



# Cedar Valley Gems

Cedar Valley Rocks & Minerals Society  
Cedar Rapids, Iowa

[HTTP://WWW.CEDARVALLEYROCKCLUB.ORG/](http://www.cedarvalleyrockclub.org/)

CEDAR VALLEY GEMS

DECEMBER 2015

VOL. 41, ISSUE 10

Ray Anderson, Editor: [rockdoc.anderson@gmail.com](mailto:rockdoc.anderson@gmail.com)

## Next CVRMS Meeting Tues. December 8 Christmas Party & Pot Luck

Guaranty Bank  
Fairfax, Iowa

meet at 6:00 pm—eat at 6:30 pm  
games, door prizes  
good food and conversation

**CVRMS WILL PROVIDE**  
main meat dish (turkey, ham)  
coffee

**BRING YOUR OWN**  
dish to share  
place settings  
other drinks

**A COLLECTION WILL BE TAKEN**  
for HACAP & Linn County Food Bank

for more details see:

[www.cedarvalleyrockclub.org](http://www.cedarvalleyrockclub.org)

## "How'd Ya Like To Spend Christmas On Christmas Island?"



Wonder what it would be like to spend "Christmas on Christmas Island"?

The Australian Territory of Christmas Island lies in the northeastern part of the Indian Ocean at 10.5° south and 105.5° east and was discovered by William Dampier in 1688. It is the home to about 2,000 residents, and its average temperature on December 25 includes a high of 81° and a low of 73°. Christmas Island is the peak of a basalt volcanic seamount which rose steeply 16,000 ft above the ocean floor about 60 million years ago.

Today the highest point of the island is Murray Hill, which rises to 1,180 ft above sea level. The core of the island is composed of volcanic material which is dominantly basaltic. Rocks such as alkali-trachyte, trachybasalts, olivine basalts, limburgite, and nepheline basinite crop out on the island. The volcanic core is overlain by a sequence of Cenozoic limestones, which were deposited during the development of an atoll reef. The oldest sediments are thin Eocene limestones and conglomerates which are interbedded with volcanics. These are overlain by a thick sequence of Miocene limestone, and the island is surrounded by a recent atoll reef. The island's extensive guano phosphate deposits were first mined in 1897 and have since become Australia's principal source of phosphate raw material.



Location of Christmas Island in Indian Ocean

The island is 52 mi<sup>2</sup> in area and is shaped roughly like the letter "T". Christmas Island National Park covers about 2/3 of the island and protects much of the island's uniquely structured rainforests, wetlands, tens of millions of red crabs, and a small but environmentally significant marine area. The island is one of the world's truly spectacular tropical seabird rookeries, with 80,000 seabirds nesting there each year. It is home to the endangered Abbott's booby and the only nesting sites in the world of the Christmas Island booby.

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## MERRY CHRISTMAS



from your CVRMS Board

# CVRMS October Meeting

October 17, 2015

**Call to order:** 7:15 p.m. by Marv Houg, President.

**Introduction of new members or guests-** No new members. Guests include Zachary Miller, Alex Von Gries, Dean Hester from U of I and Professor Jane Gilotti.

**Minutes** Minutes of previous meeting reviewed. Motion to accept as published made by AJ Second by Tom. Motion passed.

**Treasurer's report** by Dale- Checking balance \$16,860.47. Motion to approve by Terry Baty, second by Dennis. Motion passed.

**Monthly Program-** Program presented by three students from U of I who were recipients of the scholarship funds provided by the club. Jane Gilotti introduced the program as well as thanked the club for their generosity. The money goes to a great cause.

Dean Hester spoke about his research on trilobites. Zachary Miller spoke about his Zircon research and Alex von Gries reviewed their latest field trip to Montana.

**Door Prize Winner- Mike Blin**

**Show report-**Flyers are available for distribution. Everyone encouraged to take some and distribute.

**Christmas-**The annual party will be held on December 8 at the Guaranty Bank Community room. Dinner time 6:30 p.m. Bring your own place settings. Club will provide the meat and drinks. Volunteers needed to cook meat, set up room since Dell will be gone. Julie will plan on some games. Small donated door prizes are welcomed.

