THE BURNING OF TROY

AND OTHER WORKS IN QUANTAVOLUTION AND SCIENTIFIC CATASTROPHISM

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To

Eugene Vanderpool

Friend of the Agora of Ideas

FOREWORD

Entering a sparsely occupied and generally unknown region of thought is like moving into a new land. The vistas are fresh, the soil unbroken. One wishes to settle down, put in roots, build a house, raise a family. Yet the very restlessness that carried one to the frontier will not subside. There is an opportunity to do everything, it seems; the whole world attracts one and is in need of attention. So it often happens that an erratic and mobile existence evolves. An energetic spell of construction ensues; a cabin is built, animals are bred, a garden is grown, a mate is enticed, a stone wall begins to go up. Then the winds blow, the wild animals pass heading upland, the rising sun beckons and the moon waxes nervously full. Off one goes, leaving the finished things, the half-finished work, freeing the pigs, and letting the roots wither. Now it is a new sight very day, a spring discovered, a strange bird and animal, a day fishing, a day hunting, a day in the hollow of a tree with a pain. The wonders of the region spin unendingly with the vault of heaven. One is not fulfilled, but then one was not fulfilled before: such is the curse and its thrilling clutch upon the pioneer.

I had thoughts akin to these while preparing this book. It contains pieces from everywhere, notes and essays, topics vigorously attacked and promptly abandoned, because one is moved by a different wondering. The earliest piece, concerning the mind of scientists, was written decades ago, the last piece just the other day. Some of the work reminds me of an abandoned plot of frontier land: if only a person had stayed there, he could have built a life upon it, as neat as a Swiss chalet. And is the world not built upon the stable creations of centuries? Yes -- but also upon the scouting parties, the forays, the fantasies.

My friend Gerd Roesler came from Germany to an island of the Aegean, to Stylida on Naxos, and I came there too. And there was none on the wild promontory and he wrote his Master’s thesis on the geology of Stylida, and years passed, and he wrote his Doctoral thesis on the geology of the whole island, but after all of that he comes back and builds a house next to mine, which

has stood alone all the while except when I might be there. Knowing much more of geology than I, to him the promontory was very old, whereas to this natural philosopher, it seemed very young. So we stand upon it side by side, and I say to him, “You see, Gerd, Stylida is young, even by your evidence.” And he replies: “No, Alfred, these rocks are millions of years old... but maybe...” and he laughs, for he likes the feeling of the frontier, too.

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CHAPTER ONE

THE QUANTAVOLUTIONARY SCAN

The nature that offers itself to our view, which includes the solar system, the earth, and the biosphere, assumed its present form in a series of sudden leaps, occurring over short periods of time. So goes the theory of quantavolution. Besides the idea of sudden leaps, other principles are basic. First the original source of great changes in the nature of the earth and man has been in the skies. Second, the latest period of time, roughly the holocene period, say 14,000 years, has witnessed catastrophes. Third, the great changes of recent times have created modern humans. In sum, nature and mankind have been recently catastrophized and transformed by forces of exoterrestrial origin.

Science is full of controversies. It thrives upon dispute. Catastrophists are far fewer than uniformitarians, but they are, if anything, more disputacious, both amongst themselves and with others. Those who interpret natural history by the "sudden leap" of quantavolution or catastrophe may not accept even one, much less all three of the aforesaid principles.

For instance, one of the greatest current catastrophists, the geo-physicist Melvin Cook, has treated a broad range of problems in the fossil record, movement of continents, radiodating, and atmospheric changes without resort to comets or other exoterrestrial forces. Another, Donald Patten, a geographer, makes it quite clear that his work is related to and supported by Christian theology. The most famous catastrophist, Immanuel Velikovsky, did not challenge the presumption that mankind is very ancient; although unfriendly to Darwinism, he might well disagree with some of the mechanisms and interpretations of human events that I have proposed. He would probably disagree as well with other theories connected in my opinion necessarily with the catastrophic model. These three examples could be multiplied.

A practical difficulty faces a student of general quantavolution in that its materials are nowhere properly indexed as such and no special library of the field exists. Until lately, it has been the unwritten rule in scientific journals to "tone down" any indications of catastrophism in articles and especially in titles. Still I have come upon many hundreds of relevant items. They emerge mostly from conventional sources of science. A smaller number are centered upon quantavolution, with the appropriate perspective, and these are found in only several special magazines or in old scientific sources. One moves among the conventional literature with a practiced glance, like an archaeologist spotting bitty shards among tons of debris.

William Corliss publishes at Glen Arm, Maryland, a quarterly scan of anomalistic material, "Science Frontiers", often quantavolutionary it so happens. Thus, examining a list of fourteen items, which he chose for Number 15, Spring 1981 -- and these are only a fraction of the works published around the time -- my brain was twitched by every one of then, and I would like the reader to see how these raw twinges first enter the mind:

1. "Ancient Basque inscriptions are identified by noted expert on the so-called Mechanicsburg Stones of Pennsylvania." Yes, Basque dwellers of the Tethyan Sea, fringes of Atlantis, survivors of 6000 B.C., see *Chaos and Creation. (NEARNA Journal)*

2. "Agriculture was not a step forward in human development." Yes. Why plant when you can reap without sowing. Probably a response to ecological stringency; humans could plant immediately; cultural hologenesis. *(Science)*

3. "New discoveries of buried and changed Stonehenge stone configurations." Cf. changed and variant stone and temple orientations also in Mesoamerica. Earth tilts involved. As sky changes, orientations change. *(Nature)*

4. "Continental crust found 450 miles west of Gibraltar." Possible Atlantis material, sunk and left behind by rapidly rafting land masses moving both sides of the Rift, perhaps in the Saturnian deluge period. *(Baltimore Sun, AP)*

5. "Distant galaxies resemble near galaxies." Yes, cf. *Solaria Binaria.* Short time. No "Big Bang." *(Science News)*

6. F.E. Segal on "tired light." Light not tired. Just Busy. Gravitation very tired, needs to be re-tired. *(Nature)*

7. On "free quarks." Not only are "fractional charges...almost as unnerving as irrational numbers," but so too the ideal of infinite regression (or progression) in the 'size' of events: "man is the measure of all things" -- hardly. *(Science)*

8. "Do bacterias think?" Everything thinks, "Higher organisms, cf Homo Schizo, conduct more elaborate transactions with the environment (and internally) to achieve "the thinking effect". *(Psychology Today)*

9. Quick evolution: quantavolution of immunological systems, in re Ted Steele's studies. Functions of organisms have their own bio-time, time not absolute. Life-career (birth to death, etc.) is subjectively concept of the dominating ego, cf. *Homo Schizo*, momentarily in charge: the trapped soul? How free is it if it is in a paraelectric frame? *(New Scientist)*

10. Cf deep thrusting and folding burial concept in M. Cook's *Earth Models*, also my *Lately Tortured Earth*. Deep is *very* deep, perhaps embracing the surface (including exoterrestrial) origins of Soter and Gold's erupting, abiogenic, natural gases. *(Geotimes)*

11. Iceland a meteorite crater, according to Whipple, with high iridium at Cretaceous-Tertiary boundaries. Cf. galloping continental drift in *Chaos and Creation*. Was the C-T boundary laid down yesterday in the chaos of Earth parturition and Moon eruption and escape? *(New Scientist)*

12. "The Novaya Zemlya solar mirage" is likely, along with many such early phenomena of the disordered skies, to sponsor some fine animistic legends of the heavens. *(Physics Today)*

13. *In re* admitted "ice-ball fall in England," page C. Fort's comparable cases. Electrical fashioning of balls, see E. Crew's new essay. *(J. Meteorology -UK)*

14. Lorber's work on an intelligent human with 1/10 normal brain matter fits Homo Schizo theory, where I develop the concept of humanness being largely independent of the large brain but a product of self-awareness, of the fearful loss of instinctual integrity. *(Science)*

The Society for Interdisciplinary Studies (London) publishes *Workshop*, containing quarterly annotations of a score and more of titles relevant to quantavolution studies. Thus, the eye catches the following points of the varied list of Volume 5:1 (1982).

1. New 700 B.C. Martian period tablet: "The natural order of things somehow has gotten reversed and the response of the high gods, the Shaddayin, is to turn day into night." (Bull. Amer. Schl. Orient. Res.)

2. More material on the Thera disaster (of -1100?) and the confusion of dates. Tsunamis devastate Greece and the Near East.*(Bib. Archaeol. R.)*

3. Reviews special issue of *Frontiers of Science* on Velikovsky's work.

4. The disputed case of Prof. A.C. Arp, who faces shut-down of project because he believes quasars are close, not exceedingly remote, relative to our galaxy. (*Daily Telegraph* report 9 March 1982).

5. Critique of N. Hembest's attack on 3 different theories of rapid (i.e. catastrophic) shifts of Earth's poles. (*The Unexplained*, magazine).

6. Some birds (e.g. Japanese quail and zebra finches) are unexpectedly in-breeders, not out-breeders, contra "need" for genetic variability. (New Scientist).

7. Two newly spotted asteroids make total of 40 on Earthcrossing orbits, ergo potential encounters. *(New Scientist).*

8. Soviet Venera 13 and 14 results show solar radiation is absorbed by Venus at 60 km and the clouds are mostly sulphur. How can "greenhouse effect" work with these conditions? Implication: Venus heat is internal. *(Aviation Week and Space Tech.)*

9. Viking Orbiter pictures heavy meteoric, volcanic, and erosional effect on Mars, with possible meandering dry river systems. *(New Scientist).* Was Mars once (lately) biophile?

10. Review of "Burt Scandal" (BBC radio 4) on ethics and prestige of scientists.

11. Controversy over evidence of "plate tectonic" continental drift without continents on Venus (Venera 14 findings) (BBC, *Science in Action*).

12. On the temperature extremes endurable by dinosaur's eggs. *(New Scientist, Corriere del Ticino)*

13. A primitive "precursor" of the even-toed hooved animals (pigs) is now revealed to be of a different family (mouse deer), so another "missing link" is gone. *(New Scientist).*

14. Jurassic find in China exhibits an earlier line of mammals that may have evolved and extincted 30 million years earlier than accepted beginnings of present mammalia. *(New Scientist).*

15. The Eocene-Oligocene boundary is marked with extinctions, microtektites and high iridium levels of exoterrestrial event. *(New Scientist).*

16. Gravitational Constant may be changing, as applied to changing lunar orbit *(Astrophy. J.)* Is one more Absolute deteriorating?

17. Venus and Earth have different origins, or Venus had no potassium or lost its argon-40. *(New Scientist).*

18. Well-preserved Carboniferous Age fossil deposits near Glasgow, both marine and terrestrial, with confused sedimentation *(Nature)*

19. Source of earthquake lights in rock friction discharges *(New Scientist).*

20. Soviet Kola peninsula Bronze Age settlements contemporary with Mediterranean, with utensils and paintings, slate trade with far-off points. *(Soviet Weekly).* Possible polar shift or drastic (exoterrestrial) climate changes.

21. High proportion of Late Minoan Cretan copper artefacts made from Greek, not Cypriote, copper. *(Nature Science).* Culture shifts, or copper mine discoveries.

22. Density of wood in tree rings can indicate outer space events and exact weather data. *(Soviet Weekly).*

23. Reviews listed of Clube and Napier's *Cosmic Serpent* as indicating mood of scientific reception system *re* catastrophes.

24. Work of J.W. Follin on possibility of 4 billion year old solar system as a binary (report in *Memphis Commercial Appeal*).

