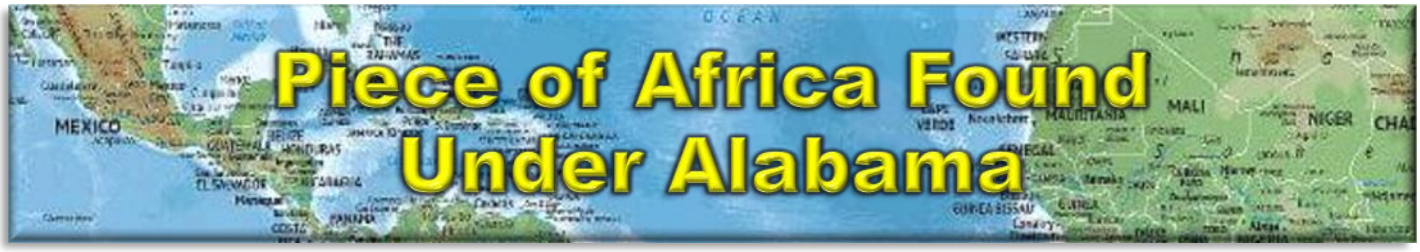
Artist rendering of *Bajadasaurus pronuspinax.*

for these spines in *Amargasaurus,* with the 2019 description of *Bajadasaurus* suggesting that they could have served as passive defense against predators in both genera. The skull was gracile and equipped with around 44 teeth that were pencil-shaped and restricted to the front of the jaws. The eye openings of *Bajadasaurus* were exposed in top view of the skull, possibly allowing the animal to look forwards while feeding. The specimen was formally described as the holotype of a new genus and species, *Bajadasaurus pronuspinax*. The generic name is derived from the Spanish word Bajada ("downhill") in reference to the Bajada Colorada locality, The specific name is derived from the Latin pronus ("bent over forward") and the Greek spinax ("spine"), referring to the long and anteriorly curved neural spines (spinous processes) of the neck. Only a single vertebra is known from the remainder of the neck. This vertebra sported the most prominent feature of the genus, an extremely elongated neural spine that was deeply bifurcated into a left and right rod-like element. This pair of rod-like elements measures 22 inches in length and made the vertebra four times taller than long. The sauropods are the big dinosaurs with long necks and long tails, but specifically this is a small family within the sauropods which were about 30 to 35 feet in length. The only specimen was excavated in 2010 by palaeontologists of the science agency of the Argentinian government. The specimen was formally described as the holotype of a new genus and species, *Bajadasaurus pronuspinax*, by Gallina and colleagues in 2019 (see https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6362061/).

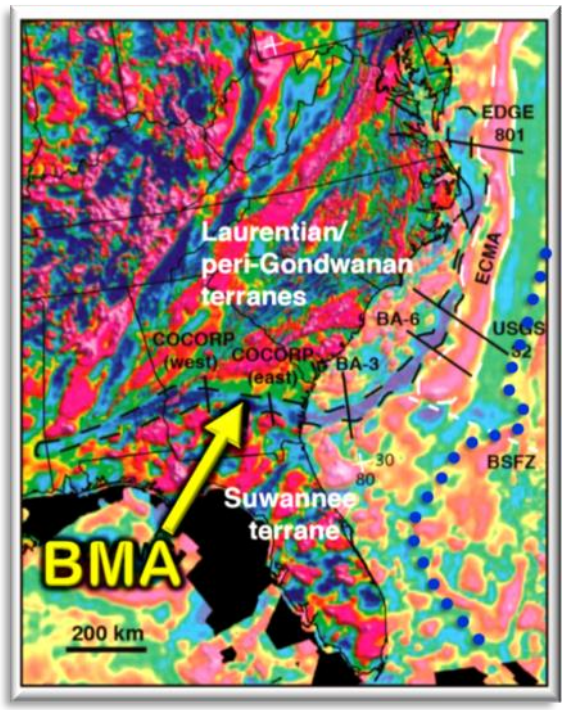


Garnet crystal with distinct tubular structures. and Microphotograph of network of tubular structures originating at garnet surface.

