Introduction: The Rapid Electrical Formation of Stone Spherules, the Scalability of the Results, and the Similarities of the Internal and External Structures of the Spheres with Naturally Occurring Concretions

1. Published Results by Vemasat Laboratories

In 2004 Plasma Physicists CJ Ransom and Wal Thornhill carried out independent experiments which tested the effects of electric arcs on various minerals and sands. Along with round craters of various types, including flat-bottomed craters, electric arcs on many materials also created small spherules. These stone spheres were formed electrically not only using many types of minerals, but also using different voltages and for different durations, from 5-30 seconds. The spherules appeared on the surface, under the surface, and on the rims of craters[].

Laboratory Modeling of Meteorite Impact Craters by Z-pinch Plasma

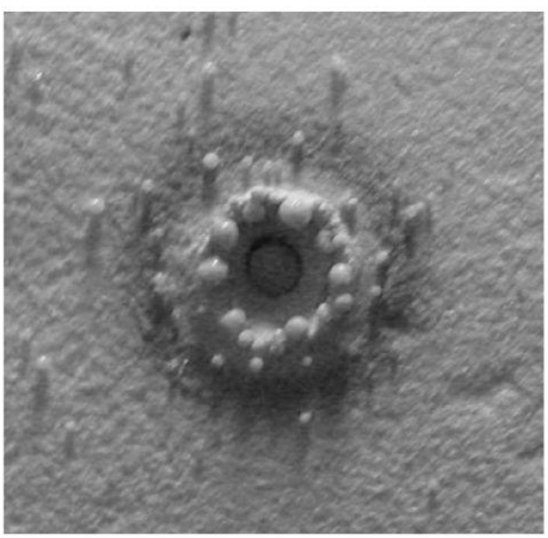


Fig. (3). Crown-like feature with spherules around crater from plasma discharge.

The types of minerals tested are common to the surfaces of the rocky planets in the solar system: silicon dioxide, iron oxide, talc, calcium carbonate, lava sand and hematite.

Fig. 2. Typical plasma-generated spherules compared to a copper BB.

White sand spheres with wire. From "Plasma-Generated Craters and Spherules" IEEE Transactions on Plasma Science, August 2007
Images courtesy of Dr. CJ Ransom

Of particular interest to the authors were the small, blue 1 mm hematite spherules formed rapidly by discharging an electric arc on hematite powder. This result matched the images of the plentiful "blueberries" on the surface of Mars being returned at the time from the Red Planet by the rover Opportunity.

Fig 3. Set of spherules formed by plasma discharge contacting hematite.

Fig 4. Single hematite "blueberry" and one composed of two joined. Picture at 60X before sizing for paper.

These lab results creating "blueberries," along with the electrical generation of craters, revealed that there was mounting, powerful evidence of electrical scarring not only on the planet Mars but on all the rocky bodies in the solar system. Planets, moons and asteroids likewise are covered with the familiar round, clean, flat-bottomed craters, so mysteriously free of fallback debris[].

The results were published by the IEEE, APS, and the Open Astronomy Journal.

Later Stephen Smith wrote widely read papers on New Zealand's Moeraki Boulders, recently discovered Chinese concretions, and Martian "blueberries." He expertly examined the evidence both from the structure of the concretions and from the surrounding rock strata, and made a bold argument for an electrical, non-sedimentary theory for their formation. "The conventional theories," he wrote, "are based exclusively on

chemistry and mechanics. But there is another phenomena that produces spheres – electric discharge. …Electric discharge tends to produce spherical layering and a distinct equator and pole, because the electromagnetic force 'squeezes' perpendicular to the current that creates it"[].

Tim Fisher, longtime collector of crab concretions in the NW, holds a crab concretion along the poles, demonstrating the best place to break it open - in this case along the equatorial bulge.

Above: an example of a fossil crab from the Lincoln Creek Formation in Washington, showing excellent preservation and the radial layering, or outer rind, common to fossiliferous concretions.

1.1 Scalability of Vemasat's Results

In his paper "Laboratory Modeling of Meteorite Impact Craters by Z-pinch Plasma," Dr. CJ Ransom wrote a brief history of the use of lasers and spark-machining on metal surfaces to reproduce craters on a sub-millimeter scale. Dr. Ransom's work expanded the type of substances used for experimentation, and also simulated craters to over a centimeter in diameter.

Regarding the scalability of the results, CJ Ransom summarized:

"Although Dietz mentioned only terrestrial lightning scale discharges, Alfven indicated that laboratory results can be extrapolated over twenty orders of magnitude to include effects seen in deep space. Peratt noted that experimental plasma effects have been shown to be scalable over fourteen orders of magnitude. Others have also noted that laboratory plasma experiments may be scaled to astrophysical phenomena."

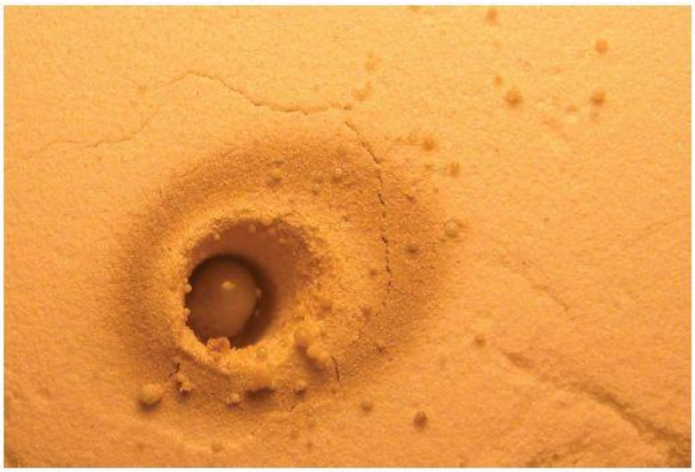


Fig 9. Spherule in crater produced on magnesium silicate by plasma discharge.

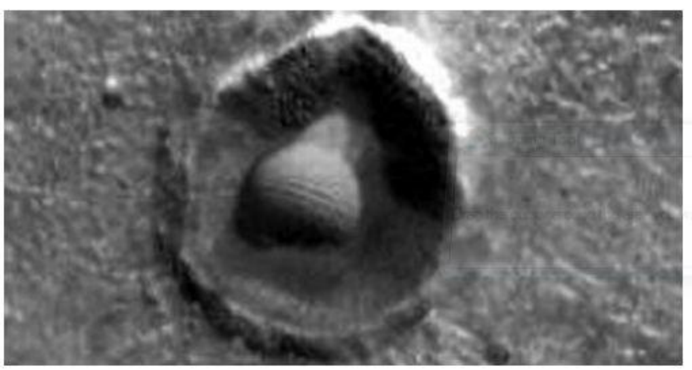


Fig 11. NASA photo M1501228a from the Mars Global Surveyor.

In "Plasma-Generated Craters and Spherules," Ransom and Thornhill observe:

"Spherules were created in a number of materials. Materials of particular interest in the studies included magnesium silicate hydroxide (talc), and silicon dioxide…. Once determined, we found that specific materials and conditions always produced spherules. We also tested various carbonates and iron oxides. The experiments produced both individual spherules and joined spherules."

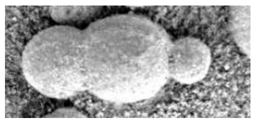
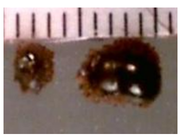
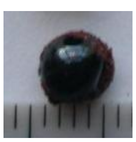
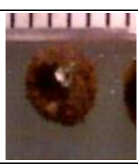
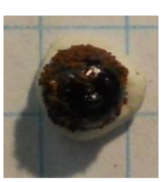
Because of both the scalability and the consistency of obtaining results in the variety of materials tested, the stone spheres created in the lab have deep, unsettling implications for the study of concretions. Concretions in nature occur in sizes ranging from microscopic examples to tourist destinations boasting 20 foot concretions resting on the valley floor.