25. Ophiolites (from oceanic crust) found in mountain sediments suggest catastrophic oceanbed lava extrusions buckling to form mountains. *(Scientific American.)*

26. Lack of texts -700 to -750 and erratic texts of mid-second millenium in Babylonian otherwise accurate Babylon records in R. Stephenson studies. *(New Scientist.)*

27. Low-density comet impact blamed for Tunguska 1908 event (U.S.R. & D. Associates, *New Scientist*).

28. Meteroid impacts (5 to 10 km diam.) may have created various large basaltic oceanic plateaus. (*Nature*.)

30. Comets now observed frequently to impact on Sun. *(New Scientist).*

31. High anomalous magnetism and radioactivity detected at megalithic sites may indicate ancient man had sensing devices for astronomical constructions. *(New Scientist.)*

32. Lunar rock magnetism without lunar magnetic field raises questions of origins of rock. *(New Scientist.)*

Most of the items were culled from conventional scientific sources such as the *New Scientist* and *Nature*. A much more extended, regular survey is obviously needed; still, that limited and antagonistic sources should provide access to so much relevant quantavolutionary material is noteworthy.

The eye of the catastrophist (this quantavolutionary primevalogist) is trained to see a record of natural destruction in the history of nature and man. Others, trained in uniformitarian ways of thought, will try to explain the same sight by gradual processes, or be oblivious of it. Niagara Falls, whose turbulence soothes the doubts of honeymooners, excites the catastrophist. For it cuts back into its source by a certain footage each year and this permits us to measure how long its gorge has been growing. Apparently only several thousand years have passed since the Great Wisconsin Ice Cap suddenly melted to create the Great Lakes and their Niagara outlet towards the sea. The age of the Falls has been reduced by 300% in consequence. But perhaps a great deluge and flooding created the lakes and a great earthquake the rift of the St. Lawrence River.

Let us continue our noting of some relevant studies, going back in time for a few years. On January 6, 1977, the *New York Times* reports the detection of a quake on Mars. One asks, for the hundredth time, “How can seismism shake celestial bodies that have supposedly been undisturbed and cooling off for billions of years?” The inconstant Sun? A recent encounter?

The eye notes an article in the newspapers of early 1976: a Soviet scientific expedition has moved into the territory of the Tunguska (Siberia) meteoritic explosion of 1908 where a flourishing new kind of forest has sprung up and new species of plants have been seen. The catastrophist thinks, “This explosion

has been long on my mind. If it had maintained its path for minutes longer before striking St. Petersburg (now Leningrad), the capital of the Russian Czars would have disappeared in heat and dust. The heat was fierce, in thousands of degrees; no wonder odd biological phenomena have occurred. But why the absence of a crater? Was the meteoroid actually an explosive gas cloud, and was it a gas cloud that blasted Sennacherib's great army besieging Jerusalem in 687 B.C.?"

In 1975 Soviet astronomers detect X-rays emanating from planet Saturn. X-rays signify a very recent explosion, a nova event, on a star. In a small nova, one that does not disintegrate the body completely, the shell blasts off, and the wounded body bleeds these rays for thousands of years. The quantavolutionary thinks: "Mythology from several places reports that Saturn, the planet-god, flew into a fiery rage...Velikovsky in 1965 wrote Harry Hess of Princeton, to urge that Saturn be studied for the emission of x-rays." And what a truculent monster appears to be the son of Saturn, Jupiter, upon examination by spacecraft.

In 1974 the astrophysicist Robert Bass demonstrates mathematically that the structure and motions of the solar system cannot be presumed to be stable even to one thousand years. Bass is a catastrophist. He is also sympathetic to biblical creationism. The quantavolutionary reads him carefully. "Will Bass lead me astray out of enthusiasm, or into the Promised Land? Will any uniformitarian arise now to challenge him, to prove his equations wrong, to defend what is after all the heart of the uniformitarian position, that the solar system is stable because the laws of Newton and the mathematics of La Place claimed them to be so?"

In 1974 oceanographer Cesare Emiliani of the University of Miami published results of core drillings showing that the Gulf of Mexico had filled with fresh waters from tremendous recent flooding and speculated that the event may have been tied to the sinking of Atlantis, with both occurring around 11,500 years ago. The catastrophist conjectures about the fresh waters of the Gulf of Mexico. First, they could be the floodwaters of the suddenly destroyed ice cap, an inconceivably great deluge, perhaps tied into the practically complete resurfacing of the earth about 11,500 years ago.

In 1974 the chemist John Anderson reports experiments indicating that radiocarbon activity, the chief present method of dating back to 50,000 years ago, was neither random nor constant. If the isotopes of radioactive carbon, for reasons yet unknown, decay sporadically or eccentrically, may not the method be unreliable?

In 1973, chemist Harold Urey, a Nobel prizewinner, conjectures that a cometary encounter with Earth could explain the abundant tektites from extra-terrestrial sources that are strewn about the world. Several scientists have collected and studied these small glassy stones and estimate their amount in the billions of tons. Since time immemorial the Chinese have called them “pearls of the dragon” and collected them. And Urey thought that the cometary collision might have annihilated the dinosaurs.

The dinosaurs looked like the Chinese dragon. Perhaps Urey is right in principle, wrong in time. Quickly the quantavolutionary puts on the cap of a mythologist. All heavenly animals (the Zodiac for instance) represent recognizable species; perhaps the most ancient men knew dinosaurs by sight. Thus the peculiar revolutionary vision, like that of a surrealist painter, contorts time and form, then settles down to give battle over the evidence.

In 1973, the geologist Derek Ager of Swansea College (Great Britain) writes that “the history of any one part of the earth, like the life of the soldier, consists of long periods of boredom and short periods of terror.” Elsewhere he says, “the periodic catastrophic event may have more effect than vast periods of gradual evolution.” He think that “for the ultimate control, sooner or later, we must face the possibility of an extra-terrestrial cause, though in most geological circles one seems to be expected to blush when doing so.” The catastrophist understands the dilemma of Ager: he longs to test his intellectual weapon, but the minds and materials of 150 years of science are constructed to refuse the test.

In the same year, 1973, I am reviewing, from the revolutionary perspective, evidence about the famed “Burnt City” of Troy. I concluded that neither the torch of the invader, nor accident, nor

earthquake, nor a single volcano had suddenly scorched and collapsed the famed Troy IIg. Multiple volcanic venting and extra-terrestrial electrical encounter had to be invoked to explain the observed facts and myths. Uniformitarian methods of a century had failed to identify the problem precisely and permitted not a whisper about the high energy expressions of catastrophes.

In 1972 the engineer Ralph Juergens announces his theory that the solar system was an electrical system operating on galactic fuel. Particles from the Milky Way bombard the sun, building up a heat that sends out the sun's radiance. (Concurrently, experimenters announced the failure to detect the sun's presumed neutrino output from its supposed atomic furnaces.)

The theory of Juergens poses a dilemma to catastrophists. Velikovsky adhered to the nuclear-furnace theory. He did not feel the need for Juergen's theory to win the war for catastrophism. C.E.R. Bruce and Eric Crew in England were catastrophists as well, whose interests, as pioneer and disciple, were in extending the discussion of cosmic electricity. They, too, disagreed with Juergens. Again, the quantavolutionary worries about the stultification of connections and internal disagreements.

But when Juergens publishes two articles on electrical types of destruction found lately on the Moon and Mars, the catastrophists agree and applaud. The electrical ravaging is by cosmic lightning and probably happened within the past several thousand years. Juergens general theory is held in abeyance. (It is, incidentally, accepted by me, and is used and extended by Earl Milton and me in the model of Solaria Binaria.)

In 1970 the palentologist D.J. McLaren, in a presidential address to his colleagues, reviews the wholesale extinction of species at certain times, and then ventures that a heavy meteoroid explosion should be introduced by way of explanation. Following an explanation of the effects of what I have since termed a "catastrophic tube,", he remarked, "this will do." He would have pleased George Cuvier, who for a century has entered the textbooks as "the father of fossil paleontology" but "unfortunately a badly mistaken catastrophist."

In 1968 René Thom publishes his first paper on the topological mathematics of catastrophe theory. After eight years, the less specialized media, such as the *Scientific American*, described his work. Actually, Thom is concerned with describing symbolically and graphically the basic types of ways in which situations build up and come crashing down.

In 1966 the geo-physicist Melvin Cook lays down a barrage of arguments against accepting uranium-lead, potassium-argon and other techniques for the dating of older ages. As a catastrophist, his accomplishments are numerous; none, to my knowledge, has so competently analyzed the overwhelmingly authoritative techniques of radio dating that have come to dominate geological, astrophysical, and archaeological dating.

In June 1956 the *New York Times* reports that the temperature of planet Venus, newly measured by radio astronomers, exceeded the boiling point of water. Studies increased in number; so did the estimated heat. When finally in the 1960's and later the space vehicles of the USA and U.S.S.R. reached Venus, they found a globe whose surface temperatures hovered around 925d. But in 1950, Immanuel Velikovsky had published *Worlds in Collision*. There he described Venus as hot to the point of candescence. He reasoned, mostly from ancient sources and legends, that it had ejected from Jupiter's region burning. Further, its erratic course through the skies had involved it in heat-provoking encounters of the second and first millennia B.C. with Mars, Moon, and earth.

In 1953 geologists Alan Kelly and Frank Dachille propose the island of Bermuda to be the focus of a giant meteoritic explosion in recent times. Their work, if known, would have stimulated among a small circle of scholars an interest in discovering impact craters around the world. (It should also have stimulated the writers of the 1970's who were excited by the mysteries of the "Bermuda Triangle.") Between 1950 and 1955 Velikovsky published three of his celebrated works. In 1963, I prepared a special issue of *The American Behavioral Scientist* on "The Velikovsky Affair." It analyzed the reasons why scientists generally were refusing to hear of theories and evidence contradicting the uniformitarian paradigm. If there is any lesson

to be taught from this *cause célèbre*, it is this: "You must be ready to consider conflicting theories. You cannot stand rigidly in the face of contrary evidence. You cannot be mass-minded and call yourself a proper citizen of science."

In 1950, the German paleontologist Schindewolf tied exoterrestrial impacts and radioactivity directly to the main periods of biological extinction and creation.

I could move, too, into the 1940's, when Claude Schaeffer assembled massive proof of a set of concurrent destructions of Bronze Age civilizations by natural causes. I have found many sources of quantavolutionary thought and studies ranging farther and farther back in time; often they are inaccessible to most readers and buried from sight inasmuch as they are not referred to in modern literature. A large job of recapturing them is before us. Indeed one could recede for thousands of years back to the now faintly heard primeval voices that are fossilized in bone, stone, pots, and oral myth.

In concluding here, I wish earnestly that my readers will turn to my books without the preconception that studies of catastrophes must be science fiction, or a work of the occult, or a defense of Biblical literalism. I do not criticize adversely such works, some of which I admire; it is simply that they are different. My books should be read and judged form the standpoint of a cosmogonic model of quantavolution that is derived from a growing body of scientific studies in various fields and a review of the most ancient as well as of the most recent sources.

Just as an archaeologist reconstructs a pot from a few shards, and a paleontologist an animal from a few bones, we have to reconstruct a general history from the rare "treasures that have come down to us", as Aristotle said. I ask not for belief but for consideration. I seek for open thinking upon another model in the competition for the best design of the sciences and humanities.

This said, let us take up a study of "The Burning of Troy," a work which I began, as I mentioned above, in 1973. The idea came to me while on the Island of Naxos. I was reading Schliemann's famous story of how he found the Treasure of

Priam on top of a wall, and I exclaimed to myself, “What a strange place to bury a treasure!”