**Calendars** are available for orders. Order from Dale at \$8.00 each.

**Dell** has sign up list for host and hostess duties. Reminder to keep the treats simple.

**Field trips-**Marv is working on getting into Jessop Mine maybe before it gets too cold. Also, Ithiel from Edelsteins in Amana will host a field trip to his basement where they are reconstructing a triceratops that he and Jen have excavated in South Dakota. It promises to be an interesting and educational experience.

**Correspondence-** Marv received word that there will be an auction in Mylan, Illinois. this coming weekend Nov. 21-22. Go to Walnutcreekauction.com for more information.

**New Business-** Tom suggested that the club also include into the scholarship awards an amount to give to the American Federation Scholarship fund. Marv will place on board agenda for next meeting.

Julie has received a request from the Midwest/American Federation for our club to sponsor a show probably in 2019. Another item for board discussion.

There being no further business, motion made by Terry to adjourn, second by AJ. **Meeting adjourned 9:00p.m.**

Respectfully submitted,  
Dell James, Secretary

## Rock Calendar

### CVRMS Events of Interest

2015

Dec. 8 - **CVRMS Christmas Party**

Guaranty Bank

Fairfax, Iowa

more details: [see Page 1](#) or

[www.cedarvalleyrockclub.org](http://www.cedarvalleyrockclub.org)



2016

Apr. 16-17 - **CVRMS Gem, Mineral, and Fossil Show**

Hawkeye Downs, Cedar Rapids

Sat. 8:30 am - 6 pm; Sun. 9:30 am - 5 pm.

**Theme: Fossil Plants & Petrified Wood**

[see Poster on Page 8](#)

Sept. 17-18 - **CVRMS Rock and Fossil Auction**

Sat. 9 am - 7 pm; Sun. 10 am - 4 pm.

Amana RV Park & Event Center

39 - 38th Ave, Amana

### Other Rock Hound Events

2016

April 1-3 - **MAPS Expo XXXVIII**

Sharpless Auctions

Exit 249 I-80, Iowa City, Iowa

**Theme: Mesozoic Era**

## ! HELP !

Julie has volunteered to serve as hostess for the January CVRMS meeting. She could use another volunteer to help her. Please contact Julie or Sharon.

## Utah's 'Grand Staircase' Leads Back in Time to Dinosaur Shangri-La

On a stormy day in southern Utah last summer, paleontologist Alan Titus wandered the craggy, buggy badlands of Utah's Grand Staircase-Escalante National Monument. He had explored this area of the rugged 1.9 million acres of the Grand Staircase's before and found nothing. This time, however, the skull of an adult tyrannosaur peered up at him, and nearby a tyrannosaur toe bone could be seen. By December, the bones of the excavated tyrannosaur lay encased in plaster in a lab, awaiting closer analysis. "It was the find of my lifetime," said Dr. Titus, a paleontologist with the Bureau of Land Management. But it is just one of the many extraordinary discoveries made in the national monument in the past 15 years. Dr. Titus and his colleagues at the bureau, along with the Natural History Museum of Utah, the Denver Museum of Nature & Science, and hundreds of volunteers, interns and researchers, have excavated tens of thousands of fossils from an extraordinary part of the Grand Staircase monument called the Kaiparowits Plateau, a 50-mile-long, high-elevation ridge. One of the richest troves of fossils from the Late Cretaceous Period, the Kaiparowits is providing a window into the hothouse world that was home to the dinosaurs in their twilight, about 10 million years before their sudden extinction. The Kaiparowits stands out for the sheer number of well-preserved, unique fossils. Finds from this ancient ecosystem are challenging long-held assumptions about dinosaur physiology, evolution and environment.



