THE ORIGIN OF PENEPLANES.

IS_____

COSMIC COLLISION THE MISSING FORCE IN GEOMORPHOLOGY?

LETTERS

BY
Allan O. Kelly

1954

THE ORIGIN OF PENEPLANES.

8-23, 1954.

In offering any new theory about a subject such as peneplanes, one should probably preface it with a short history of the previous thinking, so that readers or listeners may refresh their memories, or get some background if they are not familiar with the subject.

In preparing this paper we spent considerable time in refreshing our own memory and in trying to learn what the current thinking might be. While our study was not exhaustive, we did come to the conclusion that the trend has been toward negative rather than positive thinking; that the old theory has been generally discarded without anything new being offered.

The last report of any consequence on the subject, seems to be that of William Morris Davis. He was professor of geology at Harvard from 1898 to 1912 and has been called "The great systematizer of the science of geomorphology and the acknowledged leader of the American school of physiographers." In 1896 he wrote an article called "Plains of Subaerial Denudation" which appeared in the Bulletin of the Geological Society of America, Vol. 7, pages 377-389. In this paper he reports upon the thinking of that day as follows: "Geologists today may be divided into two schools regarding the origin of regions of comparatively smooth surfaces from which a large volumne of overlying rocks have been removed. These regions occur under two conditions: First, as buried 'oldlands' on which an unconformable cover of later formation has been deposited, the oldlands being now more or less locally revealed by the dissection or stripping of the cover; second, as uplands or plateaus whose once even surface is now more or less roughened by the erosion of valleys.

The older school, now chiefly represented by the English geologists, follows the theory of Ramsay, and regards these even oldlands" as plains of marine denudation. The new school, represented chiefly by American geologists, but also by a number of continental geologists, may be said to follow Powell, who first emphatically called attention to the possibility of pr oducing plains by long continued subaerial denudation."

Davis continued with a discussion of the two schools of thought favoring the American himself, but making it clear that in certain cases the problem of origin remained uncertain. In such cases, he said,___"It is advisable to announce indicision as clearly as decision is anounced in the others." This was a noble and scientifi attitude, but a difficult one to follow.

Davis also said that one of the most striking differences of opinion between the two schools of thought was that concerning the origin of the unconformable strata that might, or might not, be found lying upon the oldlands* The English held it essential to the solution of the problem while the Americans did not. To our mind, all of the evidence was, and still is, important. However, the most important points to be solved are, and always have been, the assumptions. A search of text books and periodic literature indicates that the assumptions are gradually being taken for facts. Text books explain with block diagrams and photographs how uplift and submergence, and long continued erosion have produced mature landscapes and the articles in periodicals describing various sections of the world, take it for granted that their readers will

* The two words, oldland and peneplane, have almost disappeared from common usage, modern geologists preferring to use the more descriptive words youthful, middle age and old age in referring to landscapes of erosion.

know what a mature landscape is and how it was formed. The facts are, that surfaces worn to near base level in hard rocks are very difficult if not impossible to explain as the work of ordinary subaerial or marine erosion. Yet this is what our text books say or imply. Any thinking person who has observed stream erosion carefully, knows that this is not so. Streams simply cannot wear hard rocks down to wide, nearly level plains. They can do nothing but deposit fine sedime nts on such surfaces. Obviously, streams can only cut hard rocks in narrow canyons where the current is swift and carrying much abrasive material.

Perhaps, because of a gradual realization of these facts, a sort of undeclared impasse has been reached, nothing is said, no controversy rages,__the whole subject is left dangling in mid air. There is no loud and clear "announcement of indicision" as Davis called for, in fact, his summary is the last report on the controversy that we have been able to find. Yes, here and there one may read that the old theories about marine planation are no longer widely held, or, that subaerial denudation does not account for all of the various types of mature landscapes, but nowhere do we find a bold attack upon the problem of <u>why</u> these theories are no longer held. Have scientists become so sensitive toward their fellows that they no longer dare to reason with them lest they be considered impolite?

We suspect that this dearth of originality, this desire to be gentlemen rather than scholars, arises out of our educational system which uses mass pr oduction methods; turning the educational machine pr oduces a uniform product, or at least, that seems to be the hope. It has been found that almost anyone can learn like a parrot,___to parrot information. What is not realized, is, that long continued

practice in our modern institutions of parrot learning, produces parrot thinking. As a result, most scientific writing is a merry-go-round of references. The more references one sites, the better his book! The "weight of scientific opinion" becomes astronomical as references are piled tier upon tier. Each one quotes the other, and the end product of this ever-widening circle of metered minds becomes as uniform as peas in a pod. Uniformity! Its wonderful!

But now we think its time for a new report. Time to announce decision and indecision clearly. What do the geologists now believe?

Returning to the old wave-cut theory of the English school, we find that geologists now generally consider that beaches tend to reach a state of equilibrium as soon as their wave-cut terraces reach a width of a few hundred yards. That most of the wave energy is then expended on the bottom and on the beach rather than in undercutting the bluffs or sea cliffs. This is well illustrated by the fact that flat sandy beaches along low coasts can take a tremendous beating during storms without cutting back into the land. Perpendicular sea cliffs soon change to sloping bluffs, as rainwash, stream erosion and other agencies of subaerial erosion take over. Plants begin to grow along the bluffs and hold the soil. Onshore winds may move some sand inland but the streams will carry a good deal of it back to the beach again. Rivers too, bring large quantities of sand to the sea and this is distributed along the coast, helping to maintain the equilibrium.