The authoress sits on a fused pair of sandstone/calcium carbonate concretions in Rock City, Kansas, with her youngest daughter, Mary. Above: lab created fused spheres.

1.2 List of features observed in lab created stone spheres

Lab generation of stone spheres using plasma discharges have so far coincided with the parameters necessary for the production of crater-like disturbances of the surface, and have resulted in a wide variety of forms. As said, lab spheres can be solid, hollow, fused pairs, fused multiples, and can even result in hemispheres with a flat plane.

Other notable features include distinct poles, polar markings (possibly ripples), equatorial bands or bulges, radial layering, a round outer scar, smooth surfaces, and smooth/rough hemispheric differences.

	solid	
	hollow	
	Fused pairs	
	Fused multiples	
	hemispheres	
	Smooth surface	
	Round outer scar	"
	Radial layering	
	Equatorial band	
	Equatorial bulge	
	Polar markings	

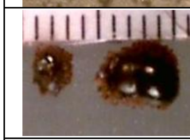
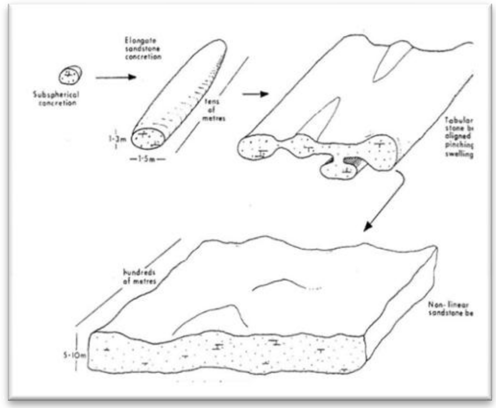
	Possible rippling effect on surface	?
	Many materials tested	Silicon dioxide sand, lava sand, hematite, magnesium silicate dioxide, on meteorites
	Spheres formed on surface or below surface	
	Flat plane	
	Silicon dioxide sand fused, without cement	
	Discrete sphere formed in neat depression	
	Messy or globular form	
	Smaller fused spheres attached (fulgurite shown at left is from a lightning strike)	
	Hemispheric differences	 Manganese nodule

Table 1: comparing lab and natural concretions, by Paulina West

Lab concretions are sometimes discrete spheres found within a depression, or they are formed in numbers around the electrical scar. Lab concretions form on the surface, or they may form below the surface.



"Sequence of forms developed by continued sandstone concretion growth. All four types, with many intermediate shapes, are present in south-western North Dakota. From Parsons (1980)." Image via Bob Biek, NDGS

More detailed scientific descriptions of concretion deposits may include a description of a progression of external structures found side by side in the nodule layer. Concretions may be round, then beyond a certain size become obloid, then begin to flatten, and then become more plate-like or amorphous. In the example below the concretion structures progress from nodules to logs - which are easily mistaken for petrified trees.

Reproducing a progressive morphology is another area in which lab experiments have imitated nature, though results remain preliminary at this time.

In some conditions, lava sand exposed to plasma discharge for varying durations created single, hollow spheres with walls consistently measuring ~.3 mm or less

CONCRETIONS

Type	Abundance	Size Range	Relation to Bedding	Enclosing Sediment
Calcareous sandstone types				
lens	abundant	1-10m long 0.1-2m thick	randomly distributed bedding undisturbed	sandstone
log	common	5-15m long 1-3m dia	randomly distributed bedding undisturbed	sandstone
irregular mass	abundant	0.5-1m dia	concentrated in layers bedding disturbed	sandstone
irregular mass	rare	0.5-1m dia	concentrated in layers bedding disturbed	bentonitic sand
Sideritic sandstone types				
lens	common	1-3m long 0.2-1m dia	randomly distributed bedding undisturbed	sandstone
irregular mass	common	0.5-1m dia	concentrated in layers bedding undisturbed	sandstone
Lignitic sandstone types				
calcareous lens	rare	1-5m long 0.5-1m thick	randomly distributed bedding undisturbed	lignitic sandstone
sideritic lens	abundant	5-20m long 0.5-2m thick	concentrated in layers bedding disturbed	lignitic, bentonitic shale
Other types				
fossil-cored mass	common	5-20cm dia	randomly distributed bedding disturbed	lignitic bentonite shale
jarosite sphere	common	10-30cm dia	randomly distributed	sandstone
pyrite sphere	rare	2-5cm dia	randomly distributed	sandstone
baritic sandstone lens	rare	0.5-1cm long 5-10cm thick	randomly distributed bedding undisturbed	sandy bentonite
cone-in-cone mass	rare	0.5-2cm dia	randomly distributed	bentonitic to lignitic sand and silt

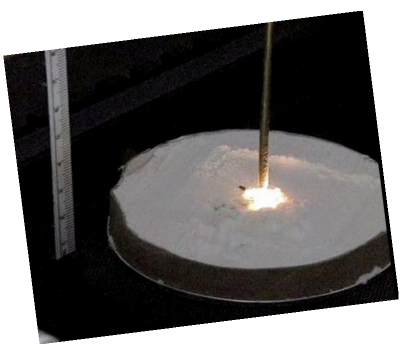
Progressive morphology of concretions in ND.
Image: North Dakota Geological Survey

Under different experimental conditions, lab fulgurites made from lava sand exhibited elongated forms and much thicker walls

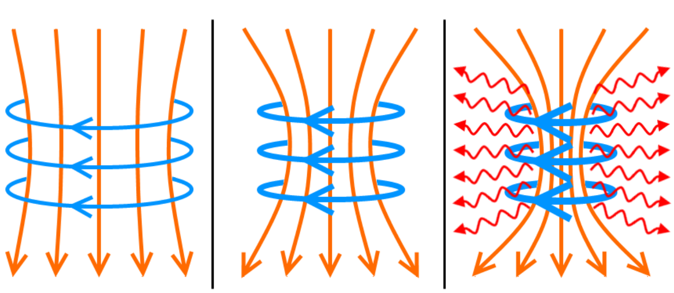
1.3 Experimental arrangement

In "Laboratory Modeling of Meteorite Impact Craters by Z-pinch Plasma," C J Ransom described the experimental arrangement: "Plasmas were created in a container with a discharge probe that could be moved in the vertical direction between experiments. The verticle distance from the probe to the sample could be set at 1 cm to 30 cm. The probe was also moveable along a path of 10 cm during an experiment. The probe could move plus or minus 1 cm perpendiular to the horizontal path. Some tests were run using ac and others using dc.

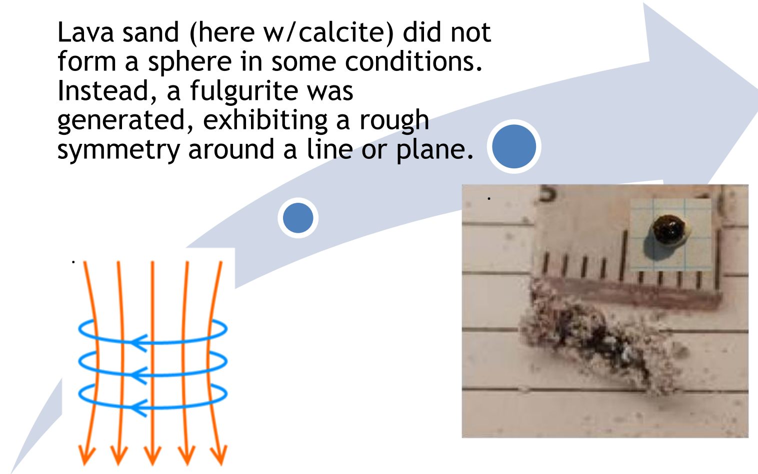
Discharge durations for experiments not using pulsed discharges were between 1 and 20 seconds. Samples were placed on metal plates that could be switched in dc experiments to act as the cathode or the anode. The sample containers were either metal trays, thin non-conducting trays, or non-conducting trays that used a conductor at the edge. Samples were generally between 4 mm and 12 mm. We used powders and solids.