Part One

HISTORICAL DISTURBANCES

CHAPTER TWO

THE BURNING OF TROY [1]

Scientists probing the subsoil in their attempts to build up the record of prehistoric and ancient humanity have paid little attention to ashes and other evidences of high heat and conflagration that they have encountered. We would agree with Claude F.A. Schaeffer who wrote in 1948 that "Our inquiry has often been made difficult by the rarity in most reports of observations on beds as a nuisance or of little interest"[2]. The recent excavation of settlements of Minoan times, buried beneath or affected by the tephra of the exploded volcano of ancient Thera-Santorini, did posses the broader perspective that Schaeffer sought. Marinatos and others introduced research on the far-flung effects of the disaster. Heezen and Ninkovich discovered a layer of ash on the south-eastern floor of the Mediterranean Sea that they could ascribe to the Santorini explosion. Charles and Dorothy Vitaliano followed up with analyses of tephra from scattered locations on Crete and elsewhere [3]. The search and testing are continuing. Still, the Thera case is exceptional, and even yet far from complete. The ash coverings of settlements have rarely been analyzed. We speak of overall calcination, and not so much of the bones of hearths that have lent evidence of the ecology, cuisine, and religious ceremonies of early human groups.

Overall calcination has sometimes, with less than complete evidence, been interpreted as the work of torch-bearing invaders. For example, James Melaart uses the convenient phrase "Whether by accident or by enemy action" to describe the destructive combustion of Troy IIg [4]. Earthquakes, too are invoked with some frequency, although a determination that a fire is an effect of an earthquake is by no means simple. On rare occasions, where there exists a historical record such as Pliny the Younger's description of the eruption of Vesuvius in 79

A.D., volcanism is admitted and may lead ultimately to excavation. There are still other possible causes, as we shall see.

The contention of this paper is that reports of past excavations should now be reviewed with a revised set of questions. Moreover, and because of the ultimate inadequacy of the information typically contained in them, it is suggested that a new interdisciplinary calcinology be devised and carried into future excavations and the testing of soils and debris generally. The rich experience afforded by the excavations of Troy can serve to expose the problems that justify a new approach. Afterwards, we can define in a preliminary way the body of techniques that needs to be assembled and developed.

THE "BURNT CITY" OF TROY

In some exciting passages, which have unquestionably been among the most widely read of all archaeological writing, Schliemann describes how, in May of 1873, he uncovered "The treasure of Priam," King of Troy during the war between the Greeks and Trojans. (Neither his identification of the Treasure as Priam's nor of the City as the Troy of Homer is at issue here, and therefore these problems are passed over lightly.)

Schliemann reports [5] that the "Trojans of whom Homer sings" occupied a stratum of debris "from 7 to 10 meters, or 23 to 33 feet, below the surface. This Trojan stratum, which, without exception, bears marks of great heat, consists mainly of red ashes of wood, which rise from 5 to 10 feet above the Great Tower of Ilium, and the great enclosing Wall, the construction of which Homer ascribes to Poseidon and Apollo; and they show that the town was destroyed by a fearful conflagration." He calls this ruined level "the Burnt City," and others have used his phrase since then.

The large slabs of stone leading down to the plain from "The Scaean Gate" for 10 feet were so weakened by heat that they crumbled upon exposure, though farther on the slabs continued hard and intact.

"A further proof of the terrible catastrophe is furnished by a stratum of scoriae of melted lead and copper, from 1/5 to 1 1/5

inches thick, which, extends through the whole hill at a depth of from 28 to 29 1/2 feet." Several visiting geologists and a construction engineer gave this opinion, and all concluded that large deposits of these existed at the time of the city's destruction.

Schliemann continues: "That Troy was destroyed by enemies after a bloody war is further attested by the many human bones which I found in these heaps of *debris*, and above all by the skeletons with helmets, found in the depths of the temple of Athena; for, as we know from Homer, all corpses were burnt and the ashes were preserved in urns. Of such urns I have found an immense number in all pre-Hellenic strata on the hill."

Then he says: "Lastly, the Treasure, which some member of the royal family had probably endeavored to save during the destruction of the city, but was forced to abandon, leaves no doubt that the city was destroyed by the hands of enemies. I found this Treasure on the large enclosing wall by the side of the royal palace, at a depth of 27 1/2 feet, and covered with red Trojan ashes from 5 to 6 1/2 feet in depth, above which was a post-Trojan wall or fortification 19 1/2 feet high."

Schliemann spotted the Treasure through a protruding copper article. "On the top of this copper article lay a stratum of red and calcined ruins, from 4 3/4 to 5 1/4 feet thick, as hard as stone, and above this again lay the above-mentioned wall of fortification (6 feet broad and 20 feet high) which was built of large stones and earth, and must have belonged to an early date after the destruction of Troy."

With his knife, he first withdrew this small copper shield, then a copper caldron with handles, then a copper plate to which a silver vase "had been fused ...in the heat of the fire"[6]. Next came a copper vase, a bottle of gold, a cap of gold and then other vessels of pure and alloyed metals, wrought and cast-copper, silver, gold, electrum. There were useful objects, ceremonial objects, and daggers, battle-axes, and lance-heads. Various weapons had "pieces of other weapons welded onto them by fire."

"As I found all these articles together, forming a rectangular mass, or packed into one another, it seems to be certain that they were placed on the city wall in a wooden chest ... such as those mentioned by Homer as being in the palace of king Priam. This appears to be the more certain, as close by the side of these articles I found a copper key about 4 inches long, the head of which resembles a large safe-key of a bank. Curiously enough this key has had a wooden handle; there can be not doubt of this from the fact that the end of the stalk of the key is bent round at a right angle, as in the case of the daggers."

Schliemann conjectures on the scene:

> It is probable that some member of the family of King Priam hurriedly packed the Treasure into the chest and carried it off without having time to put out the key; that when he reached the wall, however, the hand of an enemy or the fire overtook him, and he was obliged to abandon the chest, which was immediately covered to a height of from 5 to 6 feet with the red ashes and the stones of the adjoining royal palace...[7].
>
> That the Treasure was packed together at terrible risk of life, and in the greatest anxiety, is proved among other things also by the contents of the largest silver vase, at the bottom of which I found two splendid gold diadems..., a fillet, and four beautiful gold ear-rings of most exquisite workmanship: upon these lay 56 gold ear-rings of exceedingly curious form and 8,750 small gold rings, perforated prisms and dice, gold buttons, and similar jewels, which obviously belonged to other ornaments; them followed six gold bracelets, and on the top of all two small gold goblets [8].

Finally, Schliemann adds, "The person who endeavored to save the Treasure had fortunately the presence of mind to stand the silver vase, containing the valuable articles described above, upright in the chest, so that not so much as a bead could fall out, and everything has been preserved uninjured"[9].

Schliemann says that death was risked in hastily retrieving the Treasure. Like many another digger, he was preoccupied with artifacts and architecture. And indeed there seemed to be nothing in the literature than a Greek-set fire. Furthermore, he was already reading the ancient story of the burning of Troy into his

findings. He "knew" what he would find. So did the world of readers.

But there are puzzling aspects to his account. First of all, there is the immensity of the blaze. Can the burning of a stone and wood town of 5,000 or so inhabitants produce a bed of ashes that may have amounted to 15 to 20 feet on its first fall? For we read that it was reduced to several feet of thickness and was so hard that a huge stone wall nearly 20 feet tall could be built on top of it afterwards. And the whole area was so completely buried that the walls of the subsequent settlement were planned and built in complete ignorance of the orientation of the walls and passageways below. "The more recent walls run in all directions above the more ancient ones, never standing upon them, and are frequently separated from them by a layer of calcined *debris*, from 6 1/2 to 10 feet high"[10]. The depth of the ashes is all the more impressive when it is observed that they formed on top of a wall. Then or afterwards, some part of the ashes would fall or drift or be blown off the top of a wall. And why would the bearers of such a Treasure, if they had even half a minute of time, leave the Treasure on top of a wall when they might at least have tipped it over onto the ground, and then fled?

The ashes are spoken of as "red Trojan ashes," "ashes and stones" that buried the city, "mainly red ashes of wood." How thick a layer of ashes does a hand-burnt ancient city dissolve into? What kinds of heat would have been generated on the average outside and within houses? The answers are not now known, but might well be discovered.

Craig C. Chandler writes that he has "never seen 'red ashes of wood' in natural fires, and the term sounds much more like a distillation residue than a combustion residue"[11]. With the suggestion of a distillation, the remote possibility of an early invention of "Greek Fire" intrudes. This presently unknown, highly volatile and intense weapon was possibly of petroleum plus an accelerant, and was used by the Byzantines against their enemies for centuries. But this was more than two millennia later. Further, "Greek Fire" would not account for the huge amount of ashes.

A completely wooden and overstuffed contemporary house will leave no more than ankle-deep ashes when it burns to the ground, and then only on its own foundation. A flourishing natural forest and the ground cover is estimated to provide 200 tons organic matter per acre [12]. When reduced fully by heat, it will give up 160 tons of water, gases and other compounds to leave 20 tons of carbon residue and 20 tons of oily distillates. Further reduced to fine cinder and ash, it would weigh less and have less volume. If spread over an acre, the residue would amount to perhaps a pound per square foot; its height could scarcely measure 6 inches in its freshly fallen state. Chandler has pointed out that forest fires of the greatest intensity do not consume more than a fraction of the living material, producing perhaps 3 tons per acre of ashes. “This is an amount about 10 times as great as the fertilizer you spread on your lawn in the spring ...Ash residue from the burning of a city is measured in inches, rather than feet”[13]. And we seem to be faced at Troy by perhaps 15 feet, or 30 times as much ash, even allowing for no wind to blow the cloud of city ashes off the citadel onto the plain and for no drift off the top of the city wall.

But, to proceed, if the city were under tight siege, would not the Treasure have been carefully packed and readied for any emergency? Would it not perhaps have been buried in a safe place or carried off to a friendly town? Schliemann assumes that a Trojan custodian was transporting the box. He discovered what appeared to be a copper handle. Would not at least two persons have carried it? It was heavy. Moreover, several guards and priests would have been assigned to accompany the porters on their urgent mission. The key to the box was found, but it may have been placed inside the box; its presence does indicate haste, or else it would have been kept by a keeper of the keys or by the chief of the little group of movers and would have vanished with him.

If the “Greeks” were in hot pursuit, as Schliemann implies, would they not have caught up with the Treasure and carted it off? It would have been laid down by its porters, who would have fled for their lives. Would the “Greek” warriors have set such a blaze that they were frustrated in one of their primary objectives in capturing the city, to loot it of its valuables? Conquerors try not to burn a city before they loot it. Other

treasures and valuables were located by Schliemann. Apparently the "invaders" were in some part, at least, frustrated in one of their most enjoyable missions by conflagration. We might assume that other treasures were indeed found and carried away. Their neglect of the deposits of lead and copper, an unconscionable dereliction, is puzzling; lead and copper supposedly ran in streams over the city grounds.

Schliemann found no bones or warrior's equipment at the site of the Treasure save for a small copper shield, which may have been in or on the chest. Indications are, unless his search was incomplete, that the porters separated themselves physically from the Treasure in a great hurry and that the "pursuers" were blocked from reaching it. Unlike the ashes with which Vesuvius buried ancient Pompeiians and from which Fiorelli in 1863 ingeniously extricated their images by injections of liquid plaster, the ashes of Troy were apparently hot. They fused and welded exposed metal objects. The wood chest had disappeared. Any humans would have been incinerated and would have disappeared like the box, but they would at least have left their buckles and arms, and possibly teeth or long bones.

Why did the porters try to go over the wall, instead of through the gate? Schliemann suggests that the "Greeks" commanded the gates. Possibly.

