A New Approach to Mountain Formation

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Ancient accounts from around the world describe a time when the air was choked with dust, sand, and falling stone. Floods, tsunamis, and downpours of water submerged much of the land. Oil also rained down day and night. Hurricane-strength winds scoured the earth.

Many of the stories appear to describe earth-altering catastrophe punctuated by electrical events on a continental scale. The described events imply a global redistribution of dust and sand. The transport of wind-born material would have been interrupted by higher ground acting like a snow fence, with self-perpetuating deposition leading to drifting or duning. In this paper we consider the possibility that a high-energy "aurora" extended to earth's surface, with associated electromagnetic effects, such as the Bennett pinch, attracting and lithifying the airborne dust. Drainage of rain and flood waters quickly cut into the dunes, generating a thick slurry. According to recent demonstrations, the slurry could be deposited in extensive stratified alluvial fans.

The result of the envisioned events appears to be massive dune formation on dry land, to create mountain ranges, with slurry runoff into the surrounding (receding) water, creating new dry land. Electric discharges within the plasma environment could then convert the fresh material into many forms of rock, especially granite, sandstone, schist, and basalt. Anciently remembered "rivers of fire" appear to have flowed up many drainage channels, burning, lithifying, and eroding cliff walls in processes similar to industrial electrical discharge machining (EDM).

The effects of the hypothesized events are easy to see when traveling through the mountains and deserts, as will be shown in this photographic journal. Then the convergence of plasma physics with the ancient accounts seems to make sense.

1. Introduction

I am not religious, but I have a model of mountain formation that takes into account descriptions of events that are common to the sacred writings of ancient societies. Most people will recognize them as versions of the stories told, for example, in the Book of Exodus. If only Exodus told the story of the plagues of Egypt, I would pay no attention to it. But similar stories are told around the world, and they often have interrelationships that tie the stories together within each society's collection of myths. Taken all together, you gain confidence that the common elements refer to an event that everyone experienced.

Mythologists have noticed this global structure of myths—one story told around the world—for a long time [1, 2, 3]. If the stories referred to events such as we experience today—sunsets and thunderstorms—there would be no problem. Indeed, many mythologists have tried to force them into such a nature-as-we-experience-it-today mould. But the stories have few similarities with such events. If fact, they disallow them. In the context of familiar experience, the themes and details of the stories can only be described with such words as "supernatural" and "irrational" [4, 5, 6]. Mythologists have given up trying to "naturalize" the myths in the face of the difficulties.

However, if a context of recent catastrophism is allowed, the themes and details make sense. When Immanuel Velikovsky wrote about the one story told around the world in his best-selling book, **Worlds in Collision**, in 1950, he suggested that a number of the events seemed to involve electrical discharges on a large scale.

This got the attention of some electrical engineers and plasma physicists. We now know that the universe is composed mostly of plasma and that it has electrical properties. Specifically, the Earth is surrounded with electrical circuits that are connected or coupled with the Sun and perhaps with the galaxy.

If it is allowed that in ancient times a transient high-energy plasma discharge enveloped the Earth and reconfigured geological and social formations, the ancient descriptions are easily "natural," albeit told in mythological and anthropomorphic language. A surge of one or two orders of magnitude in the power of the Earth's circuits could generate the global events that the myths seem to describe. And those events would have consequences.

The stories describe days of darkness, winds so strong no one could stand, and thick dust accompanied by gravel and even boulders falling from the sky. They describe floods of water falling from the heavens and the seas and lakes sloshing out of their beds. A reasonable consequence would be the formation of drifts of material in a dune-like fashion downwind from obstructions. The obstruction would act like a snow fence. This would be especially true along shorelines, which would be the first obstructions encountered by wind blowing over a sea. The accumulation would fill in the water and produce more land, which would then trigger more duning. Because of the heavy rainfall and the sloshing of seas, much of the duning would be wet: Instead of the blowing dry sand that we think of in deserts, this would be—or turn into—a slurry, perhaps much like soupy concrete. It would slump from the dunes to form alluvial fans. I call it slurry runoff. Then the receding floodwaters and new land would provide sites for more dunes. The first dunes would collect the most material, and the slurry runoff from them would support smaller dunes, which is what I see in the mountain ranges.

