THE LATELY TORTURED EARTH

EXOTERRESTRIAL FORCES AND QUANTAVOLUTIONS IN THE EARTH SCIENCES

by

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Note: The word 'exo-terrestrial' is used in preference to 'extra-terrestrial.' It is more exact etymologically, less romantic and sensational, and easier to pronounce.

The design on the jacket is one of several drawings by Leonardo da Vinci of the "Deluge." He portrays the cataclysm as a terrific downbursting of water and whirlwinds.

"*Nihil difficile naturae est,*
utique ubi in finem sui properat."*

Seneca
De Quaestiones Naturae

* "Nothing is difficult for nature,
especially when she hastens to destroy herself."

CONTENTS

PART IV
CRUSTAL TURBULENCE

PART V
RIFTS, RAFTS AND BASINS

PART VI
BIOSPHERICS

PART VII
DIMENSIONS OF QUANTAVOLUTION

FOREWORD

The title of this book, *The Lately Tortured Earth*, may appear flamboyant, but such is the fault of reality. The author objects to the pedantic sweet view of the world of nature that insists, often insidiously, upon its tranquillity and beauty, and sees in the ravaged countenance of the Earth the smooth cheeks of a baby; in the same view, when attention is called to evidence of harrowing experiences, the Earth becomes old alma mater, whose blemishes are to be expected in a being of some billions of years of age. By way of contrast, here we stress the devastations of the Earth and the short time span in which they have occurred.

'Tortured' means to be acted upon violently, strained, twisted, distorted, burned, choked, immersed in liquids, and electrically shocked. And, because the word 'recent' in geology goes back millions of years, we choose the word 'lately,' signifying the past dozen or so thousands of years, approximately the Holocene period. I aim to be theoretical. I do not wish to pile up horrific details, nor do I.

By 'Earth' of course is meant our familiar globe, cracked and slightly irregular, with its high speed motions and far stretching atmosphere. We are interested in the geophysical column that extends radially from a presumably iron and nickel center, through an enormous mantle of molten rock and water, to where the biosphere dwells, then outwards by means of gases and electric charges to beyond the Moon. We seek to know what has happened lately to this Earth system.

The amateur has his place in scientific revolutions, as in civil wars and politics generally. G. Grinnell, in an historical lecture on the revolt against early catastrophism, which prevailed at the London Geological Society from 1807 to 1832, had this to say: "What is extraordinary about the London Geological Society is that none of the original members were geologists. 'The little talking dinner club,' as Davy put it, was a club for gentlemen given to talk, not to hammering rocks." Now of course, we all believe in hammering rocks, but prior to revolutionary occasions, a great deal of talk must be heard, and this book contains some of it.

I am addressing the book to amateurs, whose numbers will include, I suppose, liberally educated gentlepersons, bombthrowing intruders, and the specialist who seeks interdisciplinary enlightenment. Who, nowadays, among scientists and scholars, need not broaden his scopes anxiously and hopefully beyond his strict area of competence? Specialists in geophysics are unlikely to know archaeoastronomy or the sociology of science. An expert on radio-chronometry may be at a loss in archaeological chronology. Everyone must become an amateur to enter the lists of cosmogony, where the theory of quantavolution seeks to establish itself.

It hardly needs be said that I am myself an amateur, and could be nothing else, even if I had won my spurs in electrical engineering instead of political theory and behavior. This will become quite clear as the panorama of scientific materials and methods begins to unfold in the following pages. I hope to be regarded as an honest amateur, although I am professionally aware of the tricks that the unconscious underground mind can play upon an otherwise sincere scientist. There is no Piltdown Man fraud here, probably no wrong-headed Yale dinosaur, perhaps just plain errors, inadvertent omissions and foolhardiness, which I hope will be promptly discovered and publicized.

Isaac Newton, says a careful student of his work, fudged the members of one equation to improve its numbers for his proposition on the precession of the equinoxes; he manipulated averages in using the Moon's distance from the Earth to better correlate gravity with the Moon's motions; and "his use of the 'crassitude' of the air particles to raise the calculated velocity [of sound] by more than 10 percent was nothing short of deliberate fraud."[1] He then devoted some years to proving Biblical chronology correct, allowing catastrophes to rule the natural history of the universe until the Hebrew genesis put it into a sacred clocklike order. Aside from this, he became abnormally mad.

I have tried, on the problems that I set for myself here, not to fudge the facts, to select perforce my materials from the inordinate mass while letting the reader recognize the manipulations necessarily entailing, and to let no fraud enter my meager calculations. I intend to prove correct no sacred scriptures, beyond recognizing the contributions which they may make to scientific historiography. In all of this, I doubt that I am more than normally mad, unless it be in the presumption that this work will be useful to science.

Alfred de Grazia

Notes

1. Richard S. Westfall, "Newton and the Fudge Factor," 179 *Science* 4075 (23 February 1973), 751-8.

CHAPTER ONE

QUANTAVOLUTIONS

Clarence King was the first Director of the United States Geological Survey. He was liberally educated at Yale University and spent years in field work thereafter. According to the historian Bancroft, he "had acquired a reputation and a position second to no scientist in America." When he returned to lecture at the Sheffield Scientific School of Yale in 1877, he argued against the prevailing opinions in geology and evolution, insisting on the basis of his experiences and visions as a surveyor that the Earth had been lately devastated. The belief in catastrophism, he said, in surprising pre-Jungian language, was a true grasp of what had happened to the World. "Catastrophism is therefore the survival of a terrible impression burned in upon the very substance of human memory."[1]

Because catastrophism is a word that excites emotion and connotes only destruction, the present work and the series to which it belongs prefers the more general idea implied in the word quantavolution. The concept allows a more peaceful invasion of the realms of gradualism, uniformitarianism, evolution, and anthropology.

I do not mean this book to be violent and bloodcurdling. We have far too much of such stimulus today on television, in movies and in other books and magazines. I even go so far as to say that the Earth system has been settling down - this without conclusive evidence. But facts must be faced. The Earth has been severely traumatized in the memory of mankind. In words that I have used before, any place on earth can be viewed as a Quantavolutionary Column:

> Any tube of one kilometer diameter circumscribed anywhere on the surface of the Earth, which reaches as high as the end of the magnetosphere hundreds of miles upwards, and as low as the upper mantle some thirty kilometers down, will have endured within the past

> 14,000 years radical changes in its absolute and relative orientations, its atmosphere, its rocks and its biosphere, including any long-lived human cultures.

Several principles characterize the theories of quantavolution:

Every major feature of the Earth's surface is an effect of quantavolution; hence every feature figured in evolutionary theory is translated more realistically into quantavolutionary theory.

The dominant shape of the most determining events in natural history is a logarithmic or exponential curve where, from a pre-existing state, sharp change occurs, followed by a steep exponential decline in the effect. After a time the curve of the effect flattens out, and an illusion may arise that the processes under scrutiny have always been as they are now.

The several descriptive spheres of natural activity: atmosphere, lithosphere, hydrosphere and biosphere, transact regularly, but most emphatically and completely under catastrophic impulsion.

Partly because of the greater force of inanimate being and partly because its own basic nature is identical with the inanimate, the biosphere is as subject to quantavolutionary experience and interpretation as the physical spheres.

The theory of quantavolution depends upon the evidence that catastrophes really happened, for it is upon such abrupt, large-scale natural events that the quick leaping changes of quantavolution in the holosphere depend. By the same token, a quantavolutionary theory must show either that large spans of assigned time in natural history are fictitious, or, if they occurred, little of the natural world changed during their passage. Every chapter of our book is dedicated to these tasks, but several general comments may be offered in advance.

If our minds were still strapped to the ideological framework of the seventeenth century, there would be less of a problem in these regards. For we should normally believe that great floods,

fires and earthquakes had happened in ancient times, and operated on such a vast scale that many "miracles" were associated with them. By miracles, I mean such phenomena as the falling of edible material, manna or ambrosia, from the sky, and the specters of enormous brilliant comets to which the Earth around us responded like a giant animal coming alive.

No mental gymnastics would be required to see in the Earth's behavior an abundance of evidence of at least the one great Flood of Noah in which the whole world was deluged and inundated. Indeed, we should see so many marks of catastrophe that we would have to invent several such floods and conflagrations, and comets to explain the complex piling up of ruin upon ruin, fossil upon fossil, and their bizarre collection and combinations. Practically every extensive ancient document and legend known to us from around the world would repeat the same kind of catastrophic history and lend support to the testimony of our eyes and the voice of religious and social authorities.

We might have been granted different, or additional, heroes of science, too: the brave Spanish priests who rescued from certain destruction the iconography and writings of the original inhabitants of the Americas; astronomers like William Whiston who perceived an exoterrestrial cause for the Noachian deluge; anthropologists like Nicholas-Antoine Boulanger who recognized the symptoms of catastrophic fear in the history of religion; paleontologists such as Cuvier who discovered the layerings of catastrophe; anthropological-biological explorers like Humboldt who accorded respect to aboriginal accounts. Charles Lyell and his supporters thereupon might have had less success in dominating natural history -- even allowing that they were riding on the crest of English world power, political power always being consciously or unconsciously imperialistic in the dissemination of ideas.

Admittedly there is a world history of science to be written from the standpoint of the sociology of knowledge as a first step in the opening-up of thought upon quantavolution. We must nevertheless still provide in the here and now the evidence of catastrophes called for earlier. Fortunately and yet

unfortunately, the here and now is prejudicial to quantavolution. Fortunate it is that mankind up to the time of the atom bomb has had a respite from cosmic catastrophes for over two thousand years. However, the respite has permitted a thoroughgoing sublimation of memories of general disaster even in religion, all of which are rooted in proto-historic disaster, not excluding the Judaeo-Christian-Islamic faiths. The greatest secret of religion today is the ostensible fact, too obvious for continuous attention, that religion is originally founded upon the terrifying behaviors of its founding gods. Jesus and Mahomet originate in the Books of Moses, in the frightful times of Exodus when Yahweh became God of the Jews. The history of religion as the history of catastrophes is also to be written.

Once more we return to the quantavolutionary evidence in the here and now. If science, politics, and religion are using the relatively peaceful natural world of today to cover up ancient catastrophes, how are the catastrophes to be uncovered? So far as research goes, one must read between the lines of natural science and politico-religious arguments, picking up here and there bits of knowledge and threats of argument. Ultimately, these can amount to many thousands of pieces and a strong line of argument.

The mills of conventional science, originally churning out milk and honey, are beginning to grind stones and salt, as in the ancient Scandinavian myth of the end of the world. This trend is faster than generally believed. I would guess that the leading scientific magazines such as *Nature, Science,* and *Sky and Telescope* have carried since 1945 an ever increasing number of quantavolution-oriented articles, minute proportion to the total, to be sure. But this number has been increasing exponentially in the past several years and by the year 1993, I would expect that fully a quarter of all publications in natural history will treat of quantavolutions.

Going farther, in geology and geophysics a number of scientists are deliberately hypothesizing catastrophes at the boundaries of several geological ages and adducing old and new evidence, especially by chemical examination of sediments, to prove that

they occurred. The space programs of U.S.A. and U.S.S.R. have naively reported ancient catastrophes and on-going explosiveness wherever their vehicles have gone -Venus, Moon, Mars, Mercury, Jupiter and Saturn. Astrophysicists and astronomers are edging into catastrophic explanations of the surfaces of the inner planets and the asteroidal belt between Mars and Jupiter. Whereas in Charles Darwin's youth many scientists disbelieved in meteors striking the Earth, today certain scientists are advancing serious proposals for a space project aimed at exploding meteoroids that might appear to be on collision courses with the Earth. Where once the evolution of coal beds was supposed to have occupied million of years in the ample time depots of natural history, today at least one authoritative textbook adopts great fires and floods as the most possible explanation of the origin of coal [2]. Biology is moving swiftly, but biology (and in the case of man - anthropology) as the history of life moves much more slowly, moves even in reverse motion, sucking up ever greater draughts of time.

Still, Walter Sullivan, dean of science reporters, could declare in the *New York Times* in December 1981 that serious challenges to the conventional tempo and mode of evolution were arising; they came out of proof concerning links between catastrophe and extinction/genesis of species, out of the capacities of genetic engineering for modeling new life forms, and from the growing tendency to interpret the rarity of so-called missing links or transitional types as the non-existence of said types, introducing therefore the alternative presumption that macroevolution (quantavolution) introduced distinctly new forms suddenly. What Lyell wrote a hundred and fifty years ago, "that no causes whatever have changed the earth except those that still do so under the eyes of man," can be easily updated: today man's eyes are wider; they can see more and can see into themselves.

The surface of the Earth that appears before our mind's eye is largely a crystallized image, a set of snapshots of a whole too large to be embraced by a single thought - valleys, plains, deserts, seas, mountains, clouds, jungles, islands, cities and more - ten, twenty, thirty, until the mind tires and says 'enough'

and that is our Earth image. And, if we were quickly to call out words that we associate with each snapshot, we should probably begin with a couple of descriptive terms like, 'tall' or 'dry' or 'water' or 'trees', but then somewhere in the early words of each list there would perhaps be words like 'slow', 'long', 'evolving', 'the same', and 'old' that hint at 'long, slow processes in Nature.' Without conscious awareness, we perceive and recite the ideology of the prevailing science. Yet only when we imagine the cities of the Earth are we describing a surface feature that is surely known to be very recent, because these are manmade.

We mostly come from western countries whose dominating perspective on the Earth and its history has been shaped by the victorious currents of scientific thought of the past two centuries. Other peoples, and our own peoples in other times, and many of our own peoples who do not participate in this phase of our culture, would not exhibit the same responses. As they imagine the Earth's scenery, they would think in terms of 'creation' and often use the very word. This would mean to them an animate god, the creative force. And when they say 'long ago' they mean 'very lately' in geological terms, and the same if they were to say 'in the beginning.'

Between the gradualists and the creationists are those whose outlook is quantavolutionary, thinking that the Earth here and now presenting itself is both natural and young. To them this Earth is a setting recently arranged by disasters. Quantavolution has had a foot in both camps. Insofar as it claims the methods of science and the empirical positivism of science, it is in the evolutionist camp. Insofar as it adheres to facts and theories resembling the earliest stories of the great and small religions, it is in the creationists camp.

The combination of ideas has never been given a full trial. When, in the early nineteenth century, a few quantavolutionists were active, they were known as catastrophists, or revolutionists, or saltationists. They were soon identified with the enemy by the uniformitarian and gradual evolutionists and crushed in the same battles that saw the defeat of the creationists.

Let us identify ourselves as quantavolutionist and, confronting the Earth's features, ask "How and when did what make what?" For instance, "In the 1980's exploding and erupting magma rising under high pressure fashioned the top of Mt. St. Helens as it appears today. "This is not much of an answer but it suffices to introduce the complicated subject of this volcano.

If "what is made" has to be thought of as the whole surface of the Earth, large categories are needed. So we adopt several arenas or spheres of activity, and place this volcano under volcanoes in general, and volcanoes in general are part of the lithosphere, inasmuch as what remains on the spot is now frozen into rock. Much of what emerged from the Earth rose as ashes, and gases, as electric discharges, too, and water, in a veritable cyclone.

For some purposes, then, Mt. St Helens could find a place under a second category, the atmosphere, which was much affected locally by the eruption. The clouds of water vapor ultimately fell upon the ground and the seas and circulated widely in the hydrosphere, another principle arena for geophysical activity. Except for a few insects and plants, the close-in biosphere was wiped out by the disaster. Some biosphere specimens of homo sapiens cleverly moved to a safe distance and observed the events; a few persons were killed. So in the instance, forces typical of the lithosphere changed a feature of the lithosphere and affected the atmosphere, hydrosphere and biosphere to a noticeable extent.

There are not so many different crustal forms of the Earth that they cannot be encompassed by the mind and by this book. The splendid and fascinating variety of nature is in its details. We hope to treat the major features in a general way: volcanoes, rifts, mountain ranges, ocean basins, etc. in the lithosphere; gases and electric charges etc., in the atmosphere, but too, exoterrestrial intrusions by meteoroids, electricity, gases and dust; further, the waters acting in the oceans, floods, tides, rocks and rivers; and the biosphere of the plant and animal kingdoms. These spheres are the general answer to the question: where does change on Earth occur?

The features or forms are the "what is made." As to "what makes them," we have to settle upon a classification of forces or energies. Here we prefer a pragmatic approximation which is close to the phenomena as experienced, so most of the terms are straight from the newspapers: the volcano, though a feature, becomes also a force. Meteoroids as well, and others, too. Most of the chapter titles convey an impression both of cause and effect. Atmospherics are the workings of and in the atmosphere; hydrospherics of and in the hydrosphere; and so on.

Had it seemed more useful, a highly abstract nomination of forces might have been attempted; electromagnetic, inertial, 'weak' force, and the whole Earth described as built from the working of forces beginning at the level of particle physics. Something like this procedure is followed in an accompanying book (*Solaria Binaria*). But as matters stand, here we have already enough abstraction for our needs and perhaps even too much for the tastes of the reader.

The forceful phenomena that landscape the Earth and impress mankind go by a score of names. Some surprising consequences attend even the seemingly ephemeral noises and sights that attend natural operations; they are, to be sure, powerless effects in one sense, but in another sense, as we shall see, they are forces in their own right. The "music of the spheres" and "the wheels within wheels" are but ancient inherited words fossilizing for us ancient phenomena of sound and sight. They help make man what he is and this can be regarded as a criterion of a natural force; thus, what concerns us about the atmosphere is partly that the air we breathe and the food we eat are governed by atmospheric processes. Such are the homocentric beginnings of ideology, that which inspires our curiosity about nature in the first place.

Otherwise, the categories of forces are commonplace enough and group themselves fairly readily in the several spheres of natural operations. We name them as winds, hurricanes, cyclones, lightning and other electrical flows; as meteoroids and fallouts of all kinds, terrestrial and exoterrestrial in origin,

including especially radiation. We call up as forces too, the downpours of rain or cataclysms, the floods, tides, tsunamis, accretions of ice, the ocean currents and chemical 'baths.' And of the land we speak of continental drift or rafting, of seismism, volcanism, the folding and thrusting of mountains, erosion both fast and slow, the rising and sinking of land, the electrical processes in the land as well as air. And, so far as concerns the biosphere, we are interested in the mutational forces that speciate life forms and the human work that can often transform the landscape and affect the atmosphere and oceans.

We may become most general in our language and conceive of a holosphere, all spheres transacting among themselves. As in the case of Mt. St. Helens, effects of a natural force are likely to be experienced in all spheres, immediately or with the passage of time. An earth tremor will divert a stream, gather and discharge electricity, send the animals fleeing in all directions, and set humans to praying. Seismism is neatly numbered by intensity nowadays, and it is easy to test the holospheric principle by observing effects in all spheres produced in association with a Richter scale 1 and, say, 9, but allowing that this reading of 9 may have, in times before measurement and, more, before conscious memory, reached hypothetical reading of 12 or 20. What would the Richter-scale reading have been when the Indian sub-continent split off East Africa? Or when the fabled island continent of Atlantis "sank in a day of furious trembling," according to Plato?

Now a criticism can be launched against quantavolutionism. India split from Africa, not in a day, but by an exceedingly numerous series of a centimeters a year, as Arabia is pulling away from Africa today - so it is argued. This might be measurable on the ordinary reaches of the scale. So the event, as grand as it appears on maps, was not a catastrophe; besides, the argument goes, it happened a hundred million years ago.

This kind of argument is bound to brew trouble. The "when" problem occurs in conjunction with the "how" problem. The "when and how" are answered together. First, an up-strain from below works gradually along a weak line of rock and slowly insinuates a crack which lengthens and widens until India is

separated from Africa and, impelled by mantle-located forces of the same type, is slowly pushed towards Asia. Millions of years were consumed in accomplishing the clear break, many millions more in rafting to Asia. In such circumstances, the hydrosphere, biosphere, and atmosphere would be hardly affected; even the lithosphere would not be severely disturbed; there are always a few crumbs falling when a slice is cut from a cake and slid across the table. All to the tune of numbers 1 to 9 on the Richter scale.

Adversely, a catastrophe is asserted. India's separation from Africa was part of a worldwide fracturing of the globe. It happened quickly, with a hard blow impacting somewhere. Within hours, India was cut off and moving rapidly through watery wastes lately occupied by other lands that, too, were dispersed and moving eastwards. Not only was the event consummated suddenly, but it happened lately - thousands, not many millions of years in the past. So goes the quantavolutionary argument. We shall join the argument again and again in the chapters to come.

A classic case of holospherics is the much-studied and well-discussed theory of world-disaster befalling about the year 1450 B.C. at the instigation of a great comet. Here I shall repeat only the hypotheses, as I have stated them elsewhere, suggesting that the reader may resort to my *Chaos and Creation* and *God's Fire: Moses and the Management of Exodus* for a fuller account, or to the famed book of Velikovsky called *Worlds in Collision* and the debates surrounding it [3]. In regard to that fateful year, and throughout the world, the quantavolutionary hypotheses may be stated as follows:

(a) No geophysical feature or process that manifested a sensible form then, and which is capable of exhibiting the effects of discontinuous stress when examined by current geophysical techniques, will fail to show that such stress occurred.

(b) No record of astronomical events available for the period around that year will present astral, planetary, or solar

movements as unchanged or uniformly changing from before to after the year.

(c) No retroactive calculation or index (such as of carbon 14 levels) or historical reference will fail to show atmospheric turbulence and atmospherically implicated irregularities.

(d) No survey of biological history around this year can deny highly unusual animal and human behavior and widespread destruction in the plant and animal kingdom, including agriculture.

(e) No graphic, legendary, or archaeological account will produce a human settlement in the world that escaped heavy destruction from natural causes.

(f) No religious temple that was constructed anywhere beforehand and rebuilt thereafter shows the same astronomical orientation before and after.

(g) No god passed through this year without change of status, rites, family relations, and serious personal incident, and, correspondingly, all religions changed.

(h) No culture complex can be shown to have avoided, with or without detectable hiatus, significant changes in institutions, rulership, and artifacts.

(i) No institution, behavioral pattern, and natural setting existing today, if its history is complete, will fail to recall the effects of the events of these times.

In brief, no sphere of existence escaped intense experiences and transactions with other spheres in the quantavolution of the times. All quantavolutions imply heavy holospheric events. For periods before human race had quantavoluted (the subject of my work, *Homo Schizo I*), anthropological spheres of existence would, of course, be excluded.

It will be appreciated that, under evolutionary theory, holospherics tend to be less stressed. When large effects are

reduced by time to minute causes, the side-effects are proportionately and even exponentially reduced. The more intense and sudden the event, the more spheres will be transacting. The larger the scale of an event, too, the more spheres will enter the action.

Suppose the Earth's rotational speed were to be slowed. This is a mighty event and takes a mighty force; Earth's rotational energy is calculated at 10^{36} ergs. Yet it has been observed (by Danton) to happen recently, if only for a millisecond. No account of effect has yet been rendered; perhaps the effects were immeasurably small, or perhaps the reaction of scientists were too slow. If large solar flares caused the retardation, as seems to have been the case, worse flares or other causes might produce a larger rotational lapse, perhaps a second of time would be lost; perhaps then a minute; why not an hour? - Hypotheticals are cheap. The effects of lengthening the slowdown would be heavy. Every sphere of Earth, every force, would be activated in using up the energy surrendered by Earth in the deceleration. One would have holospherics on a grand scale. Ordinary language, the most archaic religious language, and scientific language could each provide the description required.

Now the quantavolutionist reverses the logic as well. We say, "the more affected the holosphere, the greater the force to be sought." The effects are proportional to the original force. When the effects exceed (or are theoretically calculated as having exceeded) a certain intensity, we must even go beyond the Earth into cosmic forces drastically simplifying. Only in the supra-terrestrial arena, the planetary and galactic systems, are to be found forces large enough to do the Earth what appears to have been done. Only cosmically can truly great holospheric transactions be generated.