But now we wonder whether, in fact, there were any Greek invaders climbing out of their famous Wooden Horse and reinforced by their returned comrades. For Schliemann does not find typically "Greek" (Achaean) utensils or weapons; therefore the conflagration could not come sometime after the foreigners had occupied the city and mingled their artifacts with those of the Trojans. Also, we should be inclined to deny that any invaders of any type were present. We are aware that contemporary scholarship assigns Schliemann's Troy to a period long before the "real" Trojan War. It is now called TroyII and Troy VIIa is the "real Troy," in one leading opinion [14].

A half century after Schliemann's work, a University of Cincinnati expedition returned to the site of Hisarlik. They explored painstakingly the area, employing the best archaeological techniques that the state of the art and the

typically modest funding could provide. Apart from their extensive work on the other levels, the Cincinnati archaeologists, under the leadership of Carl Blegen, examined closely the ruins of the Burnt City-Level IIg by their code. The debris over the whole site is deep, yet less deep that the debris atop Schliemann's Wall.

> The stratum of Troy IIg had an average thickness of more than 1 m(eter); it consisted mainly of ashes, charred matter, and burned debris. This deposit apparently extended uniformly over the great megaron and across the entire site, eloquent evidence that the settlement perished in a vast conflagration from which no buildings escaped ruin. This is the 'Burnt City' of Schliemann ...
>
> In all areas examined by the Cincinnati Expedition, it was obvious that the catastrophe struck suddenly, without warning, giving the inhabitants little or no time to collect and save their most treasured belongings before they fled. All the houses exposed were still found to contain the fire-scarred wreckage of their furnishings, equipment, and stores of supplies. Almost every building yielded scattered bits of gold ornaments and jewelry, no doubt hastily abandoned in panic flight.
>
> Most of the famous 'treasure' recovered by Schliemann may now be safely attributed to Troy IIg...[15].

Thus writes Blegen (1963) and the evidence behind his words stacks up in several large printed volumes and a considerable archive. Blegen continues, seeking to explain the destruction:

> Whether the disaster was brought about by enemy action or by accident cannot be certainly stated, though there are considerations that point to each of these alternatives. If the city had been captured and razed by conquerors, some of the luckless inhabitants would surely have fallen victims to the attack, and an excavator might expect to find in the ruins remains of human skeletons. So far as is ascertainable in the archaelogical records, we have actually only one instance in which a fragment of a small adult skull was definitely found in the stratum of Phase Ilg. Schliemann mentions the skeletons of "two warriors" with bronze helmets, found in the burnt layer; but the stratigraphic position is not certified, and the helmets later turned out to be fragments of a bronze vessel. One might therefore conclude that the occupants of the town escaped. On the

> other hand, if an invading army took the city it would surely have thoroughly looted the houses before putting them to the torch; and few if any 'treasures' of gold and silver would have been left for archaeologists to recover. But again a counter-argument might hold that if all or most of the citizens had run away to safety, they would surely have returned sooner or later to recover the treasures they had left behind. Their failure to do so can only be accounted for by assuming that some powerful deterrent prevented their returning. What actually happened to bring about the burning of the whole establishment is still an unsolved mystery, but it is a fact that Troy II was totally destroyed"[16].

The mystery remains, and the range of speculation is both limited and expanded. We are compelled to put aside the Schliemann reconstruction as a rather complete fictional tale. In doing so, we are led to the alternative that some huge natural force ruined Schliemann's Troy. Enemy forces had not shown a gradual "intent" to destroy Troy, else the Treasure would have been packed and readied for transport. The disaster did not begin by slow degrees, else it would have permitted exit by the main gate. Or perhaps, to avoid panic or disorder, the Treasure was being sneaked out of town.

Might it have been an earthquake followed by fire? There are few indications of fallen stones. It would not have been these that prevented the Treasure from being carried out the Gate of the city. Although the scene that we are reconstructing was not created by a great earthquake, a mild earthquake may have occurred. If it did, it had not prompted the government to abandon the town up to this last moment of disaster. Valuable objects were strewn on the floors of numerous homes. The evidence from "the depths of the Temple of Athena," where bones and skeletons were found, is ambiguous: people, sensing an earthquake, flee from the crashing roofs and walls of their structures. A large quantity of bones was found in the debris of, and next to, adjoining apartments [17]. Were these people trapped and buried by the quake? Possibly. Or did they die of heat or suffocation and were their bones preserved freakishly while most bodies were quickly consumed by intense heat?

The main event may have been a sudden fall of ashes that began as a light warm shower and then developed into a heavy

downpour of hot material. The fall would have incinerated all organic material except those people, plants and animals that were already in deep refuge where they suffocated and were later buried. It would have melted all exposed supplies of metal and partially exposed metal parts. Within a space of hours the city would have been covered and its life ended.

There would have been no survivors or enemy awaiting outside to reoccupy the destroyed city, excavate it, collect its treasures, enjoy its strategic location [18], and carry on or provide a substitute for its culture. If there were, they would have been blasted, drowned in ashes or suffocated by gases while the city disappeared before their eyes.

The destroyed setting does not support a firestorm, such as incendiary bombs, dropped en masse from airplanes, inflicted upon the cities of Dresden and Hamburg in World War II. There the ash levels were insignificant, because “firestorm winds scour the burned area clean”[19].

The setting suggests the action of Vesuvius in burying Pompeii and Herculaneum, the one in falling cinders and ashes, the other in towering lava flows. It was the falling ash and gases that buried and suffocated the people whose images were recovered seventeen hundred years later. Some had chosen not to flee and took refuge in their houses; others could not flee; still others were drowned in ashes while in flight. Pliny the Elder was gassed to death as he stood, miles away, directing a rescue operation.

The destruction wrought by the explosions and collapse of the islet of Krakatoa off Java in 1883 was done largely by tidal waves [20]. Although many persons were burned severely and succumbed to exhaustion in the hot ash-laden and gas-polluted air, the fall of ashes was not great enough to bury houses. The fall-out colors are not well-described; at least white, gray, black, brown, green, and red material was mentioned.

Examining the territory around Troy (modern Hisarlik), we find no active or extinct volcanoes [21]. Mount Ida, famous in Homer, is 30 miles to the Southwest of Hisarlik. It is not reported as an active or extinct volcano. At 30 miles of distance,

in order to have caused an ash-rain that would bury Troy, it would have had to explode in successive bursts of fury, exceeding the Krakatoan and Vesuvian (79 A.D.) disasters.

The Thera-Santorini explosion of late Minoan culture occurred hundreds of miles away in the South Aegean Sea, and is not synchronized [22]. In any event, although it might have generated waves capable of battering the coastline of northwest Asia Minor, its ash-fall would probably not have reached so far and so heavily. Ninkovich and Heezen seem to have found that the overwhelming fallout of Thera ash occurred in the Southeastern Mediterranean Sea.

Yet geologists might consider whether internal earth stresses could have induced not only the familiar cone volcanoes but also fissure eruptions, which, no matter how voluminously eruptive, leave little evidence for the unsuspecting eye once they have become extinct. A geologist might then search for some scars and volcanic products on the modern landscape.

It is well to remind ourselves that Homer, in describing at least one Trojan war, has Mt. Ida behaving in peculiar ways when the gods of heaven enter the battle of Greeks and Trojans:

> "From high above the father of gods and men made thunder terribly, while Poseidon from deep under them shuddered all the illimitable earth, the sheer heads of mountains. And all the feet of Ida with her many waters were shaken and all her crests, and the city of Troy, the ships of the Achaians"[23].

The underworld god shrieked in terror and leapt from his throne at the prospect that "Poseidon might break the earth open." And Hera laid such a dense fog upon the battlefield that none could see to engage. There is a terrible fire over the whole scene that "first was kindled on the plain" and parched it and burned the dead warriors, then turned to the river, boiling it and its tributaries. Hera, wife of Zeus, ordered up tempests from seaward to fan the flames, which another sky-god and also volcano god, Hephaistos (Vulcan), had started. All of this bespeaks volcanism with accompanying earthquakes, and possibly fissure volcanism too.

Here again, we should remind ourselves that a) the site of the "real Troy" may not be the Hisarlik site, b) there may have been several wars over the site through the ages, c) the war of which Homer sang was possibly an image of several partially idealized wars, and d) the final Homeric war probably occurred, if Velikovsky's reconstruction is followed (which eliminates the Greek Dark Age), in the late eighth and early seventh centuries. Troy IIg therefore existed at an earlier time, and we are quoting here passages regarding the landscape, nature forces, and effects of a later age or composite of ages. The date of destruction of the "Burnt City" is not at issue here.

The ancients were adamant concerning the activities of the great sky gods. Hence a look into the skies for the cause of the burial of Schliemann's Troy is not unreasonable. But will it be only for the effects of remote volcanism? An anomalous detail demands attention: Schliemann mentions that the stones of the road out of the gate had been heated to the point of disintegration but, a few feet further out, the stones continued in good condition. The natural force seems here to have been selective, destroying by heat the crown of the hill, but sparing at least this part of the plain around. Alternatively the outer stones may have been relaid at a later period, or the first fires may have consumed the city premises alone, with the ash-fall coming later. Or again, at the Vitaliano's suggestion, should we return to an attacking force that heaped fires before the wooden gate to force an entrance; too, they may have hurled or shot many fiery brands at the gate. The total context is indeed important to bear in mind, whatever its complexity.

Lightning can be hot and selective and may focus upon elevations. Ancient lightning and fire have received little attention from archaeologists and geologists. E.V. Komarek, Sr. writes, "I believe that the reason we have so little information on ancient fire scars or lightning streaks is that apparently no one has searched for them" [24].

Seneca, the Roman author, has a character in *Thyestes* begging Jupiter to bring disaster upon Earth "not with the hands that seek out houses and undeserving homes, using your lesser bolts, but with that hand by which the threefold mass of mountains fell ...These arms let loose and hurl your fires"[25]. Could there

have been a qualitatively different kind of Jovian thunderbolt playing about the world in mythical and prehistoric times? A ramified bolt of hundreds of strokes is not impossible to imagine. The myriad lightning and fire effects in the Krakatoa disaster are worth recalling, but these occurred within a radius of a few kilometres [26]. The mysterious melted copper and lead, alluded to above, which covered a large area, according to Schliemann, might have originally been deposits that contributed to the attractiveness of the site for lightning discharges.

They form a "stratum of scoriae, which runs through the greater part of the hill, at an average depth of 9 metres(29 1/2 feet)." Were they stored by the Trojans or were they "welded scoriae (Schweisschlacken)" of volcanoes; that is, fragments carried up by the powerful blast of expanding gases, ejected in a molten state, and solidifying after falling with a smacking sound back to the ground? -- "upon impact, they are squashed out flat, and are welded together where they fall" [27]. Volcanoes are not known to eject such scoriae to any considerable distance.

Still another possibility needs to be added: a meteoric fall or shower, Homer's "divine-kindled fire of stones." If a large meteor had passed nearby without crashing, its immense heat would have consumed and raised into the sky the ashes of countless trees and the dust of exploded and cyclonized fields. But the people appear to have had warning, however brief.

A veritable deluge of meteoric particles from outer space, as from a large comet's tail, might produce and contribute to combustion and burial. A cometary or planetary near-encounter, and resulting fall of gases, hydrocarbons, burning pitch, and stones, of course, is Velikovsky's "first cause." Even metals (again the layer of copper and lead) have been reputed to fall. Such events are unknown to modern experience but are indicated by ancient legends from many places [28], and by various geological and biological phenomena [29].

We cannot ignore the Biblical sources that speak of "fire and brimstone (sulphur)" such as that which wiped out "the cities of the plain." The Cincinnati team writes in several places of the greenish-yellow discoloration characteristically found in the

debris of streets and other once open areas [30]. Was this brimstone?

