Cedar Valley Gems

Cedar Valley Rocks & Minerals Society

Cedar Rapids, Iowa

cedarvalleyrockclub.org

CEDAR VALLEY GEMS **SEPTEMBER 2017** **VOL. 43, ISSUE 7**

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

Next CVRMS Meeting Tues. Sept. 19

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

Presented by

Brent Studer

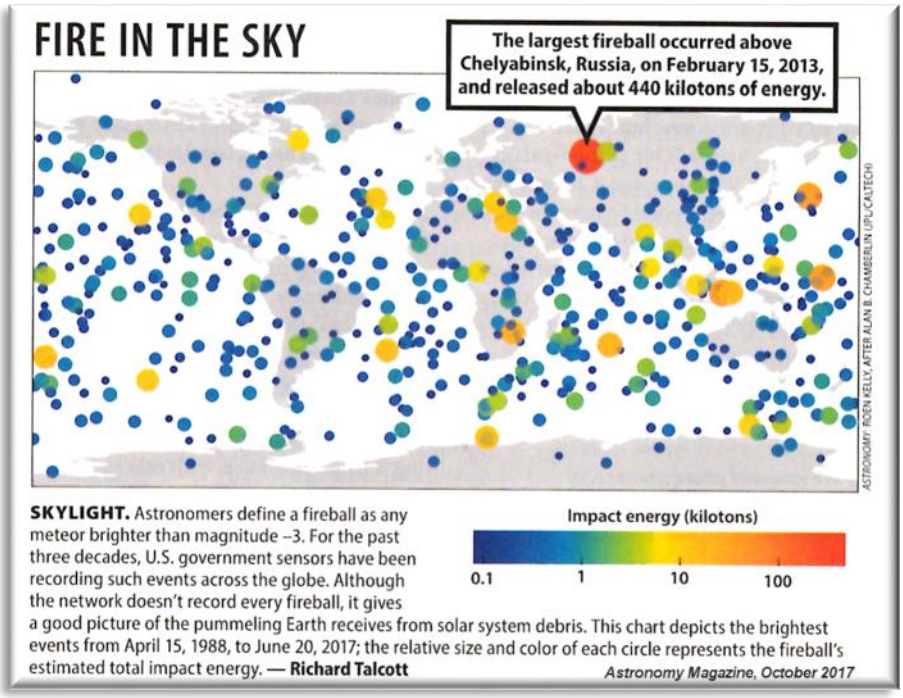
Adjunct Professor of Astronomy
Kirkwood Community College
and Cedar Valley Astronomers, Inc.

"The young Moon was far more dynamic than previously thought and tonight's presentation will describe recent findings about the Moon's history and geologic forces that shaped our nearest celestial neighbor."

from 1902 French science fiction silent film *A Trip to the Moon*

After 75 hours at the grinding wheel, master diamond cutter Mike Botha finally put the finishing touches on the "Esperanza" diamond — a gemstone that was plucked from the soil at Arkansa's ***Crater of Diamonds State Park*** on June 24 by Bobbie Oskarson. Originally 8.52 carats in weight and the shape of an icicle, "Esperanza" has been transformed into a sleek and unique 4.65-carat "triolette" that is valued at $300,000. Oskarson, from Longmont, Colo., had paid $8 to do a bit of amateur mining at the park with her boyfriend and came away with a gemstone that could fetch upwards of $300,000 when it is sold at Heritage Auctions this December. She named the gem "*Esperanza*," the Spanish word for "*hope*." The freshly cut gem was recently sent to the labs of the American Gem Society, where it's expected to be graded as internally flawless and colorless. In a preliminary test, the gem was rated **Type IIa,** the purest of all diamonds because they are composed solely of carbon with virtually no trace elements in the crystal lattice. Botha's 147-facet triolette is a shape of his own design. It resembles a teardrop and merges the elements of both emerald and trapezoid shapes. The diamond even has its own *Facebook page*. Esperanza is the fifth-largest diamond found by a visitor since the Crater of Diamonds State Park was established in Murfreesboro in 1972. The park offers visitors the opportunity to search in the eroded surface of the eighth-largest, diamond-bearing deposit in the world. Any diamonds or semi-precious stones found in the 37 1/2-acre plowed field are theirs to keep.

http://stanleyjewelers.thejewelerblog.com/master_cutter_transforms8_52_carat__esperanza__diamond_into_a_4_65_carat__triolette__that_could_fetch__300k.html



SKYLIGHT. Astronomers define a fireball as any meteor brighter than magnitude –3. For the past three decades, U.S. government sensors have been recording such events across the globe. Although the network doesn't record every fireball, it gives a good picture of the pummeling Earth receives from solar system debris. This chart depicts the brightest events from April 15, 1988, to June 20, 2017; the relative size and color of each circle represents the fireball's estimated total impact energy. — **Richard Talcott**

Astronomy Magazine, October 2017

CVRMS Board Meeting Minutes August 29, 2017

Called at 7:20 at the home of Marv Houg

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

AUCTION: Sharon will reserve the smallest Penske truck with a lift for 9:30-10:00 on Thursday, September 14. Since Andie Carter can only work Saturday this year, Ray and Jay volunteered to work Cashier. Dell will make lunch for set-up day. AJ Johnson will do security Friday night; Bill and AJ on Saturday night. Sharon will print bid cards. We will not do credit cards this year. Sharon mailed flyers to previous auction attendees and emailed them to clubs. Sharon will put an ad in the Gazette classified section. Dale will do Craig's List. Dell will do Hoopla and Collector's Journal. Sharon will mail 25 flyers to Kirk Wenndt and 50 to Ithiel Cateri. We discussed using a shared document over OneDrive or GoogleDocs for the clerking and cashiering, but are not pursuing it tonight.