Most fossils have been excavated from the Kaiparowits Formation, a multilayered band of sandstone and mudstone dating from 76.6 million to 74.5 million years ago. Quickly deposited layers of sand and mud buried the fossils in a pristine state. Their preservation is spectacular: articulated skeletons, fossilized skin, plants so shockingly fresh that their delicate leaves can be peeled right off the rocks. When they are illuminated beneath an epifluorescence microscope, their cuticles, or waxy leaf coverings, fluoresce bright green, revealing their cellular structures. Among the animals discovered here are 21 never-before-seen dinosaurs. Many are ceratopsids, or horned-face dinosaurs, including the ornately frilled *Kosmoceratops richardsoni* and *Nasutoceratops titusi* (named after Dr. Titus), a herbivore with a skull seven feet long, an oversize nose and forward-facing horns. As many as four species of horned dinosaurs lived here 77 million years ago, twice as many as have been discovered at contemporaneous sites in North

America. Hadrosaurs, or duck-billed dinosaurs, are also common in the Kaiparowits, and two new species of tyrannosaurs have been found on the plateau: the 12-foot-tall *Teratophoneus currei* ("monstrous murderer"), which died 75 million years ago; and *Lythronax argestes* ("king of gore"), at 81 million years old the oldest true tyrannosaurid known to science. With so many dinosaur fossils, this is really the only place where paleontologists can study the causes of dinosaur extinction in any detail. The Kaiparowits also has yielded some of the greatest crocodile and turtle diversity in the ancient world: six crocodile species and 17 turtle species. One three-foot-long turtle discovered last summer died pregnant, her body full of eggs.

75 million years ago, the region was a steamy, swampy, coastal forest in southern Laramidia, a narrow continent stretching from Alaska to Mexico that formed about 96 million years ago when the Western Interior Seaway bisected North America, separating the land mass into two continents for more than 20 million years. It lay about 60 miles from the sea, in a flat, forested basin crisscrossed by rivers, lakes and ponds. Giant pine trees draped with moonseed vines towered over an Everglades-like wet forest floor blanketed with gingers, ferns, duckweed, water lettuce and floating, flowering plants. The Denver Museum has collected more than 12,000 plant specimens from 75 sites in this area.

modified from New York Times online:

<http://www.nytimes.com/2015/07/21/science/utah-grand-staircase-dinosaurs-kaiparowits-plateau-fossils.html?ref=topics>



## CVRMS Board Meeting

**Members Present:** Marv Houg, Dell James, Sharon Sonnleitner, Ray Anderson, Jay Vavra, Dale Stout,

Call to order: 7:15 p.m. by Marv, President at Marv Houg's house

**Discussion** regarding recipients of this year's Christmas "pass the hat" collection. Motion made by Dale to split the funds received between HACAP and the Linn County Food bank. Second by Ray. Motion carried.

Jeff relayed that he would cook a ham for the Christmas pot luck. Sharon will get the turkey.

### Show

Petrified Wood and Fossil plants still the theme. April 16-17 show dates for 2016. Two new dealers will be present this year. One deals with pearls and the other is Phil Oliver since he has a number of petrified wood for sale and display. Larger spaces will be offered to some vendors.

Dale will contact Mary Campbell for the street art project.

Flyers are printed and available for distribution.

Programs have been selected and Ray Anderson will work out the schedule for the various speakers.

Raffle prizes will be available and Sharon and Marv will speak with various possible donors. Dale will look into obtaining the raffle license.

### New Business

Tom raised the question at the general meeting about the club donating scholarship money to National Federation scholarship fund since we have had a successful year. Consensus by the board was to keep our funds local and support our local programs first.

Also, from Tom and Julie, the question about having the National meeting in conjunction with our show in 2019. More information is needed about what is required by our club to host the show. Can we afford it? Do we need more space? Are there accommodations that need to be met? Marv will look into more specific information before the board can make a recommendation to the club.

Marv appointed nominating committee of Sharon, Ray and Jay who will present slate to general meeting for approval. The whole board except for two board members will be up for election. Jay and Dave will continue as board members.

### Misc.

Ray has made arrangements with Mark Ginsberg for March 26 at 9:30 am. He has a 3 D printer and will give a program about jewels.

Ithiel will open his basement to show us the dinosaurs that he and Jen are restructuring. Anticipate January or February.

Motion to adjourn by Dell, second by Dale.

Meeting adjourned 9:15pm P.M.

Respectfully Submitted  
Dell James, Sec

## 2nd Largest Diamond Found

In November the Canadian company Lucara Diamond discovered the world's second-largest diamond of gem quality in Botswana.

This 1,111-carat diamond is second only to the 3,106-carat Cullinan diamond found in South Africa in 1905. The gem measures 2.5" x 2.2" x 1.6" and was recovered from the Karowe mine located north of the capital Gaborone.