Experts have discovered strange tunnel-like patterns inside the gem stones that they believe may have been created by a form of fungus. Complex systems of microscopic tunnels found inside garnet crystals from Thailand are most likely the result of microorganisms making their homes inside these minerals, according to a study published in the open-access journal *PLOS ONE* in August 2018. Endolithic organisms are those that live inside a substrate, be it mineral, wood, bone, or some other material. Some microbes move into pre-existing cavities while others dig their own way in, but this behavior is unexpected in highly resistant minerals like garnet. In this study, researchers examined the structure and content of intricately branching tunnels inside garnet crystals from river sediments and soils in Thailand to determine whether they were formed by abiotic or biotic processes. Chemical analysis of the tunnels found lingering organic compounds and filament-like structures reminiscent of bacteria and fungi, strongly suggesting that microbes once lived inside. Whether or not these organisms excavated the tunnels is less clear. The shape of the tunnels, examined under microscopy, doesn't completely rule out an abiotic origin, but certain features characteristic of endolithic lairs, such as anastomoses (connecting passages between adjacent tunnels) suggest the tunnels were at least partially formed by endolithic microbes. These tunnels were originally noted because they significantly decrease the quality and value of the garnets as gems, but this study has shown that they also represent a previously unrecognized habitat for endolithic organisms. In iron-poor sediments like those studied here, garnets represent a rare source of iron for iron-oxidizing microbes, but confirming the identity of the tunnel-borers will require observations of live organisms in a laboratory setting.
http://www.geologyin.com/2018/08/something-digs-intricate-tunnels-in.html



Geologists say they have found a fragment of Africa embedded in the southeastern U.S., a remnant of the rift that developed between the two continents some 250 million years ago. Scientists have known for some time of the presence of a strange band of magnetic rock that stretches from Alabama through Georgia and offshore to the North Carolina coast, but its origin has been debated. The ribbon of rock is buried about 9 to 12 miles below the surface. According to a new study published in *GSA Today*, the fissure, known as the **Brunswick Magnetic Anomaly** (the blue line labeled **BMA** on map), was created hundreds of millions of years ago when the crusts of Africa and North America were ripped apart like stitches in a piece of cloth. A rift in the crust threatened to rip Florida and southern Georgia away from North America. The rift failed to open, but left behind a belt of magnetic basalt that filled the crack (much like the Midcontinent Rift in the central US). Crustal rocks record the Earth's magnetic field when they cool from a melt or experience heating events. The magnetism is stored by minerals, particularly strongly magnetic minerals like magnetite. Scientists can discover important information about plate tectonics, the large-scale motion of Earth's outermost shell, by determining the source of distinct striped magnetic anomalies – kind of like studying the fingerprints left behind at a crime scene. The volcanic rocks of the Brunswick Magnetic Anomaly filled a rift that developed about 200 million years ago when the Atlantic Ocean was opening as the supercontinent of Pangea fragmented into the continents we know today. Pangaea originally formed during the late Paleozoic, between about 335 and 250 million years ago when older continental fragments drifted together, including the continent of Africa which plowed into the part of North America that is now the southeast US. Then, about 200 million years ago, Pangea began to break up (see maps below). An early attempt of North America to rip free from Pangea produced a rift that filled with basaltic lava but then failed to grow. These strongly magnetic basaltic rocks produce the Brunswick Magnetic Anomaly, but instead of producing strong magnetic highs (red on the Aeromagnetic map), the anomaly produces magnetic lows (shown as blue) because the Earth's magnetic field was reversed from what it is today when the lavas cooled. Shortly after the Brunswick rifting failed, another rift developed to the east (see blue dotted line on Aeromagnetic Map) that did not fail and resulted in the separation of North America and Africa and the formation of the Atlantic Ocean. When the continents separated, a portion of the original African plate that originally joined to form Pangea was left attached to North America after the Atlantic Ocean opened. The crust west of the blue dotted line and east and south of the Brunswick Magnetic Anomaly, known as the Suwannee terrane, was originally a part of Africa. This includes southern Mississippi and Georgia, all of Florida, and some of the continental shelf below the sea in that area.