Waves striking the beach at an angle tend to transport sand along the beach in a see-saw kind of motion toward the open end of the angle formed by the wave and the beach. The wave carrying the sand up the beach slope at an angle and gravity pulling it straight

down the slope again. Waves striking parallel to the beach do not move the sand along the beach but tend to build a cusped or scalloped type of beach slope.

Storms generally move the sand off the beach and deposit it as sand bars out near the breaker line. This tends to make the storm waves break farther and farther out and produces a sort of equilibrium, even during storms, so that the beach itself is somewhat protected. When calm weather returns, the sand is moved back on the beach within a few weeks. New residents on our California beaches sometimes think that their lovely sand beach is gone for good, after some storm leaves nothing but cobble stones.

Another factor tending to maintain beach equilibrium on rocky coasts is the presence of harder rocks jutting out into the sea and protecting to some extent, softer rocks that might lie on either side. However, the most important stabalizing factor is the tidal range. Very little, if any wave cutting can be accomplished below the low tide line and beach-cut terraces do not grow infinitely wide because as the terrace widens, the wave friction on the bottom slows the waves down until they can do little work upon the shore. Thus the beach terraces are held to a definite width dependig upon the range of the tide. The greater the tidal range, the wider the terrace will be cut. This fact is proved by old elevated beach lines or terraces which are all comparatively narrow, like those now active. The English geologists mentioned by Davis, probably supposed that the old beach terraces around their English coasts only represented short stands of the ocean at those levels and that long continued erosion of this kind would reduce the whole island to a wide peneplane. This, we now see, is impossible.

The American school long ago saw the falacies of marine planation.

and also, some of the inconsistancies of their own subaerial theory. Hence the impasse.

As mentioned earlier, the real rock on which subaerial theory is wrecked is the existance of wide peneplaned areas worn to near base level in hard crystalline and sedimentary rocks. These plains of erosion occur in many parts of the world and under many different climatic conditions. The Laurentian Plateau in eastern Canada, for example, is said to cover an area of over 200,000 square miles; all of it, hard crystalline rocks. Did ice produce this gigantic work? Perhaps, for it is nearly devoid of any loose covering of gravel or soil, being a wide expanse of bare rock and numberless lakes with many signs of ice erosion. One thing is certain, it was not produced by stream erosion. Ice was nodoubt the immediate agent but what moved the ice is another matter.

In Greenland and in the Antarctic, where thick ice sheets prevail over wide areas, it still remains unproven that this ice moves over the rock surface below. Rather, there is good evidence, as reported by Hobbs and others, that high winds caused by heavy, cold air descending over the center of the ice cap and blowing outwardly, moves the snow accumulation toward the edges of the land mass where it descends to the coast in glaciers. The winds are so powerful and the snow so dry and light that this means of transportation seems far more likely than the slow plastic movement of the whole body of ice. In both Greenland and Antarctia, the ice gradient from the center toward the sides is so small that it would hardly produce sufficient pressure differential to cause flow, and if it did, it is not likely that the highly compressed bottom ice, well locked to the uneven surface of the rock would move. Rather, movement would take place in the upper layers, as is the case with mountain glaciers where the friction of canyon walls and

bottom cause these parts to hold back while the center moves ahead faster. However, the evidence in Canada shows that the ice did move against the rock.

Other types of peneplanes that should be mentioned are:

1. The remnant type in which an old peneplane has been elevated and the softer parts eroded away until only isolated surfaces having a uniform skyline remain. The Applachian plateau is an example.
2. The mature landscape of low relief, near sea level and usually covered by considerable depths of unconsolidated material. This is the type most stressed in text books.
3. The very ancient peneplanes seen to best advantage in the Grand Canyon and in lesser canyons and sea cliffs of the world. These are very instructive because we can see the order in which the other formations have been superimposed upon them in the canyon walls above In every case we find the best indication of a true peneplane is a hard rock surface worn t o near level. Anything else that may lie upon it was put there after the erosion of the hard surface was complete. This is sedimentation, not planation and brings us to our conclusion: That peneplanes are <u>always</u> hard rock surfaces worn to near level and cannot possibly be the work of ordinary erosion. The very word, planation, indicates work done on something hard. The bottom of a dry lake may be a plain but it is the work of sedimentation.

Turning now to our own explanation, we offer a theory that will seem fantastic in the extreme on first thought, but further consideration, we feel, will bring the realization that it is based upon sound scientific principles. We offer cosmic collision as the chief moulder and sculptor of our earth in all its aspects, peneplanes being but one feature of these mighty cataclysms. First, we must make

our point, that collision between the earth and other cosmic bodies is a fact as certainly well known and established as any other fact of science. It is not a theory or hypothesis, like continental Drift or Isostacy, but and established fact that is as well known as the Law of Gravity

Less than a century and ahalf ago, Thomas Jefferson, no mean sceintist himself, refused to believe that stones had fallen from the sky over New England, and not long before that, the French Academy of Sciences has denied such possibility too, although there were hundreds of witnesses to this fall in southern France. Now we know that much larger objects have hit the earth, and such craters as Canyon Diablo in Arizona and Wolf Creek Crater in Austrlia, the Ungave Crater in Canada and just lately, one of more than a mile in diameter from the Middle East. In our opinion, very good evidence of much larger collision craters exists on the earth in the shape of island arcs and mountain arcs, and many other features of the land masses and ocean depths that we cannot explain here. Peneplanes are just one phase of collision geolog but it can readily be understood that if a large body were to strike the earth, for example, one 200 miles in diameter, the errosive effects would be beyond human imagination. Water, wind and rock debris traveling at incredible speeds would slice off the mountain tops and start glacial ice caps skidding across the landscape in a way that would produce peneplane surfaces in no time. More erosion, sedimentation and vulcanism would be produced in a short time than in all of the millions of years between collissions. The evidence of these collisions is everywhere, but its products have been masquerading under another name, Uniformity. Once the concept is established in the mind, anyone can find the evidence for it is the outstanding feature of the earth's surface, just as it is on the moon.