This diamond (Karowe AK6), the largest found in over a century, has yet to be evaluated and thus far has no price tag or potential buyer. It rates as a Type-IIa stone and is roughly the size of a tennis ball. It is extremely hard to estimate the value of the diamond given the unknown color, clarity, and cutting.

To provide an estimate of final selling price, Lucara recently sold a 341.9-carat diamond of roughly the same quality for \$20.6 million, equaling out to \$60,251 per carat. If you were to extrapolate the same cost per carat for the newly found 1,111-carat diamond, it could sell for a whopping **\$66.9 million!**

"This has been an amazing week for Lucara, who also discovered a 813-carat diamond (the sixth largest of gem quality ever mined) as well as a 374-carat diamond during the same week

With a diamond of this caliber the process of determining a tender, getting it cut, polished, and sold will likely take years to complete.

The eventual fate of the diamond may be as several smaller cut diamonds. The Cullinan diamond was cut into many different stones, including the Great Star of Africa, for the British royalty's crown jewels. The diamond will be scanned and rendered in 3D to determine the best use of the diamond and how many pieces to cut it into.

The Karowe mine generates diamonds from its three kimberlite pipes. Each outcrops at surface and the majority is located within 35 feet of the surface. The Karowe mine contains an estimated 6.3-million carats of diamonds in reserves.

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## Spotlight Gemstone: Andalusite



**Andalusite**, an aluminium nesosilicate mineral with the chemical formula  $Al_2SiO_5$ , is a rock-forming mineral that is mined for use in high-temperature refractories. Gem-quality specimens are cut into faceted gems and cabochons.

Andalusite forms during the regional metamorphism of shale. It is found in schist and gneiss at some present and ancient convergent plate boundaries where the rocks have been exposed to the temperatures and pressures needed for its formation. In these rocks, andalusite is often associated with kyanite and sillimanite.

Andalusite also forms during the contact metamorphism of shaly rocks. In this occurrence, it can form within the metamorphosed rock or in veins and cavities within the igneous rock. It can be associated with cordierite in hornfels, granite, and granitic pegmatite

Andalusite has a number of useful physical properties. It has the ability to withstand high temperatures without alteration. For that reason it is used to make high-temperature ceramics and refractories. The white porcelain of many spark plugs is made using andalusite.

Andalusite is one of a small number of minerals that commonly forms prismatic crystals with a square cross-section. This can be important information for identification in the field.

Transparent specimens of andalusite are often strongly pleochroic. This makes them have different apparent colors of green, brown, yellow, and red when viewed from different directions. Some are tri-chloric. This pleochroic effect allows andalusite to be cut into unique gemstones.



chialstolite

**Chialstolite** is a variety of andalusite that contains black particles of graphite arranged in geometric patterns. The graphite is pushed aside by crystal growth within a rock that is being metamorphosed. The result can be a cross-shaped pattern within the mineral.

## Earliest Mammal Fetus

### Horse-like Fossil From 48 Million Years Ago Preserved While Pregnant



Fossil horse-like mammal with fetus found in Germany

A 48-million-year-old horselike fossil pulled from the rich Messel Pit site near Frankfurt is yielding insights into the evolution of mammalian reproduction. A fetal specimen described in a new study and circled in the photograph above is the earliest and best-preserved mammalian fetus.

In looking at the fossilized soft tissue, he and his colleagues discovered a preserved placenta, uterus and one broad uterine ligament, evidence that the ancient mare had a reproductive system very similar to that of a modern horse.

This means a sophisticated reproductive system was already present in mammals at this early stage in their evolution.

The bones of the fetus are also intact except for the skull, which is crushed. The findings appear in the journal [PLOS One](http://www.plosone.org).

The fetus was first discovered in a fossilized mare found in 2000 by Dr. Franzen, a retired paleontologist from the Senckenberg Museum in Frankfurt and his colleagues. They studied the bones and anatomy of the fetus using scanning electronic microscopy and high-resolution micro-X-ray. The researchers believe that because the fetus is very developed, the mare died shortly before she would have given birth.

modified from The New York Times <http://www.nytimes.com/2015/10/13/science/horselike-fossil-from-48-million-years-ago-preserved-while-pregnant.html?ref=topics&r=0>



# What in the World?

## November Photo



What in the world is this menacing looking gray cloud chasing the SUV??