2. Sorting of Sediment

In the last couple of decades, several experimenters have investigated the mechanics of sedimentation under conditions of flowing water. The video [7] is worth watching a couple of times: it will change your thinking about stratigraphy. Surprisingly, until they began their work, no one had tested the original principles laid down by Nicolas Stenon in the 17th century.

They found, among other surprises, that

> "… in a continuous turbulent current many superposed strata form simultaneously and progress together in the direction of the current; they do not form successively as believed originally. These experiments explain a mechanism of strata building, showing empirically the rapid formation of strata." [8]

So time flows along the strata, not in step with each stratum. The first objection to come to mind is radioactive dating, which seems to confirm that lower strata are older. The experimenters counter with the results of radioactive dating dacite from the 1980 Mt. St. Helens eruption: dates ranging from 340 years to 2.8 million years were obtained.

> "… every sample rock contains a quantity of daughter resulting from the decay of the parent in the lava, before crystallisation, which makes the rock appear older. The model age equation requires that the initial number of daughter atoms be known. No analytical equipment, however, can give this value.
>
> "The isochron age equation depends on several assumptions, the principal being that rocks of a same formation, when they formed, had the same abundance of daughter, in this case argon. This is not so for the dacite and its components mentioned above which only ten years after the eruption showed different respective quantities of argon.
>
> "The model age so determined corresponds to magma and not crystallisation (as for the dacite). Moreover, gravitational settling between minerals exists in the cooling magma." [9]

Since different minerals retain argon in different amounts, sorting into apparent age layers is likely.

The importance of these findings cannot be overstated: the standard column of geological time must be shortened, not by a little but by a lot.

> "A team of Russian sedimentologists, directed by Alexander Lalomov (Russian Academy of Sciences, Institute of Ore Deposits) applied paleohydraulic analyses to geological formations in Russia. One example was the publication of a first report in 2007 by the "Lithology and Mineral Resources", journal of the Russian Academy of Sciences. It concerned the Crimean Peninsular. It showed that the time of sedimentation of the sequence studied corresponded to a virtually instantaneous episode, whereas according to stratigraphy it took several millions of years. Moreover, a second report concerning the North-West Russian plateau in the St. Petersburg region shows that the time of sedimentation was much shorter than that attributed to it by the stratigraphic timescale: 0.05% of the time." [10]

Five hundredths of one percent of millions of years is hundreds of years. This figure is based on the assumption of today's rates of flow or, at worst, that of a tsunami. Under the cataclysmic conditions required by the ancient stories—the sloshing of oceans and dumps of material from space—deposition would have been much faster: decades or perhaps even months. The alluvial fans would have formed quickly and then would have been eroded by the final "trickles" of water [11].

Fig. 1. Alluvial fan

3. Electric Plasma

The growing awareness of plasma has the potential to overturn the accepted theories of geology. Although plasma has been studied for over a hundred years, it has been a marginal endeavor. (See "Towards a History of Plasma-Universe Theory" by Marinus Anthony van der Sluijs, presented at this conference [12].) Space probes have confirmed that the solar system is "wired" with electrically active plasma circuits. Magma and rock crystals both display plasma properties, but few probes with instruments to detect plasma effects have been launched into "inner space."

Marinus Anthony van der Sluijs and Anthony L. Peratt have identified [13] the morphology of petroglyph images with the morphology of instabilities in high-energy discharges in plasma laboratories. Based on parameters established in laboratory experiments, Peratt has estimated that an increase in power of one or two orders of magnitude would generate an "enhanced aurora" that could manifest in the sky the ancient images pecked in stone. Descriptions of similar images in myths and legends establish a physical (plasma) basis for interpretations reconstructing aspects of the ancient events [14].

Van der Sluijs and Peratt do not mention possible effects on the surface of the Earth. Nevertheless, the ancient stories tell of "rivers of fire," "fire serpents," and "rainbow serpents" that snake across—and sometimes through—the land. Many of these appear to have the characteristics of plasma discharges.

From what I have seen in several years of field study, the rivers of fire flowed *up* the canyons after the mountainous dunes and alluvial fans had been eroded by the slumping and outwash. The currents lithified the deposits and electrically excavated surfaces that faced the plasma flow in a process similar to industrial electrical discharge machining (EDM) [15]. Sharp edges, especially at the tops of the canyons, were burned.