Since the time of the fall in southern France, many meteoritic falls have been recorded, some of large size, and in recent years, a number of large meteor craters have been discovered such as the Canyon Diablo Crater in Arizona, the Wolf Creek Crater in Australia, the Ungave Crater in Canada, and more recently, one in Algeria reported to be a little more than a mile in diameter. The recognition of these impact craters, together with the growing sentiment of astronomers, favoring the impact theory for the origin of the craters on the moon, is forcing geologist to turn their attention more and more to the possigilities of collision geology. In my opinion, very good evidence of much larger impact craters exists on the earth in the shape of island arcs, mountain arcs, and many lesser features indicating collision. In fact, if collision occurred on the earth at all, in any manner comparable to that seen on the moon, then at least 90% of earth's features are due to collision, directly or indirectly, ratner than the long accepted theory of erosion, vulcanism and diastrophic movement. This is not to say that the ordinary forces of eroeion cannot produce plains of low relief such as the Mississippi Valley or the Amazon Valley, given sufficient time, but this is aprocess that consists mostly of aggradation rather than degradation; in reality, a reworking of collision flood gravels which have been thrown high on the land surfaces in bygone ages. Beneath the recent alluvial fill of the Mississippi Valleythere is no doubt a rock floor which would be called the Mississippian Peneplane, or at least, the Mississippian Unconformity. It may very likely be that the Mississippi submarine canyon found off the mouth of the river in the Gulf of Mexico, also extends inland a consideralbe distance and could be located by a series of boring across the valley or other geophysical explorations. The real problem is to explain these hard rock surfaces and the canyons cut therein, not erosion and sedimentation.

a considerable distance and could be located by cross sectional well borings or other geophysical exploration. The real problem is to explain the origin of these hard rock surfaces and the canyons cut therin, not to question the reality of erosion and sedimentation.

Peneplanes are just one phase of collision geology, for it can be readily seen that if a large body were to strike the earth, (for example, one 200 miles in diameter) the effects would be world wide and of many kinds. Erosion and sedimentation would be but one phase. The earth's crust would be faulted and displaced in all directions. Mountains would be built and volcanic action would take place thousands of miles from the point of impact. Every part of the earth would be affected and the atmosphere surrounding it would be so heated and so charged with dust and gases generated by the millions of degrees of temperature* produced at the impact center, that the whole climate of the earth would be changed for years to follow, probably never returning to the exact previous conditions. Storms of unbelievable proportions and power would rage over the earth and continue for a long time, greatly increasing the rainfall and covering the mountains and polar regions with vast accumulations of snow and ice. At the point of impact, probably all of the meteorite and a large area of the earth's crust was vaporized but beyond that and surrounding it, water, air and rock debris would be blasted outward at incredible speeds, slicing off mountain tops and starting ice caps half-floating and skidding across the landscape in a way to produce peneplanes in short order. More erosion, sedimentation, block faulting, vulcanism and general diastrophic action would take place in a few days or weeks than in all of the millions of years between collisions.

*Dachille has estimated temperatures equaling those inside the surface of the sun. (See Target:Earth page203.)

The evidence of these collisions is everywhere, as might be expected, but has been masquerading under another name, Uniformity This assumption, that all the earth's features have been moulded by the same mild forces of erosion and vulcanism as we see going on today, is now more than 120 years old. Quite a venerable assumption!

The Grand Canyon, as everyone knows, is perhaps the best and most complete record of the earth's history found anywhere in the world. In its walls are found the five major unconformities that mark the five great eras of the earth's history and seven of the eight lesser unconformities that divide the eras into lesser periods of time. The only one missing from the Grand Canyon is the last great revolution that separates the very recent from the Pleistocene and that is only missing in the sense that the Pleistocene formation is missing from that area. Any surface of the earth laid bare of recent unconsolidated material, constitutes that last great unconformity which I think was made by collision-flood a little more than eight thousand years ago.

In the time charts used to illustrate the history of the earth by means of the rock column, photographs of the Grand Canyon and higher parts of the Colorado Plateau nearby are nearly always used to show how the biologic events of the past show up in the rock column and the evolution of the various forms of life. It is also generally thought that the unconformities represent vast periods of time in which the mountains of the earth were worn down to near sea-level and that at the close of each of those eras or periods, great revolutions in mountain building and continental uplift took place, leaving only remnants of the old peneplane or unconformity. The periods of time elapsed between revolutions is determined by

the depth of sediments laid down between peneplanes, the greater the amount, the greater the elapsed time. The rate being determined by the rate which present day rivers deposit their sediments.

No cause for the revolutions but it has been usually held that they originated within the earth.