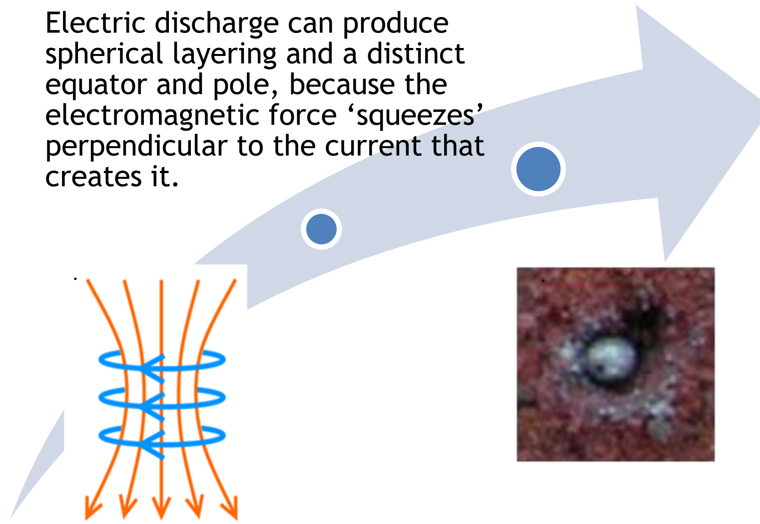


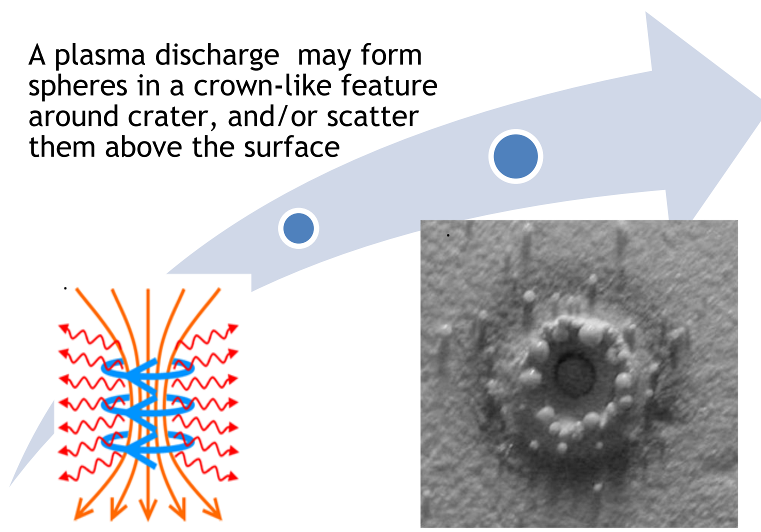
Most plasma discharges were created with a 12,000 volt 120 ma supply that could be run with a voltage doubler. Smaller voltage supplies and a 100,000 volt micro amp discharge coil were used to develop a wide variation of plasmas."



Z-pinch diagram
Image: Stanford University via Atomictoasters.com







Because of the scalability of electrical phenomena, the successful generation of stone spheres across so wide a variety of minerals, and because of the similarity of lab forms to natural forms, it is now our intention to ask whether there is a fully electrical explanation not only for concretions, but for fossiliferous concretions.

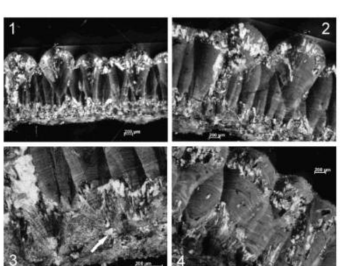
The purpose of this paper is to take the results and publications from Vemasat Labs further by applying the findings from the electrical experiments to the abundant fossiliferous concretions found all over the surface of the globe. In particular, the interest is in the 3-dimensional soft-bodied fossils encased within the concretions.

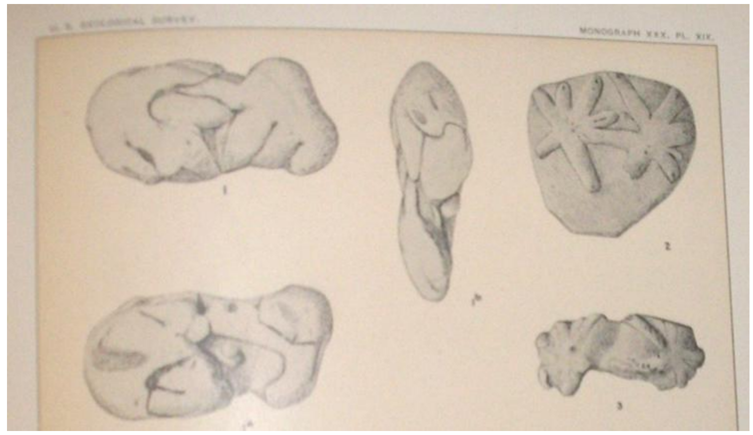
Fossil Horseshoe crab concretion from the Mazon Creek Formation, Il. Image by T.V. Testa

2. Soft bodied fossils in concretions found on all continents and covering ocean floors

What is a soft bodied fossil?

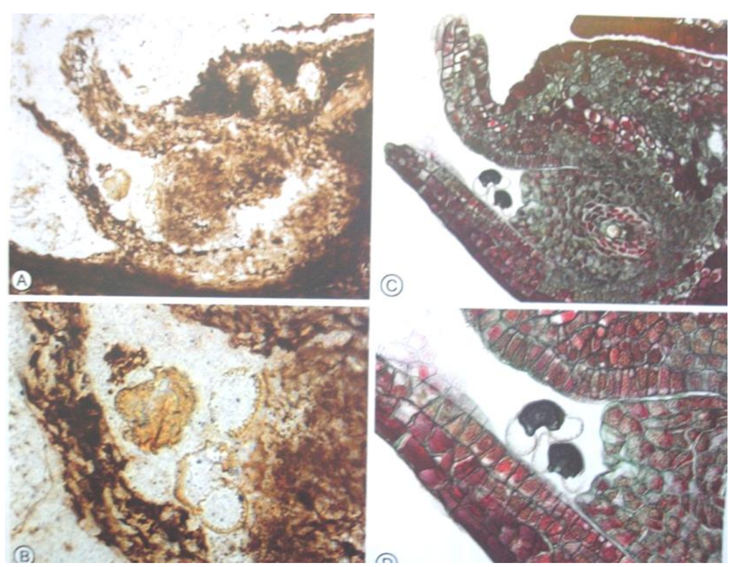
Soft bodied fossils are the ancient remains of invertebrates preserved in stone. Examples of invertebrate animals preserved in the fossil record include jellyfish, worms, insects, spiders, bivalves when extended from their shells, centipedes, incubating eggs, and many crustaceans. It also refers to the preservation of delicate traces of plant life cycles such as stems, flowers, leaves, and pollen grains. Soft bodied fossils can be casts or impressions, or the living tissue may have been mineralized. They are preserved in articulated positions between laminate layers or they may be three-dimensionally preserved.





Engravings of fissioning, or dividing, fossil jellyfish by Charles Walcott. Walcott writes: “Fig 1. Exumbrella view of a specimen in which the tendency to fission is strongly developed…Fig 1b. Side view of fig. 1. Fig. 2. A worn specimen in which fission has proceeded so far as to leave but one lobe, connecting what are otherwise two individuals. Fig. 3. Exumbrella view of a specimen in which fission has proceeded so far that there is apparently but a single lobe uniting the two parts.”

The structures of the animals and plants may be so exquisitely preserved that they are just as useful for studying the internal structure of the creature as a living specimen[]. Some soft bodied fossils are preserved in microscopic, cellular detail, though turned to stone.