One can realize, then, the importance of the "when" and "how long." To say "speedy reactions" is to invite ultimately the cosmos in to explain our terrestrial phenomena. To say "slow reactions" is to keep the Earth within its cocoon in space, traveling evenly and safely. If the Alps tower above Europe, some force must have pushed then up. If the Alps are to arise

suddenly, then something besides earthly forces are behind the event. We move into the cosmic realm. If the Alps are to arise over a great many millennia, then the force might be generated in energy measures conceivable from some mysterious, but still earthly, internal force.

Notes (Chapter One: Quantavolutions)

1. *Scientific American,* Supplement Nº 80, 14 July 1877, 1276.

2. Wilfrid Francis, *Coal, Its Formation and Composition,* 2nd ed.,London: Arnold, 1961, 625,

3. (a) Princeton, N.J.: Metron Publications, 198 1; (b) *ibid.:* 1982; New York: Macmillan, 1950; and see the files of the *Society for Interdisciplinary Studies Review* hereafter *SISR, Kronos,* and *Pensée* magazine, *passim.*

PART ONE

ATMOSPHERICS

Here the atmosphere is pictured as a heavy-working transmitter and transformer of the holosphere. Once it was part of a vastly larger gaseous plenum of the solar system. In quantavolutionary episodes, it was repeatedly destabilized and altered. Much of the crust and its deformations are exoterrestrial effects, which passed through the atmosphere, and electricity is prominent there. Gases, electricity, and fire have combined with winds - all on a quantavolutionary scale - to help mold earth and life forms.

CHAPTER TWO

THE GASEOUS COMPLEX

The atmosphere of Earth is so delicate that most sudden and violent transactions in space or on Earth transform its constituents and their behavior. Considering what is to come in this book by way of demonstrating terrestrial catastrophes, one may wonder how it happens that life has survived five thousand, much less five billion years. The very fragility of the aura around us bespeaks the recency of the atmosphere as we know it.

For example, in-coming cosmic particles collide with atoms of the atmosphere, giving off neutrons that interact with nitrogen to make carbon 14. Then C14 couples with oxygen to form carbon dioxide, and is often ingested by plants and passed along to animals through the plants. When any plant or animal (living from plants) dies, it ceases to acquire C14 and the C14, which is radiogenic, decays at a constant rate into nitrogen. In the short term, the process is fairly regular. The ratio, in a specimen, of C14 to C12, a non-decaying type of carbon, can be used to date its decease. But lightning, smoke, dust, explosions, vapors and cosmic particle flux can alter the density of C14 in the atmosphere, hence in organic material.

Soviet investigators found C14 deviations in connection with galactic supernovas of the years 1054 and 1700 [1]. Judging by the C14/C12 ratio in annual tree rings in or about the year 1908, when the Exoterrestrial Tunguska body exploded with heavy local effect in Siberia, 1% less of the C14 was available in that year by comparison with the year before and after [2]. In another case, during a period called the Maunder Minimum, 1645 to 1715, when the Sun exhibited no sunspots and the Earth was gripped by a "Little Ice Age," the C14 found in tree rings of the period averaged 20% more than before and after

[3]. Grave events disturbed the atmosphere on other occasions. Between 3200 and 3700 B.C. and in the eighth and fifteenth centuries B.C. the quantity of C14 in the air fluctuated heavily [4].

A theoretical calculation by Cook that retrogressively computed the presence of C14 in the atmosphere, basing itself on a presently observed slight built-up of the gas, concluded that today's volume of C14 would have had to originate from a zero point 13,000 years ago. Why the rate would decrease to zero around that date has been interpreted as an indication of an extremely short Earth history; we here regard the hypothetical absence of C14 around that time as owing to several factors, most importantly (a) the presence of a plenum of gases incomparably more impenetrable by cosmic radiation that the present atmosphere, (b) a stronger geomagnetic shielding produced by a stronger geomagnetic field than exists today, and (c) exoterrestrially produced turbulence in the Earth's gaseous complex [5]. The inference here would be that major events before that time might have reconstituted the atmosphere, at which time C14 would have begun to accumulate.

Obviously C14's history indicates that other atmospheric components would not have escaped turbulent experiences. Carbon dioxide in the air fluctuates with industrial and domestic combustion. The amount in the air is increasing (it is some .03% of the atmospheric mass) and concern is expressed that the Earth's climate may change so as put much of the biosphere in jeopardy [6]. So also it has been surmised by students of the ozone (O_3) constituent of the upper atmosphere that its destruction as a particle shield by aerosol discharges on Earth would engender high risks of biosphere damage [7]. All of this may happen within the next century or two.

Very similar types of blue-green algae live under the skins of rocks in the frigid Antartic desert and in the heat of the Sahara [8]. Abyssal organisms live beyond the reach of light. The limits of humans and their predecessors are much more narrow, whether we speak of oxygen or a dozen other basic requirements. (Later we shall examine the claim that simple organisms can traverse and inhabit space-conveyed meteoritic

vehicles even "on their own.") Humans have been known to acclimatize themselves to high altitudes with low oxygen and low barometric pressure [9]. But beyond 20,000 feet, the human dies. Pure oxygen is, of course, a poison and an explosive.

There is little certainty about the history of the atmosphere, even during human times [10]. The primeval air must have contained some molecular oxygen (O_2) for the lung-breathers. Not too much lest the air catch fire. Legends do report "world-burnings," that Donnelly and Velikovsky, for instance, attribute to hydrogen gas pockets of exoterrestrial origin. Nitrogen might not be needed but the air must then also have held much other gas; for terrestrial life forms are constructed to deal with outside pressures. The diaphragm and chest muscles are made to operate as a bellows sucking the oxygenated air into the lungs and exhaling it with carbon dioxide. A pressure gradient must be accommodated between the external air and the internal metabolism. Yet if the air had been too dense, creatures such as humans would be too burdened by it to move about.

Considerable leeway is permitted for the amounts of inhalable oxygen, the mixes of gases inhaled (barring poisonous gases such as carbon monoxide), the atmospheric density (pressure) and degree of vaporization, the kinds and amounts of radiation such as ultraviolet rays, temperature (from 40 to 100 Fahrenheit as a milieu), and luminosity of the environment. Dew will suffice in place of other freshwater sources. Edible plants or animals, including one's own species *in extremis*, must be available, and these, of course, are atmosphere-dependent too. The present human cannot survive in the highest mountain altitudes or underwater without artifices.

Given the prolific potential of human reproduction, the atmosphere might have been severely ravaged and changed without destroying utterly the species. The human body is built upon and functions with the basic elements of nature. It is catastrophised and by the very fact catastrophe-proofed to some degree. Its incubating young are deeply encased and easily transportable. What it cannot cope with internally it seeks to escape by rapid mobility and exponential rates of reproduction.

The atmosphere presently consists of a changing mix of gases and vapors that moves from surface levels upwards to where the magnetosphere ends at any moment of measurement. What is beyond may be called outer space, where space plasmas, solar winds, cosmic particles, and meteoritic material play about in some disorder.

The atmosphere itself is a model of disorder. It is continuously moving and reorganizing. Everyday its pressure goes up and down. About 99% of its mass blankets the globe at under 19 miles of altitude. This consists of the gases, molecular nitrogen(78%), molecular oxygen (21%) argon (1%) and carbon dioxide (.03%). Water vapors rarely reach 1% of the total: normally, half of the globe is covered by clouds, which form, reform, and discharge their vapors almost entirely within six miles of the surface.

Below the clouds hang most of the "pollutants" of industry, consumption, war, and transportation. But some of this may rise so high as to threaten the layer of ozone, a poisonous triple-atom oxygen molecule (O_3), which, so long as it stays out of the animal system, performs a vital function in stopping solar ultraviolet rays from reaching the animals.

As one moves up the atmospheric column from ground-zero one passes successively through "belts." These are statistical entities, not the usually discontinuous strata of the lithosphere. The sixty-mile homosphere is divided into troposphere, stratosphere, and mesosphere. Then occurs a heterosphere, and, at around 300 miles, an exosphere. The homosphere is a molecular region where nitrogen and oxygen are the principal actors; but at bottom are cloud and pollutant behaviors and at the top occur some vigorous radiation, dissociation of molecules, formation of hydrogen compounds, and ionization.

In the heterosphere, atomic oxygen, helium and hydrogen are the abundant elements. Some of the helium and hydrogen is on its way into farther space, but is replaced, it is believed, to produce an equilibrium. However, Melvin Cook, a quantavolutionary geophysicist, has asked, "Where is the

Earth's Radiogenic Helium?" [11]. Cosmic-ray sources are alleged to generate helium at $3x10^9$g/year. The same amount is estimated to be generated from the uranium and thorium in rocks of the lithosphere. With an Earth age of $5x10^9$years, about 10^{20} grams of helium should have passed into the atmosphere by now. The atmosphere contains $3.5x10^{15}$ grams of helium-4; if a steady state, it must have passed out through the exosphere the equivalent of the aforesaid 10^{20} grams.

However helium-4 does not concentrate in the upper atmosphere significantly and "at the escape temperature of 1500°K at the base of exosphere, the rate of escape of helium-4 would be only about 600 g/year, or only about 10^{-7} as great as the replenishment rate from the lithosphere." Only by raising temperatures at the base of the exosphere by thousands of degrees could the helium be allowed to escape in sufficient quantities to permit equilibrium. This can be conceived as possible only by means of a number of immense solar storms that would wreak havoc on Earth or, worse, by large-body encounters wrecking the atmosphere. Cook suggests that the helium-4 is still increasing; the atmosphere is not in equilibrium; and if retrocalculated, a recent beginning or reconstruction of the atmosphere must be confronted.

Geophysicists and meteorologists nevertheless retain the concept of the atmosphere as a whole being in equilibrium. This is probably not so, even in the short run of a thousand years. The idea is difficult as commonsense, considering that all the way from sea level into outer space the atmospheric column is in continuous flux. It is agitated and fed from the bowels of the Earth with heat, vapor, etc. and bombarded topside by elemental particles of all kinds. Motion is continuous, too, up and down the column and then horizontally with winds produced by thermal changes, such as the seasons produce, and rotational effect that, for instance, disturb the atmosphere via surface irregularities such as mountains and basins.

Indeed, equilibrium of the atmosphere is probably more of a hope than a fact. What makes the hope into a "fact" is, not surprisingly, the uniformitarian conviction that today's actors

and roles are unchanged from eons ago. Given hundred of million of years when animals and plants have been surviving, then the mix of vapors, nitrogen, oxygen, carbon dioxide, argon, ozone, and radiation must have been what they are today. And that spells equilibrium.

The belief becomes so strong that meteorologists, possessed of the "fact" of atmospheric equilibrium, can even take their turns at guarding the portals of uniformitarianism, assuring other scientists that meteorology, too, proves the long-enduring stability of present-day conditions. At the same time, ironically, meteorologists are leaders in the campaign to save the world from the atmospheric ravages produced by a few years of industrialism, atom bombs, and aerosol discharges.

A quantavolutionist may share heartily the meteorologists' fear of the poisoning of our present atmosphere. The quantavolutionist would at the same time point out the extreme improbability of the atmosphere's having been preserved intact-free from radical changes and poisons over long periods of time. Unless, of course, there were, before the present atmospheric system came about, some ancestral system that in its nature involved a true long-term equilibrium.

It is generally admitted that the sources of nitrogen and oxygen of the air are uncertain and disputed. Further, the sources of water and salt are unknown. Too, all of the minor gases of the atmosphere are of mysterious origin: neon, helium, methane, krypton, hydrogen, nitrous oxide, and xenon. And some has mysteriously "disappeared;" neon "should be" far more abundant, for example.

Oxygen is supposed to have been exhaled from plants, permitting thus the beginnings of animal life. Orthodoxy puts this "happening" at over a billion years ago. Perhaps the only "hard" evidence for the event is the discovery of a non-oxidized core of uranium and sulphur in Kenya, the presumption being that there was little or no molecular oxygen with which the elements could react when the rock was formed. Yet by this kind of reckoning, it is hard, too, to explain fossils of 3.1 billion-year-old bacteria [12].

It has long been permissible to speculate that the components of the air came from the "primordial melt," a fiction of science performing very much the same role as the fiction of "the end of the Ice Ages." One may as well speculate that they came from space, since practically every element has been identified within the magnetosphere of Earth.

There are indications that the Earth may have evolved in a binary system such as I have described in *Chaos and Creation* and, with Earl R. Milton, in *Solaria Binaria.* An electrical axis, carrying an arc or current between the Sun and its small and less radiant binary partner, would be a more durable and gently changing source of radiation and chemical energies than the direct glare of the sun today. A magnetic gaseous tube rotating around the axis would provide a full complement of chemical elements, again in a highly stable medium that so minor a product as aerosol sprays could not disrupt. It would be making large quantities of all the substances whose manufacture in the small atmospheric and petrological economy of "Spaceship Earth" has been hard to explain. Atmospheric pressures, too, would be stable. Winds would be largely absent, illumination fairly constant.

It should be permissible to speculate that the magnetic gas tube stretching between the binary's two principals was the source of the Earth's atmosphere. Most of the binary tube gases would have escaped into space with the decline and disappearance of the axial current. The Earth then may be surviving upon the fragment of the gases that its electric-gravitational field retained. The atmosphere now may be only a remanent halo.

The variety and abundance of the atmospheric gases are what would be expected according to the gas tube model. A long-time continuity of the atmosphere and biosphere would have been possible; life could have begun long ages ago (or recently) and enjoyed the same relationships it now enjoys with oxygen, carbon dioxide, water, and salts. The fragile ozone layer was entirely missing, without ill effects, because the Sun and galaxy were not striking directly upon the Earth. Indeed, there would be little need for a stratified, local Earth atmosphere. The Earth

could change position along the central axis without losing its atmospheric and thermal equilibrium. In the early declining period of the axial current, the pollutant of meteoroid or large-body contacts could be dissipated into the gas tube environment, and important losses replaced from the same source. Even the effects of an eruption of the Moon from the Pacific Basin would be cushioned by the binary atmosphere.

The postulated magnetic tube would be randomly composed. Its gases would be arranged with the lighter elements nearer the axial current, heavier elements in the middle; simple compounds would occur toward the boundary of the tube, where the planets were rotating. The heavy-bodied planets would accrete their special atmospheres within the tube, even while rotating magnetically around the axial current. But the difference between the terrestrial atmosphere and the tube atmosphere would be far less than between the Earth's atmosphere and its heterosphere or outer space today.

It is understandable, under these postulates, how the Earth's atmosphere, so fragile, might have existed for a considerable period of time. Given the evidences of catastrophes on Earth, I do not see how the atmosphere could have survived without large external atmospheric background. Still the Earth was lucky to escape the fate of Mars, Mercury and possibly other inner planets, whose atmospheres were almost entirely stripped; Venus, with an infernally hot and turbulent atmosphere, was an exception, but a recent arrival from Jupiter. All of this is possible, and dealt with in *Chaos and Creation* and *Solaria Binaria*. Scientific opinion has slowly liberalized in respect to new models. By 1972 a scientist might write offhandedly in *Nature* magazine that "major reorganizations of the solar system are no longer regarded as ridiculous."[13]

Recently, dendrochronologists, historians, meteorologists, radiocarbon dating specialists, and astronomers combined in a most unusual enterprise. They delivered a blow to the theory of the constant Sun. John A. Eddy of the National Center for Atmospheric Research conveyed the message: "We've shattered the Principle of Uniformitarianism for the Sun."[14] He presented evidence mentioned earlier, showing that for 70

years between 1645 and 1715 A.D. sunspots were almost entirely absent. It proved to be a period of bitter prolonged winters, when Londoners walked across an iced-over Thames River, when the Northern Lights hardly displayed themselves, and when the 11-year sun-spot cycle was absent. Lapses of the same kind were uncovered in other historical periods.

Other conditions may be expected to vary with sunspots - solar flares, ozone density, radiation diminution, precipitation, magnetic fields, atmospheric turbulence, famines and perhaps even human energy and inventiveness. No doubt the last will be among the most difficult to prove. No simple search of the annals of culture will reveal a closely related trend.

Stretching the uniformitarian thesis, more severe storms may be conjectured for pre-historic times, in an attempt to keep the planetary bodies in place, eliminate cometary encounters and still explain catastrophes upon Earth. Thus Harlow Shapley, who led some scientists in an attack upon Velikovsky's catastrophism in 1950, himself had in 1935 proposed a solar nova as the explosive generator of space X-rays.

Hurricanes, volcanism, interrupted rotation, ozone destruction, ice ages, geomagnetic field reversals, biological extinctions and even explosions of cometary and meteorological material on Earth can be rationalized up to a point as effects of solar misbehavior. Such a theory is possible, but it would be like hiring a thief to catch a thief. For the Sun would then become sole factor in quantavolutions, in the effort to exclude other bodies from trespassing upon Earth. As we shall see, there is too much evidence of other operative factors to assign the whole job of quantavolutions to the Sun, even though, as a matter of fact, the Sun is the original sire of quantavolution in the solar system, according to the model of Solaria Binaria, mentioned above, which begins history with a nova of the Sun.

According to the quantavolutionary theory here presented, solar behavior has exhibited only effects of a moderate kind since its gradual emergence as a distinct bright image some thousands of years ago. Before then, the Sun was hidden or a bright prominence in the cloudy firmament. Its indirect influence was

of course always paramount. But should the counter-thesis be proposed that the Sun was responsible directly for earthly catastrophes, it would have to be said that its "uniformitarianism," though spotty, was nevertheless much greater than that of the planetary family descended from the Sun's binary partner, which I have called Super-Uranus after the Greco-Roman first Heavenly Father.

The sunspots may be a trailing-off effect of the exhaustion of the electrical current and magnetic tube. That is, they may be fairly regular attempts of electricity to jump the gap between the Sun and its binary. In such a case, the sunspots should become less intense and more sporadic with the passage of time, like the plasmoids and bolts of Jupiter.

Climate is the typical behavior of the atmosphere over any geological column during a longish time. Every island, they say in the Caribbean and Aegean Seas, has its own climate; "mini-climate" would be precise. More expansively, we can talk of a regional climate or a global climate. Too, we shall soon have a "cosmic climate," since evidence is fast accumulating of solar-planetary transactions on a continuing climatic basis. Earthquakes, volcanism, winds, precipitation, magnetic fields, temperatures, electric currents and the biosphere transact in climatic affairs.

One does not get this sense of a welter and complex of factors in going far back by conventional chronology. Rather one has the sense that climates have swirled around in multiform changes in the Quaternary period but then somehow climates withdraw into the background while we are presented a broad succession of ages in the tens of millions of years each, when life changed very slowly and conditions of biological survival and adaptation must have been constant over long periods of time. One is privileged to view charts in which paleontological developments occur at the slowest imaginable pace, with only a dozen or so boundary lines where, certainly, it is given that climates changed and new names are provided - Devonian, Carboniferous, and so on. Did climates, with all the factors that engender them, stand still for these long periods in rigid constancy? This would be unbelievable. If in between the

major boundaries of epochs, climates changed as they have in the brief recent past of the Quaternary, then the paleontological and geological record is far too short, or contains very little information. In sum, either the world has changed and the recent past speeds up wildly in comparison with the remote past, or else the remote past is still quite unknown despite its diligent study over two centuries by numerous disciplines and thousands of scholars.

Hence climatology lends us a great doubt when we imagine it fitting to the long past ages, and many doubts when we try to use it for the turbulent recent times. A great many works on pre-history try to associate events with climatic changes. Considering that geologists have failed to establish confidence in climatic boundaries and periods, the pre-historian's failure is predictable.

For instance, classicist Rhys-Carpenter has endeavored to explain as a climatic worsening over generations the end of the Mycenean (Greek) civilization and the subsequent so-called "Dark Ages" (an invented period of several hundred years to evade evidence of catastrophes in the eighth and seventh centuries B.C. and to accommodate Greek to Egyptian chronology, the later itself wrong by centuries) [15]. Cities were abandoned in the face of desiccation; new hot, dry prevailing winds made impossible the carrying on of their culture.

To believe him, however, one must have a reason why the flowering of Greek culture occurred under the same climatic conditions later on. One must also discount the many evidences of natural destruction by fire and earthquake of the Mycenean centers [16]. One must cling to a spurious Egyptian chronology, which gives 500 years to Greek and Mediterranean history that, since nothing happened, are not needed [17]. Further, catastrophic changes in winds and precipitation have a cause; that cause can only be celestial changes, whether by introduction of new Earth motions and land forms, or by solar-system particle-outputs.

If the Alaskan musk contains the swept-in plant and animal life of large areas and the species it contains are modern, then one should suspect that sooner or later, as Hibben has opined, humans, even clothed and deep-frozen, should turn up by accident or deliberate excavation. Already, several pre-"Ice Age" settlements have been uncovered within the arctic circle by Americans and Russians. Rodents and mammoths froze quickly while eating warm-weather plants. How abrupt was the climatic change that killed them is unreported, if known. The polar regions were recently near-tropical in climate and ecology [18].

The bafflement of archaeologists over climate is understandable. They follow the evolutionists. But the attic of climatic evolutionism is stuffed with junk. When a modish dress does not suit the facts, an old-fashioned one is tried on.

For example, the heat of the Earth has been described in numerous ways over the past two hundred years; hence, without ostracism, one may propose that the Earth has an enormous internal heat or is cool - whichever advances one's theory of climates. Too, the ages of the Earth and its geological periods have been estimated with tens and hundreds of millions of years of variance and leeway, so that evidence of climatic shift can often be placed in time wherever it will fit the theory at hand. And the melting of the ice sheets can proceed rapidly or slowly, as needed for a particular job of explanation.

Uniformitarians employ typically six mechanics of climatic change :

(a) a cooling of the Earth's interior over eons of time. (Since this should have ended long ago, with the Earth's interior stabilized, a radioactivity of deep rocks is now believed to be an incessant source of heat from below.)

(b) a crawling up and crawling back of ice owing to pronounced cyclical solar activity (which has lately received some support by the aforementioned "Maunder Minimum" and sunspot studies.)

(c) a reorientation of prevailing winds due to a manmade or artificial desiccation of lands, or to ice movements or Earth cooling (as above.)

(d) the "inches-per-century" drift of the continents from cold to hot places or *vice-versa*.

(e) heavy multiple volcanism, called upon to supply the heat for the vaporizing of waters that then proceed northward and drop upon the polar areas as snow and ice.

(f) changes in solar activity, whereby a period of diminished or augmented sunspots will produce cold weather or stormy weather.

That all of these are explanations inadequate to explain even holocene climatic change is evident in the controversies and the contradictions continually appearing. Geologist Vita-Finzi practically abandons his search for climatic benchmarks in his authoritative work on the holocene. Lacking the engine of a general theory and a time-table to run it on, freightcars may be switched around at will. In one place he is driven to remark: "On the assumption that every yodel in the Alps had its echo on the coast, pebble bands are equated with glacial episodes, truant beds are eroded away, and the uplift of mountains is delayed to justify the absence of glacial features."[19] He prays that the radiochronometrists will rescue the situation. But I have already concluded in my analysis of tests of time, published in *Chaos and Creation,* that a rescue must come from elsewhere.

Perhaps a quantavolutionary scheme may do better. It is not written in some law that enough time must be allowed to let humans get away, bag and baggage, from the changing air. Every catastrophe which they underwent would demand a climatic response as one of its effects. Hence there may have been a score of global shifts in climate within a 14,000 year holocene period.

Certainly the boundaries of the ages would point to climatic change. The onslaughts of the early holocene mark a

paramount boundary. There came destruction of a worldwide greenhouse regime and the beginnings of mountain ranges, huge deserts, stripped shield rock, high plateaus, oceans and their currents, and biosphere revolution.