Collision geology does not view these peneplanes and unconformities as the evidence of vast elapses of time but as sudden cataclysms in which both the planation, deposition and mountain building all took place at the same time. ese major colisions were nodoubt separated by great stretches of time, but nothing but chance dictated the time when collisions would occurr, so that we have no way of knowing whether they were closely spaced or far apart__so far as the depth of sediment is concerned, for, obviously, the amount of sediment deposited would depend on the sice of the collision and a great many other factors. More modern methods, such as determining the radio-active age of the varioys strata in the Grandanyon, might give us the true picture.

etween collisions, the uniform fordes of erosion nodoubt took over but all traces of their work was removed by the following collision-flood for any uncolidated material would be churned up in the flood waters and redeposited according to size and weight. For that reason, most of the peneplane surfaces are followed by basal conglomerates and lighter materials. It is perhaps significant, that peneplanes are not followed by aggraded landscapes of intricate stream pattern in the Grand Canyon. Sequences, yet that is the only thing that can happen under conditions today where the hard rock surface is above sealevel.

Orthodox geologists, of course, se the rock column of the Grand Canyon as having been heaved up and down(or sealevel raised and lowered) in order to account for the alternating land and marine strata.

~~strata.~~ Collision geology sees the whole Colorado Plateau as an old sea basin that was gradually filled by some 12 collision-flood of sufficient size to leave their peneplane record. Many lesser ones nodoubt occurred but no direct hits on this area, so that the rock column record remains unscored by collision. At the same tim distant collisions have brought latteral pressures to raise the whole area above sea-level and to scour out the canyon with the later floods. This is certainly the evidence displayed in the Grand Canyon, for nothing short of a collision-flood could have produced the tremendously thick beds of uniform meterial. No known river or any combination of erosive forces known today could have produced the Coconino Sandstone, 310 feet thick and covering hundreds of square miles, this clean, uniform, white sandstone make sharp contact with the very different Red Supai formation below it and the Kaibab limestone above. Why did all of the rivers flowing into the ancient Colorado Sea suddenly begin to carry nothing but a pure white sand? Was there no other kind of rock in the water shed? Is there any evidence that modern rivers can produce so uniform a bed of so even a thickness?

The cross-bedding seen in the Coconino and other sandstone formations is not the result of wind deposition as sometimes claime but rather a condition in which sand rained down from the sky arour some collision cloud, falling in deep water moving to and fro. The main layers in this sandstone vary in thickness from a few feet to as much as ten feet, and the individual strata in the thicker layers show the direction in which the water was moving by the innumerable small deltas that were formed with their flat surfaces and steep frontal slopes all pointing in the same direction. As these flood waters moved across the Colorado Basin (then probably below sea level) they piled up on the opposite shore, then a return

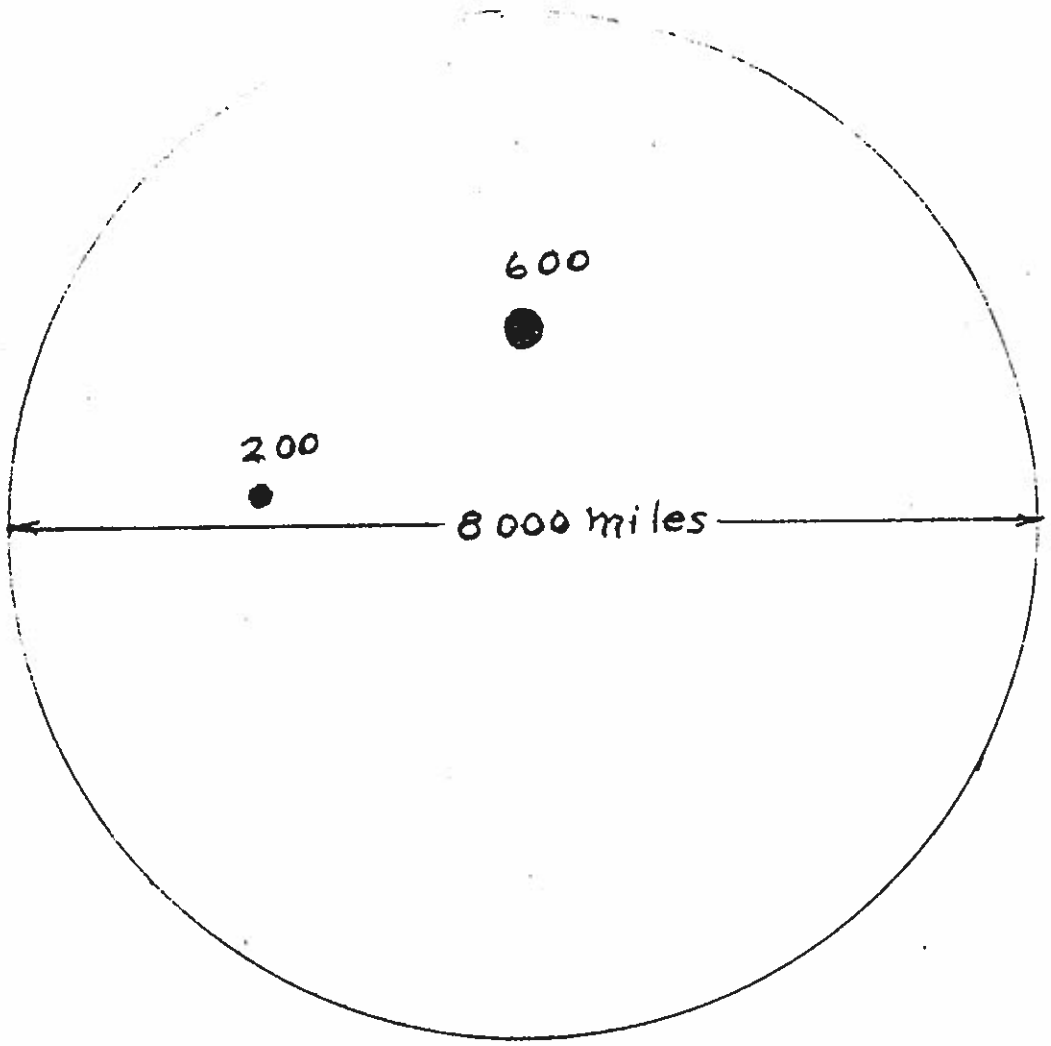
tide set in, the water moved in the opposite direction and all the little delta slopes pointed that way. As the sand sank through the water and came to rest on the bottom, a sort ing took place that fits the picture. So vast a body of water could not turn instantly, so while it came to a slow stop and gradually turned, there was time for the finer sediments to sink to the bottom that would otherwise remained in suspension. This produced a well defined contact between the thick layers and helps to explain why thei monstrous and unnatural river ran first in one direction and then the other. The sand itself, was uniform in nature because of the cataclysmic process by which it was refined.