Fossilized ovules of *Pinus arnoldii*, left, and extant *P. mugo* at pollination stage, right. Image Ruth Stockey

Left: fossil eggshell in trasnsmitted polarized light, from Argentina. Photo via scielo.org.ar

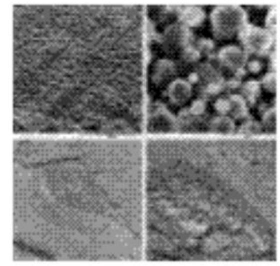
Soft-bodied fossils may also refer to vertebrate fossils when tissues have been preserved. For example, in “Bear Gulch: An Exceptional Carboniferous Plattenkalk,” James W. Hagadorn reports that “The preservation of veins, skin pigments, organ pigments, gut contents, sexual organs, and other soft tissues has allowed

The Holzmaden Shale biota of Germany is famous for the numerous specimens of female ichthyosaurus either carrying embryos or in the process of giving birth.

reconstruction of the life habits, feeding strategies, sexual dimorphism, trophic structure, and evolutionary history of numerous taxa from this deposit.” He later adds, “Dark skin color patterns, intact venous systems, as well as liver, spleen, and eye pigments also occur in many [fish] specimens (Grogan and Lund 1997). More rarely, muscles are phosphatized (Lund et al. 1993).”

Male and female sharks *(Falcatus falcatus)* from the Bear Gulch Lagerstatte, MT. Specimens 14.5 cm long. Image: H Feldman and C Maples, Indiana University, Bloomington, via James W. Hagadorn

Again, these can be preserved as molds, casts, or petrified remains. In China, SEM studies of the soft-bodied fossils from the Chengjiang Biota, Maotianshan, Chengjiang County reveal structures of the guts of arthropods and worms in which the soft tissues have been preserved as thick, mineralized films within the fossil. The film is made up of iron oxide and pyrite microspherules.



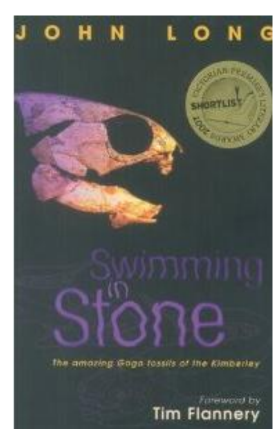
Pyrite or iron oxide microspherules found lining soft bodied fossils in China [].

2.1 Soft bodied fossils in concretions are found on every continent and on the seamounts in commercial quantities

Assemblages of concretions containing soft-bodied fossils are found all over the world, and in some abyssal plains they have been discovered to cover up to 70% of the ocean floor (though these most often have a shell nucleus). The list of sites below is representative only.

Africa: The Morocco Fezouata Formation discovered in 2010 contains 1500 soft-bodied

fossils, some of which are preserved in sub-cellular detail. The concretion shown is approximately 1 meter in length and contains an incomplete Tully Monster. This video was released by Yale University.



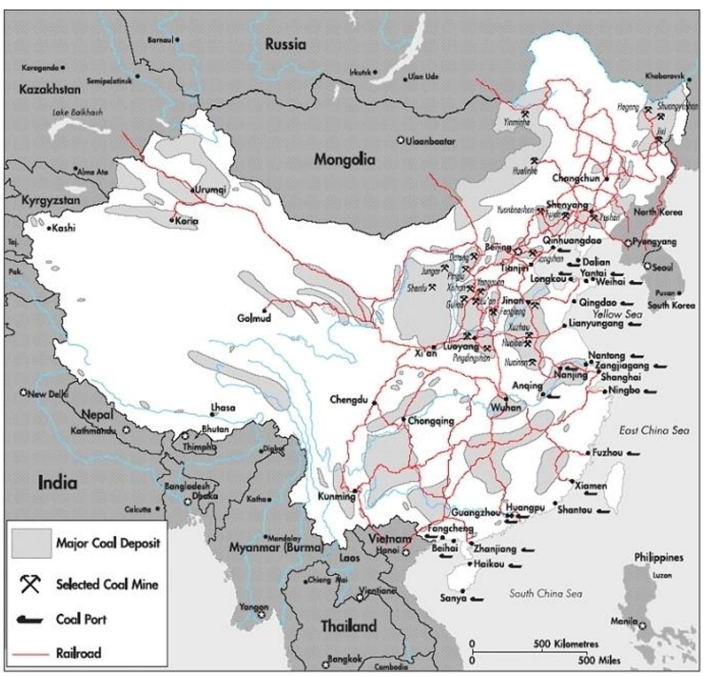
Australia: The Go-Go Formation in Western Australia is rich in concretions containing Ordovician fish and crustaceans [].

Europe: Outstanding specimens of three-dimensional fossils have been collected for decades from the Montceau-les-Mines site in France, and the fossils have been invaluable in studying the internal structure of ancient arthropods, crustaceans, arachnids, and annelids. Image via nos-photos-de-famille.com

Asia:

Images: Eric L. Peters, PhD via fiercereptiles.org

These fully articulated fish fossils with membranes preserved in concretions shown are from an unknown location in China.



Concretions in the US and England are highly associated with coal seams. Major Coal Deposits of China Map Source: US DoE. EIA. Country Energy Profile. China. February 1995.

North America:

The Mazon Creek biota contains more than 400 plant species and more than 320 animal species preserved in concretions[].

South America:

Extensive soft tissue is preserved in the concretions of the Santana Formation in northeastern Brazil [].

Antarctica:

A horizon of fine-grained sediments on the James Ross Island is the site of concretions ranging from 5- 244 cm in diameter. These contain well preserved fossils, including crabs [].

Pacific Sea Mount and Indian Ocean Floor:

Manganese nodules have been discovered on the floors of the Indian, Atlantic, and Pacific Oceans. These nodules are concretions which possess a nucleus that may be any solid object, but is often biological. Some of the biological nuclei are soft bodied, such as a sponge or a delicate microfossil radiolarian or foraminifer.

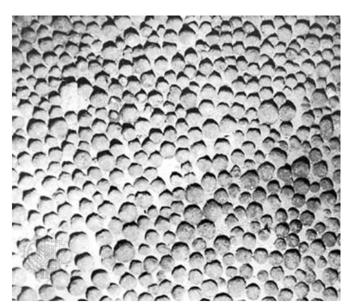


Photo Courtesy of the Lamont-Doherty Geological Observatory, Columbia University

3. The Omitted Variable: Electricity

Both in Economics and in the Sciences, there is a problem in getting accurate or worthwhile outcomes when all models or systems omit a variable in the inputs for the models or systems.

In his review of the Final Order Draft of AR5 by the UN, Alec Rawles wrote:

"My training is in economics where we are very familiar with what statisticians call 'the omitted variable problem' (or when it is intentional, 'omitted variable fraud.')

Whenever an explanatory variable is omitted from a statistical analysis, its explanatory power gets misattributed to any correlated variables that are included. This problem is manifest at the very highest level of [the analysis], and is built into each step of its analysis."

Geology as a system or model begins with the axiom that present day forces are responsible for the great majority of the features of the surface of the Earth. Rivers and water under the influence of gravity, winds, volcanoes, earthquakes, and glacial movements were all in action in the past and make up the primary inputs into the system. In this model, at all levels of the analysis, these factors are expected to be the chief forces responsible for shaping our present landscape, along with the mineral and water deposits well below the landscape.

Geology is also a system which introduces *deep time.* Spans of tens, hundreds, and thousands of millions of years are required and assumed to explain how the present forces could have enough time to shape the continents, mountains, valleys, basins, oceans, and deserts we see. Geology is not, according to geology textbooks, a hard science because the scientific method cannot be applied. It is said that the "experiment" has already been performed in the distant, inaccessible past; but what geologists *can* do, as scientists, is examine the results and advance plausible hypotheses based on the recognized inputs to the present geological model [].