This Pleistocene-Holocene boundary climax is euphemistically carried in the logbook of the sciences as "the end of the Ice Ages". I treat it as the Lunarian climax in *Chaos and Creation,* because of its apparent connection with the advent of the Moon. Hundreds of titles from many fields are dedicated to it. In oceanography, Emiliani extracts from Gulf of Mexico bottom cores the information that a fresh water avalanche descended upon the basin some 11,500 years ago and he wonders whether this was from a cataclysm such as sank the legendary continent of Atlantis. Tree pollen changed abruptly in the Great Lakes region about 10,000 years ago, according to J.G. Ogden III. "The only mechanism sufficient to produce a change of the kind described here would therefore appear to be a rapid and dramatic change in temperature and/or precipitation."[20]

Oceanographers Broeoker, Ewing, and Heezing gather ocean-bed "Evidence for an Abrupt Change in Climate Close to 11,000 Years Ago."[21] Vita-Finzi reports that a group of geosols, or weathering profiles, ended their development about 12,000 years ago; the date is proposed as the holocene beginning for the U.S.A. [22]. From Israel, paleo-zoologist Joseph Heller writes of the faunal remains of a Kebaran Site on Mount Carmel [23]:

> What then was the cause of the post-Natufian size crash? (9000-10,000 B.C.) The fact that the crash occurred in certain carnivores and rodents simultaneously suggests that it was not causally related to phases in the evolution of human cultures. Rather this simultaneous dwarfing favors climatic interpretation. Drastic climatic changes occurred in various parts of the world towards the end of the Pleistocene about 12,000 years ago. In tropical Africa, India, South America and Australia, conditions that were extremely arid before 12,500 B.P. suddenly gave way to increase in humidity.

It is generally accepted by pre-historians of Europe that the end of the Pleistocene Ice Ages brought disaster to human races and cultures. The finding is surprising, considering that the warmer the climate, the more abundant the biosphere should be. But if catastrophes were involved, the reduction and retardation would be understandable, indeed demanded.

Ruins of cultures are found in many a harsh climate of the world, in deserts, on high plateaus, amidst perma-frost, and in steaming jungles. (Let us exclude, under the seas, which, after all, involved a climatic change, one which we shall discuss later on.)

When archaeologists and pre-historians cannot explain the death of a culture by enemy invasion, plague, or economic decline, they are prone to seek out a change of climate. But what they seek out is a uniformitarian or gradual change of prevailing winds, rainfall, and temperature. Centuries, if not millennia, are invoked to pursue the death agonies of a culture.

The quantavolutionist tackles the same problem with a markedly different concept, catastrophic climatic change. With the images in mind of an aboriginal greenhouse world afforded by many sources, he sees in every desert a likely disaster, every tall plateau another one, under frozen arctic shores still another.

For the quantavolutionist, too, the mechanisms of explanation are available, they are high-energy forces as provoked possibly by changes in the Earth's motion, a change of its orbital path around the Sun, a shift of its angle of inclination to the plane of the ecliptic (axial tilt), and a movement of its crustal shell (continental displacement). They include, further, a bombardment or discharge of particles, including cosmic electricity, affecting the atmosphere and magnetosphere that stretches even now beyond the Moon. And deluges of salt, oil and other dense material that spoils the land.

With all of this, it would seem that the quantavolutionist would necessarily bungle more than the uniformitarian in describing the natural history of climatic change. He is using, it seems,

many more variables, and the more the variables, the more complicated the solution of a problem. However, the quantavolutionist has two sources of encouragement, he can see how futile are the explanations of the conventional climatologists of the natural history of climate. And the evidence appears to fall into the line of this theory with surprising ease.

The uniformitarians, in attempting to explain climate by reducing chances of natural catastrophes to a near-zero constant, become bogged down in a morass of special climates; every way they turn they discover new and different climates. They cannot cope with the possibility that in the sudden prelude and aftermath of disaster, short-term climates by the hundreds are created around the world; deserts are deluged, jungles are desiccated, lands are flooded, lands rise, winds change sharply, soils are turned over, the biosphere is transformed; if late in time, cultures terminate, or spring up, or react eccentrically. Nor can they allow that, if several global catastrophes may have occurred in four billion years, several might have occurred in ten thousand year, each transforming atmosphere and climate.

A Woods Hole Oceanographic Institution team reported in the *Scientific American* of March 1982 a set of discoveries which threatens the prevailing theory that oceanic waters are regionally stable, that regional bottoms reflect this aquatic stability, and that world climates can be determined by fossil and chemical balances of the bottom content. Eddies of the great oceanic currents such as the Gulf Stream occasionally break off from these gigantic oceanic flows and set up columnar rings of water that can reach 300 kilometers in diameter, even in this relatively placid age, and endure for 18 months or more. The ring-waters differ significantly in salinity, oxygen content, and temperature from their surroundings. Biological assemblages follow suit. Sedimentation rates are also a function of current velocity. Under such conditions, given several thousand, let alone several hundred million, years false climates can be expected to be inferred practically everywhere. Misleading strata will be exceedingly numerous. Once more, we must warn against the many theoretical

structures of climate, hydrology, chronology and paleontology that interlock in varying degrees of poorness of fit. These findings by the Woods Hole scientists may effectively administer the *coup de grace* to the whole lot of them.

But we must not be carried away with the holistic interplay of factors before we have explained them. We may content ourselves at this point with three tentative, even sceptical, remarks. The atmosphere is not stable and has not been for long in its present state of equilibrium. When subjected to quantavolutionary hypotheses, the history of the atmosphere becomes full of mystery and potentiality. The study of climates has been vigorously pursued, but perhaps with the wrong conceptual instruments. Climates, the benchmarks of atmospheric history, seem to us to disintegrate under analysis into ephemeral signals of catastrophic events.

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CHAPTER THREE

HURRICANES AND CYCLONES

An explosion of Mt.St.Helens recently blew down thousands of trees. An exoterrestrial explosion at Tunguska in 1908 blew down million of trees. The Fens of East Anglia contain millions of felled trees. Here the trees were knocked down facing northeast and were buried. They were sheared off a meter above the ground and their stumps remain rooted. Many were tall and thick trees. No volcano is to be located as the source of the blast. What kind of a wind was this?

Winds find a minor place in textbooks on earth features. They erode rock by polishing and pitting it, by making grooves, by shaping and faceting. They make various alcoves and niches in rock walls. They also form sand dunes in deserts, and blow the sand and silt of stream beds hither and yon. A sandsheet in Libya, over a meter thick, rests on bedrock over many thousands of square kilometers and is supposed to have been laid down by winds of the desert. There are others like it around the world. Such aeolian activity is allotted millions of years to help shape the landscape; the number of millions, one or a hundred, is calculated from estimated past climatic conditions working against various constraints, such as whether landforms exist nearby to provide the material of erosion.

Tornados, cyclones and hurricanes now and then wreak havoc upon soil and settlements. Part of the climatic complex of this age, these storms are localized - the "tornado belt" of the south-central United States, the Japan and China Seas, and so on. Of course, bearing in mind the "many changes of climate over the ages," most places on earth would have suffered such storms in turn. When they occur, part of the biosphere is blown away with some of the natural landscaping. Paleo-anthropology and archaeology debate the relative contributions of the Orient and the Eur-African world to the earliest American cultures, for

example, without proper attention to the possibilities afforded travelers by changing winds that come with changing climates, now pushing things one way and then again another way. So that even when the possibilities of cataclysmic changes in early human times are ignored, changing climates would carry culture both East and West [1].

Tornado effects are discoverable in some places where sedimentary beds are interrupted by poorly sorted mixtures of rock which evidence by their shape, fragmentation, and positions a sudden displacement and replacement. Ager calls these storm deposits "tempestite," after a word that he ascribes to Gilbert Kelling, when he observes them, for instance, on the heights of the Atlas Mountain of Morocco [2]. Similar deposits have been identified in a few other places. Missouri, Virginia, the English Channel, the Paris Basin, in rocks of the Mesozoic and Paleozoic. Carozzi and Gerber consider that "such an early generation of cherts in carbonates is more common than generally assumed."[3]

We cannot figure how often such high energy local events have occurred, until the world is better surveyed with this idea in mind. But one can "think big". With a thousand tornados a year (300 in the U.S.A.) tearing up two thousand square kilometers of sediments and breaking down surface features, an area equal to the total land surface of the world (240 million square kilometers) would be superficially pulverized in about 120,000 years. If a conventional age of 3.6 million years is accorded the Earth's crust, the whole of it would have been scoured, not once, but 30,000 times by cyclonic action. In the short term, not all land would be affected equally, but in the long-term, given changing climates and drifting continents, an assumption of randomized strikes could be tolerated. Where then are the scars of 30,000 tornados in every geological column? Or even in any single one anywhere?

From this we might conclude that we have a great deal of field research to do in geological history so as to obtain a realistic estimate of the number of events. This is also the situation, we may as well say, in respect of meteoroid falls, volcanism, and other high-energy events to be discussed. The

quantavolutionary approach to history comes naked as a neonate, without systematic hypotheses, data, or applicable mathematics.

If few such effects are discoverable, it may be because catastrophes acting on a large scale have obliterated almost all localized indications of damage. For instance, if great earthquakes have shattered rock strata, lesser violence to the rock would be hardly visible. The schist dropping deep below the city of Athens is infinitely fractured. Is this tempestite, thermotite, seismotite, hydrotite, turbotite, or what? If the wind god, Aeolus, blew at once all around the world, many sediments would be displaced, losing their local cyclone scars in the process and letting no new strikes penetrate deep into the new strata.

But perhaps the Earth's surface has spent 99.9% of its time in a peaceful state with a quiet atmosphere. Such quiescence contradicts uniformitarianism as much as it does catastrophism; that is, I have used above the present "quiet" state to reconstruct the past, as Hutton and Lyell recommended. Yet even so, estimates resulting therefrom would be much more impressive than present conventional history gives one to understand.

A final possibility is that the sedimentary rocks of the Earth are much too young to have experienced all that is supposed to have happened. That is, if the Earth were 100,000 years old, much of its surface would perhaps not have been scarred by tornados (or meteoroids).

Ancient legends speak of a large role for winds. The sacred book of Buddhism, the Visuddhi-Maggia, says that when world collide the winds "turn the ground upside down. Large areas crack and are thrown upwards. The winds pulverize the ground and it disappears into space, never to return. Thus ends a cycle of the ages."[4] It is the extreme catastrophic typhoon.

The ancient Meso-Americans said that the former world was brought to an end by the great wind god, Huracan. Probably the origin of the word "hurricane" is here. Huracan is also a

manifestation of the great god Quetzalcoatl, who is also identified with the god and planet Venus [5]. Huracan, the Heart of Heaven, fathered a large number of people, who he then destroyed in the darkness of a storm amidst black rain that fell day and night. So records the Quiche book of *Popul Vuh*. Then animal gods mangled the bodies [6].

"Air" is rarely missing in the legendary and early scientific classifications such as "earth, air, fire and water." The idea of world destruction by wind is, of course, quite disregarded by modern scholars. One hears the term "marine transgressions" but not "wind transgressions." It is surprising how few pages have been devoted to the winds by catastrophists, too. Again, perhaps the effects of hurricanes and typhoons are quickly concealed by other forces operating. Or the effects may be interpreted as tidal wave deposits.

The splintered bones of some fossil assemblages would indicate aerial rather than water transport. Although he does not follow through, F. Hibben provides a rare passage dealing with the immense deposits of bones that he witnesses. "Throughout the Alaskan mucks, too, there is evidence of atmospheric disturbances of unparalleled violence."[7] The Cumberland Cavern catastrophic life dump shows no evidence of water transport [8]. Probably as many collections of animals and vegetation have been gathered and flung in heaps by winds as by water. In seeking the origins of some coal deposits, catastrophic winds are a prime suspect, along with rock and water thrusts.

What can create deposits can remove them. Heavy winds, operating tidally or cyclonically, can blow away pre-existing structures. Contemplating the early ages of human settlement, one may wonder at the frequent absence of primordial sites. Here, as everywhere in the mythicized realms of science, there is a vision that is perhaps false, of excavating sites layer upon layer until arrival at bed rock, and thereupon pronouncing the last ruins to be the first settlement. But the god Huracan is able quickly to erase settlements down to bed rock one and more times. The typical absence of human vestiges before the neolithic age is usually taken to signify that human settlement

began with the neolithic. There is small reason to believe this to be the case. In fact, there is a hint of aeolian morphology in the near absence of paleolithic remains except in caves and *abris* in the Dordogne of France and elsewhere.

The power of winds to push, pull and lift is great. The Hiroshima nuclear fission-bomb explosion is assigned an energy of 7.9×10^{18} ergs. The measured energy release of a one-megaton fusion bomb explosion is in the range of 10^{22} ergs. This is about the same energy as exploded in the Berringer meteoroid crater in Arizona. "In one day a large hurricane releases as much energy as a 13,000 megaton nuclear bomb. Some hurricanes take a week to reach such intensity, others mature in a day or so. And during the time another may be at full blast a thousand miles away."[9] Some hurricanes last three weeks and travel 1,000 miles. (One can bear in mind the immediate transport of resilient living species around the world by such means.)

An ordinary Kansas tornado will approximate 4×10^{18} ergs of kinetic energy. Its power in kilowatts is 10^{18}, "which is in excess of the capacity of all the generating stations in the United States." (ca 1959)[10]. The wind velocity at the center of its funnel theoretically may achieve 2000 miles per hour. By the Fujita scale, an F-5 wind, indexed at combined forward and rotating speeds of 261-318 mph causes "incredible damage."

Electrical activity is so vigorous that Peltier's words of 1840 can be used as a model for an electrical cyclone theory. "Everything proves that the tornado is nothing else than a conductor formed of the clouds which serves as a passage for a continual discharge of electricity from above."[11] Observers have been inside of this "enormous vacuum tube, somewhat similar to a geissler, neon or fluorescent light tube, conducting very low density electric current whenever there is a sufficient accumulation of electricity in the clouds to make the jump to Earth."[12] Typhon, the cosmic spectral dragon felled by a thunderbolt from Jupiter, was anciently described by Apollodorus as "rushing at heaven" with hissing and screams, spouting a great jet fire from his mouth. This same Typhon is probably the origin of the word "typhoon."[13]

Cyclones and water spouts (water-bearing cyclones) often appear in groups. An outbreak of 148 tornados was registered in the United States and Canada on April 3,1974. Sometimes associated with a tornado are a number of downbursts of high-velocity winds that blow down whatever they strike, whether groves or houses or aircraft. Ted Fujita of the University of Chicago compares the downbursts with giant garden hoses aimed downwards upon circles kilometers in diameters; often they end their work in two minutes.

What might cause a vast number of cyclonic events to appear? A meteoroid bombardment, an interruption of the Earth's motion, a tilt of the Earth's geographic axis, magnetic axis, or sidereal axis: these would do, and also a large meteoroid impact, and a large body passing nearby, the latter, however, being tied almost inevitably to other changes in Earth's motions. Too, a deluge of waters might form into many ribbons, mushrooms, or funnels in descending. The winds and other effects of a heavy meteoroid impact would be simulated if a large number of nuclear missiles were trained upon a single spot and exploded at the same moment.

The atmospheric turbulence accompanying such impacts must include more than a blasting power. Its heat can provide the circulating system for a natural instantaneous chemical factory. The turbulence generates disturbing sounds and sends them over long distances and brings intolerable changes in barometric pressures. Volcanic explosions produce similar effects: whether a crater is a volcanic or meteoric effect is often contested, and both produce tornado and hurricane effects.

During the Krakatoa volcanic explosion of 1883, winds stripped all the surrounding area of its lush vegetation before burning it [14]. People heard noises of anchors being hauled up and dropped, of thunder and beating drums: the winds carried the explosions across the Indian Ocean where they were heard as distant cannonading. The barometer on a ship nearby jumped up and down an inch at a time. The air was sucked up so that people could not breathe. The gases were sulfurous, choking and blinding. The sun was obscured, and slightly so around the

world for years. In the pitchblack day, a Dutchman groped for a knife to despatch his family.

So cyclones darken abruptly the sky, and bring ear-bursting and chest-bursting drops in barometric pressure. They explode houses by creating vacuums into which the inside air must burst. They lift boulders and cows, carrying them off, and they dig up the earth. There is a hint in cyclonic action of what may have happened to some of the mammoths and other large-animals that were exterminated a few thousand years ago: suffocation; lifting and dropping; followed by quick freezing; thence to be discovered in the same position today.

Winds act faster than water and have the same exponential effect upon the bodies which they may encounter as their speed increases. Wind pressure, that is, increases as the square of wind velocity, up to the velocity of sound at least. A 500 km/hr wind exerts 25 (not 5) times the pressure of a 100 km/hr wind; gravel then begins to behave like fusillades of bullets. Kelly and Dachille calculated that the winds created by a large meteoroid impact will move laterally and vertically with the speed of sound [15]. Their effect has to be measured, too, in terms of the amount of debris that they transport. A single such blast, moving horizontally, can strip its area of passage bare down to bed rock, or below, especially if it is loaded with detritus, and may continue its major effects for a thousand kilometers. Only a mountain can stand against it and it, too, will be defaced; an instant ablation corresponding to millions of years of ordinary aeolian erosion will occur. Rivers would be wiped out and set up elsewhere. Valleys would be filled with debris. Great vegetable and animal dumps would be established in many places.

Waterspouts have been known to hoist and drop far away the water and biosphere of large ponds; since these events happen under meteorological conditions ordinary to our age, they must be hundreds of times less powerful than the waterspouts (and land spouts) that would arise from large-body impact explosion or related events involving catastrophic energies [16].

The turbulent atmosphere of the planet Venus rotates in six days as contrasted with the 243 days that the body of the planet takes to rotate. Its normal wind velocities of 10 to 100 meters per second are comparable to those of the jet stream that races through the upper atmosphere of the Earth [17]. The surface heat of Venus is of course in the hundreds of degrees Celsius. The mechanism has not been solved. Several effects of a perpetual firestorm might be considered, granted that free oxygen is absent. One is reminded of the firestorms that were engendered in the Chicago fire, the Tokyo earthquake, the Pestigo forest fire, the firebombing of Dresden, and the atomic bomb-burst over Hiroshima. Large areas can become like giant tornados; perhaps a planet can suffer the same fate.

Winds can operate like tides. Thus, if the Earth's rotation is altered, the atmosphere will be subjected to the same influences that cause the alteration and will in effect act turbulently, that is, out of phase with the lithosphere. They will sweep over the globe like a tide of water. The atmosphere, if electromagnetically affected by a conjunction of planets and Sun, will help to disturb the lithosphere and engender seismism.

Differential atmospheric pressures define the existence of a wind; two clouds of gas, essentially isolated but lacking an effective "bag" to contain their isolation, interact. Electric potentials are established. Electrical forces thereupon flow throughout the transacting systems laterally and vertically. It is perhaps axiomatic that where there is wind there is an electric current and discharges. And where there is an electric current there is bound to be a magnetic field. And, lacking a better container, an electric current is contained by its magnetic field.

More than one observer has confirmed the testimony of a man who was caught in the open as a tornado passed above him by a few meters. He was beneath a tunnel whose walls were composed of whirling clouds, in the manner of a magnetic field as this is pictured in drawings of a textbook. He looked up into the tunnel for at least half a mile; brilliant lightning flashes illuminated the tube. Where he crouched, the air seemed calm; the gases stank suffocatingly; screams and hisses could be

heard. The tornado, having deftly raised itself to pass over him just as gently dropped down upon his neighbor's house, exploding it and its objects [18]. This small tornado may function very much on the same principles as the cyclonic effect of a large meteoroid explosion, and again like the great tube of gases that envelops a binary star system, such as I outlined for the solar system in *Chaos and Creation* and discussed at length with Earl R. Milton in *Solaria Binaria.*

In the Uweinat section of the Great Sand Sea of Southwestern Egypt, a number of possible meteoric impact sites have been reported. One, positively identified, is of 4 km diameter; another is of 14 km diameter. Many extinct volcanos are also evident in this desolate area of sand and sand dunes, which was occupied by humans until at least the neolithic period [18A]. A great climatic change must then have occurred lately.

The region is part of the Sahara Desert, which is also marked here and there by human traces. The Gobi Desert, greatest in Asia, bears human relics as well. So do the Mexican and U.S. deserts, and the Peruvian. The great deserts of the world are recent, it appears.

The astroblemes and volcanism of Uweinat may have been associated with the events ending civilization and creating deserts. The wind-blown dunes are long, wide, and tall; yet the same winds have not erased the meteoric or volcanic craters, even though these are often not so deep as the dunes are high; not enough time may have passed. Aeolian dunes, astroblemes, volcanos, climatic switching, and culture extinction together can entertain an hypothesis of holospheric quantavolution, pending the establishment of a chronology that would prove the hypothesis or temporally sunder apart the events.

The largest deposits accorded to winds are not those of the Lybian peneplain mentioned earlier, nor those of Egypt, but the huge areas of the Earth covered by loess. The term itself was invented for glacier deposits of the Rhine and Danube valleys and elsewhere in Europe. It found itself connected with the "drift", the glacial pebbled clay of North America, where vast stretches of the buff and porous earth, compacted but frangible

to the fingers, were found distributed. Here transportation by ice sheets and rivers forming from their melts was imagined. Then, west of Peking, an area larger than France exposed its loess to geological inquiry.

Loess can occur at high elevations as well as on great plains. It breaks down into excellent thick soil in China and its cliffs degrade into natural terraces [19]. Old roads cut through it, sometimes passing through the Chinese countryside thirty meters below the houses and farms on the loess above. In Indiana, the highest lands and ridges in particular have the thickest yellow clay (called drift or loess) and it is free of sand and gravel [20]. The loess is not stratified, nor does it contain marine fossils, and land fossils of shells and mammals are only occasionally found in it.

Sedimentation from lakes and rivers seems to be an impossible explanation. Adequate sources of glaciers and ice are often absent, as for example near the loess that occurs inland from the Gulf of Mexico. The favored theory of loess formation stands upon the transporting power of winds that would carry the material from distant high places or deserts, operating over long periods of time. But where are the loess heaps on the fringes of great deserts? There are none. And why should stratification and cross-bedding not then have occurred? Nor can the chemical composition of loess be assigned to the mountains of its supposed origins. And the loess grains are not rounded by wind or water but are angular, as if exploded, and are settled in vertical lines through which rain readily percolates.

Ignatius Donnelly, in *Ragnarok* (1882), was already ascribing till, drift and loess to fall-out from a great comet, going so far as to deny the very existence of past ice ages, to which most scientists then and still today ascribe these materials. He read many distinct legendary sources and intercepted many sedimentary strata as stories of great winds that picked up the detritus of Earth, whirling it around wildly and depositing it in "intercalated beds."[21] Donnelly's denial of the ice ages in favor of exoterrestrial deposits by comet does not appear so outrageous today. As we shall see, ice age theory has been used

(and abused) to the point of exhaustion of the subject and of the geologists working in the field; it has been made responsible for many geological forms and events that might more readily be assigned to other forces. Velikovsky, in a note of the 1940's, before he had himself been subjected to ridicule, commented that Donnelly had been called "the Prince of Cranks" for his books on several difficult and controversial subjects [22]. Donnelly was in fact a superior writer and lecturer, an intense student with a sensuous affinity for the palpability of the ground, a political and social hero, and a precursor in fundamental ways of later writers such as Velikovsky.

Fifty years after Donnelly, Penniston was advocating the thesis of an exoterrestrial origin for loess [23]. Citing Shapley (later a violent critic of Velikovsky) and Belot for having proposed a solar nova as the cause of the ice ages, he reasoned upon this as a possible source of the material, which, experiencing high temperatures for a period of time, had its silicates metamorphosed in part to quartz, thus arriving at the loess. That stony meteorites have differed in composition from loess has stood against his theory. The source of meteorites has probably been mainly from the asteroid belt in contemporary times, however, and cannot be well compared with either the solar or the cometary origins hypothesized. Not unnaturally, geologists faced with a choice of wind or exoterrestrial fall, would prefer the wind. Wherever possible, as in middle America, they introduce " glacial sluiceways." Yet we would prefer to discuss the matter once again when it comes time to ask what can and does fall to Earth from outer space.