The clays are curious. Area 210 of the city shows much disintegrated clay and debris, plus pots, but no signs of burning. A house of Square A3-4 is in ruins "covered by a mass of clay more than 0.50 meters thick, which has turned red from the effects of internal heat"[31]. The roofs were of clay and wood, but the depth is remarkable and so is the color. Is there more than one kind of clay in the ruins? Is this the same "red" that Schliemann reports as "the red ashes of Trojan wood?" For that matter, is it part of the omnipresent red dust that Velikovsky pursues through early references from numerous cultures in connection with the planet Venus [32]?

At this stage of research, one craves evidence that the rude Achaeans were quite stupid but were geniuses at setting great fires from above. Or that all excavators exaggerated in their reports. Barring these explanations, the evidence speaks, or rather, whispers faintly, on behalf of a regional multiple volcanic explosion of gases, hot scoriae and ashes, some element of which rained down suddenly and heavily upon Troy, burning, burying, and baking. The Treasure of Priam would be buried atop the wall where it had been placed as its bearers cast a final despairing glance upon the abysmal world on all sides.

One should be warned, however, that a theory of concurrent regional plinian eruptions would call up a search for causes of a more fundamental kind. Volcanism on a grand scale is another word for general catastrophe: What force can roil up the mantle and wrench around so much of the crust of the Earth at a single moment of time?

A NEW INTERDISCIPLINARY METHOD

The mystery of the "Burnt City" of Troy will soon be a century old, but its solution may be within grasp. It can now be reviewed in light of substantial advances in empirical technique and general additional and spectacular theories. The latter are provided most forcibly by Claude Schaeffer and Immanuel Velikovsky.

In 1948, Professor Schaeffer, who had excavated at Ras Shamra-Ugarit, published a treatise on comparative stratigraphy of the Near and Middle East during the Bronze Ages of the second millennium B.C. He incorporate the work of many predecessors, including the investigators of Troy-Hisarlik, into a theory that a sequence of fires and earthquakes had destroyed Bronze Age civilizations concurrently, several time over, in the vast area stretching from Troy and Egypt to Persia, and even beyond into China. Similar phenomena are recorded for Etruria (Tuscany), Meso-America, and elsewhere [33] and might someday be synchronized. At the time of Troy IIg, reports the *Cambridge Ancient History* (I:2, 406), following in Schaeffer's footsteps, three-quarters of the settlements of western and southern Anatolia were permanently destroyed.

Although he is a catastrophic revisionist, Schaeffer has not gone deeply into causes. He demonstrated the hard evidence of universal destruction. He invoked earthquakes followed by fire, or where earthquakes were not in evidence, simply enormous calcination. He exculpated invaders as the destroyers of civilization in many instances, even though he employed conventional terms such as "the Peoples of the Sea" that are used to explain the abrupt termination of many civilized communities. He can point often to disturbed and unsettled human elements who came upon the sites afterward.

(Significantly, Blegen had already shown that a new cultural element did *not* succeed Troy IIg; the Troy III culture was closely related [34]. This is remarkable because the calcinated debris of Troy IIg was never dug out and was probably unknown, yet the debris of the old city was strong enough to become the foundation of the new city walls.)

In his command of the natural sciences involved and their interweaving with ancient sources and psychology, Velikovsky has excelled all writers on questions of catastrophe. Working independently, he published in 1950 his account of universal destruction of the second half of the second millennium. He asserted that heavy seismic disturbances and devastating flames consumed the same ancient civilizations. But, with the aid of ancient legends and documents, he insisted upon the role of overall volcanism, heavy meteoric falls, and as "first cause," a

derangement of the planetary system that brought down upon the earth the proverbial "wrath of the gods," not only Olympian gods, but Hebrew, Egyptian, Babylonian, Olmec and other gods [35].

Unfortunately, for twenty-five years, the assemblages of ideas and facts of Schaeffer and Velikovsky, "an extraordinary polymath," in the words of the late Columbia University classicist, Moses Hadas, were subjected to unscientific vilification. Schaeffer, Professor at the Sorbonne and a renowned excavator, has been hardly cited for his *magnum opus*. Few scholars have been ready to confront the anomalies of their own findings. One exception was Spiridon Marinatos, who plunged to his death in 1974 at the famous site of his work. His excavation of the Minoan culture of Thera-Santorini, from beneath the effects of the plinian explosion of the island, called international and interdisciplinary attention to the destruction of a critical portion of Mediterranean civilization.

But Blegen of Cincinnati was also an exception; he was disposed to a cautious empiricism, but was piqued by the strange events that had befallen Minoan and Mycenaean civilization. In the voluminous published records of the Cincinnati expedition, we find the following lines:

> "A large collection of earth samples was also made this year. (1937). Specimens were taken from all strata of all main layers in the principle areas of digging, and the number of small bags thus collected exceeded 400. They were shipped to Cincinnati for scientific examination by specialists in geology and botany" [36].

When, in 1974, we discovered this passage, we made inquiry, only to find that the sample had never been analyzed. The long period of World War II had intervened. Personnel left, never to return. Other interests took priority. The samples rested in their cloth bags in the attic of McMicken Hall at the University of Cincinnati. Finally, in 1975, material from the bags was provided to Professor George Rapp of the University of Minnesota for eventual analysis. This material will serve for the first calcinological testing of the causes of the destruction of Troy-Hisarlik. It will perhaps form the basis of testing also the more

general theories advanced as to the causes of the destruction of many ancient civilizations.

What questions should be asked of these humble sacks of debris, and, by extension, of all similar samples to be drawn from other destroyed settlements? In other words, of what should consist the science that investigates ancient destruction by combustion -- call it “calcinology,” perhaps?

We may address this question either by taking up one by one the theories as to the origins of the combustion, or by taking up the techniques for the investigation of combustion. In respect to the theories, one would inquire into the possibilities of one or a combination of accidental fire; “the invader’s torch”; Greek Fire; seismic-caused fire; explosive local volcanism from fissures or now extinct cones; fall-out of tephra from remote, perhaps general, volcanism; ramified lightning; petroleum (bitumen, asphalt, naphtha) rain, non-volcanic and extraterrestrial; and gas explosion in the atmosphere, terrestrial or extraterrestrial by origin.

In respect to the techniques, one would speak of ambiance induction; artifact analysis; comparative historical deduction; thermal-visual examination; morphological examination; electron scanning microscopy; chemical mineralogical tests; thermo-luminescence tests; tests for paleo-magnetism. Inasmuch as individual techniques may dispose of more than one theory, it may be best to proceed by offering a few words concerning their relevance.

Fundamental to pursuing all causal alternatives is a careful inductive study of the ambiance of combustion. Whether performed on records of past expeditions or upon a setting itself, a skeptical and fully alert reading or examination is required. We have entertained too close a circle of interests and hypotheses; the Trojan record shows this. So do hundreds of other excavation reports.

First of all, an interdisciplinary group of scientist must set standards and criteria for entering upon a testable location. Conventional archaeology has certainly proceeded far along these lines, but new parameters need to be added, taken from

geology and meteorology, as for instance, the effects of wind and the strength of building materials. The camera that has come to play an important part in contemporary investigations needs to be aimed at the hypotheses, so to speak. The pioneering work of the engineer, C. Lerice, in magnetomatic and radiotropic anterior probing of subsurface forms is worthy of generalization to standard practice. Standards for measuring depth of debris, original and actual density of calcination, percentage of ash content, and architectural and object deformities should be set up. Pre-selection and logging of samples should be systematically done in the manner of the Cincinnati expedition of 1937.

The analysis of artifacts is sometimes conducted as part of a treasure hunt. To this day, objects from the Treasure of Priam have not been studied carefully to determine whether they have been fused by heat or by oxidation. Objects are described as they are found but not to the extent that a specific set of hypotheses is applied to each object as to how it might have been placed or dropped, or slipped, or fallen as a result of direct or indirect natural causes.

Nor has an inductive, comparative, historical method been always conscientiously pursued. A single anomaly in a closed layer may be worth more to science than a golden chalice. To dismiss the anomaly as an “impossible” intrusion, a “similarity”, and “forerunner” is all too common practice. The attempt of the University of Cincinnati expedition to reconcile the anomalies of location of their carefully uncovered sherds in the face of the conventional Egyptian-anchored chronology is a case in point. “The discovery of these 7th-century sherds ‘in several areas in the strata of Troy VIIb1 stratified *below* layer VIIb2’, which is supposed to represent the 12th century, “presents a perplexing and still unexplained problem.” [37]. Fortunately the self-restraining, objective empirical techniques of the expedition simply stood even against an authoritative chronology at a later date. One goal of calcinology is to establish a frame of analysis that can be transferred from one excavation to another both to interlock events and to serve eventual critiques of received versions of the comparative development (and destruction) of civilizations.

I should place in the same category of historical comparative method the application of mythology. Dorothy Vitaliano, pursuing a strict uniformitarian theory, has nonetheless exemplified the necessary marriage between myth and geology that research properly demands; to her, myth serves as a clue to past events, especially when they are extraordinarily forceful [38]. Sometimes, as in the case of Troy, there are direct myths describing events overtaking the site. In other cases, myths may be transferred from other times and places as hypotheses.

The examination of bones found in circumstances of combustion may well be expanded. Paleosteology ordinarily does not address itself to the degree of heat to which human remains have been subjected, or whether the heat was searing or slow. For example, a separate volume in the Cincinnati *Troy* series, its other merits aside, does not answer questions relevant to the sudden destruction of the city [39]. How much heat reached the people whose skeletons remained? Would the heat elsewhere have erased entirely any humans and animals? Contemporary arson experts can transfer their "know-how" to such queries.

Contemporary fire experts and combustion chemists can also contribute useful principles for the visual examination of thermal effects. A high sensitivity to variations in color and texture is still not a prerequisite for professional archaeology. Conversations with persons concerned with combustion problems come around repeatedly to unanswerable questions of color, stains, textures, bubbles and cracks.

The morphology of combustion environments would deal with terrain features that might have altered, of for that matter remained significantly unaltered, in the course of the destructive combustion. Earthquakes uplift and crack the earth. Volcanic and seismic fissures leave different traces. Lightning can burn and dig distinctive fissures as well.

It would be useful to perform core drillings in the hinterland of destroyed settlements to discover whether the ash trapped about the ruins is also present in some natural lowland areas of slow deposition, removed from human habitations. Recently, for example, the Athens *Metro* project tested the subsoil to a depth of 20 meters in 228 locations for the purpose of planning subway

construction. Archealogical finds were noted and covered over, but the ordinary corings were not handled properly for the analysis of combustion or other natural phenomena. Almost all samples show "Athens schist," a vague term for sandstone, siltstones and the like; most of the preserved cores are disturbed and eroded by water used in the drilling [40]. (The rock cores, incidentally, show highly intense fracturing near the surface.)

Unfortunately, oil exploration does not concern itself with logging the cores brought up from the near subsurface of wells during the drilling [41]. It may be possible in the future to make a cooperative arrangement with petroleum geologists to provide such data. Apart from its usefulness to social and natural history, near subsurface samples may reveal chemical and morphological peculiarities of areas overhanging oil pools, such as distillates of hydrocarbons indicating surface origins. (Again, this would appear to be an appropriate scientific response, as there are frequent references in myth to rains of sticky substances from the sky.)