Such collision as pictured would probably resemble a gigantic atomic bomb. Its cloud column would probably rise thousands of miles above the earth's atmospehere, ira incandescent vapors mushrooning outwardly an some part of it probably escaping the earth altogether. In the outer fringes of this cloud, vast quantitie of molten rock might rain down as sand or metals, the whole effect being something like that of a giant cracking plant",sorting out the various elements in annular rings,___ according to their chemical properties and atomic weight.

Certainly, peneplanes and unconformities are but a small fraction of the effects of such a blast, but in order to explain their origin by collision it has been necessary todiverge somewhat from a true course.

SUMMARY::::

1. The history of the subject has been reviewed.
2. The general lack of interest in the problem
3. The nature of marine shoreline erosion.
4. The nature of subaerial denudation and its inability to produce peneplanes and unconformities.
5. The collision explanation of peneplanes and unconformities.



The earth shown to scale with two lesser bodies, one 200 miles in diameter and the other 600. They look small in camparison to the earth yet computations show that the larger body traveling at 20 MPS and striking the earth in a favorable location could change the earth's axis by some 20 degrees.

HENRY LIVA

182 GRAHAM AVENUE

Brooklyn 6, N. Y.

May 14, 1956

Mr. Alan O. Kelly
Carlsbad, California

Dear Mr. Kelly:

I have just read your article published in "THE SCIENTIFIC MONTHLY" of February 1952.

I agree with you as to the behavior of scientists. And I congratulate you for the considerations you have expressed.

There is, now, only one voice of science in the world. This voice makes the lay world believe mostly inconsistencies and unverifiable and unprovable statements.

Theories and statements which constitute an insult to the intelligence of the lay world are being exalted by organized sophists.

I believe that in the lay world there is so much intelligence that if interested groups would associate themselves, they could establish their own voice of science; with the objective of rejecting inconsistent or unverifiable theories or statements for what they can be proved to be.

Such an action would tend to eliminate the limit to knowledge set by educators within the limit of their own knowledge; and would do justice to independent investigators who might succeede in surpassing that limit. Under the present conditions, these investigators are sheep left to ~~the~~ wolves in sheep clothing.

The voice of the lay world could bring the activities of hairsplitters before the judgment of the people. By doing so, billions of dollars of taxpayers money could be saved.

The forwarding of the inclosed prediction to some members of the Congress of the United States, and to those who have frequently reported interviews they have had with those who are working on artificial satellites and space travel means, seems to have brought almost to a stop the frequency of the news concerning space travel.

I am dedicating my retirement days to the job of exposing the fakers who pose as scientists. Too many of these are worth nothing, live on undeserved salaries, and deprive of their deserved credits those who do some thing. Any one who succeeds in focusing light upon such a kind of so-called scientists renders a public service.

If you are willing to cooperate, please let me hear from you.

Very truly yours,

Henry Liva

Henry Liva

This paper was not dated at the time of writing and I can only guess the time now, from reading the content which would place it somewhere between 1948 and 1951.

AOK 4/5/87

IS METEORITIC COLLISION THE MISSING FORCE IN GEOMORPHOLOGY?

By

Allan O. Kelly

Geologists have long been aware of the fact that their profession is faced with many unsolved problems and that these problems, to a great extent, have to do with basic causes, the forces that produced the unexplained phenomena.

Geology has been called the"Mother of Sciences" and with good reason, for it is perhaps the oldest of the sciences and the one from which most of the others have sprung. Out of necessity, men became familiar with the processes of nature. They observed the life cycle of plants and animals from birth to death. They saw the forces of erosion at work and they wondered how the earth, mountains and seas came into being. They were interested in the workings of nature and so the study of geology gradually arose out of this natural curosity. T. C. Chamberlin, great American geologist and cosmologist, said of this natural desire: "There is no nobler aspiration of the human intellect than the desire to compass the causes of things."

It is my purpose in this article to point out the possibility that the collision of gigantic meteorites with the earth in past ages, may have been the missing force that will account for all the unexplained phenomena. First, however, we shall consider some of the history relative to the collision theory.

T. C. Chamberlin might be called the father of the collision theory for it was he, along with Moulton, of the University of Chicago,

who proposed the "Planetesimal Hypothesis",__the theory that the origin of the earth involved a process of growth by accretion of dust particles and meteorites. Chamberlin, however, did not consider the possibility of very large meteorites striking the earth or what the consequences of such collisions might be. He apparently held to the theory of Uniformity (unwittingly) for he wrote an article in the Journal of Geology in 1897 called "The Method of Multiple Working Hypothesis." This article emphasised the need for creative study as contrasted with the more common practice of acquiring knowledge by memorizing the work of others. He advocated independent thinking from all sides of a question,__"Multiple working hypotheses", rather than what he called a "Ruling Theory". Chamberlin was first of all, a geologist, and he did not see that his "Mother of Sciences" had long since developed a "Ruling Theory". This was and is, the theory of Uniformity.