Aeromagnetic map of SE U.S. showing anomalies in the Earth's magnetic field produced by deeply buried rocks (reds show the highest values, blues the lowest). Blue dots are the margin of North American continental crust.

Global maps showing the supercontinent of Pangea as it appeared 250 million years ago (showing the areas that were to become the current continents) a map of the Earth showing the distribution of the continents after Pangea's break up.

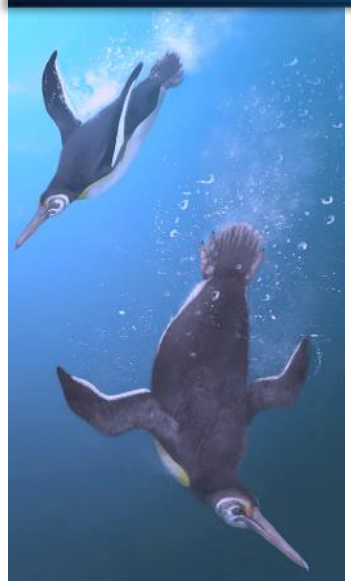
https://www.geologyin.com/2014/12/piece-of-africa-found-under-alabama.html

Over 800 Mammoth Bones Discovered in Massive Fossil Stash in Mexico

Mammoth skull and tusks found in the pitfall. Image: Edith Camacho, INAH

An area in the Mexican State of Tultepec slated to become a landfill has held a long-buried surprise: the largest prehistoric mammoth hunting site ever to be found in the country, complete with more than 800 bones from 14 individuals dating back 15,000 years. Archaeologists with the National Institute of Anthropology and History (NIAH) have been excavating the site for 10 months. They call its discovery a "*watershed*" moment that serves as a "*touchstone on what we imagined until now was the interaction of hunter-gatherer bands with these enormous herbivores*," said NIAH Coordinator of Archaeology Pedro Francisco Sánchez Nava in a statement. Named Tultepec II, the entire excavation site measures 131 by 329 feet. Within it, archaeologists observed stark vertical cuts in the layers of the Earth that contain two traps with almost 90-degree walls, each measuring 5.6 feet by 82 feet in diameter. Used for an estimated 500 years, the traps were likely visited by 20 to 30 hunters that used burning torches and branches to separate individual mammoths from their herd and push them into the pits. At least 824 individual bones have so far been found at the "**Mammoth Megasite**", including eight skulls, five jaws, 100 vertebrae, 179 ribs, 11 scapulae, five humeri, a pelvis, femurs, tibiae, and other "small" bones. Archaeologists working at the site say that the discovery adds to our understanding of how North America was impacted during the Ice Age and changes our perception of how ancient people hunted mammoths. Markings on the bones show that ancient hunters used nearly every part of the animal, eating the organs and using bones for knife-like tools. Not only were the first settlers of the Basin of Mexico socially organized people who used the environment around them to hunt the giants, but healed wound marks on the bones indicate they may have hunted the same animal for several years before killing it. Furthermore, the unique placement of some of the bones suggests the animal may have held a ceremonial purpose in society. During their lifetime, these hunter-gatherers would have seen great climatic instability. As the world shifted out of the Pleistocene and into the Ice Age, the planet's poles froze, causing sea levels to drop across the globe, including the Mexican Basin. To survive, early inhabitants of the region built traps in the clay of Xaltocan Lake as its shoreline receded, leaving its great plains exposed 15,000 years ago. Right around the same time, expansive ash from the eruption of Popocatepetl forced animals and humans to move northward. Volcanic ash found in the clay surrounding the mammoth bones has allowed researchers to date the remains accurately. Also found at the excavation site were a camel jaw and a horse molar. Researchers say this discovery is just the "*tip of the iceberg*". They intend to continue excavating the site in order to understand its full use as well as to explore similar reports in the area. https://www.iflscience.com/plants-and-animals/more-than-800-mammoth-bones-discovered-in-ancient-mega-hunting-site-in-mexico/