November's *What in the World* photo was a glacially polished exposure of basalt pillows in the Precambrian Greenstone Belt of Canada. The pillows form when basaltic magma is erupted under water, oozing out of fissures as blobs of rock that are rapidly cooled in pillow shapes. The dark gray-green material that defines the pillows is composed of fractured pieces of the glassy outer rind that cooled immediately on contact with the water. The slightly coarser-grained pillows themselves solidified shortly after. Low grade (greenschist) metamorphism has altered some original minerals to dark green chlorite. For a short video on pillow formation see:

<http://news.discovery.com/earth/videos/earth-underwater-volcano-caught-on-video.htm>

**2015 ELECTION OF CVRMS OFFICERS  
at Christmas Party December 8**

The following slate will be presented for election by the Nominating Committee of Sharon Sonnleitner (chair), Jay Vavra, and Ray Anderson.

<b>President:</b>	Marv Houg
<b>Vice President:</b>	Ray Anderson
<b>Secretary:</b>	Dell James
<b>Treasurer:</b>	Dale Stout
<b>Editor:</b>	Ray Anderson
<b>Webmaster:</b>	Sharon Sonnleitner
<b>Liaison:</b>	Joy Cummings
<b>Director 2018:</b>	Bill Desmarais

additional candidates may be nominated from the floor during the December 8 election

# Ask a Geologist

by Ray Anderson aka "Rock Doc", CVR&MS 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](mailto: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 for the column.

*Terry Baty was telling me about a large, buried, glacial erratic that was impeding the expansion of a church near Robins. He said I could have it if I wanted it. I'd love to have it in my front yard; but then there was the problem of moving it. That reminded me of the largest erratic that I have ever seen moved in Iowa, the Slayton Rock.*

## Slayton Rock, Casey Iowa:

When Robert Slayton, who farms near Casey, Iowa, decided that the glacial boulder he had to plow around would look better landscaping his home yard, he didn't realize the task at hand. When he finally excavated around the erratic in the winter of 1998 he realized that his "landscaping stone" was about 14 feet high and probably weighed 250-300 tons! Using his D-9 and two borrowed Caterpillars pushing, and two 8-tired Steiger tractors pulling it took two weeks to move the rock to the road. However, to get the rock home he had to go another 1.5 miles down a gravel road and over two bridges. So with the spring planting season looming, the monster rock sat along the road until the fall harvest was in.



D-6 and D-8 Caterpillars push Slayton Rock to the road.

To move the rock on the road Robert constructed a 8 ft wide by 25 ft long skid of 1.5-in-thick plate steel, intending to push the rock onto the skid and slide it to his house. But the weight of the rock bent the skid so severely that it dug into the ground like a plow when they tried to pull it. Not deterred, Robert constructed a second skid of 3-in thick steel, and this time the sled held its shape. After several futile attempts to move the skid and rock they finally found a neighbor with a 200-ft. long ship's anchor chain, with links 2 in. thick and 1 ft. long. They built temporary culverts and fills over the two creeks they had to cross, so they could avoid the bridges which could not have stood the load.

By December 18, 1999, with at least 3 inches of frost in the ground and a fresh 2 inches of snow on the gravel road, it was time. Robert assembled a D-8, a D-7, four older model Steiger 4x4s, and in the lead a brand new Deere 9200 4x4 tractor, a total of about 3,000 horsepower. With the tractors in a line connected to the chain and



Seven Steiger 4x4s and two Caterpillars pull, and D-6 and D-8 Caterpillars push Slayton Rock down the road.

pulling the skid, and the D-6 and D-8 Caterpillars pushing from behind, the rock headed down the road. On several occasions they pulled the rock off the road onto adjacent fields where it was easier to move and not so hard on the roadbed. The rock was finally installed in a grove of trees near the Slaytons' machine shed and a circular drive installed "so people could see it." The move required the assistance of about 100 people and help from numerous construction companies and dealerships. A group of friends getting together to move a "mountain."