According to the dictionary,__"Uniformity is the doctrine that the present laws, forces, or principles, which govern the world as it is, are just the same as always and are responsible for whatever geological changes that have taken place."

Sir Charles Lyell, although perhaps not the originator of the theory, was, without doubt its greatest advocate. His chief work, "Principles of Geology" published in 1833, is the acknowledged authority on Uniformitarianism and remains to this day the foundation upon which modern geology rests.

Before the time of Lyell, many men of science had believed in cataclysmic deluge because of the evidence they saw but they could not produce a reasonable cause or physical force to account for the gigantic effects, so they fell back on the supernatural. Lyell denied the idea of supernatural cataclysmic deluge most forcefully and emphatically, he said:

"No causes whatever have changed the earth except those that still do so under the eyes of man". He was also very critical of his predecesso and contempories for indulging in speculations: "They employed themsel in conjecturing what might have been the course of nature in a remote period, rather than in the investigation of what was the course of nature in their own times".

This seemed like a really scientific approach but Lyell overlooked the obvious fact that a few thousand years of recorded history was only a microscopic speck, only a grain of sand on the shores of time and hardly a fair sample of the two or three billion years of the earth's history.

Lyell looked to the forces he could see and investigate to give him the key to the earth's history. He held that ordinary erosion, sedimentation and volcanics, working slowly through very long periods of time, could produce all of the earth's physical features excepting those for which there was then no explanation. These latter, he thought would be explained some day when more was learned about the earth. Time has shown that those simple processes are not enough, for after 1950 117 years, many of the problems unsolved in Lyell's time, remain so toda Let us look, then, at some of these unexplained problems and see how the collision theory may explain them.

1. What caused the so-called "Ice Ages" and why did the ice expand over great areas of North America in what are now low elevations and comparatively mild climates?

2. What caused the glaciation in South America and in South Africa in what are now subtropical regions?

3. Why are coal and coral found in arctic regions now incapable of supporting this kind of life?

4. Why were thousands of animals suddenly frozen in the Arctic?

5. How were submarine canyons built?

6. What is the cause of earthquakes?

7. Why are large "erratic boulders" found in warm climates where there is no evidence of former glaciation?

8. What force produced the lateral pressure in the earth's crust that has built our mountain ranges?

These and many other questions have long been considered by geologists without reaching any reasonable conclusion or solution.

Because the known forces of nature have been found wanting, geologists have added "movements in the earth's crust" for which they can find no cause. We are told that great areas of the earth's crust rise and fall. That tremendous lateral pressures develop in the crust and that mountain ranges are buckled up or faulted so that in some cases one side of the fault is thrust over the other as much as fifty miles. These movements are thought to occur so slowly that they cannot be measured with any assurance of accuracy, especially those that have to do with the rising or falling of large surfaces of land, for there is no stable point from which to measure except sea level and we cannot be sure that the ocean did not rise and fall instead of the land. On a lesser scale, we see that our great mountain systems were once laid down as nearly level sedimentary rocks. Now they are thrust high in the sky. But this vast movement did not take place "under the eyes of man" so we have no historical experience to prove whether it took place slowly or quickly. Some believe the physical evidence shows a quick birth, but most geologists have tried to explain it by some very slow process. One of these is the theory of "Isostacy".

Isostacy is defined as "The theory of general equilibrium in the earth's crust, supposed to be maintained by the yielding or flow of rock material beneath the ~~surface~~ crust under stress of gravitation". It is

supposed that as rivers transport sediments from their watersheds to their deltas that in time, this redistribution of weight causes the hot material beneath the crust to flow as a plastic substance. Thus the magma moves under the crust to replace the weight of sediments removed from the mountains. Or, in other words, the mountains become lighter and so float higher on the magma beneath. According to this reasoning it might be argued that mountains should rise as fast as they are lowered by erosion and so we would be faced with the necessity of finding an origional cause for the mountains in order to start this never-ending cycle. Another argument against Isostacy is the fact that rivers carry a considerable portion of their sediments into the sea and that the ocean water thus displaced is spread evenly over a great part of the earth. The facts are that most large rivers are building new land at their mouths and there is very little if any evidence that these delta areas are sinking. If Isostacy were a fact we should find drowned river valleys all around the world, but this we know is not so, for the deltas of great rivers like the Nile and the Tigris-Euphrates have been extended for many miles even within historic times. This would seem to indicate that it is much easier for the ocean to flow than it is for the magma beneath the earth's crust. It may be possible that in a few cases where rivers empty their sediments into inland basins or desert regions, that Isostacy could take place but only to the extent of leveling the land surface. If mountains were elevated only as fast as erosion takes place, then there would be no rugged perpendicular mountains but only smooth, rolling surfaces.

Volcanic eruptions are the only mountain building forces that men have observed. It is known that such eruptions can build or destroy large mountain peaks in a very short time but the total volume of volcanic mountains is very small compared to pressure mountains. In fact,

volcanics are in most cases, only a by-product of pressure mountains, for in many cases the lavas are seen to have come up through the sedimentary rocks along the faults caused by lateral pressure. What then, caused the lateral pressure? This is one of the questions that Uniformity could not explain in Lyell's time and does not answer today.