BUS TRIP: Bill reported 40 members have signed up for the Bus Trip to Fryxell and Lizzadro Museums. The bus will depart Cedar Rapids at 6:30am and stop in Iowa City. We expect to be at Fryxell from 8:00 to 9:30 and at Lizzadro from about 1:00 to 3:30 or 4:00. We can't eat at the Lizzadro, so we will plan to stop at the DeKalb Oasis for lunch on the way to Chicago. The bus will not have WiFi.

MEETING LOCATION: Dale confirmed that we cannot return to the Rockwell cafeteria, since they no longer allow outside groups. Bob Roper checked on AEGON, but the cost is prohibitive. The Hiawatha Community Center is available for $300 per year, but is booked on the 3rd Tuesday this year in October and November. Karen Desmarais is checking on Grant Wood and the Vast Center. We will check on the following: Marion Library (Marv), Hills Bank on Blairs Ferry and Marion (Bob).

SHOW: We will invite the same dealers as last year, except Super Agate, who was a one-year dealer in place of Cornell College, which couldn't make it in 2017.

CRINOID AS STATE FOSSIL: Ray reported an outline of steps to pursue:
Create a Web Page with crinoid PowerPoints, information sheets, photos and illustrations, and sample letters to legislators
Contact Legislators – Working with Senator Joe Bolkom and will create a one-page Statement of Intent including reason for needing a State Fossil (suggestions were: almost all states have one, create awareness of State's natural history, increase tourism), why it should be the Crinoid, what a Crinoid is, and where Crinoids can be found in Iowa (particularly Burlington Formation, Gilmore City and LeGrand). ***Work with Chad Heinzel (UNI)*** to Make Connections with Iowa Teachers to have students write their legislators and provide educational materials for teachers and students. ***Contact*** Iowa Geological Survey, Iowa DOT Geology, Iowa DNR, and the State Museum. Marv said Brian Gossman wants to help. ***Contact*** Iowa Colleges and Universities and AEAs. ***Contact*** Iowa Limestone Producers Association to encourage their promotion. ***Contact*** MAPS and other Appropriate Organizations. ***Prepare Press Releases*** as Required. ***Contact*** other Clubs; ***Research*** how other state symbols got done; ***Include Crinoid Experts*** from the State – Harrell & Christina Strimple, Doug DeRosear, Karl Stuekerjuergen, Forrest Gahn, Glen Crossman, Brian Witzke, BH Beane, Arthur Gerk and Calvin Leverson.

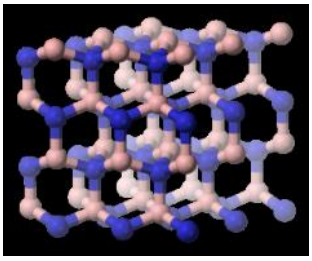
MISC: Ray noted it is not too early to start planning the 2019 show. The Science Center in Des Moines wants a 2'x3' slab with lots of fossils of lots of varieties. Marv suggested checking about getting into Dingleberry Quarry.

Ray made a motion to adjourn. Second by Dale. **Adjourned at 9:40**.

Respectfully submitted,
Sharon Sonnleitner, Acting Secretary

Diamond No Longer Hardest Natural Material

Diamond lost its title of the "world's hardest material" to man-made nanomaterials some time ago. Now, rare natural substances appear even harder. Chinese researchers have investigated two substances believed to have promise as very hard materials. The first, **wurtzite boron nitride** (BN with wutzilite crystal structure) has a similar structure to diamond, but is made up of atoms of boron and nitrogen. It is formed naturally during volcanic eruptions with very high temperatures and pressures. The second, the mineral **lonsdaleite** (a hexagonal crystal form diamond) is made from carbon atoms just like diamond, but they are arranged in a different crystal structure. **Lonsdaleite** is sometimes formed when meteorites containing graphite hit Earth. In fact the mineral was first discovered at Barringer Crater in Arizona.