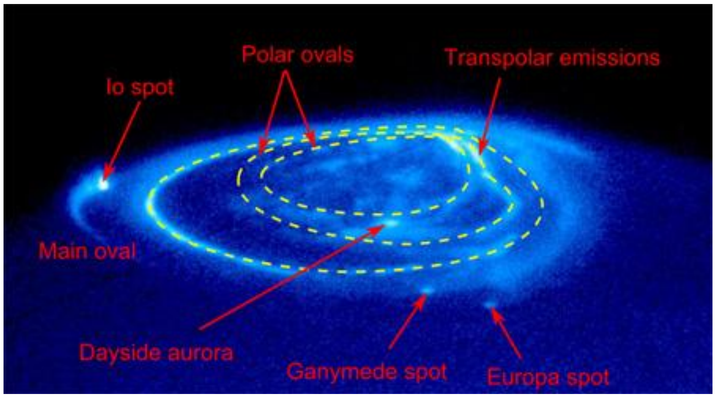
This inquiry is therefore not geology in the modern sense of the word. It cannot be, because it is not limited exclusively to those inputs and variables.

"NOAA's mission is to understand and predict changes in the Earth's environment, from the depths of the ocean to the surface of the sun…" This statement appears to acknowledge that the Earth is not a closed system, but is in continuous, dynamic adjustment with its space environment.

Rather, this inquiry admits a previously omitted variable: electricity. Specifically, the omitted variable introduced in this inquiry is electricity on a cosmic scale which is caused by mega-ampere plasma events in the space surrounding the earth.

Everyday experiences readers may call to mind which give some sense of the scale of these plasma discharges are the beautiful auroras in the Northern and Southern hemispheres. These auroras are caused by electrical currents which excite the thin air in the upper atmosphere, so that the excited gases give a pleasing, otherworldly glow. Auroras pass through various formations often inspiring the viewer with a sense of awe, which borders for some on a spiritual experience [].

Importantly for our inquiry, these auroras are also to be observed on other planets. In particular, the gas giant planets have leaping, spectacular auroras on their poles, and these auroras are many times the size of the earth.



Earth is roughly 4xs the size of the "Io spot." Image via baen.com

Furthermore, lightning storms of stupendous, Earth-sized proportion rage on the gas giants, so that there are constant lightning signals picked up by spacecraft and even sometimes on the AM radio [][].


After the solar storm of March, 1989 auroras could be seen as far south as Florida and Cuba. Power grids in Quebec and in the northeastern US failed, radio satellites were destroyed, electrical currents ripped along oil pipelines, and the CME actually created electrical currents in the ground beneath much of North America [][].

Evidence in the rocks for these kinds of *cosmic scale electrical forces which can be observed in the solar system* is examined. Laboratory techniques and experiments using plasma and electricity to deposit, engrave, sculpt, or otherwise alter common materials are admitted for their explanatory power in understanding the history of the planet Earth.

The techniques and processes under consideration here include:

1. lab creation of spheres and surface scars,
2. the effects of lightning bolts on sand, soil, and rock, and
3. low temperature nuclear transmutations.
4. Plasma deposition and engraving and electro winning processes are cursorily referenced as well.

The Study of Exogenic Fulgurites: The Effects of Lightning Bolts and Downed Power Lines on Rock, Soil, and Sand

When lightning strikes the earth, high temperatures melt the surface materials and surprising forms are sculpted by the electrical arc and its fields. Just as the experimental arrangement by Vemasat Laboratories which form craters and spheres has many variables which can be adjusted, the formation of a fulgurite by natural lightning has many variables which affect fulgurite formation. Some of the possible variables of natural, large scale electrical discharge events are polarities, charge differentials, current flows, material conductivity, duration, intensity, and charge capacity from the surrounding area [].

Lightning strikes which form below the surface are known as fulgurites, and lightning strikes which may travel along the surface of the ground and cast up liquefied materials are called exogenic fulgurites []. Along with the experimental results by CJ Ransom et al, fulgurites created by powerful lightning bolts in sand, rock, and soil present an opportunity to study the entire surface of the Earth in a manner much closer to the scientific method, because they happen in real time and are reproducible. We continue by noting some basic features of the electrical effects on sand, rock, and soil, which we can later compare with the strata of the five previously mentioned geographical sites where fossiliferous concretions are found.

3.1 Effects of Lightning on Sand

Lightning strikes on beaches and deserts create fulgurites from the clean, dry sand which are more easily spotted because they are easier to reach on foot and because of the lack of covering underbrush. They are also easier to retrieve intact because of the loose, sandy surrounding material. For this reason they are the most familiar and available for study. Sand fulgurites are hollow, often branching tubes, with a glassy interior and an exterior that is made of sand grains fused to the surface. The surface can even include a conglomerate of larger pieces of pebbles and rocks which are fused to the fulgurite. All the transition rock between the melted quartz layer inside the fulgurite, and the outer layer which is only lightly fused together, has many gradations which are, at least partly, the result of dropping temperatures radially from the center of the fulgurite.

3.2 The Effects of Lightning on Rock

Less accessible fulgurites form when lightning strikes mountain peaks, or enters a subsurface rock layer. These fulgurites are difficult to reach on foot and are fused into or onto the surrounding rock. Fulgurites in rock were mentioned by early explorers such as JS Diller and Alexander von Humboldt, who found them on mountain peaks in Oregon and in Central America []. In "Fulgurite in the Sierra Nevada" Christopher A. Libby writes:

"It appears that the composition of many volcanic rocks is favorable to the formation of fulgurite. This hypothesis was reinforced by my observation of fulgurites atop Mount Thielsen, South Sister, The Husband, and Three Fingered Jack among the volcanic peaks of Oregon's Cascade Range. Fulgurite occurrences in these areas appear as black or greenish, bubbly crusts on the dark volcanic rocks on the upper several feet of those peaks.

I was surprised to find, in the summers of 1984 and 1985, that fulgurites are relatively common on the granite peaks of California's Sierra Nevada. In Sequioa and Kings Canyon National Parks I found fulgurites atop the following granitic peaks: Thunder Mountain (13,588′), Sugarloaf (8,002′), Whaleback (11,726′) Mount Stewart (12,205′), Big Bird Peak (11,602′) Peak 12,416 (feet) on Glacier Ridge, and Peak 11,840 (feet) on Glacier Ridge….The Sierra Nevada fulgurites are similar in appearance to those in Oregon – black, green, or white bubbly crusts on the surface of the rocks. The crusts appear on the topmost rocks as veins running down the summit blocks and in pockets below the topmost rocks. Fulgurites seem to be confined to approximately the top two meters of the peaks."

3.3 The Effects of Lightning on Soil

On April 20, 2002 in Denton, Texas a lightning bolt struck a transformer and downed a power line. According to observers, the downed line snaked across almost 60 feet of a residential lawn, and continued to spark for a period of 30 minutes. The line (along with additional energy from the lightning) burned a long, glassy trench into the clay soil which terminated in the street, blasting apart and liquefying portions of the concrete curb []. George Maxey of the University of

North Texas, in his peer reviewed paper on the event, wrote:

"Fulgurites and similar structures produced by downed power lines have characteristics of both igneous and metamorphic rocks. Their vitreous interiors are igneous in origin while their crusty exteriors are contact metamorphic structures."

Soil samples collected from around the burn scar contained numerous hollow stone spheres, measuring 1-6 mm in diameter []. In the above photograph, orange-brown "discoloration" appears on the top of the pipe, along with possible oxidized remains from the grass.

Other instances of fulgurites forming in a soil medium have been documented. These fulgurites were described as bubbly crusts of green, brown, or even white, like the exogenic fulgurites on mountain peaks. An Oswego, NY fulgurite had "drapery or sheet forms" close to the effusion craters, and spheres of green, brown, grey and white. Many delicate forms, such as "wires" and hollow fused drops, were believed to have formed as they cooled in the air before reaching the ground. Differences in texture on opposite sides of the exogenic fulgurites were noted [].