The photos and much of the Slayton Rock story came from "Humongous Rock Moved from Field to Farmyard" written by Mick Lane and published in *Farm Show Magazine*, vol. 24, Issue 2, 2000, p. 44. Mick has much more of this story at [https://www.farmshow.com/a\\_article.php?aid=13481](https://www.farmshow.com/a_article.php?aid=13481).



Cedar Valley Rocks & Minerals Society  
Presents its

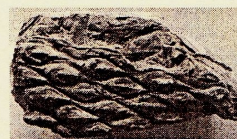
# 2016 GEM, MINERAL & FOSSIL SHOW

Iowa's Largest & Among Midwest's Largest

New Month,  
Same Venue

Saturday April 16 - 8:30 a.m. to 6:00 p.m.  
Sunday, April 17 - 9:30 a.m. to 5:00 p.m.

Hawkeye Downs Expo Center  
4400 6th Street SW  
Cedar Rapids, Iowa



## OUR 52ND SHOW: PETRIFIED WOOD AND FOSSIL PLANTS

### PROGRAMS

Programs on  
Theme-Related Topics  
Call ahead or check our  
web site for Speakers & Times.

### DEMONSTRATIONS

Tumbling  
Glass Bead Making  
Cabbing, Beading  
Silversmithing  
Flint Knapping  
Geode Cracking

### PEBBLE PIT FOR KIDS

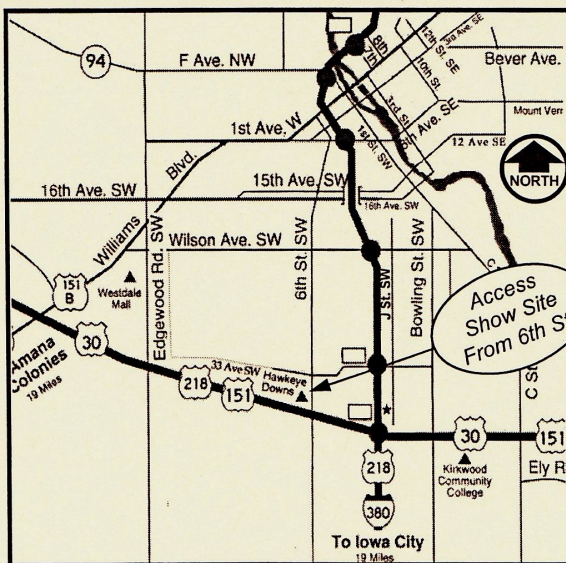
1¢, 5¢, 10¢, 25¢, & 50¢ Items  
\$1 Rock & Mineral Kits

### SILENT AUCTION

Geodes, Minerals, Crystals, etc.

### HOT FOOD

PROFITS GO TO  
SCHOLARSHIPS



### DISPLAYS

Agates  
Minerals  
Crystals  
Fossils  
Amethyst  
Petrified Wood  
Polished Stones  
Artifacts  
Spheres, Geodes

NOT RESPONSIBLE  
FOR ACCIDENTS

### DONATIONS REQUESTED

Adults.....\$3.00  
Students .....\$1.00  
(12-18)  
Children ..... Free  
(Under 12)  
Youth Groups ..... Free  
(w/adult)

### SLUICE FOR GEMS

#### MANY ITEMS FOR SALE, INCLUDING:

Books	Fossils	Jewelry	Minerals	Book Ends
Opal	Agates	Carvings	Seashells	Petrified Wood
Slabs	Geodes	Crystals	Tumblers	Lapidary Equip.
Gems	Beads	Spheres	Meteorites	Jewelry Findings

CHILDREN MUST BE  
ACCOMPANIED BY AN ADULT

#### For Additional Information. Contact:

Marvin Houg (319-364-2868, m\_houg@yahoo.com);  
Sharon Sonnleitner (319-396-4016, sonnbn@aol.com); Tom Whitlatch (319-362-0684, whitlatcht@gmail.com)

For program, dealer, and show updates, check: [www.cedarvalleyrockclub.org](http://www.cedarvalleyrockclub.org)



## Diamonds not Rare?

**Diamonds may not be as rare as once believed, says a new Johns Hopkins University research report**

"Diamond formation in the deep Earth, the very deep Earth, may be a more common process than we thought," said Johns Hopkins geochemist Dimitri A. Sverjensky, whose article appeared in the online journal [Nature Communications](#). The report says the results "constitute a new quantitative theory of diamond formation," but that does not mean it will be easier to find gem-quality diamonds and bring them to market.