Wurzite boron nitride's cubic crystal form

Londsaleite is brownish-yellow and translucent

Only small amounts of **wurtzite boron nitride** and **lonsdaleite** exist naturally or have been made in the lab, so until now no one had realized their superior strength. The Chinese researchers were able to apply stress to micro samples of the minerals with a finely tipped probe. The simulation showed that **wurtzide boron nitride** would withstand 18% more stress than diamond, and **lonsdaleite** 58% more. If the results are confirmed with physical experiments, both materials would be far harder than any other substance ever measured. But more definitive tests on these minerals won't be easy because both are rare in nature, so it will be difficult to obtain sufficiently large samples to test. If confirmed, however, **wurtzite boron nitride** may turn out to be the most useful of the two, because it is stable in oxygen at higher temperatures than diamond. This makes it ideal to place on the tips of cutting and drilling tools operating at high temperatures, or as corrosion-resistant films on the surface of a space vehicle, for example. Paradoxically, **wurtzite boron nitride's** hardness appears to come from the flexibility of the bonds between its atoms. When the material is stressed some bonds re-orientate themselves by about 90 degrees to relieve the tension. Although diamond undergoes a similar process, something about the structure of **wurtzite boron nitride** makes it nearly 80 per cent stronger.

https://www.newscientist.com/article/dn16610-diamond-no-longer-natures-hardest-material/

Spotlight Gemstone: Saphire

September's Birth Stone

Sapphire, the birthstone for September and the gem of the 5th and 45th anniversaries, is a gemstone variety of the mineral corundum, an aluminium oxide (Al_2O_3) typically containing traces of iron, titanium, chromium, copper or magnesium. Typically associated with the color blue, sapphires can also naturally occur in a wide variety of colors such as blue, yellow, purple, orange, green (which are also called "*fancy sapphires*"). "*Parti sapphires*" are those sapphires which show two or more colors in a single stone. The only color which sapphire cannot be is red (red colored corundum is called ruby). Commonly, natural sapphires are cut and polished into gemstones and worn in jewelry. They also may be created synthetically in laboratories for industrial or decorative purposes in large crystal boules. Because of the remarkable hardness of sapphires, 9 on the Mohs scale (the third hardest mineral, after diamond at 10 and moissanite at 9.5), sapphires are also used in some non-ornamental applications, including infrared optical components, wristwatch crystals and movement bearings, and very thin electronic wafers used as insulating substrates in special-purpose solid-state electronics.

The sapphire is one of the three gem-varieties of corundum, the other two being *ruby* (defined as corundum in a shade of red) and *padparadscha* (a pinkish orange variety). Although blue is their most well-known color, sapphires may also be colorless or shades of gray and black. Significant sapphire deposits are found in Eastern Australia, Thailand, Sri Lanka, China (Shandong), Madagascar, East Africa, and in North America in a few locations, mostly in Montana. Blue sapphires are evaluated based upon the purity of their primary hue. Purple, violet, and green are the most common secondary hues found in blue sapphires. Blue sapphires with up to 15% violet or purple are generally said to be of fine quality. Blue sapphires with any amount of green as a secondary hue are not considered to be fine quality. The 423-carat (84.6 g) Logan sapphire in the National Museum of Natural History, in Washington, D.C., is one of the largest faceted gem-quality blue sapphires in existence.

What in the World; is this the way to run a railroad??

June Photo

The June *"What in the World?"* photo is an unusual specimen of transparent botryoidal chalcedony (var. hyalite) on matrix from Zacatecas, Mexico, with unique intense green daylight fluorescence. In artificial light (incandescent) it becomes almost colorless, and in UV light it is crazy neon-green (see inserted photo). Fluorescence is caused by small uranium content. This cutting quality material is known from this only locality in the world.

Rock Calendar 2017

CVRMS Events of Interest

Sept. 16-17—CVRMS Rock Auctio
Amana RV Park and Event Center
Amana, Iowa
starts at 9:00 am both days

Sept 19 - CVRMS Monthly Meeting
new location: **Hiawatha Community Center**
program - Brent Studer - Kirkwood astronomer
see Page 1 for details

Oct. 8 - Sunday at the Quarry
BMC Aggregates Morgan Quarry
4816 Donald Street, Waterloo
11:00 am—4:00 pm

Oct. 21-22 - Des Moines Lapidary Society Show
3000 E Grand Ave., Des Moines, Iowa

Oct.21 - CVRMS Fall bus trip
Fryxell Geology Museum, Rock Island & **Lizzadro Museum of Lapidary Art,** Elmhurst, Ill
free to members **and now open to non-members ($25)!**
see Page 11 for details

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.

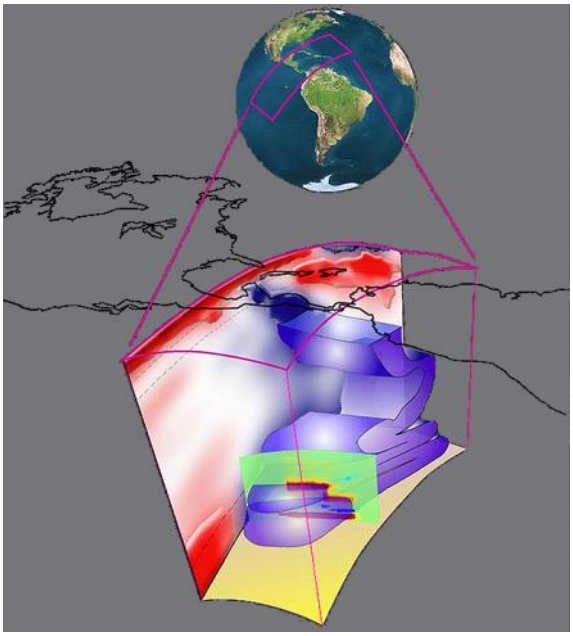
***Rona commented*:** *"With all of the emphasis being placed on electric cars to help slow climate change, they are powered by lithium batteries, and I thought lithium was in short supply. Where does the lithium come from??"*