Let us rest content here if we have but established several points: The force of wind rises with the square of its velocity, with correspondingly large effects upon the landscape. Hurricanes must be associated with every abrupt and intensive geological event. Cyclones convey major electrical and fire phenomena. In large-scale catastrophic events, a great many typhoons could originate to accommodate changed atmospheric and lithospheric motions or multiple meteoroidal instrusions. Finally, if the sediments of the world do not reflect adequately cyclonic effects, the reason may rest in their continuous erasure by more forceful events which themselves require

identification. Furthermore, assigned geological times may be too long; maybe not enough events have happened to flesh out the skeletal ages.

Notes (Chapter Three: Hurricanes and Cyclones)

1. *Cf*. C.L. Riley *et al, Man Across the Sea: Problems of Pre-Columbian Contacts* (Austin, Tex.: U. of Texas, 1971) 302 *et passim*.

2. Derek W. Ager, *The Nature of the Stratigraphical Record* (New York: Wiley-Halsted, 1973), 39.

3. A.V. Carozzi and M.S. Gerber, "Late Paleozoic Tornados and Synsedimentary Brecciation of Chert Nodules."

4. Warren, *Buddhism in Translation*, p. 328 quoted by Velikovsky, *Worlds in Collision* 70.

5. William Mullen, "The Mesoamerican Record," 4 *Pensée* 4 (Fall), 34-44.

6. *Popul Vuh: The Sacred Book of the Ancient Quiche Maya* (Norman, Okla.: U. of Okla. Press, 1950), 90.

7. *Op. cit.*

8. I. Velikovsky, *Earth in Upheaval* (New York: Doubleday, 1955), 60.

9. Frank W. Lane, *The Elements Rage* (Philadelphia: Chilton, 1965), 6.

10. *Ibid*., 45.

11. 38 *Amer. J. Sci. and Arts* (1840) 73, *cf*. William Corliss, compiler, *Strange Phenomena* (Glen Arm, Md.: Corliss), GLD052-G2-105.

12. *Ibid*., G2-104-5.

13. Velikovsky, *World in Collision*, 68-70.

14. Rupert Furneaux, *Krakatoa* (Englewood Cliffs, N.J.: Prentice Hall, 1964), 34.

15. Allan O Kelly and Frank Dachille, *Target: Earth, The Role of Large Meteors in Earth Science* (Carlsbad, Calif.: Box 335, 1953), 203, 66 *et passim*.

16. *Ibid*., 202; Hans Oersted, 1 *Amer. J. Sci*. 37 (1839) 250-67, quoted in Corliss, *op. cit.*, G2-233.

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18. Alonzo A. Justice, 50 *Monthly Weather Review* (May 1930) 205-6, quoted in Corliss, *op. cit.*, G2-105-7.

18A. Faraouk El-Baz, 213 *Science* (24 July 1981) 439-40.

19. Frederick W. Williams, "Loess Deposits of Northern China," 22 *Popular Sci. Mon*. (1882) 243-8, quoted in W. Corliss, compiler, *Strange Planet* (Glen Arm, Md. 21057: Sourcebook Project, 1978), ESL001-E2-161.

20. J.T. Campbell, 23 *Amer. Naturalist* (1889) 785-92, quoted in Corliss, ESL004-E2-167.

21. I. Donnelly, *Ragnarok: The Age of Fire and Gravel* (New York: Appleton, 1883), 53.

22. "Precursors," 7 *Kronos* 1 (1981), 53.

23. J.B. Penniston, 39 *Pop. As*tro. (1931) 429-30 and 51 *Pop. Astro*. (1943), 170-2, quoted in Corliss, ESL-003-E2-165.

CHAPTER FOUR

MAGNETISM AND AXIAL TILTS

The Earth has two axes of concern here, its axis of rotation between the geographical north and south poles, and the warped axis of its magnetic field lying between the north magnetic pole and the south magnetic pole. It is easier to imagine the axis of rotation; the imaginary equator divides the globe into two equal halves and this equator marks a circle around the spinning globe which, every 24 hours, completes a turn.

The magnetic poles are distant by some hundreds of kilometers from their corresponding geographic poles. They are denoted by the behavior of a compass needle which assumes a vertical position when at or near the magnetic pole; the nearly global distance that lies between the north and south magnetic poles witnesses a continuously changing dip of the compass needle which reverses itself as it passes approximately half the globe and again turns to the vertical (in reverse) as it approaches the opposite pole. The magnetic poles are in perpetual motion, seemingly traversing a kind of oval figure. In the north, the pole is just south of King Chirstian Island (1980, 77°19 N;101°49W) and is moving north by 24.4 km per year and west by 5.4 km per year [1].

Apart from a certain usefulness in navigation, its extreme weakness may let one think such magnetism to be quite unimportant. But it indicates the presence of several important processes of the atmosphere, lithosphere, biosphere and cosmosphere. An entertaining book might be written concerning the effects on life of the loss of the magnetic field. How will wild geese navigate? Will there be less heart attacks or more? Cox says that the removal of the dipole magnetic field will reduce the total shielding of the biosphere from cosmic rays by 10 to 12%, no more than is involved in a person's

moving from the equator to Alaska. Waddington is of the same opinion "unless it is assumed that these periods are associated with greatly increased particle radiation from some external source."[2] This last point stresses the atmosphere-exosphere relationship, and may serve later on to solve some reversal perplexities.

In 1989, NASA's Magnetic Field Satellite confirmed that the field, already weak, is decreasing in strength. The trend indicates a zero strength in about 1200 years [3]. Relying upon studies begun in 1830 by Gauss, Barnes made the same prediction earlier [4]. Theorists are divided, some saying that the field hits zero, then reverses, and then returns to zero, and so on over great periods of time. A few, the present author among them, say that the field is a once and for all thing: it began at higher intensity, endured for a long time, then began to diminish, meanwhile from time to time reversing its direction.

Assuming a continuously increased strength reading backwards in time, however, implies an enormous intensity eons ago; there is a hint here, to our way of thinking, that the field was created and sustained at a constant level, and then abruptly was cut off from its source, and began to decline. Barnes declares, too, that "This magnetic decay phenomenon could not have been going on for more than a few thousand years, as the magnetic field would have been implausibly large for a relatively neutral body such as the earth."[5]

The magnetic field constitutes a magnetosphere which is much larger than the Earth itself;[6] it can be imagined as a kind of giant electric globe enclosing the Earth which is perceptible even as one descends into the deepest rocks and which may only end in some kind of an electric current which may be running through the core of the Earth at about the geographical spinning equator, very roughly perpendicular to the geophysical poles.

It is important, too, to appreciate that these two features, the magnetic electric current and the geographical spinning equator may be largely independent of one another. That is, one can

conceive of the magnetic and geographical systems operating even at right angles to one another. We have discovered no natural law that says the two equators and sets of poles must be close together.

This implies, however, that the two sets of poles are not stable, that their present positions are a historical accident. But, then, to think so introduces worrisome possibilities: that the axis of spin of the Earth may be changed, too. Both of these possibilities have increasingly occupied the minds and studies of scholars and explorers. Have there indeed been occasion on which the globe has tilted, geographically and magnetically? The answer today is yes, that the axis of spin has shifted and also the magnetic axis has shifted.

But before we consider these two probabilities, it is well to mention yet a third change in the Earth's behavior that would possibly occur without magnetic or geographic shift. Suppose that the Earth simply tilted in space.

On this phenomenon, Peter Warlow reports that both Needham and Dodwell found oscillatory change in the obliquity of the ecliptic, on the basis of ancient astronomical records. Dodwell concluded that three factors were operative in the movement, the linear drift conventionally ascribed, a decaying oscillation with a period of 1200 years, and a logarithmic-sine decay. Dodwell saw in the exponential decay (quantavolutionary exponentialism that I mentioned earlier and in *Chaos and Creation*) a drastic occurrence some 4500 years ago [7].

Could the Earth have even turned over completely without interrupting (interrupting very little) its spin or its magnetic field? The geographic poles would be reversed, and along with them the magnetic field. The Earth could not perform such a movement without an external assist, whether from an upsetting explosion of gases from the Sun or from the attraction or repulsion of a large passing body.

According to Warlow, who has however been challenged by Slabinski, the transaction could be relatively delicate; it would amount to the drawing of a force along the Earth's path that

would cause it to tip over while containing its spin, in the manner of a tippe-top, a toy that is weighed on top and set to spinning on the board; the top turns completely over continuing to spin all the while in the same direction, North becomes South and East becomes West [8]. The motion performed is technically a fast precession.

A moment's reflection will rid us of any notion that the action would be harmless. The atmosphere, hydrosphere, and lithosphere would be agitated and produce effects that by any measures would have to be called quantavolutionary. For instance, it appears most likely that the widespread sudden destruction throughout the northern regions of the mammoths and other large mammals occurred in conjunction with a tilt of the Earth's axis in the presence of the exoterrestrial entity causing the tilt. We can say this because a sudden deep vacuum freeze, asphyxiation, thrusting of masses of gravel and bones, and permanent cold ever thereafter, such that the animals are sometimes found still fleshed-out and diagnosed in certain cases as heart-failures or with blood-clotted lungs, must indicate a holospheric event comprising an atmospheric and aquatic withdrawal, the descent of an extreme coldness, and upon the passing of the body, returning tides of water and wind to accomplish quick burial under muck, ice and tundra.

Yet, according to Warlow's theory, the tilt, which might have been complete to 180° and would change East to West and North to South, would require only thousandths of the energy to be disposed of if, by contrast, the Earth were largely cease or reverse its rotation. If such were to happen, it would be most unlikely that the two bodies, Earth and the intruder, would achieve just the mode of encounter and passage that would avoid direct electrical and material exchanges or that would bring about a full 180° reversal; the Earth, unlike the tippe-top, could cease its tilt at any angle not excluding a full 360° circle with its intruder acting momentarily as its binary, and performing a "loop-the-loop."

Should the intruder collide with the Earth, the Earth might tilt, also, and the damage to it would be much greater. Dachille estimates that a body 320 km in diameter, impacting

tangentially at a velocity of 12 km/sec would produce an axis shift of a mere 0°32' [9]. Many forms of energy disposal are available, it appears, besides reorientation of the global axis. One is led to suspect that non-colliding encounters involving heavy electrical differentials might more effectively produce axis tilting than would collisions.

Lest the idea be considered quite fanciful, it should be recalled that several ancient sources refer seriously to a reversal of directions. Herodotus and Plato cite Egyptian sources of occasions when the Sun changed directions and arose in the West instead of the East. A ceiling in the tomb of Senmut of Egypt also pictures a reversed sky tableau such as would occur were the Earth turned upside down. In fifteen spectacular pages[10] Velikovsky searches out and orders rationally other indications in legends and writing of a reversal of directions that could only come with the Earth turning upside down. The contexts scarcely permit the alternative, a cessation and reversal of the Earth's rotation.

Thomas Gold once remarked that, if the Earth were a perfect sphere, an insect alighting upon it might turn it over. In revising Warlow's calculations, Slabinski assumes that the Earth has to be turned over in a single pass-by at two Earth's radii distance in a parabolic approach trajectory. He emerges with a requirement for a body with the mass of 62 Suns. Even if the crust of the Earth is shoved around independently of the underlaying layers, a body of the mass of 68 Jupiters is needed [11]. We expect that such an action will be totally catastrophic." Furthermore, "any appeal to electromagnetic forces that does not give a quantitative analysis of how such forces produce the required torque is equivalent to saying..."a miracle occurs."

Ellenberger, although a stout Velikovsky supporter, agrees: "Since motions occur along the path of least resistance, the possibility that a spin reversal has occurred would appear to be greatly reduced and that interpretation of Senmut's ceiling (and other evidence cited) may be in need of a raison d'etre other than evidencing a spin reversal. If a spin reversal is a viable alternative, where are there discussions and quantifications of

its mechanism?"[12] Yet Velikovsky, arguing the case for axis displacement, had earlier discussed a calculation by Weizacker demonstrating that an Earth transaction with a strong magnetic field would affect its axial inclination much more readily than its rotation [13].

Presently, the evidence for sidereal tilts is considerable, for geographic tilts also some, for upside down tilts little, for stop-and-reverse rotation very little. There is no way in which astronomical assurances can be lent to geologists on this account. Conversely, there is enough doubt on all scores to let geologists be open to the possibility of several catastrophically effective maneuvers of "Spaceship Earth". A moment's consideration of Slabinski's calculation leads to the suspicion that he may be employing a rate in his formulas that soars to wild heights and casts doubts *prima facie* on his procedures: if it would take the gravitational force for 62 Suns to turn the Earth around at a distance of less than 15,000 km, how does a single Sun lock the Earth into fixed orbit at 150 million kilometers? Also, evidence of a geographical shift of the poles is abundant; if this is not to be denied, then we should have to supply the force to do the job; if not 62 Suns, then how many Suns at 15,000 km distance are needed?

The possible occurrence of reversals in proto-historical times may suggest additional reversals in pre-human ages. However, Milton and I have presented in *Solaria Binaria* (Chap. 8) a theory according to which the Earth was in grip of a huge external magnetic field of the solar binary system until perhaps eight thousand years ago; during almost all of geological time, it could not reverse its field. In fact, it is argued that this same magnetic field and its reciprocal electrical current are the present geomagnetic field and current within the Earth, which have been steadily undergoing decay since the grip of the external magnetic field was released. This theory permits us here to explain the principal geological problems connected with terrestrial magnetism.

We would have to assert that the numerous alleged reversals of the Earth's magnetic field in geological history simply did not occur. Obviously there is no evidence to be obtained one way

or another by atmospheric testing of the field; any number of reversals (or none at all) might have occurred without leaving discernible evidence.

The geophysicist, however, can search for evidence of the magnetic field in rocks [14]. Igneous rocks have often been imprinted with magnetism when in a molten state; hence they hold myriads of tiny compasses, pointed towards the magnetic pole. If for one set of rocks the compasses point north and for another adjoining set they point south, it is conceivable that the magnetic field had reversed itself on an occasion between the melting and hardening of the first set of rocks and the melting and hardening of the second set.

Magnetic mapping of rocks is almost entirely of this century but has burgeoned swiftly and, some say, chaotically. Persuaded that they can tell the ages of rocks by radiometry, explorers have used time as a reliable indicator of the change in the magnetic field of the Earth. Since the rocks of the world have exhibited a bewildering variety of magnetic directions, many "dated" strata of differing magnetic direction have been assigned to the different magnetic periods, usually forced into a preconceived mold of "normal" and "reversed" magnetic field.

Depending upon the angle of declination, not only have such fields been noted, but they have been asserted to pertain to shifting magnetic poles. Some students have supported the idea that hundreds of field reversals have taken place in the several billions of years allotted to the Earth's history. One catalogue reports 433 paleomagnetic poles for 3 to 4 billion years of Pre-Cambrian time, an average of one new pole per 7 to 9 million years [15]. Since the Cretaceous, says Heirtzler, 171 reversals of the magnetic field have been identified [16]. Others have perceived certain intervals of time to elapse between reversals, 700,000 years, fifteen million years, and so on; several studies claim that the farther back in time one goes, the longer the period between reversals.

Some observe much more frequent reversals; they can claim that a reversal occurred 2600 years ago, 3500 years ago, a dozen times during the Pleistocene, and so on. If, they say, we

cannot perceive so high a frequency in times more ancient, it is because the reversal is not accompanied by a general melting of rocks and therefore cannot be detected, or it is too faint to be recognized because of disturbances or contamination of the strata. Magnetic reversals may be concealed because sedimentation is too slow to capture its duration, when samples are not closely spaced in time and the reversals are brief, when turbulence and contamination affect samples, when the sediments are dumped or shifted, and when biological activity is high at the level being searched for magnetism [17]. Still indications are strong in favor of heavy magnetic disturbances in the mid-first and mid-second millennia B.C., with ceramic, clay, rock, biostratigraphic, legendary, and historical contributions.

As early as 1907, P.L. Marcanton, using Folgheraiter's method, demonstrated magnetic reversal and intensity changes by studies of the magnetic inclinations imprinted upon Bavarian and Etruscan vases of the period 600-800 B.C., a period that in *Chaos and Creation* I called "Martia."[18] In 1981, K. Games reported upon a similar investigation of Egyptian pottery over a 3000 year period, concluding: "Clearly, the geomagnetic field in Egypt has varied rapidly and by large amounts. The greatest rate of change, which occurred around the maximum at about 1400 B.C. was about 140 manoteslas/year... and lasted about 300 years either side of the maximum [19]. He did not study directional changes of the field; further, his date of 1400 B.C. is more likely to have fallen in the 8th century, since he was using an unreconstructed chronology which is backwards by 500 years.

One important off-shoot of this enthusiastic age of magnetic pole discovery is the belief that the discovery of a new magnetic pole means that a new geographic pole has been discovered. If so, and if what is being discovered are true magnetic reversals, the Earth would have suffered thousands of devastations. A shift in a true geographic pole (as opposed to a purely celestial or sidereal tilt) must involve a shift in the axis of rotation, the worst kind of disaster. Apparently some geologists are runaway catastrophists as long as they can run on

free time long past. Munk's title, "Polar Wandering: A Marathon of Errors,"[20] deserves sober thought.

The significance of this chaos of findings also lies in the association of magnetic reversals with atmospheric, biospheric and lithospheric turbulence. The magnetic field or magnetosphere, even though it is remarkably weak in the farthest stretches of the atmosphere, nevertheless blocks and deflects a host of incoming particles. It acts thus like the ozone layer and atmosphere in general, as a protective shield. If it is removed, or temporarily "shut off" because it is shifting, or overwhelmed or shunted aside by great blasts of gases and charged particles, species extinctions may occur. Kennett and Watkins claim, on the basis of deep-sea drilling, that volcanism was at a peak in coincidence with changing geomagnetic polarity [21]. Wollin, Ericson and Ryan have noted by faunal and oxygen indicators at various sedimentary levels that cool climates may be associated with high magnetic intensity [22]. These may be short-term indicators, since at least by the *Solaria Binaria* theory, magnetic intensity was stable and high until recently and has since been declining.

A sampling of Siluro-Devonian sedimentary sections from the Arctic Archipelago of Canada reveals a common magnetic reversal. The magnetic inclinations suggest a low equatorial latitude. The rocks were apparently laid down under equatorial conditions, and they magnetized rapidly. Unfortunately, if the globe's axis rotation has since tilted or the continents have shifted or a plenum of clouds then covered the globe, the findings of such studies must be discounted; all three probably occurred. That is, the Devonian has long been thought to have been a warm world; the arctic rocks, whether drifted by conventional modern theory or by quantavolutionary theory, would give false paleomagnetic readings, and the geographical poles may well have shifted as late as the end of the ice ages.

Also, field reversal is an indicator that worse things may be happening. An incoming giant meteoroid may dislocate the magnetic field in the course of destroying life and blasting rock. Whatever it lays down or heats to melting point will be

stamped with a deviant magnetic imprint as it cools, provided the field has not sprung back into its original figure.

The complex picture is liable to so many contradictions and misinterpretations that one is tempted to discard it completely. If the magnetic field is due to an original source of electrical current deep in the Earth, can such a current be so fickle, breaking down and resetting itself in a new pattern time after time, so as to mark new orientation upon the rocks and atmosphere above? Runcorn has written that microsecond daily changes in Earth's rotation (one report gives 1 second slowdown every 600,000 years) may cause variations in the shape and intensity of the current; he adds that sudden changes in rotation would produce radial changes in the currents [23]. Michelson argues that the energy required to interchange the Earth's magnetic poles is about that of a moderately strong geomagnetic storm resulting from an intense solar eruption [24].

Meteors have pronounced magnetic effects. Studies to this end by Jenkins, Gilmor, Campbell and Green are summarized by Corliss, and Dachille has also insisted upon the phenomenon [25]. Passing cometary trains exhibit strong electrical disturbances and can cause the same in transacting bodies as in the space plasma. A large meteoroid, whether impacting or passing close by, will disorder the Earth's electromagnetic field. Also, were the Earth to change its orbital position, it would behave like a comet, with a flaring electric tail representing electrical transactions with the unaccustomed medium of passage.

The most enthusiastic students of terrestrial magnetic changes are the exponents and developers of continental drift. Prof.Billy Glass once told the author that what convinced him of continental drift was paleomagnetic measurements. These generally are held to correlate positively bands of rock, moving away from the central Atlantic ridge, with time; the older rocks are farther from the ridge. Not only do the magnetic measurements depend upon geochronometry but also upon uniformitarianism, because it is assumed that the lava flood extending from the ridge has been of the same volume-to-time

ratio for many millions of years. More on this last point will be brought forward later.

To conclude these pages on magnetic and geographical tilts, we can state our position: the geographical figure of the rotating Earth can tilt or reverse north and south, with moderate applied exoterrestrial force and with large holospheric damage. It has done so. The magnetic figure of the Earth will tilt or reverse in general accord with a change of geographical figure, but can also tilt or reverse independently depending upon a large electrical exchange between the Earth and a massive agglomeration in space. It has done so repeatedly. The damage is much less. Both types of change - of geographical and magnetic axes - could not have occurred, by the theory of *Solaria Binaria*, until the binary system was collapsing, which has been placed in time by the present author and again by Milton and myself at less than 14,000 years ago.

There remains a more devastating change, whereby the Earth not only tilts but also emplaces its poles upon a new geographical location. The physical force needed to accomplish such a change is many times greater than that required for the tilt alone, because the rotation of the Earth is both interrupted and altered in orientation. It is known that the Sun changes differentially the rotational speed of its several sections and some sharp movements may occur in connection with solar storms [26].

Too, on Earth, an interrupted rotation is likely to be ramified latitudinally and stratified internally. T. Gold has given attention to such problems; in one place he has demonstrated that the polar positions will change owing to crustal movements and distortions [27]. In another place, too, he insists upon the alteration of the Earth's shape that must accompany a displacement of the geographical poles [28]. He points to the evidence of paleomagnetism as indicating numerous different polar locations over geological time, evidence that we must largely discount.

But hard geophysical evidence, as presented by Hapgood, Velikovsky and Cook, for instance, supports belief in a recent

ice-age finale that shifted the north geographical pole from a position presently denominated by Baffin Island, 20° south of its present location. There is a measurable spring-back occurring all the way from Scandinavia to the Hudson Bay area, a rising area that may be due to a new rotating figure of the Earth, involving a new equator, and possibly to collapse and sudden removal of a burden of ice that had been weighing down the region. (Inasmuch as the great global cleavage passes through the center of this region, one has to introduce the probability of a forcing apart and expansion of the area between the two rising elements of continental rock.)

Surely, if the Moon were to have erupted from the Pacific Basin, the Earth's shape would have been altered, the crust would have been half removed, and the conditions Gold sets for a shift of geographical poles would be satisfied. A great force moving southwestwards would have tilted the globe, removed the crust, cleaved the globe, set the continental fragments into motion, slowed the speed of rotation, and established a new figure of spin, with a new equator and new geographical poles.

This occasion may have been the one and only time that the Earth changed its true axis of spin, as opposed to a number of other occasions in which the geographical and magnetic axes tilted. All the historical and legendary allusions to the world "turning like a potter's wheel," to celestial dizziness, to changing constellations, suns standing still, and so on may relate only to tippe-top behavior of the globe. Moderate changes in time, that is, of orbital and rotational motion, are not excluded, involving deceleration of the Earth's rotation, whether momentary (the Gibeon phenomenon) [29], or permanent. Claims of heavy deceleration, even so, are suspect; with a tilt, the sun may be visually retarded but the Earth's rotation very little affected.