Discharges melted the tops of mountains/dunes in situ, producing the basalt caps without needing a "missing volcano" to erupt lava and then to be eroded away [16].

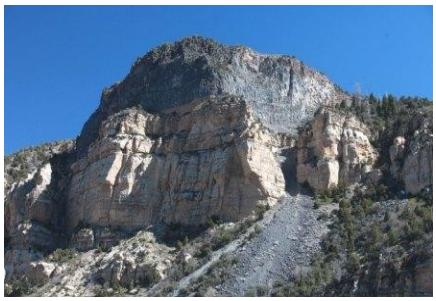

Fig. 2. Cedar Canyon

The ancient stories tell of mountains "melting like wax," an apt description for many lava fields that seem not to have flowed but only to have solidified in place. In the case of many isolated hills and mountains with basalt caps separated by drainage channels, the channel would have formed quickly while the material was still in a slurry state. Then the river of fire would have lithified the remaining slurry and melted the top [17]. There would be no millions of years while water gently rubbed away the hard basalt [17a].

Fig. 3. Kingman, AZ

There would be non-electrical effects as well. Astronomers have known for some time that magnetic storms can retard the Earth's rotation by tiny amounts. Presumably, a storm on the order of an enhanced aurora could disrupt the rotation by significant amounts. Ancient Middle Eastern stories relate that the sun stood still for an extended time. In the Americas, the stories are about an extended night [18]. A sudden disruption of the Earth's rotation would cause the oceans to "slosh" onto the continents. They would stir up and carry sediments with them, leaving behind a stratifying slurry runoff.

The standard explanation for garnets is that they can only form under conditions of heat and pressure found over a hundred miles below the surface. They had to make a round trip of over 200 miles [19]. Many metamorphic rocks require similar, although shorter, journeys on the "geologic elevator" to form. One geologist conceded that an enhanced aurora might provide sufficient heat but not the pressure.

However, one effect of an electrical current in plasma is the Bennett pinch: the linear current generates a cylindrical magnetic field around it that squeezes (pinches) the current into a thread-like filament. Instabilities can cause the current to form dense knots and to break up into beads. Remembering that crystals are a form of plasma, it is possible that garnets can be formed on the surface—or even in the dusty air. A similar line of speculation can allow for metamorphosis on the surface.

4. Welded Granite

Can an electric current lithify loose sediment? A few years ago, I met a prospector who had been experimenting with running electrical current from a welder through stream sediment. He was surprised to find that when the material in his crucibles cooled, it was indistinguishable from rocks that he saw while prospecting.

Fig. 4. "Welded" granite

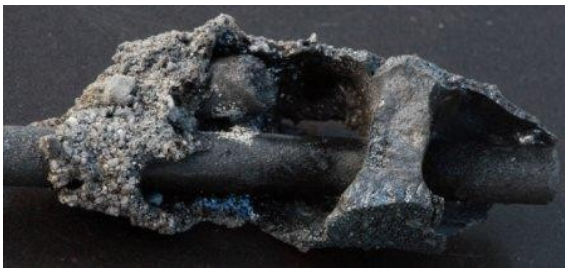

Fig. 5. "Electric" basalt.

Granite [20], basalt [21], and schist, often appeared in layers that mimicked the strata in the mountains. It occurred to him that strata, perhaps even whole mountains, could be caused electrically. He immediately dismissed the idea: Where would the welder be, the source of the current?

When I told him about plasma and the space currents that surrounded and likely penetrated the Earth, his idea regained plausibility. If a surge in space currents should generate something like an "enhanced aurora" that swept across and into the surface, there could be more than enough power to "weld" "superposed strata form[ed] simultaneously" into rocks—not gradually over millions of years but in hours.

Under the right conditions, the plasma pinch can sort material according to various properties. Space plasmas appear to form cylinders of similar elements, sorted by ionization potential, around the filamentary currents (Birkeland currents) coursing through them [22]. Experimenters need to investigate the effects of this process in dusty plasmas and in slurries mixed with an electrolyte.