Table 2: Melting points of common soils and sands

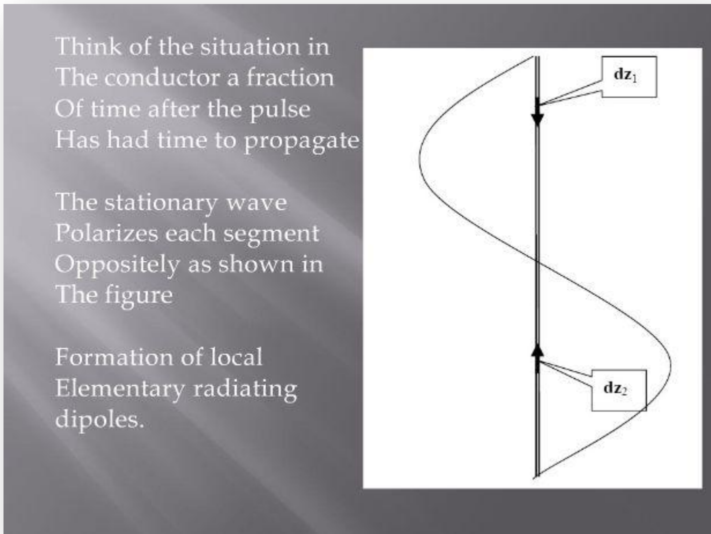
Iron oxide/lava sand	1377-1566°C
silicon dioxide sand	1600-1725°C
clay soil	1000°C
calcium carbonate	825°C
hematite	1566°C

4. Transmutation and the Temperatures Involved

Despite the stigma attached to cold fusion in the general public discussion, some readers may already be aware that in 2009 the United States Navy announced success in producing low energy nuclear reactions[]. Other scientists have been working on the problem without much thanks or funding in the decades since 1989, when the US Department of Energy announced that cold fusion was an error and could not be reproduced[].

Among them are Drs. Tadahiko Mizuno (right []) and Akito Takahashi, who have published results from years of lab work showing nuclear transmutations have taken place as evidenced by neutrons, excess heat, x-rays and altered compositions of the elements. For example, Cs coating on Pd rods in an electrolyte at 343K and 10 atm has transmuted to Pr[]. Methods have generally involved packing palladium rods with deuterium, and running electricity through the rods in an electrolyte. The reason the rods are packed with heavy hydrogen is to theoretically place the atoms as close together as possible, in order to "assist" the nuclear fusion through the use of lattices, with the expected result of obtaining excess heat from the fusion of two H atoms into a He atom. What was discovered instead, while seeking to produce helium and excess heat, is that the real cause of the effects was in the fusion and fission of heavier elements [].

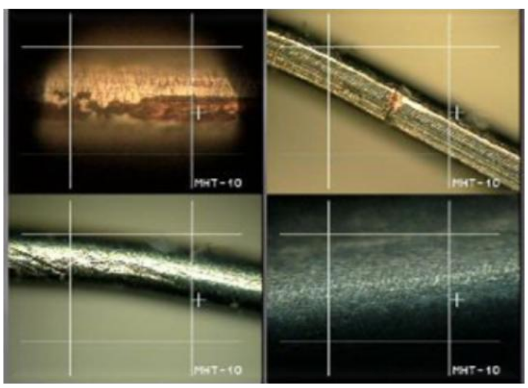
Other scientists have reported and published success in obtaining nuclear reactions at low temperatures using wires. For example, research in "pyroelectric fusion," or exploding wires, has been carried out by Greek scientist Theophanes E. Raptis. In his experiments, a transient pulse is run through "loaded" wires. It has been observed that

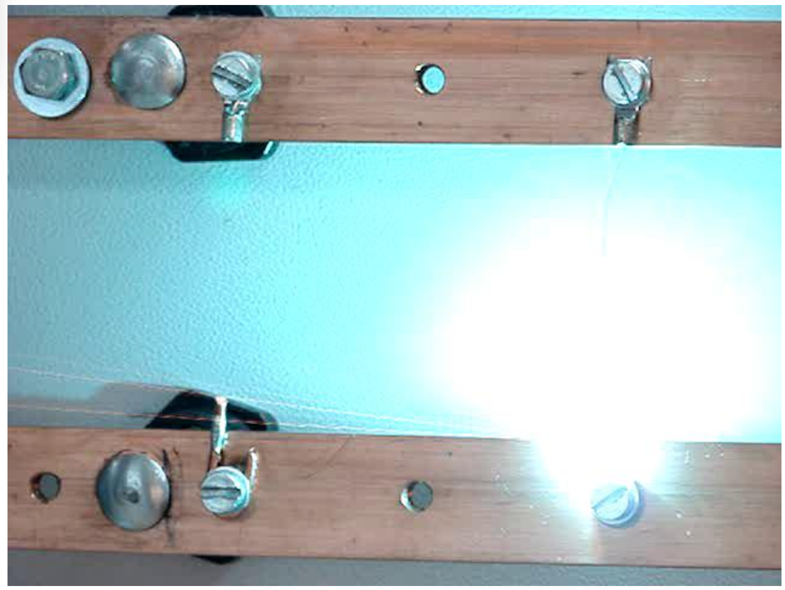


"The key question behind such experiments is as follows: does the initial energy support both the plasma formation, the kinetic energy and the high activation energy (white light emission) of the fragments?" Theophanes E. Raptis

the wires fragment first in the center and then symmetrically along the remaining halves of the wire. His hypothesis is that the reaction occurs at certain harmonics along the wire, as if it were an antenna. The reactions are "responsible for X-ray and even neutron emissions"[] (Slides are from an online presentation, used by permission.)

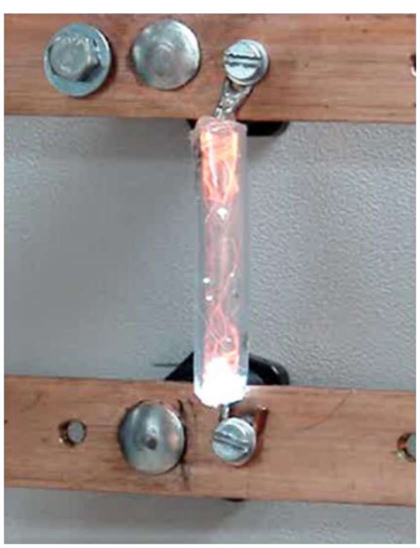
Right: wire samples examined in the Metallurgical Microscopy Lab of the Nat'l Technical University of Athens.





Caption: "Here we see a most impressive explosion event where the conductor completely disintegrates in a violent eruption of fragments. One should notice that fragment trajectories have been captured emitting white light, an indication of high energy concentration given that copper normally emits near the green part of the spectrum." Theophanes E. Raptis

These are remarkable results, and from them we can observe and deduce certain principles potentially at work in the low energy nuclear fusion process. We see that both resonances and the heavier elements are present in successful atomic fusion experiments. However, packed deuterium and even exploding wires are only generally helpful in our present study of fossils, because these are not very natural conditions. One can hardly speak of bone, shell, or tissue as "packed" or dense. Bone and wood in particular are quite spongy and porous, and nothing at all like a deuterium packed palladium rod or wire.



Left:
Helical plasma formation from an exploding wire experiment

4.1 Closer to Nature: Advances in Transmutation Using Powdered Nickel

The recent work of Andrea Rossi in obtaining stable low energy nuclear reactions is much closer to conditions in nature: Dr. Rossi uses powdered nickel, trace catalysts, and mini-hydrogen tanks. He reports that at the melting point of nickel, the reaction ceases because at those temperatures the nickel no longer has the powder form necessary for the reaction. The granulated state of the nickel is much closer to approximating the soils, sands, and silts on the surface of the earth. And nickel is one of the most common elements in the earth's crust!