Penguins Gave Up Flight, Started Swimming 66 Million Years Ago



Kupoupou stilwelli

Penguins weren't always the petite, tuxedo-sporting birds we know and love today. Once, giant penguins the size of humans reigned supreme. They waddled on land but swam supremely in subtropical seas more than 60 million years ago, after the dinosaurs were wiped out on sea and land. Fossil records show giant human-sized penguins "flew" through Southern Hemisphere waters—along side smaller forms that were similar in size to some species that live in Antarctica today. Now the newly described *Kupoupou stilwelli* has been found on the geographically remote Chatham Islands in the southern Pacific near New Zealand's South Island. It appears to be the *oldest penguin known with proportions close to its modern relatives*. It lived between 62.5 million and 60 million years ago at a time when there was no ice cap at the South Pole and the seas around New Zealand were tropical or subtropical. The new penguin was identified after the study of fossil skeletons collected from Chatham Island between 2006 and 2011. Next to its colossal human-sized cousins, including the recently described monster penguin *Crossvallia waiparensis*, *Kupoupou* was comparatively small—no bigger than modern King Penguins which stand about 3.5 feet tall. *Kupoupou* also had proportionally shorter legs than some other early fossil penguins. In this respect, it was more like the penguins of today, meaning it would have waddled on land. As well as size, the penguin had hind limb and foot bones similar to modern forms. The discovery may even link the origins of penguins themselves to the eastern region of New Zealand—from the Chatham Island archipelago to the eastern coast of the South Island, where most other ancient penguin fossils have been found, 500 miles away. The research provides further support for the theory that penguins rapidly evolved shortly after the period when dinosaurs still walked the land and giant marine reptiles swam in the sea. Researchers believe that penguins diverged from the lineage leading to their closest living relatives—such as albatross and petrels—during the Late Cretaceous period, and then many different species sprang up after the extinction of the dinosaurs. .

http://www.geologyin.com/2019/12/giant-penguins-gave-up-flight-and.html?utm_source=feedburner&utm_medium=email&utm_

What is Green Obsidian?

Obsidian is a naturally occurring volcanic glass. It is formed during the eruption of felsic (granitic) lavas, which are distinguished by having high concentrations of the chemical element silica. Because of their high silica content, felsic lavas do not behave like the mafic,

or silica-poor, lavas we see on the island of Hawaii. Pure obsidian is usually **dark** in appearance, though the color varies depending on the presence of impurities. This can be caused by tiny microscopic inclusions of other minerals (feldspar, amphibole, biotite, quartz) called microlites (not the mineral). They can be observed under a microscope as thin rectangular, sometimes equant crystals that can sometimes form bands and give obsidian its characteristic color. Most black obsidians contain magnetite (an iron oxide) nanoinclusions. **Green Obsidian** contains iron and magnesium impurities. Most green obsidian can be found in portions of California. One source is reported to be Glass Mountain in northern California. It has also been reported from the island of Lipari, the largest of the Aeolian Islands in the Tyrrhenian Sea off the northern coast of Sicily, southern Italy. Slag and other melted glass is frequently mistaken for green obsidian and many fakes are on the market. One collector suggested that the density of normal and natural obsidian ranged from 2.3 to 2.42. He measured a sample of Lipari obsidian as 2.34, while fake obsidian reported to be from Lipari displayed a density of 2.518.

http://www.geologyin.com/2019/12/what-is-green-obsidian.html

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Club meetings are held the 3rd Tuesday of each month from September through November and from January through May at 7:15 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:

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