5. Carbonates and Comets

A while back, I was challenged to explain carbonates with this model. At the time, I was studying the Red Rock Canyon area [23] west of Las Vegas. There are high cliffs on the south side, and at the bottom they are composed of young sandstone that is acknowledged to be hardened sand dunes. I was told that old limestone lay on top of the dunes. Later, another authority corrected that: the formation was actually dolomite.

Fig. 6. Red Rock Canyon.

The standard story is that dolomite is merely limestone—calcium carbonate—with some of the calcium replaced by magnesium. The replacement occurred in ancient oceans, and then the carbonates precipitated in great quantities: The Bonanza King formation, for example, is 4500 feet thick. But chemists disagree: under the conditions found in seawater, magnesium will *not* replace the calcium [24].

So where did all the dolomite come from? I found one clue in a NASA publication [25]: They found fine particles of dolomite in comets' tails. Their analysis indicated that about 7% of the material captured was dolomite, but because the particles were so fine, they likely underestimated the amount. They also found calcite (limestone).

Another clue came from the ancient stories. Many legends tell of a huge and frightening comet-like body in the sky at the time of the cataclysm that devastated the Earth [26]. It was bright and displayed a tail or a mane or hair. It was called the Queen of Heaven or the Goddess and was later identified with the planet Venus. Whether or not it was the planet that we call Venus today, it is noteworthy that space probes have discovered "stringy things," identified as electrical Birkeland currents, in the anti-solar direction from Venus near the Earth's orbit [27]. Under the cataclysmic conditions of an "enhanced current," the plasmatic transfer of large quantities of electrically sorted material from one body to another is possible.

The dolomite problem gets worse: Some marble is composed of dolomite.

Fig. 7. Marble Canyon.

This image [28] shows Marble Canyon in Death Valley, a canyon cut into (or lined with) dolomitic marble. According to the standard story, the dolomite had to take a ride on the geologic elevator. After precipitating, it began to sink and was covered with other sediment. It went down many miles, changed into marble, and then came back up to where it started. The miles of sediments on top of it, which would have been lithified if not metamorphosed, eroded away, leaving the formation we see today.

Given the standard presumptions, the story must be true: What else could have produced the marble! However, if plasma and catastrophic phenomena are considered, the exclamation becomes a question and the story becomes absurd: It begins with a chemical process that is impossible and ends with a mechanical process that is unbelievable. All that is needed is plasma experiments to test whether dolomite can be "pinched" into marble.

6. Characteristics of a Catastrophic Episode Reconstructed from Ancient Art

Translating the language of myth into the language of science is ambiguous at best. But with experimentally discovered plasma behavior as a guide, some characteristics can be outlined:

- The atmosphere was choked with dust and in darkness for days to months.
- It was whipped with extreme winds (some perhaps electrically enhanced).
- Mountains "melted like wax" or were scoured away like sand in the wind.
- Stones fell from the sky, in size from sand and gravel to boulders.
- Mountain-high floods--from downpours and ocean transgressions ("sloshing")—inundated the land.
- Earth's rotation may have changed abruptly, which could have contributed to oceans "sloshing."
- An extremely large comet-like body interacted with Earth.
- Plasma discharges snaked across--and through--the land.

These are indeed terrifying and cataclysmic conditions: One wonders how anyone or anything could have survived. Legends say that 98% did not.

7. A Possible Conclusion

In my travels around the Western United States and Mexico, aided by the "context" provided by Google maps, I've tried to "see" landforms through cataclysm- and plasma-colored glasses. This is not so much a scientific endeavor as it is brainstorming, something with which to unsettle the settled presumptions that now impede bold new thought in geology.

> We see the world through [the fundamental concepts of science] to such an extent that we forget what it would look like without them: our very commitment to them tends to blind us to other possibilities. Yet a proper sense of the growth and development of our ideas will come only if we are prepared to unthink them. [29]

So here is what I think I "see": A "snow fence" effect would generate drifts or dunes downwind from obstructions, such as shorelines; electrical variations could cause electrostatic deposition [30].

Fig. 8. Hierarchies of dunes

The "pinch effect" of plasma discharges in the air (the petroglyph instabilities) could squeeze and lithify dust and sand into gravel and boulders, which would fall into the dunes or in heaps [31].