***Rock Doc replied**: "Lithium is the third element in the periodic table, a soft, silvery-white alkali metal. It is the lightest of all metals (density about the same as pine wood), and in its elemental state it will float on water. Lithium was one of the three first elements to be synthesized in the Big Bang, and at 20 mg lithium per kg of Earth's crust, it is the 25th most abundant element. Although lithium is widely distributed on Earth, it does not naturally occur in elemental form due to its high reactivity. The total lithium content of seawater is very large and is estimated as 230 billion tons, where the element exists at a relatively constant concentration of 0.14 to 0.25 parts per million (ppm), but no efficient technique to remove lithium from sea water has been developed. Estimates for the lithium in the Earth's crust range from 20 to 70 ppm by weight, where granite pegmatites provide the greatest abundance of lithium-containing minerals, with **spodumene** and **petalite** being the most commercially viable sources and **lepidolite** another significant lithium mineral. A newer source for lithium is **hectorite**, a soft, greasy, white clay mineral with a chemical formula of $Na_{0.3}(Mg,Li)_3Si_4O_{10}(OH)_2$ that occurs with **bentonite** as an alteration product of **clinoptilolite** from volcanic ash and tuff with a high glass content. Most lithium is produced in South America, throughout the Andes mountain chain. Chile is the leading producer, followed by Argentina. Both countries recover the mineral from brine pools where lithium-rich brine is concentrated by pumping it into solar evaporation ponds. Future production will come from Bolivia, which has half the world's known lithium reserves. In the United States, lithium is recovered from brine pools in Nevada;.however, a deposit discovered in 2013 in Wyoming's Rock Springs Uplift may become a major resource. Lithium-ion electric vehicles can be designed with a large variation of battery capacities; the Nissan Leaf electric car, which has a 24 kW·h battery uses a rough median size battery. For these batteries, every 10 kW·h requires 1 kg of lithium, so it takes at least 2.4 kg of lithium to make a Leaf battery. If all the world's lithium were used to make electric car batteries for Nissan Leafs, with **current production** of 2×10^7 kg of lithium per year, we can make 8.3 million of them. Using all of the 9.9×10^9 kg of the world's lithium **reserves**, we can make 4.1 billion Leafs; using all the **identified lithium resources** (2.55×10^{10} kg), we can make 10.6 billion Leafs. If we would like to have a North American standard of living for everyone in the world – say, 1 car for every 2 people – then we would need about 3.4 billion Nissan Leafs. This would use 32% of the identified resources (all known lithium in the world), or 82% of the reserves (all lithium that is currently economic to produce). Even with widespread recycling, that seems like an unsustainable prospect*

Lithium and Nuclear Weapons

Naturally occurring lithium is composed of two stable isotopes, ^{6}Li and ^{7}Li, the latter being the more abundant (92.5% natural abundance). Lithium-6 is valued as a source material for tritium (also known as **hydrogen-3)** production, and large amounts of lithium-6 have been produced by isotope separation for use in nuclear weapons. Lithium deuteride ($^6Li^2H$) was the fusion fuel of choice in early versions of the hydrogen bomb. When bombarded by neutrons, both ^{6}Li and ^{7}Li produce tritium — this reaction, which was not fully understood when hydrogen bombs were first tested, was responsible for the runaway yield of the **Castle Bravo nuclear test** (the 1954 US nuclear test at Bikini Atoll **released 2.5 times more energy** than expected). Although details remain secret, lithium-6 deuteride apparently still plays a role in modern nuclear weapons as a fusion material .

A huge slab of folded Earth that scientists think used to be part of the ocean floor has been detected near the planet's core. The discovery supports the theory that Earth's crust is constantly recycled deep into the planet as molten material from below simultaneously pushes up to refresh the surface. The structure begins about 125 miles deep and is at least 125 miles wide and 370 miles in the north-south direction. In consistency, it is more like a giant, folding mush of taffy, researchers report. The slab was found by monitoring seismic waves—generated by earthquakes in South America—reflecting from deep inside the mantle and recorded in the United States. The diving crust is made of essentially the



The core-mantle boundary is the yellowish curved floor of the box, which represents the study area. The slab is shown as the

same material as the lower mantle, the researchers said, but it is much cooler, by about 1,260 degrees Fahrenheit. The lower mantle is roughly 4,500 degrees. Along the west coast of North America, crust beneath the ocean dives under a continental plate, creating earthquakes and volcanoes. Geologists have long speculated that when crust is folded into the planet, it sinks to the bottom of the mantle, where it displaces the material down there and forces some of it up. This slab began its plunge toward the center of the Earth about 50 million years ago. It is denser than surrounding material, which is why it sinks, like a carpet sliding off the dining room table. Its lower reaches are near the core, about 1,740 miles down. Yet it is still attached to the surface, much like a conveyor belt.