Dr. Rossi has published his results, and demonstrations of his working Energy Catalyzer (E-cat) were held in Barcelona, Italy in October of 2010 to qualified witnesses []. He has since devoted all of his time to the further development and production of home devices, and left the theoretical aspects of the discussion of his innovative energy source for a later time. The US Patent Office does not give patents for cold fusion energy sources, stating that cold fusion is a "perpetual motion machine" and "the usefulness cannot be demonstrated"[]. Dr. Rossi has, however, obtained a European patent and is working on making a device as inexpensively as possible. As an inventor, his aim is to make it available to more people through low prices, and also to make an advance strike on competitors and reverse engineers through streamlined, mechanized production already in place when his invention reaches market. Despite the highly politicized atmosphere and the legal agreements which prevent full discussion of a product before its release for sale, we proceed with caution to examine the implications of the E-cat for the earth sciences.

Publications describing the structure of the transmuted copper particles are still pending. When asked about the forms of the copper particles, and whether he observed microspherules after the reaction, Dr. Andrea Rossi wrote: "The copper has been detected by means of a SEM and a SIMS and it has been found in form of amorphous grains. But this is an issue still under probe, the effect is much more complex than imagined originally."

Table 3: Reported operating temperatures for the E-cat

Lowest safe stable reactions	<200°C
Recent increases in operating temps	600-1000°C
Melting point of nickel	1455°C

Comparing the melting points of the common minerals which comprise fossiliferous concretions (Table 2) with the operating temperatures of the nickel to copper reaction (Table 3), we see that the process of transmutation can be well below the temperatures which would liquefy those minerals. Fossilization, if an electrical effect, would not necessarily cause the sand, calcium carbonate, or iron oxide to melt. This is the reason the concretions can appear sedimentary, and not strictly like a fulgurite from lightning. We also saw that some of the lab generated stone spheres formed, it would appear, at much lower temperatures in the intensifying, azumathal field of the Z-pinch.

Left: scattered spheres above the surface around the electrical surface scar

Right: Georges Cuvier, French naturalist and founder of vertebrate paleontology, wryly complimented some of the dozens of geological theorists of his day for their ingenious ability to find abstract solutions for geological difficulties. Cuvier greatly praised the fact that "*several have even traveled extensively with the intention of examining them.*"

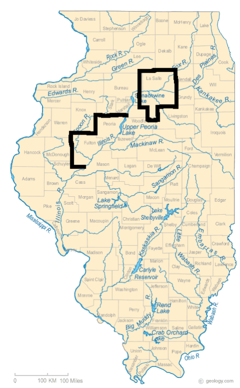
5. Methods

5.1 Define geographical areas for study using county lines.

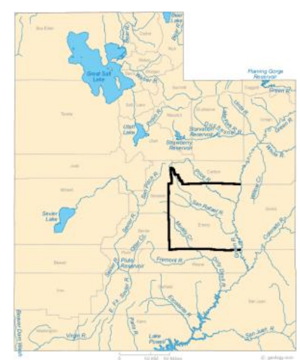
Only carefully defined areas are marked out for the present study, so that the attention is always on the actual evidence, and not on creating a new "system" which replaces the old.

This will satisfy the standards and methods both of James Maxwell [] and Georges Cuvier [].

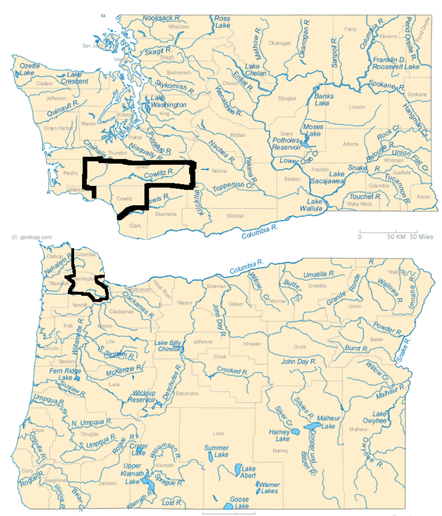
The regions marked out for the fields of this investigation are Mazon Creek Formation in La Salle County, Illionis, and Peoria & Fulton Counties on the western bank of the Illinois river; The San Rafael Swell and surrounding region of Emery County, Utah; Rock City, Kansas in Ottowa County; the mid-Pacific Seamount area (<3,000 m depth); and the Keasey Formation in Columbia and Washington Counties in northwest Oregon, along with the adjacent Lincoln Creek Formation in Cowlitz and Lewis Counties, Washington State.



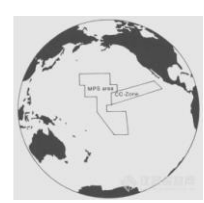
Illinois



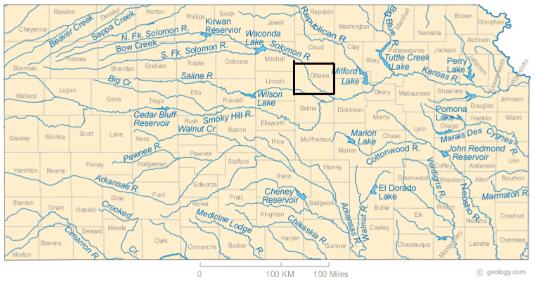
Utah



Washington and Oregon



Mid-Pacific Seamount



Kansas

5.2 Compare satellite imagery of earth with electrical scarring from lightning, and with manmade Lichtenburg figures.

It has already been observed that while the lab generated stone spheres are associated with circular crater scars, spheres are also formed in the same materials with the formation of other electrical scars. They were present in the soil around the long burn scar left by the lightning and power line in Denton, Tx, and they have also been reported occurring around the branching Licthenburg scars left by lightning on the ground.

Photos of lightning scars on sidewalks via Samuel Trommler, Jr. of notjustrocks.com

5.3 Travel to area under study. Examine local stratigraphy for similarities to fulgurites, exogenic fulgurites, and other evidences of high temperatures in the rocks.

5.4 Ask new questions based on known electrical processes.

Technology is rapidly advancing and methods of using plasma and electric currents to deposit materials, to engrave surfaces, or to scar surfaces have been well researched and applied. Opportunities to compare the properties and appearances of crystals and plating which were formed in an e-field or electric current with the properties and appearances of crystals and rocks in nature abound. For example, electro winning is a simple process which creates some unusual forms of crystals. And below is a detail from the internal structure of a concretion recovered from the Thermopolis Formation near Cody, Wyoming [].

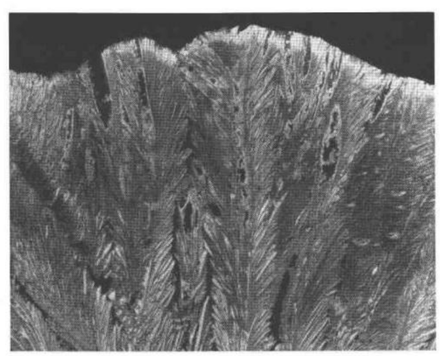


FIG. 2. The plumose fibers of the spherulitic structure containing numerous small cavities and filled cavities. (Oblique reflected illumination.) ×8.8.

5.5 Observe and describe four specific features of the surrounding geology: 1.) Lateral continuity - when there is no lateral continuity, and when there is lateral continuity over hundreds or thousands of square miles; 2.) the location of caves; 3.) the presence of uranium in discrete layers or objects; 4.) the presence of microspherules.

This paper has been written in an expandable format, and these features of the landscapes will be noted, without explanation at this time.