The full range of possibilities in tilts has not been completed yet. Two additional ideas remain to be presented. The first concerns crustal slippage. The Earth's shell or crust, contributing about 1% to the Earth's radius, lends about one-thirtieth to the moment of inertia of the whole Earth.

Apparently, then, if the shell can slip without an identical movement of the mantle and core, the energy required to change celestial and geographical orientations on the shell would be less than that required for a total reversal or retardation of Earth motions.

There are signs that this stratified slippage has occurred in the overwhelming evidence of crustal destruction around the globe as, for example, in the outpourings of lava found everywhere. Even so, the energy required for total shell slippage (following the attraction of a passing body) is formidably high, and where it would be applied is crucial, so that this idea appears, initially at least, to be as totally destructive as any other means of moving the Earth about.

However, if this crustal slippage were to occur at the moment when over half the crust was being blasted into space, then obviously the problems of slipping and venting would be greatly lessened, especially with the assistance of fracturing, rifting, and expansion. These topics cannot well be delved into here, and are reserved for treatment in later chapters.

Archaeology affords support to the proposition that the Earth has changed position relative to the Sun and the planets in recent antiquity. In connection with the human drive to build settlements according to the prevailing cosmological observations and beliefs, the compass orientation of the constructions presents highly important issues in regard to changes in the Earth and the sky. That the earliest humans felt compelled to address their dwellings and public places to astronomical occurrences is generally granted. No one has yet found an ancient settlement capable of taking some shape that is not sky-oriented.

The mind of today's scientist turns first to the Sun, then the routines of the current Sun - the rising and setting, the solstices and equinoxes - to answer all problems of ancient civilizations. When the ruins do not confirm to these directions, then Polaris, the current fixed star of the north, is assumed to guide the primeval builders. One preplexed writer suggested that the Mesoamerican Olmecs aligned their structures with the Big

Dipper. When neither the north-south axis nor the solar behavior nor a constellation fits the orientation, then it is that the ancients could not tell directions well, or that the matter in any case was not important to the builders.

What is absent from such reasoning? First, there is a failure to appreciate that the desire to orient to the skies was an obsession, a compulsion, an inescapable tradition, a sacred obligation, a proud duty. Second, the ancients, as far back as we can discover their humanity, could calculate readily and exactly the course of heavenly bodies and orient themselves thereto. Many examples of this are presented in G.de Santillana and H. von Dechend's book, Hamlet's Mill [30], indeed this is the book's theme.

Third, not only the Sun, the North Star and the constellations, but also and especially the Moon and the planets were often objects of sacred (which is to say, all-important) architecture. This point has been stressed in numerous works on many cultures. The ancient pyramids of several countries, the design of Greek temples, the Hebrew Tabernacle and the Temple of Solomon - these and all other ancient masterpieces were like wedding rings uniting Earth and Heaven.

Fourth, when the heavenly bodies deviated from their customary paths or when the Earth shifted its position with respect to them, then the plans of temples, buildings, and settlements were shifted to conform to the new order of the skies. That is, celestial and mundane catastrophes of the past can explain many deviations from present "true" orientations.

Controversy naturally is engendered by any claim that the planets and Earth have shifted their axes in million of years, if not billions. Still, every oriented edifice or monument built since about 2600 years ago (after the last of the catastrophic shifts, as argued by Velikovsky)[31] seem to have remained fixed in relation to the present skies, while those built before then appear to have moved.

Certain claims of "fixed" structures warrant study. The most famous is the Great Pyramid in Egypt. Recently, the

Stonehenge megalithic "astronomical observatory" has also been widely discussed. The age of the Great Pyramid of Ghiza is in question. It has been ascribed to around 3200 B.C. and to other times. But no one suggests that it was built after 687 B.C. or for that matter after 1450 B.C. that is, after the end of the Middle Bronze Age. The West face of the Great Pyramid, which Stecchini believes was drawn first and is the basic face, is oriented 2'30" west of true north [32].

This slight discrepancy, claims Stecchini, may be attributed to the precession of the equinoxes, which occurred from the time at which the plans were drawn to the commencement of work. He thinks that the Egyptians knew of the precession and deliberately allowed this discrepancy. I doubt this thesis, also, which is based partly upon the work of de Santillana and von Dechend, and ascribe the deviation from true north as an increment of continental drift and other seismic movement of the area.

A more important question concerns whether the almost perfect north-south orientation means that no tilt or change of poles has occurred since the Great Pyramid was constructed. The following possibilities ensue :

1. The Pyramid was imperfectly oriented to true north.

2. The Pyramid was perfectly oriented to true north but the continuing drift of the African land mass or at least northeastern Africa has amounted to minute disorientation since the Pyramid was built [33].

3. The Pyramid was oriented to a pre-existing true north, marked by another star. The axis of the earth shifted celestially. But an abundance of stars can be used to mark true north; Polaris is the most recent star and naturally the Pyramid points to it.

4. The Pyramid was oriented to a pre-existing true north, which coincided with the present true north. The Earth's axis tilted on one or more occasions and then tilted back to its former position when it was built.

5. The Pyramid was oriented to the north-south. Subsequently, the rotation of the Earth changed direction, meaning that a new *geographical* (not celestial) true north was set up, but the rotation was either changed by 180° and therefore south became north, or alternatively, accompanying or subsequent land mass thrusts coincidentally brought the area around Cairo to rest pointing at the true and original north-south axis.

Of these five possibilities, the third appears most acceptable within the framework of this book. It would permit a number of axial tilts but only a minimum land-mass movement affecting Egypt since the Pyramid was constructed. This seems to be in accord with the theories advanced in *Chaos and Creation* that catastrophes subsequent to the great Pyramids construction did not cause major crustal slippage or a changed axis of rotation even though they caused heavy electrical, flooding, hurricane, and volcanic events. Earlier catastrophes involved the major changes in the geographical existence and location of the Earth's land masses.

At least so far as the Egyptian area is concerned, Velikovsky's descriptions in the Venusian case (*ca* 1450 B.C.) especially may be exaggerated; any implication that the geographical masses moved, or the Earth's axis of rotation changed, would have to be discounted. His evidence that the Pyramid shows signs of great seismic stress should be recalled, however. The most resistant material ever sculpted and fitted by mankind was affected visibly by earthshocks that must have been beyond the present limits of the Richter seismic scale.

The huge stones placed in circles and lines at Stonehenge, England, can be proven to be only generally oriented to observe solar solstices of the present age. Otherwise they display actual rearrangements of stones, done with immense labor, which can best be accounted for by an axial tilt, that is, by catastrophe.

Here, as at other magnetic settings, the earth scientist needs to take into account human motives, asking oneself: is it likely

that the stupendous collective labor required to build these great structures, admittedly astronomical, would have been mobilized if the Earth (and hence the skies) were not exhibiting strange and terrifying changes of motion? Was the human urge to control the sources of his terror implicated?

Attempts have been made at dating Stonehenge by C14 on organic objects found in association with it. MacKie is of the opinion that the dates of Stonehenge and other megalithic astronomical sighting locations would not permit one to claim reorientations of the Sun after 1500 B.C [34]. Hence, in Joshua's time or on later occasions, reports of the Sun altering its route would have to be considered false.

Still, Stonehenge, like the Pyramid, is a catastrophized artifact in the first place, and bears also the marks of catastrophic changes in its settings. The C14 dates are not abundant and consistent, nor generally reliable within the span of centuries.

The Mesoamerican sites magnify the uncertainty. There are many of them. All are thought to have been set up after 1500 B.C. Macgowan, (1945), and now we quote Anthony Aveni extensively[35],

> ...seems to have been the first person to suggest that the plans of a large number of Mesoamerican cities exhibited an east of north axiality. Among those sites which evidenced some orderly arrangement, he observed that the orientations fell into three groups: true north, about 7° east of north, and about 17° east of north; he noted that few sites were oriented west of north. In the 17° group were Teotihuacan, Cholula, Tenayuca, Mexican period buildings at Chichen Itza, Tula, and the pyramid adjacent to the Zocalo in Mexico City. A number of sites of the Peten District seemed to belong to the 7° group. Macgowan suggested that a historical pattern might emerge in the sense that early structures such as Cuilcuilco possessed a nearly true north axiality while the 17° east of north orientation showed up in the later buildings.

Aveni found by transit that fifty of the fifty-six sites surveyed align east of north; the 17° orientations seems to be prevalent in the valley of Mexico.

Yet Carlson, working on centers carbon-dated between 1000-1400 B.C. says that "Olmec culture is well-characterized by ceremonial centers, which are generally 7° to 12° west of north..."[36]. This would suggest that tilts of different ages are represented in the two regions, or that the Olmecs, who invented the magnetic compass, may have oriented their buildings to a magnetic north. Almost all of them deviate from true north orientation.

According to sacred scripture, the four gods who were born of the creator gods govern the four cardinal points of the Earth's compass, and struggle with each other. It would appear from the chart that, while north-south was the way human construction should be engineered, by present direction lines, frequent changes have occurred.

A few years ago, Mesoamerican civilization was considered recent and crude. Today the view has changed and the same respect is given the early Mesoamerican as is accorded to other world civilizations.

In 1976, a lodestone compass was claimed for the Olmec civilization at 1000 B.C. or earlier, before the earliest demonstrable Chinese compass. In this case, it cannot be argued that the Mesoamerican were incapable of planning their settlements and public buildings with accurate reference to north or any other cardinal point. In a letter describing a study trip to Central America, Patrick Julig writes:[37].

> ... I observed changes in the orientation of the foundations of Mayan buildings between the Archaic and Classical periods. Sometimes there were changes within the same building by as much as 10° in later additions to the structure such as in the Palace at Palanque. This could possibly be a way to date the structures, or at least the foundations, as being pre-687 B.C.

One must tentatively conclude that at least Middle America suffered serious crustal slippages. Or, axial tilts occurred frequently and the Mesoamericans were employing a method of determining true north (the Earth's axis of rotation) by a means not dependent upon a star. And, if this technique existed, the alternative presents itself that the object defining true north itself moved on occasion.

A second study by Aveni leads us also to believe that astronomical settings have altered in proto-historical times. He and his associates traced and surveyed the orientations of "The Peaked Cross Symbol in Ancient Mesoamerica" in many places [38]. These peaked crosses are not monuments of the highest level, but remind us in some ways of the frequent crude religious sculptures that are to be found at crossways in many places on Earth, dating up even to the present day. The cross represents the application of the Sacred Year to the four quarters of the world, the cardinal directions, the highly significant merging of time and space that the ancient Mesoamericans achieved.

Teothihuacan was probably the religious center of ancient Mesoamerica, like Rome of medieval Europe. The fundamental Teotihuacan grid as excavated is oriented 15.5° east of north. Of the some 30 symbols that the Aveni group have assembled from elsewhere in Mexico, the orientations of 19 are given. Of the 19, nine are oriented with in 2° of the Teothihuacan grid. Of the nine, all except one (carved on an outcrop) are on a floor. Of the remaining ten with known orientations, all range between 35°42 and 80°24'; all are incised upon outcrops except one that is on a broken flat stone whose "axis points toward Teothihuacan"(TEP3), and another (TUI) that is "pecked on horizontal floor of lava field." Most of these are considered as pointing towards the summer solstice sunrise, which is rather insulting to the intelligence of the humblest pecker. Are we to believe that they could not find the point of farthest advance of the Sun? And why should outcrops be carved east and floors to the north?

It would appear that either (a) the carvers were inexact amateurs with biases towards the east, or (b) the larger part of

Mexico shifted its axis by 15.5° to the west of north in response to seismism and/or a tilt of the Earth's axis in reference to the solar and sidereal system, or a geographical transfer of poles implying a changed axis of rotation, or (c) the axis of Teothihuacan shifted at an early time eastwards from true north and its new position was assigned sacred and ritual meaning, a Holy North to be imitated, just as the 260-day Sacred Year was tenaciously preserved, without a celestial referrent, until modern times, alongside the 360 and 365-day calenders. In the case of (b) and (c), the extreme eastern orientations of the peckings might have been memorial, without special orientation, to Teotihuacan's gods upon the occasion of faulting, fracture and exposure of new rocks. The geology and the relative dating of the peckings are important in considering these alternatives. Especially, the hypothesis can be entertained of a deliberate attempt to follow a fault line (especially if an electrical current were running) in the outcroppings. (If the Etruscan priests took possession of and catologued all aspects of a spot struck by lightning, similar obsessions may be expected among the equally obsessional Mesoamericans.)

So long as north-oriented axes were to Holy North, they would be consistent. But east-oriented axes, if there is no "Holy East", would wander with tilt of the Earth's pole, that is perhaps from 30° to 80°, whether in the wake of the Teotihuacan shift or upon some later occasion. The association of the peaked cross symbols with outcroppings must have some significance. If a desperate speculation may be permitted, new outcroppings might have become thereby "holy" too, just as fallen meteoroids have become holy, and perhaps the outcrop orientations might be attempts at affixing the eastern risings of that vagabond planet, Venus.

A research of deviating Egyptian, Mesoamerican, Mycenean, Greek and other structural orientations may suggest dates for the construction of earliest Teotihuacan- a subject of some controversy - as well as point to causes of the phenomena of the peaked crosses.

Finally, one may observe that the Teotihuacan orientation 15.5° to the east of north could have indicated a transfer of the

geographical north pole of the Earth by that amount at some point of time. This shift is not far from the degree of shift in the north pole from a location at Baffin Island to its present location northwest. A number of students believe such shift to have occurred at the "End of the Ice Ages."

Notes (Chapter Four: Magnetism and Axial Tilts)

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32. L.C. Stecchini, Appendix to Peter Tompkins: *Secrets of the Great Pyramid* (New York: Harper and Row, 1971), 380.

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37. To William Mullen, 1974 n.d. Julig studied the famous Nazca earth lines of Peru and concluded that they might represent lines of meteoritic falls from which the (sacred) burnt stones were removed.

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CHAPTER FIVE

ELECTRICITY

Tertullian, an early Christian apologist, came to the attention of a contemporary physicist delving into the occult, and he, J. Ziegler, has supplied us with this quotation which can introduce this chapter and the next:

> The philosophers know the distinction between common and mysterious fire. The First that serves man's use is one thing. The fire that ministers to the judgement of God is another, whether flashing the thunderbolts from the heaven or rushing up from the earth through the mountain tops. For it does not consume what it burns, but, even while it spends it, repairs the loss. So the mountains remain, ever burning; and he who is touched by fire from heaven is safe - no fire shall turn him to ashes.

Lightning expresses only a small fraction of electrical processes. Electricity is everywhere. It presents itself in the smallest particle and, some of us believe, commands the behavior of every remote galaxy of stars. It is part and parcel of every natural transaction. Perhaps it is the hunger of protons for electrons that initiates all natural behavior, whatever the scale or intensity.

Earth scientists have been reluctant to admit electricity to their domain. There is a confined interest in "hard" lightning, taken over by metereologists now, and geophysics must trespass upon nuclear physics in connection with chemical bonding and radioactivity. Historically, earth scientists have led the parade of debunkers when meteoroids were reported to fall or when lightning took unusual forms. Of course, when geologists stood upon mountain tops and St. Elmo's fire flowed from their beards and hammers, they could not well deny this "god's fire"

of the ancients [1]. But one searches in vain for a treatise on St. Elmo's fire, one of the oldest and most fascinating phenomena continuously reported.

In fact, there exists no treatise on the full range of electrical behaviors related to geology. This universal presence of electricity in geological events does not excite systematic attention, no more than it has in astronomical events up to the present. If one seeks a rational explanation for this neglect, it may lie in the unreadiness of the lithosphere, hydrosphere, and atmosphere to display their electrical history, letting the electrical be considered transient and superficial.

If one seeks non-rational explanations of an ideological or psychiatric sort for such avoidance, it may be in the quixotic or miraculous appearances of electrical phenomena. Bordering upon the religious and the occult, these set up psychological resistances among "hard" scientists. As we shall see, even the famous subject of lightning, which can hardly be ignored, is little understood. The latest literature on lightning is still at the state of trying to survey its extent and intensity, and not even its forms are classified.

The ancient Etruscans thought that they could discern eleven different types. So wrote Pliny, but a modern Etruscan expert, Rilli, says that they recognized thirty kinds of lightning [2]. Ancient sources that refer to fire often are speaking of electricity, "god's fire." Applying the modern meaning of "fire" as combustion and conflagration, one cannot comprehend their outlook. To early theologians and philosophers,"fire" meant a set of qualities exhibited by the "aether", loosely translated as "air", and when "air" was considered a basic element of existence, electrical phenomena were deemed to be integral with it.

The large importance given to electrical phenomena in ancient times, drives us to believe that their manifestations were much more in evidence. Furthermore, although there are a few indications that the Egyptians may have employed wire on occasion to transmit electricity, unquestionably they were preoccupied with electrostatics, the exploitation of the generous

and ready electrical potentials of the ground atmosphere. This I have discussed in my study of Moses.

Lately, the ionization of the atmosphere has come to be studied. Even the ground beneath our feet has come to be conceived as a conveyor of waves of numerous types, ranging from the gross seismic tremors that topple whole cities to the delicate motions of the wire in the hands of dowsers in search of underground water [3]. Ions are electrified particles; they affect the growth, fibres and nervous system of plants, animals, and humans in ways mostly unknown [4]. Many students think that an abundance of negative ions in the atmosphere produces a sense of well-being, but that "excessive" positive ions provoke depression, irritability, and illness.

The Earth's surface contains a charge; it too is unknown in extent and effects [5]. The charge is called negative originally because it is of the kind that comes from rubbed resin, and conventionally because it comes from the ground. On a clear day an electric potential of about 100 volts per meter of height occurs. The charge of Earth tends to persist in the absence of exoterrestrial intrusions, employing the lower atmosphere as an insulator. The charge in our opinion, will have varied greatly over the human past. Then its variation, as well as its constancy, must have had significant effects upon human behavior and ecology.

The Earth may have presumed once to have been in the grip of a constant heavy charge, for reasons that will unfold below and are also treated in *Solaria Binaria.* It began to lose this charge, both gradually and in series of catastrophic discharges. Today, solar flares excite large surges in the flow of charge from upper atmosphere to ground. Too, thunderstorms may be principally a method of balancing the atmosphere-lithosphere equation by releasing ground electricity [6].

There persist certain phenomena that may reflect this decline of charge. All over the world there are pathways that were worked out mysteriously (part instinctively and part deliberately) by ancient men and that are followed today. Michell has sought out the English paths especially. He shows that they are often

not the shortest way between two points [7]. Rather they have seemingly pursued geodetic "power lines" which thereupon developed as religious routine, ritually followed. As with many customs, people follow behavior that originally had a perceived and sound meaning.

Waterlines have been explored successfully by following the cues provided by traditional water-dowsers. It may well be that underground water moves along paths which are electrically distinctive. In other cases, it may emulate the course of lightning that once travelled along root networks and also fractures formed by lightning. Seismic fractures also are important conduits of water.

Lightning has been used as a kind of naturally-provided instrument for studying the electrical nature of the ground. Aside from numerous ancient observations along these lines, a few modern studies exist [8] to indicate that soils of high conductivity (e.g. marshes) are lightning-prone; that ironstone outcrops attract lightning; that strata discontinuties attract lightning. So do underground springs; so do areas of high negative ion concentrations. Masts, lightning conductors, and buried metal pipes invite strokes.

Experiments by Stekolnikov showed that soils attracted sparks depending upon their conductivity. Certain trees are stroke-prone, the oak, for example. The variety of effects is scarcely understood - the fancy dendritic patterns sometimes displayed underground, the killing of flocks of sheep, the escape unimpaired of a girl enveloped in lightning flames, the subsequent death of a man seemingly unaffected at the moment of stroke, and so on.

In 1977 an American physicist, J. Ziegler, published a study of the knowledge and uses of electrostatics among the ancient Hebrews and other peoples of the Near East and Greece [9]. His thesis, elaborated shortly thereafter by the present author in a book on the period of Moses, maintained that these ancient peoples possessed devices for inducing and displaying electrical effects in their religious practices. The most spectacular of the devices was Moses' Ark of the Convenant,

which G.C. Lichtenberg, a German Electrician of the 18th Century, termed a form of Leyden jar.

The Leyden jar is called an electric capacitor. A metal rod based upon a metal lining within an insulating (e.g. wood) vessel will store a charge from the air. When the outside of the vessel is also lined with metal that is in touch with the ground, an opposite charge is induced. The potential between the two poles may accumulate to a level at which a spark will jump the gap between them. The frequency, brilliance, and power of the spark or arc (Ark = box = Aron in old Hebrew) depend upon the size of the gap and the voltage differential that is generated.

The condition of the atmosphere and ground are critical factors. The higher the box and the wetter its grounding contact, the greater the electrical effects. That is, the effectiveness and potency of the devices depends upon local conditions that can to some degree be manipulated. Aside from this, the general electrical state of the Earth and atmosphere (including exoterrestrial influences affecting these bodies) determines the overall effect.

In an atmosphere where electrical and dust turbulence were prevalent, as in times of Exodus and other periods that I have identified elsewhere, and the Earth was discharging at an effectively higher level than it is today, the incitement of electric displays without motors, pumps, and wires was easy: large potential differences continuously presented themselves for exploitation. Electrical effects became essential to political and religious roles and were subjects of jealous contention within and between governments. A full social analysis is presented in my treatise on Moses; what may be stressed here is that the existence and activity of such devices evidences that the Earth was then in a state of heightened electrical activity relative to modern times.

With the settling of the skies, the intensity of electric phenomena diminished. The divine spark manifested itself less and less; the arks were carried more and more up to the mountain temples (e.g. both the Temple of Solomon and the Temple of Jeroboam). The angels, demons, and mountain gods

manifested themselves in electrical demonstrations on high with the aid of crosses, trees, and poles [10]. These, too, could not be maintained. Empedocles, when discussing the four elements, fire, earth, air and water, says that fire has ceased to "travel", and no lower forms of fire remain [11]. Plutarch wrote at the end of the pagan age an essay on why the highly placed Delphic oracle had lost its influence; he gave the vaguest of references indicating a failure of electric current, but the question itself is significant [12]. By late classical times, the knowledge of arks and of the exploitation of "god's fire" was largely defunct.

Yahweh became "invisible", who before, declares the Bible, could be seen in flaming display upon the Ark of Moses. So later philosophers gave new meanings to words: realities became metaphors and abstractions; thus, the "word" and "presence" of the divine became thoughts, rather than the noises and signs of electrical divinity. The profuse electrical references in the Bible, in ancient Near East documents and Greek Mythology, in the Hindu Vedas - all were reduced to metaphors, generalized into ordinary meanings ('fire' becomes 'conflagration'), and metaphysical abstractions (the commandment to worship no other God nor image is interpreted philosophically rather than realistically). The obelisks whose points once lit up as the eyes of the hidden god Amon (Amen) came to be variously interpreted as giant sundials, emblems of royal power, phallic symbols, or sign boards for vainglorious inscriptions. As Ziegler suggests, the Greek word "obelisk" itself might have meant "ob-el-ish," or "serpent-light-fire."

Von Fange recounts a century-old report on a Babylonian ziggurat, which may have been the Tower of Babel. The structure can be placed several centuries earlier than Moses but also in a highly electrical epoch.

> It appeared that fire struck the tower and split it down to the very foundation. In different parts of the ruins immense brown and black masses of brickwork had changed into a vitrified state. At a distance the ruins looked like edifices torn apart at their foundations.

> Evidently the fiercest kind of fire created the havoc. The most curious of the fragments found several misshapen masses of brickwork, black, subjected to some kind of heat, and completely molten.
>
> The whole ruin has the appearance of a burnt mountain. On one side, beneath the crowning masonry, lay huge fragments torn from the pile itself. The calcined and vitreous surface of the brick had fused into rock-like masses. It is difficult to explain the cause of the vitrification of the upper building. Great boulders were vitrified, and brickwork had been fused by fire [13].