https://www.livescience.com/784-giant-slab-earth-crust-core.html

You can bet that if I somehow came into possession of a diamond the size of a quarter, the last thing I would do would be to carve out a finger-sized hole in it. It seems almost impossible, but a ring has been carved entirely of a single faceted diamond. No gold band. Just an ounce of pure ice. "*A ring made entirely of a faceted diamond has always seemed like a fantasy," said* Mohamed Shawish, president of Geneva-based Shawish Jewelry. "*Diamonds are made of carbon and molecules that can change. Even the color can be altered when attempting to cut it*," he said. It took a year for the jeweler to get the copyright for the design (much like the shape of the Coke bottle) and to craft the ring. The company had to purchase a special laser to cut the diamond into the perfect circle for the band. The ring was crafted utilizing the laser and traditional diamond cutting and polishing techniques, and it weighs in at an impressive 150 carats. The ring is the first ever to be carved from a single diamond (certified by the Guinness Book of Records). It's expected to sell for about $70 million, although it was recently on display at ***Baselworld*** (the watch and jewelry industry's most important show), suggesting that a buyer has not yet been found. By comparison, in December, an Asian buyer got a comparative bargain when he bought the late actress Elizabeth Taylor's 33.19-carat ring that she received as a present from husband Richard Burton. He paid a mere $8.8 million at Christie's. A video of the all-diamond ring can be viewed at: https://youtu.be/fhzXuqLeH3w .

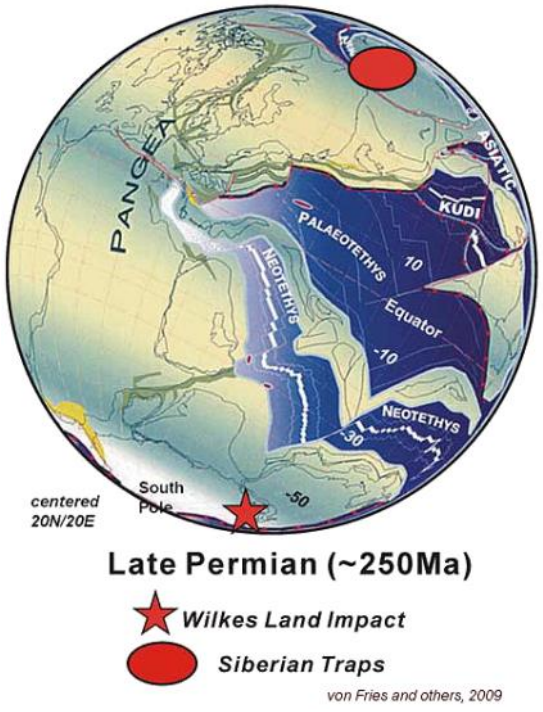
Ring carved from a single diamond crystal

The faceted stone that was carved into the first all-diamond ring.

Giant Crater Found: Tied to Worst Mass Extinction Ever: Maybe

An apparent crater as big as Ohio has been found in Antarctica. Scientists think it was blasted by an asteroid up to 30 miles in diameter and may have triggered the greatest mass extinction on Earth, 250 million years ago (the *Great Killing*). The crater was discovered buried beneath a half-mile of ice using airborne and satellite imaging, and it appears to be about 300 miles in diameter, more than twice as big as the one that killed the dinosaurs. The new crater's location, in the Wilkes Land region of East Antarctica, suggests it might have assisted in the breakup of the so-called Gondwana supercontinent, according to Ralph von Frese, a professor of geological sciences at Ohio State University. The crater is about 300 miles wide and was found by modeling the differences in crustal density that appeared in gravity measurements taken by NASA's GRACE satellites. Researchers spotted a mass concentration (which they call a mascon) likely produced by an impact. Such impact-related mascons are common in large craters on other planets and their moons. Frese and colleagues overlaid the gravity data with maps of the elevation of the rock surface below the ice (obtained by airborne radar imaging) that showed a 300-mile wide sub-surface, circular ridge. The mascon fit neatly inside the circle. The Permian-Triassic extinction, as it is known, wiped out most life on land and in the oceans about 250 million years ago. Some researchers have long suspected a space rock might have been involved, but most scientists have blamed gasses produced during a huge outpouring of volcanic magma in Siberia (called the Siberian Traps) for dramatically changing the climate. Over 5 to 10 million years, magma was erupted over an area the size of Europe in enough volume to bury the entire U.S. in basalt to a depth of about 1/2 mile! The outpouring of CO_2 and other greenhouse gasses produced a sudden and massive disruption to the carbon cycle, abnormally high air and sea temperatures, and an increasingly acidic ocean—all signs of a huge and rapid addition of greenhouse gases to the atmosphere. Whatever triggered the mass extinction, scientists reasoned, must have been powerful enough to generate enormous amounts of greenhouse gases in a short period of time. The extinction event allowed dinosaurs to evolve and rule the planet. The Wilkes Land basin also shows a striking antipodal (opposite side of the Earth) relationship to the Siberian Traps on reconstructed end-Permian maps. Scientists have suggested that a huge input of energy from the impact would be focused by the spherical shape of the Earth on an antipodal crustal site. This antipodal energy might excite volcanism at offset crustal faults, fractures, hot spots, and other pre-impact structures. Such impact crater/antipodal structure relationships have been observed on the Moon and Mars. Much more work is needed to confirm these interpretations. The best way to do that would be drill through the ice and sample the bedrock to determine if it is an impact crater and determine its age. There are currently no plans to conduct such costly research drilling.