This conjecture leads naturally to inquiry into the composition of shales, clays, and soils found in connection with ancient destruction. An analysis of "samples that cover depositional chemical environments ranging from continental and coastal soils to marsh and subtidalmarine deposits" of recent ages had disclosed complex polycyclic aromatic hydrocarbon assemblages (PAH) with "a high degree of similarity in the molecular weight distribution of the many series of alkyl homologs"[42]. This PAH is carcinogenic and mutagenic. The soils sampled were from widely separated locations on and off the New England coastal region. Forest pyrolysis and atmospheric transport was suggested. A search for other nonbiological organic compounds was indicated. The cause of such an immense fire is conjectural, as is indeed the postulate of the fire itself.

Are we so swollen with pride that we cannot review Ignatius Donnelly's *Ragnarok* (1883) and not gain from it at least a doubt as to the origins of some of the world's clays? Clay is conventionally assigned to sedimentation or decomposed structural material, without inquiring as to possible volcanic or other sources. Yet a geological walk along many a Greek island

beach may pass across deposits of pumice dust and of gray clay that visually suggests bentonite. Donnelly claimed a cometary origin for a heavy rain of fire and gravel that destroyed part of the globe and most of mankind. What does the new geology say to this? At least in regard to calcinated settlement debris and top open area subsurfaces nearby, what is called for is an increased resort to professional morphological, visual, and tactile examination, then to chemical mineralogical tests, and also to electron scanning microscopy.

Reference was made earlier to the extraordinary layer of copper and lead scoriae found by Schliemann in the burnt city. Is this mined ore, purified metal, or ore in a natural state? The origins of metals are not a settled matter. There is too long a stone age, too ready an access to ores, too abundant a mythology to relax in the arms of conventional theory.

Sample tests are generally inexpensive and well structured; they require only small amounts of material, often only a gram. But of course, the sampling technique is critical and a manual of instructions for sampling calcination with a mind to covering all hypotheses raised by this paper is a task for the future.

The idea that thermo-luminescence, radiocarbon, potassium-argon, and fission-tract dating techniques can be applied to combustion studies with good effect is natural but perhaps overly optimistic. Of course, calcinology is interested in dating inasmuch as one of its aims is the establishment of concurrences in destruction; if two spatially separated combustion processes point to the same or related causes, then their dating will not only confirm their relationship but will also permit a more secure dating of other sites where similar combustion but insufficiently related artifacts and structures are discovered.

Thermal effects encountered on calcinated sites play a large role in permitting age-determinations (as in thermoluminescence tests and fission-track dating) by providing a basal date from which calculations of age may be made, and in obscuring chronology by contaminating burned substances through mixing, as in radiocarbon dating. However, it will be of interest to apply long-term dating techniques such as the potassium-argon method if only to check whether the test gives an impossibly old date to a

recent volcanic event. Where uranium minerals have been used to give color to artifacts of glass, the fission-track technique may provide reliable dates and a check on radiocarbon dates. If an artificial glass is subjected subsequent to its manufacture to combustion temperatures of over 600 degrees centigrade, the fission-tracks may be partially or entirely erased, permitting the date of the new calcination to be determined from the tracks now present. Tracks in volcanic glass should date the eruption that produced it. Extra-terrestrial microtektites lend themselves also to fission-track dating and can be searched for in ruins [43].

Tests for radiation levels of the debris are indicated because of the possibility that the destruction may have involved atmospheric or air-transported agents. For instance the radiation levels would vary from the norm if lightning had struck or a meteoric pass-by had greatly raised temperature levels. Lightning effects may also be indicated by magnetization of metal pieces; for this reason and also to determine whether a change in the magnetic pole had occurred, supposing a catastrophe to have been widespread, the then-exposed rocks should be tested for abnormal magnetism, and ceramic sherds of successive levels should be tested for the same and for possible reversal of direction from one level to another.

As the gamut of tests and procedures is subjected to the concerted attention of scholars of relevant fields, it may be expected that a system of producers and a battery of tests will evolve -- simpler, easier to employ, practicable given the conditions of archaeological exploration. The resultant research and testing would possibly confirm that archaeology and geophysics have overlooked some significant part of the absolutely small fund of ancient data. At that point, not too far away, we may begin to speak of a new subfield of science called paleo-calcinology.

And when this task is finished, we might turn to another new subfield, which beckoned us temptingly even as we tried to concentrate upon calcination, paleo-seismism. Here the implication is that the Mercalli scale may be quite inadequate to denominate thrusting, folding, and crustal rising and falling that may have occurred in the time of man, and that the present awareness of settlement sites is merely fractional; much more

may have disappeared or is effectively hidden so as to lend a false perspective to the human story.

Also paleo-diluviology, the study of ancient floods and tidalism. And still another, paleo-meteorology, a study that would include the great winds that can sweep away everything down to bed rock, given the slightest faltering of the earth's rotation, or the passage of any substantial material from outer space through the atmosphere. Part of the total task, we seem to be saying, is to separate ancient real occurrences from ancient myth. The larger task is to distinguish real ancient catastrophism from literal theology, not to denigrate theology but so as to recognize catastrophism for what it did to shape man and his environment.

POSTSCRIPT OF NOVEMBER, 1983

The author's interest in the calcinology of Troy led the University of Cincinnati authorities to propose an investigation of samples of debris that had been stored for many years at the University. Generous grants were obtained from several foundations and in 1982, the Princeton University Press published Supplementary Monograph 4 of the University of Cincinnati Excavation at Troy, under the title of *Troy: the Archaeological Geology*, by George Rapp, Jr. and John A. Gifford. The present author, whose own research proposal had failed to receive support, was not consulted at any stage of this work. However, since his original memorandum, on which the preceding article was based, had been made available to the investigators in the very beginning and he had called their attention to the possibilities residing in the neglected samples, there may have resulted some effect on what was done in the investigations.

If so, it is not notable in the book just cited. The book does not state its hypotheses. Its tests discovered only that in almost all samples, whatever the level, a reed *(arundo donox)* occurred; the finding lacks significance since the reed is used in making bricks. In sample number 81 (p. 130) of Phase IId, burned earth was analyzed to revel charcoal, bone, and pelecypod fragments. There appears to be nothing of further interest to calcinology proceeding from the entire investigation. The soil samples were not, however, exhausted, and a future investigation is still

possible, hopefully by means more sophisticated than those described in the published work. The senior author, without serious defense of the thesis, seems to support earthquakes as the cause of destruction. ('...one earthquake of Richter magnitude greater than seven to affect the Troad about every three hundred years.' (p. 46)).

Notes (Chapter 2: The Burning of Troy)

1. This paper is an expanded version of one that was first presented on June 18, 1974 before the international symposium -- *Velikovsky and the Recent History of the Solar System* -- held at McMaster Univ., Hamilton, Ontario, and was published in Volumes I:4 and II:1 of *Kronos* magazine. The author is wholly responsible for the theory and presentation of this report. He wishes to acknowledge his obligation, however, to a number of persons who kindly supplied information and advice as he was preparing it. Among them are: C.C. Chandler, Director of Forest Fire and Atmospheric Sciences Research, U.S. Department of Agriculture, Forest Service; Arthur Brown, Geological Engineer, Technical Consultant, Athens *Metro* Project; Ruben G. Bullard, Department of Geology, Cincinnati Bible Seminary; J.L. Caskey, Professor of Archaeology, University of Cincinnati; Dr. Howard W. Emmons, Karman Laboratory of Fluid Mechanics and Jet Propulsion, California Institute of Technology; John Greeley, Professor of Physics, University of the Bosphorus; Billie Glass, Associate Professor of Geology, University of Delaware, Newark; W.A. Hans, Engineer, Fire Protection Department, Underwriters Laboratories Inca; John Gnaedinger, President, Soil Testing Services Inc., Northbrook, Ill; Jorg Keller, Professor of Mineralogy, University of Freiburg, West Germany; G. Marinos, Director, Department of Geology and Paleontology, University of Athens; Dr. Charles D. Ninkovich, Lamont-Doherty Geological Observatory, Palisades, N.Y.; Dr. Gerd Roesler, Consulting Geologist, Naxos, Greece; Eugene Vanderpool, Archaeological Photographer, American School of Classical Studies, Athens; Eddie Schorr, Archaeologist, Houston, Texas; Dorothy Vitaliano, Associate Professor of Geology, University of Indiana, Bloomington, Ind.; Dr. Immanuel Velikovsky, Princeton, N.J.

2. Claude F.A. Schaeffer, *Stragigraphie comparée et chronologic de l'Asie Occidentale* (London: Oxford U. Press, 1948), p. 7.

3. J.W. Mayor, Jr summarizes the work of Marinatos and Galanopoulos in "A Mighty Bronze Age Volcanic Explosion," XII *Oceanus* (Woods Hole, Mass.), 3 April 1966, and *Voyage to Atlantis* (New York: Putnam's Sons, 1969). Christos Doumas

summarizes the latest "official" theory of the succession of events at Thera in *Antiquity* XL VIII (1974), 110-15, plates. Also, cf. D. Ninkovich and B.C. Heezen, "Santorini Tephra," *Colston Research Society Papers*, 17 (1965), 415-53; the papers of J. Keller, D.L. Page, and C. and D. Vitaliano in *Acta of the First International Scientific Congress on the Volcano in Thera, Greece, 1969* (Athens, 1971); and C. and D. Vitaliano, "Volcanic Tephra on Crete," *Amer. Jrnl. Archaeology*, Vol. 78, no. 1, Jan. 1974, pp. 19-24.

4. IX *Anatolian Studies* (1959).

5. This and the following quotations are from pages 16-17, 348, and 325 of H.Schliemann, *Troy and Its Remains* (1875).

6. *Ibid.*, p.330. Schaeffer, op. cit., 223-4, claims that he saw no evidence of *flame-exposure (feu d'un incendie)* on the objects exhibited at the Berlin Museum from the treasure, and suggests chemical fusion. Also, radiative heat would be an alternative to "chemical fusion" if one must be sought.

7. Schliemann, *op. cit.*, p. 333.

8. *Ibid.*, pp. 334-5.

9. *Ibid.*, p. 340.

10. *Ibid.*, p. 302; cf. p. 347. The walls and gates of ancient cities had usually an orientation to the cardinal directional points. The "de-alignment" of successive Trojan escarpments is itself cause for suspecting and investigating a possible reorientation of the hill.

11. Communication of March 7, 1984. Bruce V. Ettling and Mark F. Adams accelerated combustion of woods, cotton cloth, and plastics by hydrocarbons (fuel oil, gasoline, could be etc.) and discovered by gas chromatography that accelerate hydrocarbons could be distinguished from the natural hydrocarbons in the char. ("The study of Accelerate Residues in fire Remains," N.D. offprint, Washington State University. College of Engineering Research).

12. Allan O. Kelly & Frank Dachille. *Target: Earth, The Role of Large Meteors in Earth Science* (Carlsbad, Calif.: the authors, 1953), p. 192.

13. *Loc. cit.*

14. Blegen, *Troy and the Trojans* (London: Thames and Hudson, 1963), pp. 161-4. Troy IIg is presently dated to ca. 2200 B.C. by the conventional chronology.

15. *Ibid*, p. 69. There is a contradiction here with fin. 13, as to how many bones were found.

16. *Ibid.*, p.70.

17. *Op. cit.*, p.17.

18. It is well to stress that an influential school of experts on Troy consider the Trojan War(s) to have been essentially a struggle for the command of the Dardanelles, through which heavy commerce funneled. Cf. Emile Mireaux, *Les Poems Homériques et l'Histoire Grecque*, 2 vols. (pairs: Albin Michel, 1948), ch. II, XIV, *et passim*. A strategic city that had to be put to good economic use might be thoroughly destroyed, short-sightedly, and another later on built upon the site. Even if this were true of Troy VII, would it have been also true of the earliest Troys, a habitual shortsightedness?