Is meteoritic collision the key, the missing force that geologists have been looking for? The answer seems to be yes, if one is willing to believe that objects as large as the asteroids may have struck the earthduring past ages.

It is obvious that any large body striking the earth would cause oceanic flooding and that such flooding would cut submarine canyons across the continental shelves at the mouth of every large river. The ocean water would surge in over the land and back again to the bed of the deep ocean; not once but many times, something in likeness to gigantic tides that would gradually abate until the oceans returned to normal. The greater part of these flooding waters would be concentrated in large river valleys and since the continental slopes are the greatest relief features on the earth's surface, the steep descent into the abysmal depths would provide tremendous cutting power for the ocean waters concentrated in the river valleys and so the submarine canyons would cut back across the continental shelves. Such oceanic flooding not only accounts for the submarine canyons off the mouths of rivers but also those found far from land, such as Bering Canyon. Bering canyon is perhaps the largest submarine canyon on the face of the earth yet this is not so remarkable when we realize that a great part of the Arctic Ocean may have been forced through Bering Strait into Bering Sea. Wrong! Bering Canyon lines up with Bering Strait just as other submarine canyons line up with river valleys. No

Uniformitarian geology has never been able to account for

submarine canyons by those processes "going on under the eyes of man", so they have been forced into the speculations that Lyell so abhorred. Some suggestions have been; spring sapping, undersea landslides, slumping of cavern roofs, and the lowering of ocean levels due to the locking up of ocean water in greatly enlarged polar ice caps. The latter supposition has had the greatest vogue but it too has its difficulties. Many submarine canyons are near a mile in depth and Congo Canyon is said to be nearly 9000 feet deep at the edge of the continents shelf. This would require nearly half the water in the ocean to be locked up in polar ice if the rivers were to have cut canyons down to an old sea level 9000 feet below the present level. The fact that submarine canyons are of all sizes and depths indicates that the ocean level had nothing to do with the cutting but that when the oceans surged over the land, they cut submarine canyons of a size and shape to match the river valleys above. If the ocean level had remained at some lower level for a sufficiently long time to have produced submarine canyons by ordinary erosion, then all of these canyons would have descended to the same level.

The glaciation of North America can also be explained by meteoritic collision and oceanic flood as can the older signs of glaciation in Africa and South America. These are the glaciated areas once beneath older polar ice caps when the earth's polar axis was in these respective locations. The earth did not become warmer or colder but each major collision produced a new polar axis and a new polar glaciation. Any large body striking the earth and penetrating its crust would throw it out of balance and of necessity form a new rotational axis. On the other hand, it is next to impossible to believe that vast sheets of continental ice would have formed all over the eastern half of North America while Alaska, Siberia and the northern

fringe of islands in Canada, remained free of ice, if the North Pole was in the same location then as now. There is plenty of physical evidence to show that the old North Pole was located near the mouth of Hudson Bay and that the old Arctic Circle encompassed and area extending from the northern islands in Canada to Kansas City, and from Alberta to Iceland. If this seems difficult to believe, it may be pointed out that all the rules of Uniformity must be broken to believe that a sheet of ice two miles thick formed in one segment of the northern hemisphere while the rest of it remained free of ice. This is not going on under the eyes of man today and it is very unlikely that it ever did.

The presence of coal and coral in the polar regions is also very good proof that the polar axis of the earth has been in different locations in past ages. In fact, no other theory has ever been advanced so far as we know.

The various kinds of prehistoric animals found frozen in Northern Alaska and Siberia are also good proof of the collision theory. The sudden change of the polar axis moved these animals from a north temperate climate into the Arctic and the following oceanic flood buried them in a great mass of muck and gravel that was quickly frozen and has remained so until today.

The so-called "Erratic Boulders" are another evidence of collision and flood. They are found all over the world in warm climates and where they never could have been transported by floating icebergs. These were transported from their source by oceanic flood. As a matter of fact, "erratic" stones of all sizes may be found in almost any stream at lower elevations. Stones utterly foreign to any mother rock to be found in that water shed. These stones are just as "erratic" as the huge boulders moved by ice in the glaciated areas of the world.

Earthquakes are the continuing adjustments of the earth's

crust as the forces of gravitation and rotation work to make the earth a more perfectly balanced sphere following the impacts and dislocations caused by meteoritic collisions. The deep ocean floors are the beds of the great collision points. Here the molten lava caused by impact, welled-up and took the curvature of the earth. Earthquakes are rare under these deep ocean beds. Around their rims, (which are seen as continental slopes, mountain chains or island arcs and their accompanying deeps) we find great seismic activity. Here the earth's crust is cooling and cracking, pulling away from the surrounding crust as the central lava pool made by impact, cools and contracts. Thus earthquakes are most frequent along these old crater rims where the crust is cooling and faulting. The volcanoes which usually line these rims are the result of lava coming up through the faults. The fact that the volcanoes are gradually migrating from the outside of the arcs toward the inside, is proof that a circular pool of lava beneath the crust is actually cooling, for the more ancient volcanoes are always found on the outside and the younger ones on the inside of the island arc or curved mountain rim. Most of these old collision craters overlap one another so that only segments of their rims are still visible. This is a condition also found upon the moon.

Space does not permit the lengthy discussion of each of these problems, suffice it to say, that meteoritic collision is a known and proven fact, and a force that cannot be dismissed as something apart from the geological history of the earth.

Note:1987: One feature of impact I failed to see (top of page) was the fact that such major collisions would have a tremendous volumn of gas, ionized gas and dust in micron size, and this would have escaped the earth because impat velocities being far in excess of the 7½ mps escape velocity of the earth. Most of this could have been carried away from the earth never to return, or carried away by gravitational ripoff from a close passing body of larger size.