Rocks of the Siberian Traps, layers of volcanic lava flows, northwest Russia.



Distributions of the continents during the Late Permian and the antipodal location of the Wilkes Land Impact and Siberian Traps.

http://onlinelibrary.wiley.com/doi/10.1029/2008GC002149/abstract

What's New In Iowa Geology ??

Brochure on Fossil collecting at the ***Fossil & Prairie Park Preserve*** in Rockford, Iowa is now available

Iowa Geological Survey Educational Materials—**EM-45**

https://tinyurl.com/

The Iowa Geological Survey has published a new brochure on fossil collecting at the Rockford Fossil & Prairie Preserve. The preserve is managed by the Floyd County Conservation Board and allows visitors to collect the wide variety of Devonian fossils that weather out of Cerro Gordo Mbr shales. The brochure includes a map guiding visitors to the site and photos and descriptions of many of the fossils to be found. A pdf of the brochure can be downloaded or printed copies can be ordered from the Educational Materials list on the Survey's Publications Page, https://www.iihr.uiowa.edu/igs/publications/publications?category=Educational-Materials.

Click on cover to download pdf.

Amazing Dinosaur Found (Accidentally) by Miners in Canada

On the afternoon of March 21, 2011, a heavy-equipment operator named Shawn Funk was carving his way through the earth. That Monday had started like any other at the Millennium Mine, a vast pit some 17 miles north of Fort McMurray, Alberta, operated by Suncor energy company. Hour after hour Funk's towering excavator gobbled its way down to sands laced with bitumen, oil sand—the transmogrified remains of marine plants and creatures that lived and died more than 110 million years ago. In 12 years of digging he had stumbled across fossilized wood and the occasional petrified tree stump, but never the remains of an animal—and certainly no dinosaurs. But around 1:30, Funk's bucket clipped something much harder than the surrounding rock. Oddly colored lumps tumbled out of the till, sliding down onto the bank below. Within minutes Funk and his supervisor, began puzzling over the walnut brown rocks. And then they turned over one of the lumps and revealed a bizarre pattern: row after row of sandy brown disks, each ringed in gunmetal gray stone. Right away Funk realized, 'We gotta get this checked out, it was definitely nothing we had ever seen before."

In life this stone was an imposing herbivore called a nodosaur which stretched 18 feet long and weighed nearly 3,000 pounds. Some 110 million years ago, this unlucky armored plant-eater ended up dead in a river, possibly swept in by a flood. The belly-up carcass wended its way downriver—kept afloat by gases that bacteria belched into its body cavity—and eventually washed out into the seaway, scientists surmise. Winds blew the carcass eastward, and after a week or so afloat, the bloated carcass burst. The body sank back-first onto the ocean floor, kicking up soupy mud that engulfed it. Minerals infiltrated the skin and armor and cradled its back, ensuring that the dead nodosaur would keep its true-to-life form as eons' worth of rock piled atop it. Researchers suspect it initially fossilized whole, but when it was found in 2011, only the front half, from the snout to the hips, was intact enough to recover. Its skull still bears tile-like plates and a gray patina of fossilized skins. The specimen is the best fossil of a nodosaur ever found. You can't even see its bones, yet scientists are hailing it as perhaps the best-preserved dinosaur specimen ever unearthed. That's because, 110 million years later, those bones remain covered by the creature's intact skin and armor. Indeed, the Royal Tyrrell Museum of Palaeontology in Alberta, Canada, recently unveiled the dinosaur as the centerpiece of a new exhibit of fossils recovered from Alberta's industrial sites. Now the public is marveling at what has wowed scientists for the past six years: an ambassador from Canada's distant past, found in a moonscape by a man with an excavator. The dinosaur was so well-preserved that many have taken to calling it not a fossil, but an honest-to-goodness **"dinosaur mummy**."