19. Chandler, *loc. cit.*

20. Rupert Furneaux, *Krakatoa* (1964).

21. Communication from Prof. Jorg Keller, Institute of Mineralogy, Univ. of Freiburg, June, 1974.

22. Israel M. Isaacson (E.M.S.), "Some Preliminary Remarks about Thera and Atlantis," *KRONOS* I, 2 (Summer, 1975). pp. 93 ff.

23. *Iliad* (Lattimore trans., 1951), p. 405.

24. "Lightning and Fire Ecology in Africa," Proceedings Annual Tall Timbers Fire Ecology Conference (April 22-23, 1971),473-511,475.

25. Quoted in I. Velikovsky, *Worlds in Collision* (N.Y., 1950), p. 218.

26. Furneaux, *op. cit.*, 73, 97, et passim.

27. A. Rittmann, *Volcanoes and Their Activity*, trans. by E.A. Vincent (1962), pp.12-13. 218.

28. *Worlds in Collision*, especially "The Hail of Stones," "Naphtha," "Ambrosia," "Rivers of Milk and Honey," "Samples from the Planets."

29. Harold Urey, "Cometary Collisions and Geological Periods," 242 *Nature* (March 2, 1973), p. 32; Velikovsky, *Earth in Upheaval* (1955), 147-53.

30. *Troy* (Princeton, N.J.: Princeton U.Press), Vol. 1, 325, 363.

31. *Ibid.*, p.373.

32. Cf. *Worlds in Collision*. 48-51, "The Red World."

33. CF. Nicola Rilli, *Gli Etruschi a Sesto Fiorentino* (Firenze: Tipografia Giuntina, 1964). Also, Michael D. Coe R.A. Diehl, and M. Stuiver, "Olmec Civilization, Veracruz, Mexico: Dating of the San Lorenzo Phase," 155 *Science* (1967), 1399-1401 (the authors report that many pieces of asphalt litter the excavated ruin level). F. Wendorf, *et. al.*, "Egyptian Prehistory," 169 *Science* (18 Sept. 1970), no. 3951, pp. 1163, 1169 and figure 1, speak of widespread brush fire in reference to a bed of ash in the Nile Valley. Geologist Louis Lartel, in his first studies of Cro-Magnon man near Les Eyzies-de-Tayec, Dordogne, in 1868 uncovered five archaeological layers covered with ash. And so forth.

34. *Op. cit.*, p. 700.

35. E. C. Baity, "Archaeoastronomy and Ethnoastronomy Thus Far," 14 *Current Anthropology* (October, 1973), 389-449.

36. Vol. I, p. 17.

37. I. M. Isaacson, "Applying the Revised Chronology," *IV Pensee,* no 4, 5, p. 14, quoting C. W. Blegen, *Troy,* V.IV, 1, p. 158.

38. *Legends of the Earth* (Bloomington: Indiana U. Press, 1973).

39. J. Lawrence Angle, *Troy: The Human Remains* (Princeton, N.J.: Princeton U. Press, 1951).

40. Site visit with Arthur Brown, Geologist and technical consultant, Athens Metro Project, September 11, 1974.

41. Communication of April 24, 1974 from K.F. Huff, Manager, Exploration Division, Exxon.

42. M. Blumer and W.W. Youngblood, "Polycyclic Aromatic Hydrocarbons in Soils and Recent Sediments," *Science* (April 4, 1975), p. 53.

43. W. Gentner, B.P.Glass, D. Storzer and G. A. Wagner, "Fission Track Ages and Ages of Deposition of Deep-Sea Microtektites," 168 *Science* (17 April 1970), 359-61.

CHAPTER THREE

THE FOUNDING OF ROME

For some time now, the founding of Rome has been accredited to truculent Latin rustics lost in the miasma of VIII century history. The more glorious legend of its establishment by Homeric heroes, particularly Aeneas, prince of Troy, has been in abeyance. However, in the light of recent theory and newly uncovered fact, the two stories can be blended in to a credible account. To suggest the new history is my purpose here.

To begin with, I would allude to two larger ideas, which we shall be carrying into the Italian setting. One is the increasing probability that a period of over 400 years of accepted chronology around the Mediterranean world did not exist and should be stricken from the record. These are the so-called Dark Ages of Greece, which were placed in the historical record in the first place to correspond with four hundred years of Egyptian chronology that were also non existent. “The Aegean prehistorians”, writes J. Cadogan, “have no choice but to adapt themselves to the Egyptologists”[1].

This may seem still to be true to most ancient historians, but a generation ago Velikovsky, in his book *Ages in Chaos,* knocked out the Egyptian centuries at issue and, following his cues respecting the Greek Dark Ages, I. Isaacson (Schorr), the *Review of the Society for Interdisciplinary Studies* of England, the journal *Kronos*, Velikovsky himself, and even the present writer have worked to close the Greek time gap.

Hence, it is possible now to connect Cadmus of Thebes with Akhnaton, the butning of Pylos with the destruction of Troy, to tie together in fact a number of natural catastrophes and movements of people that Claude Schaeffer had coordinated in time, and that could readily be slipped down by four hundred years into the VIII century. For Schaeffer’s inventory of

destroyed sites of the XIII century "Peoples of the Sea" period reveals that these settlement were succeeded by towns of archaic Greek, Greco-Roman, or other much more modern settings not older than the VIII. century.

The case of Troy, so close to our subject here, is especially instructive about the pseudo-time gap. As J. N. Sammer sums up the evidence [2], Troy-Hisarlik VIIb was the last Bronze Age city of the famous site. There followed a Greek town of the VII century or later; no deposits intervened. Furthermore, there was an abundant continuity. Gray Minoan pottery was found in Troy VI, Troy VII, and the Greek Age Troy. The forms of settlement were identical in the Late Bronze Age (supposedly the XII Century) and the -700 or later Greek settlement. A Late Bronze house was obviously used by VII century Greeks. Beset by the dogmas of Egyptian chronology, scholars such as Blegen and Coldstream resorted to the excuse of an abandonment followed by contamination in a mixing of debris.

In Egypt this was the time around the pharaoh Ramses III, on whose temple of Medinet Habu relating to the year 8 is recorded the "Invasion of Sea Peoples," that "They were coming while the flame was prepared before them, forward toward Egypt" [3].

Fire "before them" is not metaphor but refers probably to the innumerable cases of destruction by fire at this time, a fire which may have been from fierce earthquakes, volcanism, and exoterrestrial sources, which desolated many peoples and sent them out as marauders and colonists. Or so it is argued in a number of places, and it is precisely this kind of general ecological destruction encountered in VIII and VII century history that helped to confuse the dates by seeming to cause "Dark Ages" of barbarism, depopulation and continual movement and strife of peoples. Hence, the second point about the background of Rome is that the town originated in a turbulent period when the war planet Mars, Homer's "bloodstained stormer of walls," became a top god in Troy and not by coincidence in Rome.

The latest consensus may be expressed in the words of F.Castagnoli: [4]

> Archaeological excavations have opened up new prospects: the considerable documentation of evidence of the Late Bronze Age (particularly in the zone involved directly with the legend such as Ardea and Lavinium) and the Mycenean imports in Southern Etruria, and between Reatino and southern Umbria, has reinvoked the thesis (for some time cast aside) of a true historical reality adumbrated in the legend; joined to this suggestion is the hypothesis that various manufactures of the oldest Latium civilization reflect Cretan models and finally the theory that the Latin language reveals Mycenean traces. In consequence, the coming of Aeneas to Latium my not be an artificially created myth, but instead, in a certain sense, a tradition, that is, the echo of real occurrences, the arrival of Aegeans in Latium during the period of the Trojan War.

This certainly does not go far enough to suit our views, but will do for a start.

At the magnificent bimillennial exposition honoring Virgil in the beautiful setting of the Campidoglio in Rome in 1981, the heroine was the famous sculpture of the wolf of Rome, suckling Romulus and Remus. A small boy listened while his father explained: “She nursed the orphans, and Romulus then founded Rome.” The wolf was fashioned alone in ancient times, possibly by an Etruscan master, and the twins were added only several centuries ago. The wolf of Rome and the Mars-Ares of Aeneas’ may not have been far apart.

Already in antiquity and possibly based upon the word of Herodotus alone, the Trojan wars had been placed in remote antiquity, the XII and XIII centuries. When the Romans came to deal with this date, they found that their tradition of Romulus as founder of the city proper in the VIII century (753,747, etc) was impossibly disconnected with the Trojans, who now seemed to have disappeared four centuries earlier. Thereupon at the end of the III century B.C., Q. Fabius Pictor, a Roman writing in Greek, first (to our knowledge) bridged the gap by inserting an Alban line of Kings: but a more recent quotation from him (see below) seems to contradict this reputed view. In contrast, Ennius and others connected Aeneas and Romulus directly, as grandfather and grandson.

F. Castagnoli tells us how skepticism discounted the tradition :

> The Trojan origin of the Latins was already put in doubt in the seventeenth century by the humanist Philipp Cluever, a rigorous critique of philological aspects begun in the middle of the Eighteenth Century (Niebuhr, Klausen, Schwegler, etc.); principally upon their work has been based the interpretation of legendary material accorded by most historians of ancient Rome.

It is understandable that since the Romans had not been able to stabilize the history of their origins, the legendary part would fall prey to the new scientists who were bent upon sharpening their tools against superstition.

Later on the strong interest of the Etruscans in Aeneas was exposed. Also presented was the theory that Greek writers had created the legend. But then, after Mycenean connections had been liberally displayed in the archaeology of Italy, the notion of archaic elements corresponding to the myth grew up. More recently Latium has come under exploration, including especially Lavinium.

In the *Iliad* (302-8), the god Poseidon saves Aeneas from being killed by Achilles so as to preserve the house of Dardanus, beloved of Zeus, whose head will be Aeneas and also Aeneas will be king of Troy with many generations to follow. Hera adds that Troy must be substituted. So went the logic behind the legend.

But of course there was more than nonsense in the *Iliad*. In the years when Virgil was writing the *Aeneid*, Properzio publicized him, announcing that he would revive the armed exploits of the Trojan Aeneas and the wall built upon the Lavinian strand. "Take yourselves back, Roman and Greek writers! There stands hidden something greater than the *Iliad*."

In the middle of the VIII century, Ilioupersis of Arctinus and Miletus spoke of the secret flight of Aeneas from Troy up Mount Ida. Later the Homeric hymn to Aphrodite promises Aeneas a kingdom with a glorious future, a Troy restored. In the VI century a coin of the city Aineia on the Chalcidean peninsula displays Aeneas in flight from Troy, whence to found this same settlement.

That Aeneas went west appears for the first time in the fragmentary record in a table of the Capitoline Museum illustrating the work of Stesichorus of the VII century. In one scene Aeneas leaves through a Trojan gate; in another, Aeneas, with his father, Anchises, son Ascanius, and companion Misenus board a ship *eis ten Hesperian*, "toward the west." Anchises carries the sacred idols.

A direct connection of Aeneas with Latium appears a century later, at the end of the V century, with two Greek historians, Ellanicus of Lesbos and Damaster of Sigens. The story also appears of the burning of the Trojans' ship by their womenfolk, and of the naming of Rome after the Trojan heroine Rome, ringleader presumably in the affair.

The story told by Greeks (and no Roman history in Latin is known until much later) is seen in Italian perspective about 300 B.C. when the historian Timaeus of Tauromenium attests to sacred Trojan relics preserved in a sanctuary of Lavinium. Several decades later, the poet Licofronius, depending upon Timaeus, confirms him and details on the existence of the legendary Lavinium.