Here possibly was cosmic fire. Another effect deserves mention. A major electrical discharge in which a number of humans are stimulated, as in a town on an eminence, may proceed slowly and without killing. It leaks rather than blasts. It might affect people's minds. Today, a fearful side-effect of electroshock therapy, which is used to treat persons suffering from depression, is amnesia; whole sections of the person's store of memories will be erased.

The Tower of Babel was probably erected at a time when electrical perturbations were attributed, if my analysis in *Chaos and Creation* is correct, to movements of the planet Mercury [14]. The arrogance of the builders in attempting to reach the sky was punished, recites the Bible, but in a peculiar way. They who spoke the same language when they began their work were caused to "babel" in many tongues. The Earth shook long beforehand; the tower partly sank into the ground, so say Jewish legends; but also much of the tower was destroyed by fire from the sky. The work had to be abandoned and afterwards the nations spoke different languages.

I offer a scenario for consideration. The Tower of Babel was being built in terror and hope of appeasing sky-bodies, possibly Jupiter-Marduk or Mercury. Conscripts or slaves of many countries made up a work force of 50,000 men. They put together a rough *lingua franca* from the language of the area to communicate on the job. The approach of a large body (there were actually many adoring and frightened references to planet

Mercury around this time) occasioned the build-up of charge and then a flowing discharge through the structure, creating a confusion in administrative orders and a linguistic amnesia especially in the *lingua franca*. No longer could people understand each other. And then the whole edifice was stuck by immense cosmic bolts, partly fractured, and exploded.

"Slow lightning" is the geologically and biologically effective discharge of terrestrial electricity. A "slow lightning flood" may be conceivable, too. The curious vitrified forts of Scotland may be a case in point [15]. They remind us of the Ziggurat of Babylon. Their stone and mortar are fused solidly with the clifftops to which they adhere.

The forts are much in need of study. The early interpretations of them as cattle pens is uncomplimentary to a people that lived in hovels that experienced no such fusion. The idea of brush being heaped outside the precipitous walls, and then burning them with an intense heat, would require a mobile ceramics oven and vent.

We would argue that the lightning here was not "bolt-thin" and "lightning-quick" but poured upwards over seconds, diffusing through its medium, ferruginously-mortared stone. There would have been an approaching unequally charged great body or gas cloud that had pierced the electrically balanced plasma and drawn away or brushed aside the magnetic space sheath of Earth. The Earth below would have collected on its highest surfaces a charge to meet the incoming charge. This would begin to flow upwards. Heavy leader strokes descending would have collapsed the roofs of houses. A tube of ionized dust would arise and descend, make contact from both ends and set up a fierce heat that would scorch its "vessels." A final flash, and then the body would pass or the cloud dissipate, and a rain of dust and vapors would fall back upon the ground, calcinating it.

It is probable that many thousands of burnt eminences exist around the world whose tops have seen the fusion of rocks, perhaps even Troy IIg, the "Burnt City" so-called [16]. The famous site, whether or not it was the real Troy, is on an

eminence. While not high, the city would have had many small reservoirs of water, whereas the ground outside might already have been dried out. In Troy IIg a sulphurous color suffuses all outdoor spaces and passageways of the town. A deposit of lead and copper melted and flowed around the town. (It is possible that this melt had been scavanged after Schliemann reported it in the 1880's and the discoloration was all that was discoverable when the Blegen expedition re-excavated the site in the 1930's).

No human hand could have or would have set such a fire. The heat was fierce. The ash was far too abundant for a deliberate fire from local materials, and carried a red color. In places it was like calcinated rock, a meter or more in depth, perhaps like the vitrified Scottish forts. No one would have wanted to destroy precious metals (not so mention even more precious metal left in abundance in the scorched houses and the Treasure of Priam, found on a Wall). Noteworthy is the absence of human and animal skeletal material in the ruins. Either they turned to dust from the heat, or the electrical build-up was sensed, as it is by animals before earthquakes for example, and they fled from the hill onto the plain where the sensations were absent.

Perhaps a heavily charged cosmic body was approaching or was near the Earth with an opposite charge or inducing one to collect on Earth; this would cause numerous discharges. Every eminence, one might imagine, would offer an exit for lightning, especially if it held the slightest metallic component, and were not surrounded by damp lowlands. Buildings are not needed.

If settlements seem to have been affected by slow lightning flood, unsettled eminence should often have endured the same experience. I have explored as a candidate a conical hill of Stylida, Naxos, Greece (Alt.152m) [17]. The top is a hard silicate with bits of ferruginous rock in the eroded (burst?) rubble. It nests among loose, hardly consolidated rocks that have fast fallen away from the columnar core. This phenomenon is usually seen as an ancient metamorphosis. Somehow the temperature of water-laden deep limestones and granites mounted and caused them to nearly melt and to rise.

Limestone is a common environment of silicification. Silification is abundant around igneous metamorphism. In a hot and fast reaction, siliceous fluid is introduced hydrothermally and replaces the host rock, such as limestone, into which it intrudes.

Such is the case where an electric charge is seeking an exit from far below. With or without water, a hot electric discharge current can assemble and proceed quickly up the core of a hill, heating and silicifying as it move. On top of the hill, it forms a cap just as caps will form on the sparking end of a discharging rod. The charge, that is, uses the plastically flowing rock as a conductor and then builds a deposit from which it may discharge more easily.

The taller the mountain, the less time and chance for the siliceous fluid to reach and cap its peak. At the same time, electricity of this type may even build mountains. Juergens has suggested that mounds may have been formed on the planet Mars by the same process. An electrical process may also be involved in the vigorously erupting mountains of Io, satellite of Jupiter. These are casting material to heights of several hundred kilometers from caldera-like structures. Unless Io is newly emplaced, all water or carbon dioxide would have long ago been exhausted as propellent media. Spectroscopy evidences no water on Io, moreover. Sulfur would be too heavy to gain the speed of eruption required for such lofty explosions.

Therefore, Thomas Gold turns to the electric current of $5x10^6$ amperes that cyclones upwards from the Jovian surface arguing that it is "largely conducted through the body of Io [18]. The current contracts along a narrow tube of passage which is kept hot and therefore more conductive. As it emerges into cold space, the current encounters conductive resistance and, hence, forms heat spots of several thousands of degrees kelvin. "Most current spots are likely to be volcanic calderas, either provided by tectonic events within Io or generated by the current heating itself." The electric volcanism is steadied by the "accurately repeating" electric arc from Jupiter. So now we find here a model for processes that may once have occurred on Earth as

well, supposing a sufficiently intense terrestrial discharge were occurring at a weak spot for even a few days.

The "slow lightning" may shape not only eminences but also subterranean cavities. Von Fange writes that "The same phenomenon has been observed in the mounds and barrows of the British Isles. Some have at one time been filled with an intense heat. Their walls are melted and their contents fused. The stones of the innermost cell of a long barrow near Maughold on the Isle of Man have been fused together like the mysterious vitrified towers of Scotland and elsewhere."[19] Many Egyptian tombs and the interiors of pyramids are scarred by intense heat. Caliche ($CaCO_3$) adhering to bones and rock undersides in a California burial cairn provide radiometric dates of 19,000 to 21,000 years, whereas archaeological estimates of the many such cairns give 5,000 B.P. or less [20].

The famed caves of Aquitaine (France)[21] whose primeval users carved and sculpted images upon the walls, may surprise the naive visitor. One expects to find a general similarity of the interiors. Not at all. Each interior is unique. Some are serpentine, others like grand ballrooms; some have magnificent silicate columns and startling naturally formed shapes; others are plain and dull, save for the signs of human occupancy. All are of limestone; all are elevated, if only slightly, above the flat river and stream valleys around.

Why are they so different? Caves are said to be formed by the percolation of water through weak stone, cracked stone, or interstices of layers of stone. The filtering drops become trickles, and then streams. The cavity is enlarged. The river deviates or dries up and the interior is prepared for occupancy. Time elapsed may be "millions of years."

However, Worrad reports that limestone caves can be rapidly formed by water - "that in one year a cave of 3ft. x 6ft. cross section x 120ft. long would be formed per square mile of the surface," and opines that the Deluge [not to mention other floods] provided huge amounts of water for limestone solution and cave foundation [22]. Dripstone would be formed rapidly, too. A *National Geographic Magazine* photograph (1953)

carried a picture of a bat "entombed" inside a stalagmite, which, therefore, could not have formed at the "0.001 inch per annum or so rates " usually assumed [23]. In Brixham caves (Devonshire), the bones of fossil mammals, of the types drawn in the Caves of Dordogne, are stuck in the ceiling - so writes a correspondent, U.E. Ramage, to this author -as well as in the sides and floor. In as much as these species' extinctions were quite recent, this shows that it may not take long to hollow out a cave. Furthermore, the small cave is "prettily ornamented with concrete growths."[24] So we would appear to have a very recent catastrophic bone assemblage of animals, then or soon extincted as species, followed by a geologically instant cave-making, and prompt furbishing with stalagmites and stalagtites.

Although water may quickly hollow out caves, the role of electricity is not to be ignored. Electric fields, as Asakawa has demonstrated experimentally, enhances heat transfer in nearby gases (up to 1.5 times); liquids (up to 2.0 times) and solids (up to 1.6 times), depending upon the positioning of electrodes and the strength of the applied fields [25]. Perhaps caves are ancient hotspots, electrical calderas, where creation time is shortened by the blasting impatience of electrical arc currents.

Notes (Chapter Five: Electricity)

1. *Cf.* 44 abstracts of such experiences in Wm. Corliss, *Sourcebook* GLD-001 to 044, GI-81 to 110.

2. Pliny, *Natural History*, Rockham tr. (Cambridge: Harvard U. Press, 1967), II. LIII; N. Rilli, *Gli Etruschi a Sesto Fiorentino* (Florence: Giuntina, 1964).

3. Guy Underwood, *The Pattern of the Past* (London: Abacus, 1972) Treats dowsing, electricity, geodetic lines, and cultural associations all together.

4. Fred Soyka and Alan Edmonds, *The Ion Effect* (Toronto: Seal Books, 1978); S.W. Tromp, *op. cit.*, 112-5.

5. Fernando Sanford, *Terrestrial Electricity* (Stanford, Calif.: Stanford U. Press, 1931), Chapter 4.

6. "Solar Activity and Terrestrial Thunderstorms," 81 *New Scientists* (1979), 256.

7. *A View Over Atlantis*, (1969).

8. See the survey of unusual ground effects by B.L. Goodlet, *J. Inst. of Elec. Eng.* 81 (1937), 1-26.

9. Jerry Ziegler (pseud. Zeromiah II), *YHWH*, Princeton: Metron Publns., 1977.

10. *Ibid*., 53ff.

11. Hock, *God in Greek Philosophy*, 99, cited in Ziegler.

12. "Why the Oracles Cease to Give Answers," IV, 56. See Ziegler, Chapter 19.

13. Erich A. von Fange, "Strange Fire on the Earth," 12 *Creat. Res. Soc. Q*. (Dec. 1975), 132.

14. *Op. cit.*, 210 ff.

15. James Anderson, 5 *Archaelogia* (1777), 241-66; *ibid.*, (1980), 87-99. and see the materials reprinted in W.R. Corliss, *Strange Artifacts* (Glen Arm, Md.: Sourcebook Project, 1974) vols. M-1, M-2, under "Forts."

16. A. de Grazia, "Paleo-Calcinology: Destruction by Fire in Pre-Historic and Ancient Times." I *Kronos* (April 1975), 25-36; II *Kronos* (August, 1975), 63-71.

17. The author thanks geologists Dr. Gerd Roesler and Dr. Poul Andriessen, who aided me notwithstanding their scepticism.

18. "Electrical Origin of the Outbursts of Io," 206 Sci (30 Nov. 1979), 107 1-3. On sulphur as the medium, *cf.* Guy J. Consolmagno, "Sulfur Volcanos on Io," 205 *Sci* (27 July 1979), 396-7.

19. *Op. cit.*, 132.

20. P.J. Wilke, "Cairn Burials of the California Deserts," 43 *Amer. Antiquity* (1978), 444-8.

21. *Inter alia cf.* J.P. Rigaud and B. Vanderneersch, eds., *Sud-Ouest (Aquitaine et Charente): Livret-Guide de 1' Excursion* A4, IX Congrés U.I.S.P.R. Paris, 1976.

22. Worrad, *Creat. Sci. Res. Q.* 197; see also letters by D. Cardona and B. Raymond in 3 *Pensée* (Winter, 1973), 48-50; and E.L. Williams and R.J. Herdklotz "Solution and Deposition of Calcium Carbonate in a Laboratory Situation," 13 *Creat. Res. Sci. Q.* (March 1977), 192-9.

23. Ltr. of Felix Fernando, III *Pensée* (1973), 50, citing Nat. Geog. (Oct. 1953).

24. 8 Sept. 1967 from Ceylon; Villey Aellen And P. Strinati, *Guide des Grottes d'Europe* (Paris: Delachaux, 1975), 130.

25. Y. Asakawa, "Promotion and retardation of heat transfer by electric fields," 261 *Nature* (20 May 1976), 220-1.

CHAPTER SIX

COSMIC AND TERRESTRIAL LIGHTNING

A powerful, highly developed and mysterious people of ancient Italy, the Etruscans, believed in the strictest set of relationships between the small Earth and the great and divine Universe [1]. They planned their cities astronomically, as did all early peoples, but, more specifically, worshiped lightning and gave "the thunderbolting god" Jupiter to the Romans. They founded a College of Lightning Arts (*ars fulminum*) at Visul. When a bolt of lightning struck, the ground became at that instant hallowed; no one might disturb it until priests made a site inspection and had concluded which of thirty types of lightning it was and what should be done about it [2].

They dug wells to receive lightning and marked the wells with the bidental symbol of Jupiter (Zeus), a two-pronged spear. Zeus has been variously portrayed as the hurler of cosmic lightning, with a two or three-pronged spear, and even hurling a bolt whose shape was not forked lightning but like an American football, a plasmoid perhaps, a kind of lightning bomb [3].

All mountains were sacred to thunderbolting Jupiter. Seneca, the Roman stoic and dramatist, has him dissolving mountain ranges with his bolts [4]. The Bible says the same of Yahweh, all this and more.

Psalm 97 gives us :

> "His lightnings lighten the world;
> the earth sees and trembles.
> The mountains melt like wax before the Lord,
> before the Lord of all the earth."

The Babylonians speak so of Marduk, the Indians of Shiva, the Persians of Mazda. Other gods played with lightning and fire -

Hephaistos, Apollo, Hermes, etc. but Jupiter was the overwhelming lightning god. Giambattista Vico believed that lightning was less on Earth in the damp age of Saturn, before Jupiter, because of deluges. It is noteworthy that satellite maps of terrestrial lightning published this year (1981) by Orville and Vonnegut show a dearth of discharges upon oceanic surfaces [5]. Satellites have also shown that a realm of lightning bolts a thousand times more powerful than the ordinary terrestrial bolts dominates the upper atmosphere [6].

The Etruscans said that their great city of Volsinium, by what is now Lago Bolsena, was destroyed by a thunderbolt of Mars. They believed that a portent or an inducement to the awful act came from rituals performed by their King [7]. This was about the time that Rome was founded, likely by near descendants of fugitives from grave disasters in the Near East [8]. The famous Seven Hills of Rome themselves may be a set of extinct volcanos, according to an early French geologist. Since few scientists believe in cosmic thunderbolts, this report of Lake Bolsena has never been thoroughly investigated. The Italian anthropologist-geologist Leonardi assured me that the lake basin is a typical extinct volcano. Velikovsky accepted the lightning thesis [9]. Geographer Donald Patten calls it a meteoric crater-lake because it lacks a volcano talus, is oval shaped, 7x9 miles, and is bottomed by lava and ash [10]. Until an intensive investigation is made, Leonardi's expertness must weigh heavily in our judgement.

J.E. Strickling has guided the author to a passage in Ginzberg's *Legends of the Jews*(I,240) where, it is said, " the day whereon God visited him (Abraham) was exceedingly hot, for He had bored a hole in hell, so that its heat might reach as far as the earth..." Was this hole dug by a meteoroid impact, a lightning stroke (downwards or upwards), or a volcanic outburst? That it would have been a sudden occurrence, and that other studies indicate probably exoterrestrial (hence volcanic) disturbances in Abraham's time and that Abraham's God was a God of lightning are bits of fact to consider with the larger mosaic being pieced together here.

Archaeologist Nicola Rilli dug in one location at Prato (near Florence) and found three distinct heavy ash layers defining

three distinct periods of prehistory [11]. He found a small silo grain, intact but carbonized, a fact that he ascribed to a great fire that had been suffocated. Lightning fires may have played a role in the burnings.

Recent astrophysical opinion regards Jupiter as a hot hyper-active planet that exchanges bolts with its satellite Io over a distance of 50,000 miles. The bolts are frequent enough to be an arc or current. Strangely, Pliny described great thunderbolts as the "fire of the three upper planets," not to be confused with terrestrial lightning [12]. Today lightning could not discharge over the great distance between Jupiter and Earth, not unless Jupiter were to explode, a great cloud of gases that would drift between the planets and provide a conductor for the electric spark. Something akin to discharge can affect the Earth and Sun, though, when the great planet is in conjunction with Earth and Sun, as Gribben and Plageman have propounded [13].

However, according to the theory of Solaria Binaria which we have advanced in another book, the two bodies were once nearer, there were remnants of a gaseous envelope between Sun and Jupiter, and there were sporadic efforts to push through discharges along the defunct axis of an electrical current that had once connected the bodies. Since Earth was descending upon this axis, which became the ecliptic plane it may have experienced the reported Jovian bolts. These would still be discharging from time to time, seeking to make contact with the Sun and being short-circuited by Earth and probably other intervening bodies.

It may be surmised, too, that, upon the nova and fission of Super-Saturn (Saturn-Jupiter), not only would water and debris be discharged into interplanetary space, but also gases that would temporarily afford Jupiter its chance to earn its reputation as the discharger of interplanetary thunderbolts. Not until the arc flashes had quite disappeared, the gaseous medium had been quite dissipated, and the Earth drifted out of its binary-locked, conjunctive orbit with Jupiter would the cosmic lightning cease to threaten the Earth with a bolt from the blue.

Replacing the binary current and magnetic gas tube were two contemporary phenomena: the solar winds and the space

plasma. The solar winds are not a current, but are unfocussed particle flows and blasts. They diffuse into space rather than concentrate upon the planets. Earth receives only a very small fraction of the solar radiance.

The space plasma that surrounds the planets is composed of dissociated ionized atoms that generally do not assemble in electrical charges [14]. It protects the Earth and other planets from inducing and suffering repeated cosmic discharges. And it prevents leakage of the remaining charge of Earth, which may indeed be building up.

However, the space sheath or magnetosphere of the Earth cannot suffice as a buffer when large or fast erratic bodies approach. In the Venusian catastrophe, cosmic lightning played a heavy role. Cometary Venus, according to Velikovsky's reconstruction, encountered the Earth in the spring of 1453 B.C. and followed roughly its orbit for some days. The comet with its millions of miles of tail appeared and reappeared as the Earth continued with interruptions its rotation. On the second approach, after six days had passed, a gigantic column towered into the sky, a pillar of smoke by day and of fire by night, as Exodus 14:19 describes it.

> This stage was accompanied by violent and incessant discharges between the atmosphere of the tail and the terrestrial atmosphere. When the tidal waves rose to their highest point, and the seas were torn apart, a tremendous spark flew between the earth and the globe of the comet, which instantly pushed down the miles-high billows. Meanwhile, the tail of the comet and its head, having become entangled with each other by their close contact with the earth, exchanged violent discharges of electricity. It looked like a battle between the brilliant globe and the dark column of smoke. In the exchange of electrical potentials, the tail and the head were attracted one to the other and repelled one from the other. From the serpentlike tail extensions grew, and it lost the form of a column. It looked now like a furious animal with legs and with many heads. The discharges tore the column to pieces, a process that was accompanied by a rain of meteorites upon the earth. It appeared as though

> the monster were defeated by the brilliant globe and buried in the sea, or wherever the meteorites fell. The gases of the tail subsequently enveloped the earth."[15]

I would depart from the scenario mainly to suggest that the column of smoke seen everywhere was probably a mixture of the comet's tail and the "catastrophic column" (as Kelly and Dachille picture it). The main contact between Earth and Venus occurred at this point were the main discharge left Earth carrying upwards surface material and building then and there a "great chemical factory" of Venusian and Earth raw materials [16].

Legends from around the world describe this engagement. It is the battle between Marduk and the dragon Tiamat, between Isis and Seth, between Vishnu and the serpent (or Krishna and serpent), between Ormuzd and Ahriman, between the Lord and Rahab and, the most widely known of all, between Zeus and Typhon.

Velikovsky proceeds, after citing these legends, to place the comet Typhon in the mid-second millennium B.C., at the time of the Exodus of the Jews from Egypt. Bimson has established the pharaoh of Egypt just then as the first Hyksos King by the name of Typhon [17]. Typhon is related to Typhon (South Seas), Toufan (Arabs), and is another version of the legend of Phaeton. Legends, myths sacred scriptures, and ancient historians have been mobilized to support the theory of the encounter. That Venus also suffered is logical; it still faces Earth "respectfully" in "resonance", upon its near passage [18].

Electrical phenomena akin to lightning are associated with volcanism, earthquakes, and meteoritic phenomena, including atmospheric pass-through and impact explosions. They may also be an independent "instrument of the gods," as strong or stronger than gravitation in their effects when two dense bodies approach one another closely. Further, cosmic electricity may traverse a whole star system or planetary system.

C.E.R. Bruce of the British Electrical Association for many years sought recognition of the place of electricity and lightning in the creation and destruction of whole galaxies of

the universe [19]. He described lightning discharges of $6x10^{11}$ miles in width and ten times as long generating temperatures of $5x10^{8}$ degrees Celsius and lasting for 10^{6} years or more. The discharges occur amidst accumulations of cosmic dust.

Bruce's colleague, Eric Crew, who shares his views, has given more attention to cosmic lightning within the solar system and particularly in encounters involving earth. How he handles electrical problems of large-body encounters can be exemplified in the following passages:

> If a charged body B (such as a large comet) approaches a planet A which has an atmosphere, opposite charges are induced and the atmosphere will be pulled out towards B. This increases the voltage gradient between B and the extended atmosphere very rapidly and violent discharges may take place even though the two bodies are separated by a considerable distance. The effect is intensified if both A and B have atmospheres, and even more so if they have opposite charges.
>
> The effect... is to cause jet of compressed material to form and for the substance to be ejected on to the negatively charged body, or the induced negative charge.
>
> Charges induced in the solid surface of A as B approaches will cause a ground current to flow and the resistance of its path will cause the induced charge to lag behind the line joining A and B. The electrical force will produce a turning moment on A and B and the resultant motion will depend on the direction of the force in relation to the axis of rotation of A and B. The displacement may be increased if B has a crust floating on a molten interior, as the moment of inertia of this would be much smaller than that of a completely rigid sphere, even if the possible tilting of the axis is ignored [20].

That is, in the case of the several large body encounters of the Earth, which we think may have occurred, strong lightning exchanges took place, atmospheres exchanged in varying

proportions, debris flew into space, powerful ground currents of electricity followed the point of closest contact, and these currents assisted inertial forces to push crustal sections of the Earth over its plastic mantle.

Ralph Juergens' theories of cosmic electricity have been close to the historical events proposed by quantavolutionary theorists. Intimately acquainted with the experiences and ideas of Velikovsky, he worked for many years upon the basic astrophysical problems posed by the Venus-Mars-Earth scenario, specializing in the application of electrical theory.