For one thing, the prevalence of diamonds near the Earth's surface (where they can be mined) still depends on relatively rare volcanic magma eruptions that bring them from the depths where they form. For another, the diamonds being considered in these studies are not necessarily the stuff of engagement rings, most are only a few microns across and are not visible to the unaided eye.

Using a chemical model, Sverjensky found that these precious stones could be born in a natural chemical reaction that is simpler than the two main processes that up to now have been understood to produce diamonds. Specifically, their model (yet to be tested with actual materials) shows that diamonds can form with an increase in acidity during deep interaction between water and rock.

The common understanding up to now has been that diamonds are formed in the movement of fluid by the oxidation of methane or the chemical reduction of carbon dioxide. The reactions require different types of fluids to be moving through the rocks encountering environments with different oxidation states. The new research shows that water could produce diamonds as its pH falls naturally (it becomes more acidic) while moving from one type of rock to another, Sverjensky said.

Nobody has yet put a number on the greater abundance of diamonds, but Sverjensky said scientists are working on that with chemical models. It's impossible to physically explore the great depths at which diamonds are created: roughly 90 to 120 miles below the Earth's surface at intense pressure and at temperatures about 1,650 to 2,000 degrees Fahrenheit.

## Hallucigenia Lives !!

The animal kingdom got off to a slow start. Studies on DNA indicate that the first animals evolved more than 750 million years ago, but for well over 200 million years, they left a meager mark on the fossil record. As best as paleontologists can tell, the animal kingdom during that time consisted of little more than sponges and other creatures rooted to the ocean floor.

But then, about 520 million years ago during the Cambrian Period, animal evolution shifted into high gear. Fast-moving predators, scavengers and burrowers evolved. Many of the major living groups of animals first appeared during this so-called Cambrian explosion, including our own ancestors. But the Cambrian explosion included many bizarre species that have long puzzled paleontologists.

For almost 40 years, the poster child for the Cambrian explosion's strangeness has been a hand-size armored worm with a name to suit its bizarre appearance, *Hallucigenia*, a worm with 14 limbs and 14 spikes on its back.

But recently, *Hallucigenia* has lost much of its mystery. Scientists have worked out the creature's anatomy, and they have figured out a lot about how *Hallucigenia* and its relatives thrived in the Cambrian oceans. And despite its odd appearance, *Hallucigenia* isn't an incomprehensible zoological experiment. Paleontologists have been able to place it comfortably on the evolutionary branch that led to a group of invertebrates alive today called **velvet worms**. These studies now give us a much clearer picture of the animal *Hallucigenia*.

Among other things, the scientists have discovered that *Hallucigenia*'s bulb is its head. It carried two eyes, a mouth with a ring of stiffening spines around its edge, and teeth farther down its throat. They also found that *Hallucigenia*'s front three pairs of limbs had no claws. Instead, they were flexible tentacles that could have reached the animal's mouth. The study concluded that they were living on the sea floor, probably living on food particles from decaying matter.

While *Hallucigenia* may not be as exotic as it once seemed, the fact remains that its lineage was a lot more exuberant back in the Cambrian.

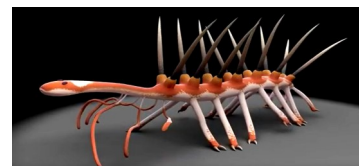


Illustration of *Hallucigenia*



Photo of a modern *Hallucigenia* relative, a velvet worm

## Officers, Directors, and Committee Chairs

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Director '15.....	Jeff Kahl .....	455-2201
Director '16 .....	Dave Roush (daroush1@gmail.com).....	363-7842
Director '17.....	Jay Vavra .....	447-9288
Sunshine .....	Dolores Slade (doloresdslade@aol.com) .....	351-5559
Hospitality .....	Jeff Kahl .....	455-2201
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. at the Rockwell Collins 35th Street Plant Cafeteria, 855 35th St NE, Cedar Rapids, Iowa. The December meeting is a Christmas dinner held on 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:**

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

CVRMS website:  
[cedarvalleyrockclub.org](http://cedarvalleyrockclub.org)



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