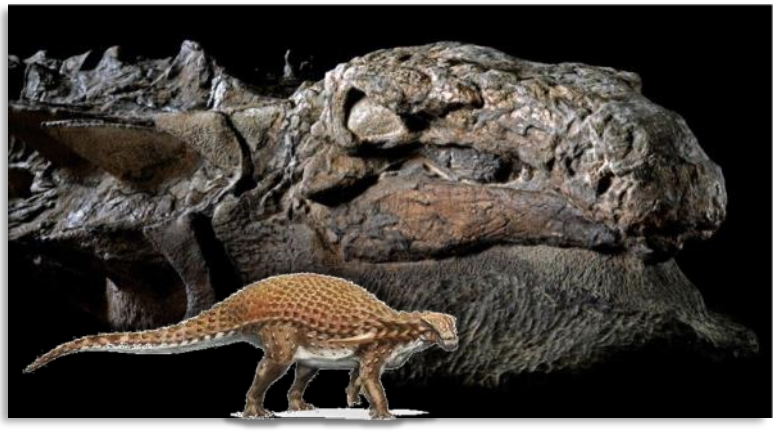


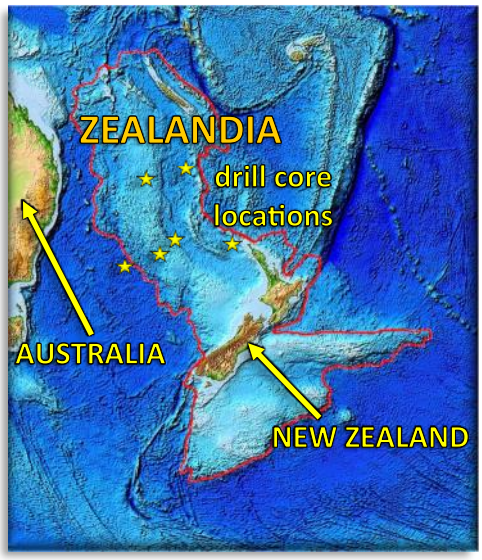
Photo of the head of the spectacularly preserved nodosaur and an artists reconstruction of the live animal.

The Canadian specimen literally defies words, in more ways than one. As this article went to press, museum staff were finalizing the creature's scientific description and hadn't yet settled on a common name for it. But already the fossil is providing new insights into the structure of nodosaurs' armor. Reconstructing armor usually requires educated guesswork, as the bony plates, called osteoderms, scatter early in the decaying process. Not only did the osteoderms on this nodosaur preserve in place, but so did traces of the scales in between. A lucky break in the nodosaur's left shoulder spike reveals a cross section of its bony core. The spike's tip was sheathed in keratin, the same material that's in human fingernails. What's more, sheaths once made of keratin still coat many of the osteoderms, letting paleontologists see precisely how these sheaths exaggerated the armor's size and shape. "I've been calling this one the Rosetta stone for armor," says Donald Henderson, curator of dinosaurs at the Royal Tyrrell Museum.

The National Geographic Society has posted a fantastic 3-d interactive image and many more photos of and information about the nodosaur at http://www.nationalgeographic.com/search/?q=nodosaur.

Scientists Embark on Expedition to Submerged Continent of Zealandia

Zealandia is a mass of continental crust about half the size of Australia that surrounds New Zealand. Increasingly detailed seafloor maps have brought Zealandia into focus in recent decades. Unlike other continents, though, more than 90 percent of Zealandia is submerged. Now scientists are at sea in search of clues about its history and the answers to key questions about plate tectonic processes and Earth's past greenhouse climate. On July 27, 30 researchers set sail aboard the *JOIDES Resolution*, one of the world's most sophisticated scientific drillships, on a two-month ocean drilling expedition to search for clues to help answer these questions. They will be drilling at six sites in the Tasman Sea (*see stars on map below*) at water depths ranging from 3,000 to 16,000 feet. At each site, the scientists will drill from 1,000 to 2,500 feet into the seafloor to collect cores -- complete samples of sediments deposited over millions of years. The cores hold fossil evidence the scientists will use to assemble a detailed record of Zealandia's past. About 100 million years ago Antarctica, Australia and Zealandia were all one continent. Around 85 million years ago, tectonic plate movements caused Zealandia to split off on its own, and for a time, the seafloor between it and Australia was spreading on either side of an ocean ridge that separated the two. Some 50 million years ago, a massive shift in plate movement occurred in the Pacific Ocean. It resulted in the diving of the Pacific Plate under New Zealand, the uplift of New Zealand above the waterline, and the development of a new arc of volcanoes. This drilling expedition will examine the timing and causes of these changes as well as related changes in ocean circulation patterns and ultimately Earth's climate.

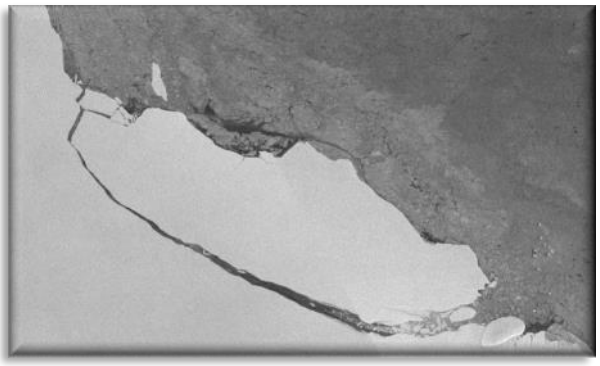


Zealandia has been left out of many climate models, and its presence could be one explanation for the difficulty scientists have had in developing accurate models of the greenhouse climates of around 50 million years ago.

http://news.rice.edu/2017/07/18/zealandia-should-hold-answers-about-tectonics-past-climate-2/