His primary theory deals with the source of solar energy [21]. It is in one sense non-catastrophic. It is also quite new and unaccepted; yet, as he says "the modern astrophysical concept that ascribes the Sun's energy to thermonuclear reactions deep in the solar interior is contradicated by nearly every observable aspect of the Sun." Whereas the conventional theory is that the Sun derives its energy from a hydrogen-fusion nuclear reaction continuing over millions of years, Juergen's theory is that the Sun's surface bears a negative heavy electrical charge, which it has gathered mostly from galactic winds and from a great many bodies brighter than the Sun, and which discharges itself upon the solar system bodies. The solar radiance that strikes Earth and causes heat is as nothing compared with the galactic radiance that strikes the Sun. The Sun's bloated atmosphere is the anode; its highest levels are of the highest temperatures, which go down, rather than up, as the surface of the giant gas bag of the Sun is approached. Hence, elaborate attempts to catch neutrinos from the Sun's "solar furnaces" as they traverse the Earth must fail; if no nuclear fusion, then no neutrinos.

The Sun's radiance, varying only slightly as its total charge varies, penetrates the electrically neutral plasma of interplanetary space, passes through the positively charged outer magnetosphere, enters a neutral zone and then a negatively charged inner zone, and finally strikes the Earth's atmosphere with warming and radioactive effects. (Jupiter does not "need" the Sun's heat; it radiates several times as much energy as it receives from the Sun.)

A great proportion of all the craters and many fissures of the Moon and Mars, and, though less visible, of the Earth, are explained by Juergens as the effects of cosmic lightning, occurring during the holocene period that we are studying.

The "plasmoids" which I referred to earlier are a type of lightning conducted to Earth as "pieces of plasma." These balanced "things" of positive ions and electrons retain their identity and appear as luminous objects of missile-like proportions. They would cause impact craters or above-ground explosions that leave little trace. A second type of primeval lightning, like that known best to us, would give clear evidence of electric scarring, whether as a crater or as a jagged crack in the ground.

The jagged cracks of clefts are called rilles and are found by the thousands on the Moon. The principal candidate for the most recent creation of rilles is the planet Mars, which, following Velikovsky's reconstruction of events, would have happened in the period 776-687 B.C. Electrons has to be torn from the lunar crust in numbers sufficient to trigger an interplanetary discharge. The Moon becomes the cathode, Mars the anode. As the charge mobilizes quickly on the Moon, it probes along lines of weakness and explodes the surface in traveling to its discharge point. It blasts a crater as it exits into space.

Again Juergen's theory is exceptional. More favored as agents are running water (now gone), erosion by dust winds, an explosion of underground gases, and the collapse of lava tubes through which liquid lava had passed. That these alternatives to the agency of eruption of a breakdown channel raise severe problem is documented by Juergen's table presented below. It may be seen that the lightning channel eruption, not entirely unknown even today on Earth, provides a better explanation of rille characteristics.

Competence of Various Theories to Explains Sinuous Rilles of the Moon

Rille Characteristic	**Proposed Rille-Origin Theory**				
	Erosion by Running Water	Erosion by Ash-Gas Cloud	Formation by Gaseous Outburst	Formation Lave-T Collapse	Eruption of Breakdown Channel
1. Width greater at higher end	C	C	O	B	A
2. Channel sinuous	A	C	O	C	A
3. Irregular crater at upper end	B	B	O	B	A
4. Ends of rille at different elevations	A	A	O	A	A
5. Outwash deposits lacking at lower end	C-X	B	A	C-X	A
6. "Bridges" lacking along channel	A	A	O	B-C	A
7. On-channel cratering frequent	O	O	A	O	A
8. Channel may traverse high ground	X	X	B	X	B
9. Channel may stray from dip of surface	C-X	C-X	B	C-X	B
10. Channel may follow crest of ridge	X	X	A	B	A
11. Channel may expose numerous strata	B	B	A	C-X	A-B
12. Surface strata upturned at rille margins	X	X	A	X	A
13. Clustering of rilles	C	C	B-C	B-C	A-B
14. Young rilles may cross older rilles	C-X	C-X	A-O	C-X	B
15. Secondary rilles in rille bottoms	B	C	C	C	B

Symbols : A. Predictable on basis of theory, B. Permissible in terms of theory, C. Permissible, but difficult to explain, O. Apparently irrelevant in terms of theory X.

Evidence precludes theory.

Probably the main focus of the electrical battle between Moon and its assailant is the huge crater Aristarchus. It expresses its recency by a bare uncratered floor, by giving off light and by being intensely radioactive. The greatest concentration of lunar rilles is also located at and near Aristarchus. The light bolt was estimated by Juergens at $2x10^{21}$ joules of energy, "a few million times as energetic as ordinary lightning."

The likely partner in catastrophe, Mars shares gases with the Moon.

> As things stand, the situation is this: Lunar finds are rich in argon, neon, other rare gases, and carbon dioxide None of these gases is known to be present in the solar wind, nor is elemental carbon a known constituent of that medium... Precisely those gases known to be present in the atmosphere of Mars - the great bulk of which has been mysteriously "stolen" away in the not-too-distant past - are also found tenaciously held in superficial crystalline layer of the Moon's outermost blanketing materials. This would be a most incredible coincidence if the interplanetary discharges described by Velikovsky never took place [22].

We are only in the early stages of fulminology. Edward Komarek has discovered that the effects of modern lightning are extensive. When a tree is struck, surrounding trees and vegetation are affected by structural, biological, and chemical changes for a long time to come. Lightning also may fuse the Earth around. Fused sand tubes caused by lightning and called "fulgurites" are common around the world. "In one sand-dune patch of 5,000 acres at Witsands, on the southeastern border of the Kalahari Desert, Lewis estimated that there were not less than 2,000 fulgurites. Since lightning is at the present time very infrequent in this area, some of the tubes must have been formed thousands years ago [23]. The fulgurites often followed bush and plant roots. Perhaps they occurred simultaneously and were one of the causes of the desert. That all deserts, whatever their origin, may be indeed new is a question worth considering.

Lightning may descend in showers. Lightning may instantly fossilize trees; a high tension wire did so too in Alberta, Canada, E.R. Milton reports. Lightning alters C14 content in trees, hence their "age" for dating purposes [24]. Recently various theories have been offered to explain the mysterious kimberlite tubes of South Africa and similar tubes in Utah. The former are like fulgurites and are found near the great diamond fields. Probably the same electrical flows that dug the kimberlites produced the diamonds. Whether this should be called "slow lightning," and discussed in the preceding chapter, or should be discussed here is perhaps immaterial at this stage of research. The Moses Rock dike of Utah is about 4 miles long at the surface, in the shape of a hook, and about 1000 feet wide. It was forced up from possibly 200 kilometers below the surface.

Komarek has come to believe that "lightning is ecologically fully as important as such better known factors as temperature, rainfall, soils etc [25]. He does not estimate past incidences. If present lightning effects must be exponentially retrojected into the past, the world would have been significantly remolded therefrom.

Juergen's theory of Moon and Mars belongs to Earth as well. The Earth must have lunar rilles in large numbers. An unknown but considerable number of craters, "river" valleys, fractures and ravines must owe their origin not to ice, water, volcanos, or meteoroids, but to cosmic lightning. In the absence of well-directed field work, not only are their indications misinterpreted, but usually their very existence remains a surmise. The present level of electrical activity on Earth does not excite research except in imaginative minds, like Ralph Juergens, Nicola Tesla and Frank Dachille.

It is well for geologists to consider meanwhile the promise of such theories. Take, for example, the consequences of the concept that the Earth's global electric potential has not been uniform throughout its history, an idea that I repeat in this book several times; consider its consequences for another insistent

idea of these pages, that geological time may be grossly exaggerated.

Juergens argues that the Earth's surface potential is highly negative and low [26]. Suppose that it is lowered further. Rampant radioactivity would occur. The half-life of every radioactive atom would be drastically reduced. Radiochronometric time would be largely erased. In the opposite case, if Earth's potential became higher and less negative, polonium, for instance, which has a short life as evidenced in the geological record by the halos it inscribes upon rock, would acquire a much longer half-life and so would other radioactive isotopes.

Nikola Tesla's work is acclaimed for its genius. But some of it was unfortunately cut short by a lack of funds and his growing madness. It went largely unreported and, especially because it was so astonishing, it was and is difficult to describe and appraise. Around the turn of the century, after his dramatic successes in designing and building alternating current electric motors in the East, Tesla went West to Colorado Springs and built an extraordinary electrical apparatus [28]. He set up a 200 foot tall mast with a metal ball on top nested in a 10 foot diameter coil. At a diameter of 80 feet he provided a second surrounding coil. These were affixed to banks of condensers. A 300 volt line from a nearby power plant supplied initial impetus to the oscillator. The magnetic field created by the current in the large coil set up an alternating current in the central coil. Over 150,000 times per second, a charge was sent through the Earth and back up and out into the atmosphere, discharging as bolts of lightning.

Tesla thought that such a machine oscillating through the Earth might be tapped at a number of place through local receivers to supply energy for local consumption. It would be a wireless electrical power distribution system. This naive and astounding project has not to my knowledge been seriously considered by geophysicists and electrical engineers in these years of energy crisis.

Nor, for that matter, has the idea of Juergens, that "once the curtains of *thermo*-nuclear theory are drawn aside, electrical engineers will quickly discover that the controlled-fusion reaction they have been seeking in vain for a quarter of a century have actually been within their grasp for at least twice that long - that a relatively small throughput of electrical energy will release the pent-up power of matter on a scale far beyond the most fanciful prediction of the late 1940's."

Notes (Chapter Six: Terrestrial and Cosmic Lightning)

1. Nicola Rilli, *Gli Etruschi a Sesto Fiorentino* (Firenze: Tipografia Giuntina, 1964), 92.

2. *Ibid*., 94-5.

3. Ralph Juergens, "Of the Moon and Mars," 4 *Pensée* 4 (Fall 1974) 21-30; 4 *Pensée* 5 (Winter 1975), 27-39; A. de Grazia, *Chaos and Creation*, 203 for illustration. On ball lightning see A. Wittmann, 232 *Nature* (27 Aug. 1971), 625.

4. In *Thyestes*, a drama remarkable for its catastrophic images.

5. R. Orville and B. Vonnegut, "Patterns of Thunderbolts," 92 *New Scientist* (1981), 102.

6. *New Scientist* (20 Oct. 1977), 150.

7. G.P. Pliny, II *Natural History* (trans. Cambridge: Harvard U. Press, 1967)II: LIV. The translation of Rackham is questionable, if only because he has no idea that the Etruscans and early Romans, like the Hebrews and Greeks of the age, were using electrostatic machines to produce divine image and oracles.

8. A. de Grazia, critique of *Enea Nel Lazio* (Rome: Palombi, 1981) on the Virgil Bimillennial Celebration, in *The Burning of Troy* (in press).

9. *Worlds in Collision*, 273.

10. Donald W. Patten, R.R. Hatch and L.C. Steinhauer, *The Long Day of Joshua and Six Other Catastrophes* (Seattle: Pacific Meridian Pub. Co., 1973), 18-9.

11. *Op. cit.*, 88-91.

12. Patten *et al*., 92.

13. *The Jupiter Effect: The Planets as Triggers of Devastating Earthquakes* (New York: Vintage Books, 1974).

14. Juergens, "Moon and Mars," *loc cit*., 37 *et passim*.

15. *Worlds in Collision*, 77-8.

16. *Target Earth*, 189ff.

17. "Rockenbach's 'De Cometis' and the Identity of Typhon," I *S.I.S.R.* 4 (Spring 1977), 9-10.

18. C.G. Ransom, *The Age of Velikovsky* (Fort Worth, Texas: LAR Co., 1976), 117 interprets several studies.

19. His basic work is *A New Approach to Astrophysics and Cosmogony*, (London: Unwin Bros., 1974); *cf* letter of Dec. 1958 in 4 *Electronics and Power*, 669-70, "Cosmic Electric Discharges."

20. "Electricity in Astronomy," *S.I.S.R.* (1976-7) I: 1,2,3, II: 1.

21. 2 *Pensée* (1972) 3 (Fall), 6-12.

22. Juergens, "Moon and Mars," *loc. cit*., Winter 1974-5, 33.

23. "The Natural History of Lightning," *Proc. Tall Timbers Fire Ecology Conf.* (9-10 Apr. 1964), 150.

24. L.M. Libby and H.R. Lukens, "Production of Radiocarbon in Tree Rings by Lightning Bolts," 78 *J. Geophy. Res*. 26 (10 Sept. 1973), 5902-3.

25. *Op. cit.*, 171.

25A. 98 *Sci News* (11 July 1970), 33 on the work of T.R. McGetchin; I.D. MacGregor, "First Kimberlite Conference," Rep. S.A.F. *Geol*. (Mar. 1974), 151-2.

26. "Radiohalos and Earth History," III *Kronos* I (Fall, 1977), 3-17.

27. J.J. O'Neill, Chapter 2.

28. 4 *Pensée* 4 (Fall 1974), 30.

CHAPTER SEVEN

FIRE AND ASH

"A 'universal conflagration' (if possible) would certainly not last long enough to leave any sort of recognizable stratigraphical record, whereas a few centuries or millennia of occasional heath or forest fires, during a particularly dry spell, would probably do so without requiring any special mechanism."[1]

Even to speak of a universal conflagration gives a geologist cause to blush, as Derek Ager, the author of these lines, remarks in another context. Without the "special mechanism", forest fires, started by lightning, and volcanos, started by hot spots in the deep crust or mantle, must do the full job of whatever we see as signs of burning on Earth and whatever the ancient voices are fearfully asserting. If this were all, and it certainly is not all, we would still have to ask about lightning and hot spots; neither is a simple autodynamic mechanism, as we have seen already in the case of lightning and will see in regards to hot spots.

The legendary and early historical record is replete with assertions that global burning has occurred. Writing apparently about historical experiences, Seneca, the Roman stoic philosopher, gives a common ancient view of the holocaust:

> And when the time is come when the world destroys itself to be renewed, then (Earth, seas and life) will destroy themselves by their own strength. Stars will fall upon stars. And when all material things are in flames, everything which now shines according to a planned distribution will rise up into a single fire [2].

Of course, Seneca does not declare that a stratigraphical record will be thereafter available; the Earth is "renewed," which

implies that few marks would have been left upon the rocks and no bed of ashes would have formed and persisted. Where are the ashes of single or multiple events, for that matter? Sometimes they are present, sometimes not. In certain parts of the world, extensive beds of ashes of possibly local type can be found. They are thin. We can find the ashes of Troy, on several levels of destruction, but can the ashes of the countryside around be found? If not found, does that means that Troy alone was burned, or that ruined Troy alone preserves its ashes? Paleocalcinology - such a science hardly exists - will help us someday to measure the words of Ager and Seneca.

The "ordinary" fire mechanism of volcanos and forest fires sometimes incite rains, but these are hardly conspicuous. On the other hand, the legendary coupling of fire and water is so flagrant as to pass notice, except when a progressive rabbi, for example, finds it easy to explain to his children why the heavens are of fire and water; *ish-vamayin* (fire and water) make up *shamyin* (heaven) because the ancients thought of sunlight as fire, and the rains, of course, come from the sky [3].

G.R. Carli, writing in 1780, was already asserting that "the idea of a deluge of fire and a deluge of water was present among all peoples... This idea of fire and water... seems to recall tradition of an event of which the memory has endured. It is certainly odd that the indications manifested by a seaflood should have suggested the idea of a deluge of fire [4]. Carli cites Clement of Alexandria for the observations that Stenelas, father of the king of the Ligurians, lived at the time of the fire of Phaeton and the flood of Deucalion. So fire and flood occurred together. Reasoning from effect to cause, Carli then assigns the coal deposits of the world to burning and water acting in quick succession, a theory now coming into prominence again. He argues that only a comet could burn up the world, drop vast amounts of water, and bring great tides at the same time. Probably this line of argument will stand up: a large body encountering Earth, even if it were not dropping water or ice, would bring both conflagration and flood. Whether it crashed or not, the effects would still be similar.

Donnelly produces an abundance of legendary accounts of the world in flames: from Druid mythology, Hesiod's Greek account, the Eddas of Scandinavia, Ovid's Roman account of Phaeton, the meso-American Toltecs' *Codex Chimalpopoca*, the Persians' *Zend-Avesta,* the Hindus' myth of Ravana and Sita, and the legends of the Tupi, Aztecs, Tacullies, Ute, Peruvian, Yurucares, Mbocobi, Botocudos, Ojibway, Wayandot, and Dog-Rib Indians, that is from one end of the Americas to the other, and across both continents. He quotes the Gothic Surt of the flaming sword, "He shall give up the universe a prey to the flames," and also the Algonquins, whose god "will stamp his foot upon the ground, and flames will burst forth to consume the habitable land."[5]

Job of the Bible hears from a retainer that "the fire of God is fallen from heaven and hath burned up the sheep [to the number of 7000], and the servants, and consumed them, and I only am escaped alone to tell thee." (In our days cases of a score or more animals being electrocuted by a lightning bolt are recorded.) There begins then the woes of the stubbornly patient Job against frightful divine tests. It is only one of many references to naturally caused combustion in the Bible. The story of Job may be exceedingly old; there Elohim (Heavenly One) is addressed; it happened in full Neolithic times, perhaps at the ending of the age of predominantly Saturn worship [6].

Later in reference to fire is the "flaming sword", east of the Garden of Eden, "which turned every way, to guard the way to the tree of life." This was after the "Fall from Grace."[7] The image of a sword in the sky may refer to the Great Central Fire of early Greek Philosophy and, as we elaborate in *Solaria Binaria,* to a then intermittent arc between Jupiter and the Sun. (We treat the image in detail in *Solaria Binaria*.) The seasons begin; it must be now the period of the gods Jupiter-Jehovah, the Jovean Age I have elsewhere termed it. In a later incident, the wicked cities of Sodom and Gomorrah are destroyed by a fall of fire and brimstone and swallowed up. Then, as earlier described, the Tower of Babel succumbed to fire in part. During and after the Exodus, repeated references to the heavenly fire are encountered. It comes in all its forms; lightning, gas blasts, burning naphtha falls. These are

elaborately treated by Velikovsky in *Worlds in Collision* and by the present author in *God's Fire: Moses and the Management of Exodus.* In all, von Fange quotes 37 different passages from the Bible referring to, or prophesying, destructive fire from heaven [8].

Both Donnelly and Velikovsky claim the myth of Phaeton - the one writer for a Great Comet of an earlier age, the other for the events of the mid-second millennium, where we too have decided to place it. The Latin author, Ovid, is the principal source of Phaeton. The Babylonian cuneiform expert, Kugler has explained Ovid's as a true history of a comet [9]. Phaeton is the inexperienced son of Phoebus who demands to be let to drive the chariot of the Sun one day. He prevails, but loses control of the steeds and burns up sky and earth. The constellations are disturbed. The flames turn whole nations into ashes. The ground bursts asunder, the rivers dry up. Smoke billows bring darkness to the world. The ocean shrinks. Ashes cover the Earth.

Mother Earth trembles and sinks below here usual place. She pleads with Jupiter. "If the sea, if the earth, if the palace of heaven, perish, we are then jumbled into the old chaos again. Save it from the flames, if aught still survives, and preserve the universe." Jupiter responds by demolishing Phaeton and the chariot; Phaeton, his yellow hair streaming in flames, is hurled to the earth like a falling star.

The Sun, Father of Phaeton, mourns as in an eclipse. The earth was lit only by its own flames. He would not resume his daily journey until all the gods supplicated with him. The days appeared once more, and Jupiter restored order and life to the heavens and earth.

No one disputes the fact that the earth has been badly burned. Provided, of course, that the statement is properly qualified. The ocean basins are of melted rock; they are fashioned almost entirely of basaltic lava. Ocean abyssal sediments are thin and loose, and composed of organic and dust fall-out for the most part, including some products of combustion.

Of the continents, part of the surface that is exposed to view is igneous, a product of old or new melting. Another portion is metamorphic, a word meaning rock transformed mostly by heat and pressure, both old and new; this emerges from both sedimentary and igneous rocks. (It is significant that whereas observers are compelled by the sight of volcanism to say that *some* lava beds are new, they are reluctant to name any metamorphosis of rock that has taken place very recently.) Igneous rock, if not witnessed as it forms, is also invariably given old dates.

A Phoenician vase of around 1500 B.C. was found embedded in the copious lavas of the Jezreel Valley of Palestine, where volcanism had supposedly ended in prehistoric times [10]. At Nampa, Idaho, in 1889, a well-worked human image carved of pumice stone was found amidst coarse sand of an old lake bed beneath 300 feet of alluvium, lava and clay [11]. The lava had been and still is classified as late tertiary or quaternary, a million or more years before mankind is supposed to have arrived in America. The Nampa image, now lost, is disregarded; given the strong testimony concerning it, one may wonder how much of natural and human history would be erased under the same strict rules of appraisal.

Granites are the continental structure: nearly all come from an ancient cooling of molten rock. They rest below the recent igneous rock, metamorphic rock and sedimentary rock on all continents. We have direct information downwards only on a couple of miles of crust; it is considered that granites carry on down to a basalt not unlike that of the ocean bottoms. When and how the granites formed is unclear; their chemistry is distinctive.

A final part of the continents is covered by sedimentary rock. Sedimentary rock is formed from transports of materials by wind, water, and ice. Donnelly argued that much of the clay, gravel, and till that composes it descended from a cometary train recently in " the age of fire and gravel," rather than from other rock being ground up and spread around by moving ice.

From the standpoint of human primevalogy, the uppermost layers of rock and debris are highly important. These are usually termed unconsolidated, or loosely consolidated, or aggregated, or conglomerate. High energy expressions of "earth, air, fire and water" will produce large quantities of this material and their origins, dating, and relation to the biosphere are hard to discern.

Everywhere one is likely to find soil, a catch-all work for any layer from the thinnest film up to a few meters in which life forms take hold or dwell. Fossil soils often rest between layers of the several types of rock.

Besides the soil, too, exist metals, soda ash, peat, various ashes, coal, oil, natural gas, salt, and other deposits. Some of these are thermal products. Billions of tons of glassy microtektites are strewn over the globe; whatever their origin, they may have fallen in as hot rain on land and sea. Layers of ash are found over vast stretches of the oceans bottoms, perhaps everywhere, since the searches have just begun. Ash is fairly distinguishable; it is more difficult to detect whether the much more profuse sedimentary clays are not themselves in part the products of combustion, carried over and dropped upon the sea or drained off the continents onto the slopes and shelves.

On the land, too, ashes mix readily with soils and detritus to form clays. It is not impossible to detect calcination in soils and clays, but the subject has attracted few geo-chemists. Soils and young marine sediments of northeastern and offshore America reveal, under chemical analysis, evidence of a fiery origin in that they contain polycyclic aromatic hydrocarbons [12]. These are carcinogenic and mutagenic. It is possible that their incidence is world-wide. If so, it would indicate that the whole world suffered one or more fall-outs of burning or burnt material. The burning could have been caused by super-terrestrial impact explosions or gases. Or the products of atmospheric fire (burning naphthas and brimstone or sulphur, as the Bible would have it) descended. Or both might have happened. The authors of the report cited here considered the effects to have been possibly produced by giant forest fires and air transport, and unfortunately, did not consider exoterrestrial

origins of the widespread combustion products, or for that matter, of the fire that consumed the biosphere. T.M. Harris [13], in describing "Forest Fire in the Mesozoic," found much fusain in many layers at many places, including the deltas of Greenland and Yorkshire. The admission that cosmic lightning and cosmic fire were prevalent at quantavolutionary points is avoided by placing layers of time between layers of ashes.