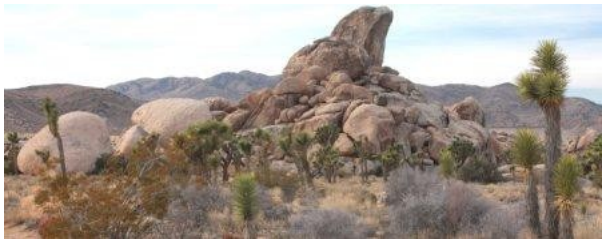

Fig. 9. Gneiss boulder heap at Joshua Tree National Park

Downpours of water and oceanic "sloshes" would turn dust into soupy concrete that would slump downhill, forming a "slurry runoff." This runoff would erode the mountain-high dunes and be deposited in alluvial fans [32, photojournal 32a].

Fig. 10. Book Cliffs

The process would be episodic rather than continuous, generating hierarchies of stratified fans and dunes as land built up and water drained away.

Material would be sorted: mechanically as in the sediment video and electrically as in the granite sample above, producing assemblies of strata of the same age [33].

Fig. 11. Capitol Reef National Park

The "comet concrete" would set up to form rock, and rivers of fire (plasma discharges) would lithify material, as in the sample shown [34, see photojournal 34a]. Pressures generated by the Bennett pinch in the rivers of fire would further change the rocks into metamorphic varieties.

Fig. 12. Granite on left, sediment on right

Rivers of fire would also excavate and burn rocks--similar to the industrial process of electrical discharge machining (EDM)--which would add dust and larger pieces of rock to the atmospheric mix [35, 36].

Fig. 13. Dune near Whitewater, CA

Fig. 14. Composition of Whitewater dune

Field observation suggests that the rivers of fire flowed *up* the drainage channels, eroding and burning obstructing faces where the channels turn [37].

Fig. 15. Snow Canyon

The largest drifts or dunes would form first--the mountains. Slurry runoff and receding floodwater would create more land. With less dust available, smaller dunes would form on the flanks of the larger [38].

Fig. 16. Telluride, CO

The process would be fast and recent: Legends relate days of darkness, a decade for water to drain out of valleys. Dating is impossible because all methods are based on uniformist assumptions, but the cataclysm (or cataclysms) would be thousands of years ago, not millions.

Most of the formations that we see are the result. The layers of coal and oil shale that lie a mile below the surface of Pennsylvania and under the Book Cliffs of Colorado may be the first deposit. Perhaps they are the remains of previous forests that were ground up by the winds. Then they were buried under the slurry runoff, the duning of comet dust and native dirt, and the welding of strata into rock.

Because humans were eyewitnesses, there may be human traces left under—or mixed in with—the strata. The findings of anomalous artifacts are not unexpected: a metal sphere and a vase in Precambrian strata, an iron nail in Devonian, metal objects and a carved stone in Carboniferous, and many more [39].

Using the term "cataclysm" is somewhat misleading: that term places the process in a human scale. "Resurfacing" places it in a planetary scale, and at that scale the effects fit in with what space probes have found on other planets and moons. Comparable and even larger-scale formations are found on Mars, for example: dust, sand, and boulders strewn across the surface, often gathered into dunes; craters and canyons revealing a multitude of strata; an entire hemisphere excavated (or the other deposited) by several miles. An electrical surge in the plasma circuits of the solar system would not likely create an enhanced aurora only on the Earth.

James Hutton's dictum that the present is the key to the past is not only turned on its head but expanded: the past is the key to the present on all the planets.

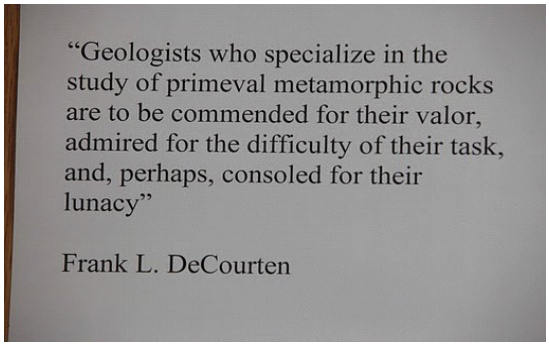

Fig. 17. Sign on geologist's office door

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