Antarctica's Larson C Ice Shelf Spawns Iceberg A68

The growing rift that carved across one of the Antarctica Peninsula's largest ice shelves reached its end, sending a 2,240-square mile iceberg spiraling into the sea. Welcome to the world, iceberg A68. The massive slab of ice, equivalent to the size of Delaware is large enough to cover the U.S. in 4.6 inches of ice, will slowly melt over the coming years as it drifts away from Antarctica, probably into the South Atlantic Ocean. A68 is only half as big as the record-holding iceberg B-15 which split off from the Ross ice shelf in the year 2000, but it is nonetheless believed to be among the 10 largest icebergs ever recorded. The growing instability of the continent's ice has major implications for coastal communities around the world as it melts and pushes sea levels higher. Ice-shelf retreat on the Antarctic Peninsula has been observed throughout the satellite era -- about 50 years. Large sections of the Larsen Ice Shelf A and B, and the Wilkins1 ice-shelf collapsed in 1995, 2002, and 2008, respectively. Geological evidence suggests that ice-shelf decay of this magnitude is not unprecedented; however, prior to 2002 the Larsen-B ice shelf remained intact for the last 11,000 years. While Antarctic ice shelves are in direct contact with both the atmosphere and the surrounding oceans, and thus subject to changes in environmental conditions, they also go through repeated internally-driven cycles of growth and collapse. The Larsen C crack had been growing since 2010 largely due to natural causes, according to most researchers. When it finally broke through around July 4, it reduced the Larsen C ice shelf to its smallest size on record. Scientists will be looking to see if other rifts open on the ice shelf, which could mean more big calving events, putting further stress on the remaining ice. Coupled with a slew of other findings it's clear the Antarctic landscape is rapidly shifting due the ravages of climate change above and below the ice.



The rifting of the Larson C ice shelf is complete, freeing Iceberg A68.

https://www.sciencedaily.com/releases/2017/08/170802082909.htm

CVRMS FIELD TRIP TO FRYXELL GEOLOGY MUSEUM AND LIZZADRO MUSEUM OF LAPIDARY ARTS

Following last year's superb field trip to the Field Museum of Natural History, CVRMS Director Bill Desmarais is organizing another field trip by bus, this year to the **Fryxell Geology Museum** in Rock Island and **Lizzadro Museum of Lapidary Art** in Elmhurst, Illinois, scheduled for **Saturday October 21st**. The charter bus will depart from Cedar Rapids at 6:30 a.m. and also pick up passengers in Iowa City enroute to Rock Island's Augustana College and the Fryxell Geology Museum, then to Elmhurst and the Lizzadro Museum of Lapidary Art. **The Fryxell Museum**, named after Dr. Fritiof Fryxell, was started in the late 1880s with a modest natural history collection. Today it is one of the largest and finest collections of rocks, minerals and fossils in the Midwest, with more than 1,500 rock, mineral, and fossil specimens, and a fluorescent mineral display. It includes a cast of a Tyrannosaurus rex skull and a complete 22-foot long skeleton of *Cryolophosaurus,* a large crested carnivorous dinosaur collected in 1991 in Antarctica by Professor Bill Hammer and his students. One display shows a rare amphibian fossil from the famous Mazon Creek area. This fine specimen shows nice preservation of the skull, body and limb material. Also on display is a quarter-ton piece of the Canyon Diablo meteorite, a planetarium show with images and information on the wonders of the night sky, and a newly acquired piece of the Chelyabinsk meteor that exploded over Russia on Feb. 15, 2013.

Fryxell museum visitors are greeted by a 22-foot-long skeleton of a *Cryolophosaurus,* a large carnivorous dinosaur.

The **Lizzadro Museum of Lapidary Art** in Elmhurst (a western suburb of Chicago) is dedicated to the art of cutting and polishing stones. The museum was founded by Italian immigrant Joseph F. Lizzadro, Sr., an electrical engineer with a life-long interest in lapidary and a special fondness for jade. As his collection grew he desired to display it to the pubic, and was granted permission to build a museum within the city's Wilder Park. The museum's doors opened in November, 1962, and it include displays gemstone treasures, antiques to modern, with a blending of earth science exhibits. The building itself is designed to resemble a jewelry box in a park setting and features more than 200 exhibits, including the ***Castle Lizzadro***, which is carved out of gold. Housed within the museum are rare pieces such as a jade imperial altar set completed during the Ming Dynasty, (1368-1644) and a cinnabar screen encrusted with gemstones that was a gift to the Chinese emperor Qianlong in 1791. Both pieces were originally housed in the imperial palace of China. The lower floor of the museum is an interactive earth science center containing unusual rocks, fossils and hands-on exhibits. The field trip will be free to club members, with a minimal charge of $25 to non-members if unclaimed seats remain. To register for the field trip contact Bill Desmarais at 319-365-0612 or desmarais_3@msn.com.

The Lizzadro Museum of Lapidary Art

Carved cinnabar statue in the Lizzadro Museum of Lapidary Art.

Seats are limited so don't delay and miss this great trip!

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

Club meetings are held the 3rd Tuesday of each month from September through November and from January through May at 7:00 p.m., temporarily at a location to be announced. The December meeting is a Christmas dinner held near the usual meeting night. 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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