We cannot readily separate ash from human, at least not without chemical tests of a degree of sophistication hitherto undeveloped because of the theory of gradual accumulation of soils over long eons. Commenting upon Ager's search for ash, Hans Kloosterman speaks of a "black horizon" of soil "that seems to have been covered with sediments immediately after its formation," this in Derek Ager's work; and despite Ager's retreat into what Kloosterman calls "crypto-uniformitarianism," the latter defends the idea that there might be identified only" one enormous forest fire, which is moreover correlatable from Southern England to the Great Lakes of North America. Doesn't that sound somewhat like a universal conflagration?[14]

Kloosterman goes on to discuss the "dark bank" he witnessed in Brazil. Despite deliberate tropical burnings that are regular and go back hundreds of years, "no charcoal-rich layer is formed anywhere; the ash is incorporated into the human layer or washed away."

Whereupon, this author adds evidence by Wendorf, Said, and Schild that in Egypt, at claimed dates around 10,550 B.C. a burnt layer appears over a large region of the Upper Nile Valley, which the investigators guess to have been caused by brush fires, but which to de Grazia seemed to have been associated with holospheric catastrophe and world-wide conflagration and/or incredibly heavy ash fall-out.

J. Lamar Worzel of Lamont Geological Observatory (Columbia University) published important findings in 1969, entitling them "Extensive Deep Sea Sub-Bottom Reflections Identified as White Ash."[15] The analyzed deep sea cores came from the east-central Pacific, from Mexico to Peru, an area of a million

and a quarter square kilometers. The piston-corer was not long enough to probe the nature of echoes, possibly representing other ash layers, obtained from below 78 feet.

The layer of ash measured differently in the various drilled cores but ranged from 5 to 30 cm of thickness. "Since the layer is fairly near the surface and is not discolored and contains nothing but the glassy ash material, it must have been laid down fairly quickly." At depths of 1000 to 3000 fathoms, the ash was under great pressure, also the original atmospheric and hydrospheric conditions might have dissipated and disintegrated some of the initial deluge.

The fall was so heavy and quick, "that it may be difficult to ascribe it to the Andes... Perhaps sub-bottom echoes from other areas can also be correlated with this white ash layer. If so, it may be necessary to attribute the layer to a world-wide volcanism or perhaps to the fiery end of bodies of cosmic origin."

In a critique of "The Significance of the Worzel Deep Sea Ash," Maurice Ewing, Bruce C.Heezen and David Ericson, also of Lamont Geological Observatory, advanced reasons why the white ash layers might be found elsewhere: citing the sounding of the vessels *Albatross, Galathea*, and *Verna* from different part of the world, they conjectured that the same sub-bottom echoes and possible ash layers existed over much of the globe [16]. Sedimentary mixing would often subdue or annul the echoes.

> The ash deposits observed by Kuenen and Need and Bramlette and Bradley were mixed through a column of sediments several times the thickness of the original ash bed. In addition to this mechanical mixing, solution may vastly alter the sediment before permanent burial is accomplished. Devitrification and alternation, proceeding at rates dependent on the environment, may transform an ash bed into products whose origin is not readily recognized.

"Extensive ash layers are now recognized in continental areas throughout the geological record," they point out, citing C.S. Ross. They declare too that "ash of similar composition has been logged in boreholes in many of the dry lakes of the western United States." (These dry lakes are all very young, post-glacial.) As mentioned, Wengret and others showed extensive ashes and calcination in the Nile Valley to which they assigned fairly recent ages; one can only wonder, for similar reports simply are not registered generally, how many cuts and profiles around the world reveal such calcination and why, as has been observed, the older rock-strata show almost no calcination - except that metamorphics, granites, igneous rocks, and perhaps limestones themselves are sign of heavy thermal activity.

Until very recently, geologists, like archaeologists, have been incurious about thin beds of ashes. An alerted surveyor, Heladio Agudelo, wrote this author (Oct. 4, 1977) saying, "In my work... while helping build a new street I noticed a black line in the gravel formation." It was a "one inch thick black line in otherwise homogeneous alluvial(?) formation." Within several weeks it became invisible due to erosion "but it will take no bigger a tool that a hand shovel to expose it again. This is in Londonderry, N.H., no more than an hour's drive from Boston Airport." Thin beds of ashes represent enormous fire, the effects of ordinary forest and construction fires disappear quickly.

The Ewing group, quoted above, comments that "Murray and Renard identified volcanic particles in practically all of the *Challenger* surficial samples of deep sea deposits, demonstrating that volcanic detritus is an important component of modern deep sea deposits throughout the world. They suggested that the abyssal clays are largely the result of alternation of volcanic ash." Later on, the authors themselves conclude: "It is necessary to study the alterations of fine pyroclastics in the sea and to set up criteria for recognition of the alteration products formed under the full range of environmental conditions." (I proposed such procedures for heavy combustion products in many archaeological levels, exemplified in the "Burnt City"of Troy IIg).

The Worzel ash consists of colorless shards of volcanic glass without sorting by particle size. "In all important respects it is similar to material which has been classified as volcanic ash in the deep-sea deposits of the world." Analysis of the surrounding sediment in the Worzel cores indicates that the bottom waters "must have contained some oxygen" and that the sediments "probably represent no more than 100,000 years and conceivably far less." Whatever the date, mankind was very much present and concerned. Certainly years of darkness, disease, distress and terror occurred around the world with this deluge.

"The ash is entirely unlike material described as meteoritic dust. Only the wide geographic extent of this layer suggests any source other than volcanic eruptions. "To this proposition, with which Worzel might differ, given his quoted remarks, one might take exception. "Meteoritic dust" is too imprecise a term to use in argument, considering that we may have to consider lunar material and the 50 to 150 million mile tails of comets. If, as the authors grant, there is a need to examine and re-examine numerous types of sediment, there is also a need to distinguish, if at all possible, "cosmic dust" from "terrestrial dust". If world-wide volcanism can only originate from an externally interrupted motion of the Earth, or from a titanic large-body encounter, then "terrestrial dust" is also an effect of exoterrestrialism.

Heezen and Hollister write that the Krakatoa eruption of 1883 "produced an insignificant sprinkling of ash" by comparison with six great eruptions of the past "million" years that blanketed thickly the ridge and basin of the Java Trench. "Indeed how great must have been the earlier eruptions if the greatest known to man was too small to produce significant record. Powerful eruptions in the Japanese, Kurile, and Aleutian arcs have produced so much ash that these airborne volcanic products dominate the scenery of the Northwest Pacific in a belt almost 1000 km wide [17]. (We note again that human were already present during these great ash storms and presumably coining legends.) Heezen added elsewhere the

Mediterranean Sea bottom as a depository of several heavy ash layers.

Walter Sullivan describes " a succession of ash layers" encountered on the edge of the continental slope before striking the lava basalt of the true ocean bottom. Might this not indicate that the continental slope was laid down subaerially, collected its sedimentary and ash layers and was then inundated by the ocean? Drilling in the Atlantic "has begun to paint a picture of the awesome events that accompanied the birth of that ocean [18].

To all of the ash layers referred to, and much more exist, one must accredit exponential ash storming that has dropped to relatively tiny amounts during historical times. Max Blumer led the discovering and detailing of paleochemicals in soils. His group found polycyclic aromatic hydrocarbon from pyrolysis in many places and wondered at the great conflagration of ancient times.

Blumer even suggested that these carcinogens and mutagens played a role in the mutation of species [19], Beadle has explained the origins of a peculiar ancient Mexican corn as a case of thermal polyploidy, genetic gigantism brought on by subjection to environmental heat, a feat he duplicated in the laboratory [20]. Gigantism, and possibly dwarfism, and associated polyploidy in plants and animals have, then, as a possible contributing cause, heat stress.

The work of Edward Komarek Sr. on fire and lightning stresses the role of these agents in prehistoric as well as modern times. He regards many species of plants and animals as fire-prone, including mankind. They have become adapted at some time in the past to naturally caused fires and are inclined to make the best of it. Komarek has been active in instituting controlled forest fires to imitate natural fires which strengthen growth, rather than weakening it as is popularly believed; the observed quick recovery from fire is one more indication that the great conflagration can occur without citation in the geological record.

Fires in prehistory may have been much more extensive than they are today and their part in animal adaptations may have been considerable. He quotes Harris on "Forest Fire in the Mesozoic," where the author describes vast fusain deposits, identifies them as fossil charcoal, and says "the objection usually used against accepting fusain as charcoal produced by fire is that there is too much of it and in too many layers. It would make the past a 'nightmare.'" Fusain is intimately associated with coal beds and thus reinforces the Carli and Velikovsky thesis, seconded by Francis and Cook, that coal is what remains of a bulldozed burning biosphere, buried deeply and tamped down promptly by successive waves of other material.

Animal fossils are sometimes found amidst ashes. "Ancient Ashfall Entombed Prehistoric Animals," heads an article by M.H.Voorhies [21] where a Middle Miocene prodigious ashfall over hundreds of square miles snuffed out over 200 species at one waterhole alone. When geologist Louis Lartel was excavating Cro-Magnon man (fragments of 15 individuals) near Les Eyzies-de-Tayec (Dordogne, France) in 1868, he uncovered five archaeological layers that had been covered by ash. The Upper Paleolithic was an age of ashes too. The glacial ice, where such great sheets existed, must have been covered with ash, if today ice drilling reveals no heavy ash fallouts it must mean that the caps are exceedingly young.

Erich von Fange has come upon many a recent report of burnt sites. He mentions towns whose calcinated ruins resemble strikingly what one can read of Troy IIg, "The Burnt City," when reexamining the extensive records of its excavation. His cases come not only from the Near East but also from Western Europe and Britain, Central Africa, the Gobi Desert of Central Asia, the Mohave Desert of the American Southwest, India, Cusco (Peru), and Cete Cidades (Piaui, Brazil). The "Cities of the Plain," including Sodom and Gomorrah, flourished in an area that became a scene of utter devastation to this day, over four thousand years later. All that grew in this Dead Sea Rift area, all who lived there, all that was built there, were wiped out by falls of fiery debris and an upheaval of the earth; asphalt, salt and sulphur are abundantly displayed now.

The prophet Isaiah (2:10,2:19) has people rushing into holes and caves when the Lord in his majesty "ariseth to shake terribly the Earth." The lowland Indians of Peru put pots on their heads and run for the hills when the earth quakes. So do Kamchatka Siberians. Against softly reasonable explanations of such behavior stand grimly reasonable ones, that in times past, earthquakes and fall-out and heavy tides came together.

Boiling seas have been observed near subterranean volcanos. That large stretches might boil is arguable. Velikovsky adduced legendary accounts around 1450 B.C. Thus, quoting the *Zend-Avesta*, "The sea boiled, all the shores of the ocean boiled, all the middle of it boiled," when heated by the star Tistrya (Venus) [22]. Carl Sagan claimed a total boil-off if the Earth abruptly stopped rotating [23], but a slowdown would bring limited surficial boiling.

Perhaps the oldest radiocarbon dates of a burnt city come from Dilmun (modern Dahrein) at the North end of the Persian Gulf [24]. There the lowest level is calcinated. It is located below a thick wall. The burning occurs over the whole area of settlement. The debris contains burnt bitumen and "black masses," producing radiocarbon dates of 19,000 to 36,000 B.P. (in my opinion, valueless). There are "strange" sand "fill" intrusions at this level that carry various artifacts and bits of copper. Below the calcination occurs a meter of sand with shards, and below that, bedrock.

The ruined mysterious city of Tiahuanacu, 18000 feet high in the southern Andes mountains, is believed to have once rested upon the shores of the ocean, now hundreds of kilometers distant. It seems to have had port installations and to have been connected with Lake Titicaca, to the north, which contains living species of oceanic type. Tiahuanacu stands on strange ground. The climate is dry, the foliage is scanty, the weather is cold, the neighboring people wretchedly poor and few in number. The top soil of the plateau is a two-foot dry deposit, now soft stone. Below it stands the lignite of charred tropical plants. Next come a layer of ash deposited amidst rainfall, and then appears an alluvial deposit. All can be considered short-

term deposits of the lowlands. Combustion obviously played a large part in the happenings. In such a place, one would normally expect merely a scanty soil, windwept, on rocky ground.

Poznansky, the major investigator, detected three cultures and three natural destructions [25]. He allows Tiahuanacu a very old age, calling it the oldest known city in the world. Bellamy believed it to be a city that dwelt beneath a terrible sky, with first a satellite that closed into Earth and crashed later, and then a newly captured moon circling above [26].

I argue elsewhere for a single event, that the Moon erupted from the Pacific Basin to occasion the destruction of Tiahuanacu; at the same time it was elevated, but not to its present height. Another elevation might have followed in the second millennium B.C. whereupon the city was left in ashes and ruins. That is, an early Tiahuanacu might have flourished before the new-born Moon. Peruvian legend has it that before the Sun and Moon were made, Viracocha, the White One, rose from the depths of Lake Titicaca and presided over the erection of the cities on its islands and Western shores.

The conventional view classifies Tiahuanacu as pre-Inca and places it therefore in the present era. It was never an important Inca site and its resemblances to Inca culture are no more than its resemblances to the earliest Ecuadorian or Mexican cultures or to the Easter Island complex for that matter. Its astronomical observations carved upon stone gates were magnificent [27], the Incas were underdeveloped by contrast. Tiahuanacu may then be the oldest of fire-devastated ruins.

Examples of the latest possible world conflagration can be found in Greece. These would be in the -776 to 687 B.C. period, by Velikovsky's chronology, which I accept; owing to a major shift in time reckoning, most of the great destructions in these areas that has been assigned to around 1200 B.C. is now scaled down to the eighth and seventh centuries. The new great destructive sky god was Mars in many forms [28]. It was now that King Nebuchadnezzar ravaged the Near East believing himself to be the personification of the planet-god Mars-

Nergal: " I am Nergal. I destroy, I burn, I demolish, leaving nothing behind me." (He was, of course, not nearly so effective as his model, and was ultimately killed).

The same age began with the downfall of the Mycenean culture. The evidence of the destruction of Mycenean culture by fire has been available for a long time, but put aside for lack of a cause. A.H. Frickenhaus, a German excavating long ago at Tiryns, described how he had located a burnt Mycenean palace with a new Greek-style temple built right over it [29]. At Pylos, not far away and of the same period, fire was manifest everywhere, burnt rooms, burnt oil, fused metallic implements, scorched pots.

In his analysis of the Pylos event and others, Isaacson has substantially proven the correctness of the revised dating [30]. Apparently, the Mycenean (Greek) Age changed into the archaic Greek period amidst general conflagration. But so did age upon age before, both geologic and cultural.

I have not mentioned thus far the catastrophes that ended the Old Bronze Age around 2300 B.C. According to Schaeffer: "There is not the slightest doubt that the conflagration of Troy IIg corresponds to the catastrophe that made an end to the habitations of the Old Bronze Age of Alaca Huyuk, of Alisar, of Tarsus of Tepe Hissar, and to the catastrophe that burned ancient Ugarit in Syria, the city of Byblos that flourished under the Old Kingdom of Egypt, the contemporaneous cities Palestine, and that was amongst the causes that terminated the Old Kingdom of Egypt." Egyptian Old Kingdom tombs are generally marked by signs of conflagration, Emery has discovered [31]. A great many places elsewhere must have become heaps of ashes as well.

At Anemospilia, Crete, a small north-watching hillside temple was excavated [32]. Of four skeletons unearthed, one was identified as a priest, a second as a youth of 18 who had just been sacrificed. ("The only remains of Minoans heretofore unearthed had been recovered from tombs.") He had been trussed and laid upon the altar. The sacrificial knife lay on his bones. The priest sprawled in an agonized posture nearby,

intimating death by sudden collapse of the stone structure. The other persons were perhaps attendants and killed simultaneously. Earthquake was presumed. The youth, an analysis of his bones revealed, had died just before the disaster, half his body had been drained of blood, the upper-most half. Then a fire had swept the premises before the bottom half was drained.

The fire is attributed to tipped oil lamps, but, following the logic employed in my study of Trojan fires, I would suspect an external source, possibly drifting flammable gas pockets, for an ordinary fire would consume the bones, in the unlikely event it could start up in the first place. Perhaps it was not fire, but a scorching blast, that preceded or succeeded a seismic shock. Why, also, were there only three persons in the temple? Were all other people in hiding while the heroic priest and his staff went to offer the sacrifice? Why did not the people return to dig out the bodies and restore the temple? Burial was a holy obligation; an unburied priest would be a holy horror. A presumption of total desolation and death over a considerable area arises.

John Bimson, describing the recently famous Ebla excavation in Svria, finds that the proto-Syrian culture datable sometime after 2300 B.C. by Schaeffer's scheme was destroyed by seismism and fire [33]. As I stated on several occasions, this finding was predictable, for all known settlements of the time were similarly struck. It would fit among the Mercurian disasters described in *Chaos and Creation.*

The specific origins of burning are usually in doubt. Catastrophic combustion is a product of earthquake-caused fire, of fissure and cone volcanism, of lightning, of phaetonic atmospheric penetration, of typhonic impact explosion, of fall-outs of combustible materials that are ignited in flight, including gases and naphtha. Donnelly, a century ago, speculated convincingly upon the fall-outs of gas clouds from the tails of comets. His *Age of Fire and Gravel,* the culminating devastation of all human time, was pictured as a burning of great patches of the world from carbureted hydrogen.

Some kind of exoterrestrial gases are often to be suspected in great prehistoric and ancient fires. A combination of gases and lightning, if the gases are not too concentrated, will bring masses and sheets of flame, rather than explosions. I have read few convincing reports of gas and fire explosion - the Pestigo Forest Fire and the Tunguska blast, both modern, being the type of event to look for, nor have I read a report of excavation revealing an exploded city, unless some of the settlements that seem to have been wreaked simultaneously by fire and earthquake do not in fact involve earthquakes. Probably a strict investigation would discover any such explosion affecting human settlements, but the geologic causes would have to depend for evidence upon legends. A gas explosion and flash fire would leave practically no traces within a few years of occurrence.

Volcanos are more obvious sources of fire. Many a volcano has claimed its Pompeii and Herculanum. It has worked its way with mud and lava flows, ashes lofted nearby and afar, and noxious gases. It may be fissure or cone, extinct or live. One of the oldest pyramids, that of Quiquilco in America, stands almost buried in lava. It is probably as old as the oldest pyramids of Egypt.

When a great may volcanos erupt simultaneously, the effects upon settlements are more than proportionate to the effects of a single eruption. Inasmuch as layers of ashes have been discovered over millions of square kilometers of the ocean bottoms, it has to be granted that the same ashes fell upon the land and the biosphere, and upon human settlements, if such existed.

Ashes are apparent to an alerted observer when they lie in belts and heaps. But material dissolution occurs, the destruction and effacement may involve additional forces that remove the ash, incorporate it, or dissolve it. Ash may be washed away by tides, blown away by hurricanes, or subjected to these forces gradually. It may turn to clay, impervious to all but the most exacting chemical analysis and electron-scanning microscopy.

The tephra of Thera-Santorini, falling from the plinian explosion of 3000 B.P. (a less likely date is 3500 B.P.) is found in heaps, but also in miocroscopic form amidst debris that may or may not have been of the same occurrence, in widely separated locations. In Thera itself, one bluff is composed of pumice, the next one, higher, contains none. In Kos(Greece) at one place, 40cm of Thera ash is visible; at many other outcroppings of subsoil in Kos, no ash is visible. So in Crete, so also Anafi. Common clay is abundant on land and on sea bottoms. It contains not only the material of slow erosion and ice age drift but of sudden exponential erosion and ice cap avalanche, of volcanic ashes, and of meteoritic and other exoterrestrial fall-out.

To conclude these pages of fire and ashes, we may assert once again that the gradual processes of today were preceded very recently by quantavolutionary processes. More and greater fires burned more widely in the world than during the past two thousand years. More blankets of ashes were laid down. More settlements were ruined. That the fires and ashes may often have had ultimate exoterrestrial causes is probable. Until the basic issue of geological chronology is settled, we are not prepared to affirm that the 85% of the exposed Earth's crust which is of igneous rock is all nearly as young as the ash levels, but the possibility is real. From the standpoint of theoretical mechanics, the Earth's ash layers and all the components of soil and clay originally containing ash may have been the fall-out of global volcanism which produced the igneous rock. But we have yet not covered enough ground in our tour of the Earth's features to determine the matter. And perhaps in the end, we shall still be uncertain.

Notes (Chapter Seven: Fire and Ash)

1. letter, 2 *Catastrophist G*eologist, 1(June. 1977), 13.

2. "Consolatio ad Marciam"

3. L. Ginzberg, *Legends of the Jews*, p. 7: 15, 76; *cf.* H. Tresman and B. O'Geoghan," The Primordial Light," II *S.I.S.R.* 2 (Dec. 1977), 40, fn. 102.

4. II *Lettres Americanes* (Paris: Buisson, 1788), 309.

5. *Ragnarok: The Age of Fire and Gravel* (New York: Appleton, 1883) p. 428.

6. Martin Sieff, "Cosmology of Job" I *S.I.S.R.* 4 (Spring 1977), 17-21, 32.

7. *Genesis* 4: 24.

8. *Op. cit.*, 136-7.

9. L.C. Stecchini in A. de Grazia *et al.*, *The Velikovsky Affair*, 2nd ed. (London: Sphere, 1978), 120ff.

10. Velikovsky, *Earth in Upheaval*, 197-8.

11. See W.R. Corliss, ed., *Ancient Man* (Glen Arm, Md: Sourcebook Project, 1978), 457-60, from G.F. Wright, 11 *Am. Antiq*. (1889), 379-81.

12. Blumer and W.W. Youngblood, "Polycyclic Aromatic Hydracarbons in Soils and Recent Sediments," *Science* (4 Apr. 1975), 53.

13. 46 *J. Ecology* 2 (1958), 447-53.

14. 2 *Catas. Geol.* (1977), 14.

15. 43 *Proc. Natl. Acad. Sci.* (15 Mar. 1959), 349-55.

16. 45 *Proc. Natl. Acad. Sci*., 351-61.

17. B. Heezen and C. Hollister, *Face of the Deep*, 476-8.

18. Walter Sullivan, *Continents in Motion*, (N.Y.: McGraw-Hill, 1974), 147-8.

19. 234 *Sci. Amer.* 3 (1976), 45.

20. *Cf. New Scientist* (12 Nov. 1981), 433.

21. *Nat. Geogr. Mag*. (Jan. 1981), 66.

22. In Asimov *et al*., *Scientists Confront Velikovsky*, (Ithaca: Cornell U. Press, 1977); but see Shulamit Kogan, ltr. *Physics Today* (Sept. 1980), 97-8, repr. VI *Kronos* 3 (1981), 34-41.

23. *Worlds in Collision*, 92

24. G. Bibby, *Looking for Dilmun* (N.Y.: Mentor, 1969), 167-9.

25. Arthur Posnansky, *Tiahuanaco, The Cradle of American Man*, (N.Y.: Augustin, 1958).

26. *A Life History of Our Earth* (London: Faber and Faber, 1951); *Built Before the Flood* (London: Faber and Faber, 1947), especially on Tiahuanacuo.

27. *Cf*. H.S. Bellamy and P. Allan, *The Calendar of Tiahuanaco* (1959) and *The Great Idol of Tiahuanaco*, both published by Faber and Faber, London.

28. *Worlds in Collision*, Part II; Chaos and Creation, 235-46.

29. August H. Frickenhaus, I. *Tiryns* (Athens, 1972).

30. In 3 *Pensée* 2 (Spring-Summer, 1973), 26-32 and 4 *Pensée* 4 (Fall 1974), 5-20. See also my study: *The Disastrous Love Affair of Moon and Mars* (1983).

31. *Arhaic Egypt* (Penguin Books, 1961), 71-3, 92, 97.

32. Y. Sakellarakis *et al.*, "Drama of Death in a Minoan Temple," 159 *Natl. Geog*. (Feb. 1981), 208-23.

33. "Ebla Reconsidered," V. *S.I.S.R.* 2 (1980-1), 37-9; Matthias, *Ebla: An Empire Rediscovered* (London: Hodder, 1980).

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