Allan D. Tully

I don't know if this paper will be accepted or not, because I still have to go through some "hard fact" geologists and editors. The main program that Bob and I started out to do was to get the geological profession to think more about the role of impacts in geologic history.

Thanks again for the book and your very welcome comments.

Sincerely yours,

Byron Sharp

Byron J. Sharp

BJS:ess

cc. Dr. H. H. Nininger
Dr. Robert E. Cohenour

Oct. 31, 1987

TO WHOM IT MAY CONCERN:

This young man and his friend, professional geologists with degrees from some good university, illustrate how long continued dogmatism in some major field of science or education can become so fixed, so set in cement, that only the brave or the ignorant, dare offer a new or different solution.

No sane person wants to be a John the Baptist, and get his head cut off---socialy, politically or economicaly. I think of an early California Mission some 30 miles north of here called "San Juan Capistrano"(St. John the Beheaded)by those Spanish Priests who gave their lives to a cause. The church had a dome that was constructed of uncut rock. That dome was beheaded in the great earthquake of 1812. The remainder of that church still stands today, as a monument to those early explorers.

Only man is truly creative. The lower animals live by rule, (instinct) but they do think. One can see this from a distance or when the animal is not aware of your presence. I recall seeing a cow with her small calf, come to a fork in the trail, stop to think which way to go---over the hill to some good pasture, or down to the spring with water and shade...She looks one way and then the other for a minute or two and then bows her head in one short motion(like a person saying yes to a question) and takes the trail she has decided upon.

Formal education to the advanced degree, does not teach people to think. It teaches them to lean upon authority, to the accepted. How else does the savage, the illeterate, or the gradeschool graduate, learn to think and to do creative work?

Finally, the truly creative person will tell you that he did not will to have the new and origional idea---it just popped into his head at some odd and unexpected time.

Allan O. Kelly

QUOTATIONS FROM THE "EVOLUTION---CREATION CONTROVERSY."

1. ALBERT EINSTEIN WROTE: "CLASSICAL THERMODYNAMICS IS THE ONLY PHYSICAL THEORY OF UNIVERSAL CONTENT CONCERNING WHICH I AM CONVINCED THAT, WITHIN THE FRAMEWORK OF APPLICABILITY OF ITS BASIC CONCEPTS, WILL NEVER BE OVERTHROWN."

2. SIR ARTHUR EDDINGTON SAID:"IF YOUR THEORY IS FOUND TO BE AGAINST THE THIRD LAW OF THERMODYNAMICS I CAN GIVE YOU NO HOPE: THERE IS NOTHING FOR IT BUT TO COLLAPSE IN DEEPEST HUMILIATION."

3.JULIAN HUXLEY WROTE: "EVOLUTION IN THE EXTENDED SENSE CAN BE DEFINED AS A DIRECTIONAL AND ESSENTIALLY IRRIVERSIABLE PROCESS OCCURRING IN TIME WHICH IN ITS COURSE, GIVES RISE TO AN INCREASE OF VARIETY AND INCREASINGLY HIGHER LEVEL OF ORGANIZATION OF ITS PRODUCTS."

4. DUBOISE WROTE: " MOST ENLIGHTENED PERSONS NOW EXPECT AS FACT, THAT EVERYTHING IN THE COSMOS FROM HEAVENLY BODIES TO HUMAN BEINGS, HAS DEVELOPED AND CONTINUES TO DEVELOP THROUGH EVOLUTIONARY PROCESSESS."

5. ACCORDING TO THE EVOLUTIONISTS, THE PREBIOLOGICAL WORLD OF CHENICALS WAS ONE OF CHAOS, RANDOMNESS,DISORDER. THAT THIS PROCESSS IS BELIEVED TO BE CONSISTANT WITH THE SECOND LAW BECAUSE THE EARTH IS AN OPEN SYSTEM RECEIVEING ENERGY FROM THE SUN.

6. THE CREATIONIST SAYS: THAT IT MAKES NO DIFFERENCE WHETHER THE EARTH IS AN OPEN SYSTEM OR A CLOSED SYSTEM....THAT THE SECOND LAW IS UNIVERSAL AND THA ORDER COULD NOT HAVE SPRUNG OUT OF DISORDER. THAT THIS NEGATES THE BASIC THEORY OF EVOLUTION THAT A DISORDERED WORLD OF INORGANIC CHEMICALS AND ENERGY FROM THE SUN, BY SHEER CHANCE AND AGAI THE LAWS OF PROBABILITY, CAME TOGETHER ALL AT ONCE TO PRODUCE THE SINGLE CELL, A HIGHLY ORDERED AND COMPLICATED UNIT OF LIFE.

7. DR. WYSING, THE AUTHOR OF THE BOOK, "THE EVOLUTION-CREATION CONTROVERSY", SAYS THAT BASICALLY, BOTH THEORIES, TO A CERTAIN DEGREE, MUST BE TAKEN ON FAITH,...EITHER THE UNIVERSE ALWAYS EXISTED OR A SUPREME INTELLIGENCE CREATED IT."

8. From the above arguments one can add the further arguments that the present dynamics of change in the earths features are sudden like earthquakes and volcanic eruptions with others grading off in to some slower yearly cycle like glacier movements, ocean currents or the monthly changes in the weather due to planetary motion, in short---- evolution and creation are like light and darkness---we cannot have one without the other. GOD is!

AOK

1988