5.6 Document Native fossil legends from the area.

Another key to examining the question of fossilization is to study of the worldwide legends and myths of native cultures. This is the approach to the history of the solar system taken by Wallace Thornhill and Dave Talbott in the Thunderbolts of the Gods, and in the Electric Universe. Adrienne Mayors emphasizes that this was also a method of inquiry used by the great French naturalist and founder of vertabrate paleontology, Georges Cuvier (1769-1832) in his work "Researches on the Revolutions of the Globe." One of his many foundational contributions to paleontology was establishing the fact of extinction, without which a directional history could not be read from the earth's crust. He took into account the oral and traditional legends of the past, finding that there was indeed a theme running through all the myths witnessing to worldwide catastrophe and renewal, and in some cases, successive epochs ending in cataclysm.

Much of the research regarding fossil myths on several continents appears here through the work of the outstanding scholar and authoress, Adrienne Mayors. There is certainly more research to be done, particularly for the Sahara Desert and South America, and she also has noted that her work in North America is not exhaustive. Still, it is worthy to note that in Europe, the early Greeks and Romans believed that an era of giants, monsters, and large beasts was ended when a war between Zeus and Aphrodite and the Titans turned them to stone and buried them where they lay, in a clash of cosmic thunderbolts. The traditional locations where these battles were said to take place correspond with major recent fossil discoveries in the Mediterranean [].

Thunderbeings and lightning bolts are a stunning leit-motif in North American Indian fossil legends as well. Lightning was given as a gift to turn the large creatures to stone in order to make the world safer for the Indians, in one of many fossil myths [].

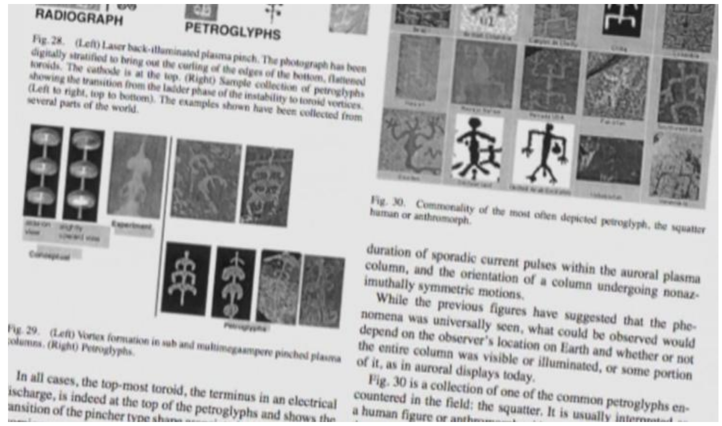
Some cautions exist. The number of tribes and languages in North America at the time of the arrival of the Colonists has been estimated to be over 2,000. The difficulty in finding pre-Columbian myths from a tribe in a precise area would be enormous. But it is hoped that modest progress can be made in finding fossil legends from general areas.

5.7 Record the presence and types of petroglyphs and pictographs.

The interdisciplinary approach to understanding the surface of the globe originated by George Cuvier when he collected ancient native myths and legends has been carried on by later scholars. In 2000, a small group of astronomers, physicists, and mytho-historians met in Portland, Oregon to discuss the evidence for electrical effects in the solar system. Among them was Anthony Peratt, plasma physicist and colleague of Nobel Prize Laureate Hannes Alfven. His presentation included drawing figures upon the board that looked like stacked arrows, stick figures, and rayed wheels. The mythologists identified them as familiar rock art figures. A Canberra Times article by Wal Thornhill continues:

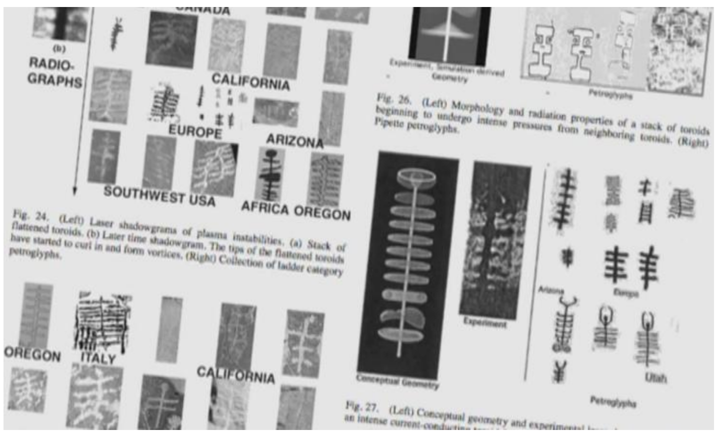
"He…was sketching plasma instabilities that occurred in experiments with the giant Z-pinch machine at Los Alamos National Laboratory. For an instant, it concentrates 80 times more electrical energy than the combined power stations on earth into the volume of a cotton reel.

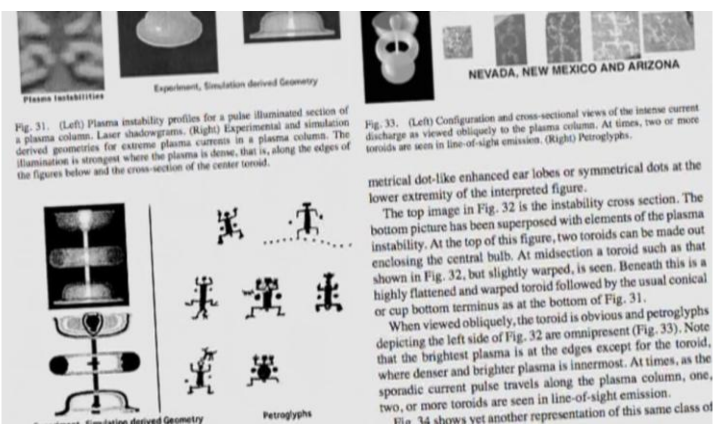
He thought the shapes were known only to a few scientists. But apparently the ancient petroglyph artists had been sketching the life cycle of a cosmic thunderbolt! That interdisciplinary meeting mobilized a worldwide network of scholars and volunteers to document the precise location, appearance and orientation of prehistoric petroglyphs. We now have data on hundreds of thousands of petroglyphs and a clear pattern has emerged. They are oriented so the lower sky toward magnetic south is blocked. The ancient artists were shielding themselves from lethal synchrotron radiation at the heart of the electrical discharge. The correspondence between the strange figures inscribed in solid rock and the plasma instabilities is almost total [].”



Above graphics courtesy of Thunderbolts: The Tutorial DVD.

Later in December of 2003, Anthony Peratt published “Characteristics for the Occurrence of a High Current, Z-pinch Aurora as Recorded in Antiquity” with IEEE Transactions. This paper compares the plasma formations in the lab with rock art from all over the world.

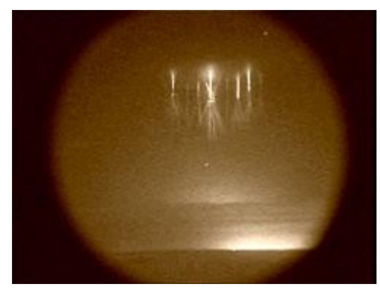




These rock art forms and their locations in areas where fossiliferous concretions are found are also represented in this study.

Equipment: laptop, camera, Chevy pick-up truck, 32' camper trailer, microscope, hydrochloric acid, scales, laminate sheets, beakers, tile wet saw, sandpaper, permanent marker and ziplock bags. Vemasat Laboratory set-up listed previously. End of Part 1.

This paper carefully compares the predominating geometry of the changing forms of plasma instabilities with worldwide petroglyphs and finds they are highly similar, if not perfect likenesses. The startling possibility is that the people who made the rock art were witnesses to auroral forms caused by millions of amperes coursing through the atmosphere above them.



Images above: “Sprites over thunderstorms in Kansas on August 10, 2000, observed in the mesosphere, with an altitude of 50-90 kilometers as a response to powerful lightning discharges from tropospheric thunderstorms. The true color of sprites is pink-red. Click on images to enlarge. Credit: Walter Lyons, FMA Research, Fort Collins, Colorado []” and toy Medusa by Safari