About the same time, Q. Fabius Pictor was writing his history. A recently discovered and fragmented inscription says only this about him:

> He enquired into the arrival of Hercules in Italy and (?) the alliance of Aeneas and Latinus ...Not (?) much later Romulus and Remus were born [5].

Thus contrary to his reputed view, Pictor (or Pictorinus as the inscription has it) carries Aeneas in the VIII century. The mention of Hercules is not queer. In *The Disastrous Love Affair of Moon and Mars*, I review the legendary ties between the good-man figure Hercules and the god Ares-Mars, and place the sons of Hercules, the Heraclids, as the invaders of Greece in the VIII century, at Pylos, for example, where they fight against the Pylian kinsmen of the young Nestor, later famous as an old warrior of the Trojan War.

Another case implicating Hercules-Mars and the Heraclids reminds us of the Roman case. It is introduced by Desborough in his book on the *The Greek Dark Ages* [6].

> Temenos was one of the three Heraclid leaders who with the Dorians seized the Peloponnese, according to the conventional Greek chronology at the end of the twelfth century. He had a grandson called Rhegnidas, who gained control of the little town of Philius; this would be not much later than the middle of the eleventh century. This event, as we are told by Pausanias, resulted in the departure to Samos of the leader of the opposition party in Philius, Hyppasos; and Hyppasos was the great-grandfather of "the famous sage Pythagoras." Pythagoras should then have been living at the end of the tenth century, and so one might think, one has an admirable Dark Age situation : until, that is to say, one discovers that Pythagoras belonged to the middle of the sixth century, a difference of no fewer than three hundred and fifty years.

The Heraclids are evidently of the eighth century.

In the superior guidebook to the Bimillenario Virgiliano at the Campidoglio in Rome, 22 September to 31 December 1981, we find the major leads needed to connect *Enea nel Lazio* to the larger Mediterranean framework of time and events.

Hundreds of archaeological discoveries are displayed and all of the sites excavated until now are described. The distinguished editors and authors do not speak of a "Dark Ages" in Latium or Italy. They act nevertheless as if they existed. Therefore we find that when all the artifacts can be grouped by centuries they concentrate into two groups , the first from the XI to XIII century B.C. and the second from the VIII century to the end of the Republic.

> The archaeological record of contacts between the Aegean world and Tyrrhenian Central Italy are few and difficult to interpret. Presently one treats with seven fragments of pottery and five fragment of bronze coming from the areas of Luni sul Mignon, San Giovenale, Monte Rovello, and Prediluco-Contigliano none of them coastal...It is almost impossible to assign them precise form and the decoration is too generic to permit all but the broadest dating [7].

Not only is there an absence of imported articles over the centuries between the supposed time of Aeneas and the time of the founding of Rome, but indigenous discoveries of the period are also rare (and, we argue, perforce non-existent). Hundreds of dates and artifacts mark the Bimillennial Exposition. Perhaps only a dozen are slipped into the period between the XI and VIII centuries. The earlier objects and dates are of Italian provenance; the later ones are heavily Greek.

The earlier period carries Central Italy into late Bronze and the beginnings of the Iron Age. The cultural uniformity of southern Etruria and Latium is called total already at this XI century boundary. Iron tools of Aeneas are attested to. And then, following the "Dark Ages", there occurs an outburst of production and trade.

> The king and cities of Virgil become then historical realities only when figured in the early Bronze Age: it is on the other hand certain that their origins need be sought in that crucial period, the Late Bronze age [8].

The arrival of "Aegean" people in the XIII Century, writes one authority, Renato Peroni, should have inaugurated a process of elements deriving from various fields of human activity, beginning with the material culture.

> Yet of all this, in the archaeological sources related to the period of Latium that interests us, there is not the slightest trace. It is hard to imagine a cultural continuity, in ceramics for instance, greater than that which is presented during these centuries [9].

Peroni, after expressing grave doubt that one could have an invasion and occupation without cultural impact, though that is what archaeology seems to reveal, repeats that in the XIII to XI Centuries (and significantly for our argument he terms the XI "less developed") "the cultural uniformity of southern Etruria and old Latium appears to be total."

What else can he say, so long as he believes the long chronology inherited from the Egyptologists: "The literary sources and archaeological evidence permit us to assign the destruction of Homeric Troy to the XII century. The Latium of the 'saga' of

Aeneas is therefore of the period contained between the Middle Age of Bronze (XVI - XIV Century B. C.) and the first phase of Latin civilization (X Century)" [10].

He goes on to survey the town sites occupied in the late Bronze Age, and finds a continuity of occupation going into the age of iron, such as Ardea, Ficana, Pratica di Mare, and Acqua Acetosa Laurentina. This in itself is remarkable, considering the lapsed centuries and the absence of cultural remains of the long period of time.

Also remarkable is the evidence that between the end of the Bronze Age and the beginning of the Iron Age the number of inhabited places of Erturia dropped by four fifths [11]! At the same time, the underpopulated regions of Latium and Sabina held their own and increased slightly their settlements.

"So rapid a process of depopulation (in some cases occurring violently, in others voluntarily abandoned) and the incorporation of the population in a few proto-urban centers will make way, in its turn, to the mechanisms of formation of a complex society, even of a 'stratal' type, at the beginnings of the Etruscan nation." Meanwhile, the Latins were beginning to accrete settlements.

This scenario of Peroni suits exactly our theory of a period of natural catastrophes and survivors occurring in the VIII century. One age disappears into another without evidence of transition. As in Greece the culture reverts to survivorship; strife is rampant. The Trojans arrive amidst a general desolation and disorganization, gain a foothold without difficulty even welcomed in a way, and begin to expand and to found new towns, among them Rome.

In Southern Italy and Sicily a similar set of events is occurring. The scholar's "Dark Ages" myth prevails. After the mid-XIII Century, writes L.B. Brea, "a real Dark Age set in only to be brought to an end five centuries later with the Greek colonization of Sicily and Southern Italy." Before it set in, there had been much trade with the Mycenean century and a flourishing civilization. However, we find that the city of Gela was established by a warrior from Troy in 690 B.C. We also note

that at Agrigento and Segesta artwork in Mycenean style was practiced at both of the interfaces of the Dark Ages. Further, dome-shaped Mycenean *tholos* tombs were closely alike across the imagined 500-year gap. And that at Morgantina excavators founds a Greek fort constructed just above and on top of a destroyed Mycenean level.

Virgil has Aeneas landing in Latium, at the mouth of the Numicus river (Sol Indiges, Troia and by today's name Fosso di Pratica). The hero, desperate to feed his men, chase an animal for distance of all 24 stadi (4440 meters) and comes upon a herd of pigs on a hill. He sacrifices them there and founds the town of Lavinium. The names and distances between the two given by Virgil are exact today [12]. Titus Livius remarks on the name, Troy, given to the place of landing. The Trojan altars were said to be still there at the end of the pagan era, by Pliny the Elder and Dionysius of Halicarnassus, the historian.

At Lavinium, named for Aeneas' wife, Dionysius visited in the I century B.C. There he witnessed relics supposedly of Aeneas held in a sanctuary and tomb dedicated to the Trojan hero [13]. The preservation of the relics and the identification of the tomb might well have been impossible if they have originated in the XII century; it is more plausible that they had lasted from the VII or at least until the time of Timaeus of Tauromenum about 300 B.C., who saw them. Recently, the "tomb of Aeneas" has been uncovered and placed in the VII century, with remodeling into shrine occurring in the IV century [14].

Dionysius describes a round temple at Lavinium that housed the idols of the Trojans, which seems to have been emulated in the round temple of Vesta and the Penati of the Roman Forum. The small Lavinium temple is replicated on a coin of the Emperor Antonius Pius.

Aeneas probably rested in several places on his way to Latium, in Asia Minor, Macedonia, Crete, Carthage, and Sicily. Apollo's oracle at Delos told him to seek the lad of his ancestors and this was taken by his father, Anchises, to mean Crete. The refugees did go there, finding a desolate and abandoned settlement. They began to settle down but were beset (significantly) by a natural disaster that made further consultation with Apollo necessary.

Luckily, a second trip to Delos was not required because voices authorized by Apollo urged them to find the true place of their origins, and they set sail for the West [15]. Anchises could not remember Italy, hence had not been born there, but recalled that certain ancestors had come from there, Dardanus and Iasius, and had been Olustrians or Italians.

On the way to Italy, they stop at Carthage, which is, says Virgil, still under construction by Queen Dido, who has fled with her supporters from a berserk brother who ruled Phoenicia. Here we encounter a chronological problem; to be sure it is not a matter of centuries but of a generation. Dido is best placed at -804 or -803, before the dates which we accept for the Trojan War(s), which may have occurred over most of a century, at which time Aeneas would most likely have left Troy. Moreover, the dates assigned traditionally to Romulus, a grandson of Aeneas, are -772 (-771) to -717, and to the founding of Rome -747 or thereabout.

Either Aeneas left upon an earlier sack of the city, or someone related to Aeneas and therefore confused with him visited Dido. The stop itself was not unexpected. There appears to be a non-Greek connection that binds in alliance the Trojans and their Thracian and Anatolian friends, the Carthaginians, and the Etruscans. Etruria, said Herodotus, was settled by Anatolian Lydians before the Trojan War [16].

But who might have visited Carthage and could be mistaken for Aeneas? Philistos and Appios clearly give 50 years before the Trojan War as the date when Carthage was founded. Timaeus gives -814 and Josephus independently gives -826. Yet Carthage's earliest archaeological remains afford specimens of Greeks material ascribed to the last quarter of the VIII century, presumably -725 to -700 [17].

Were the Phoenician and Trojan refugees in motion a century apart? Not according to Virgil, obviously, who describes a torrid love affair between Aeneas and Dido. And not according to the traditional dates for Romulus and the founding of Rome; if Aeneas abandoned Dido at the turn of the century, he could have grandfathered Romulus at the appropriate moment, about -772.

Arie Dirkswager, in an unpublished manuscript lent the author, offers a solution. He suggest that the king of Tros who founded Troy then moved to Italy where he founded Etruria and gave the Etruscans his name, about -815. It was he who knew Dido! Then later, the refugee party led by Aeneas would join its kinsmen about 747 B.C., when Troy burned.

However, although we also view the Etruscans and Trojans as related, we see a later date for the Trojan wars finally to end, and one has to place Romulus and the founding of Rome into the very end of the VII Century.

We are perplexed now and have exhausted our meager supply of information. The most plausible suggestion I can afford is that the Trojan Wars were several until the city's final destruction (and we cannot confirm the site of Hissarlik - Schliemann's discovery - as more than a frontier post in the struggles). Given the practices of those times, an age of colonization and restless wanderings having begun, Aeneas, Prince of Troy, led his party of refugees out at an early stage of the wars (which Homer combined into one for literary effect and from amnesiac causes), did visit Dido at the turn of the century, and so history picks up with Romulus and the founding of Rome in the middle of the next century. We are introducing one doubt in order to relieve ourselves of several. And we should be grateful if some brilliant scholar carried down the whole scenario by another century to place it squarely in the catastrophic VIII and VII centuries.

We have relieved ourselves of several notions: that Virgil was only glorifying Rome by mythmaking; that the "Dark Ages" existed Italy between -1200 and -700; that Aeneas and Troy were of the XII Century; that Aeneas and Romulus were fictional characters; that were was no significance to Mars and the Wolf of Rome; that he Etruscans were long settled in Italy and were a natural and continual foe of the new Latins; that the Romans were a simple farm folk who took well to fighting; and that in the VIII Century natural conditions were normal.

We understand better why the exasperating gap between Aeneas and Romulus was created: the need to integrate chronology of diverse cultures by basing it upon what was believed to be the nearly perfect chronology, the Egyptian; the scholarly skepticism

of all legend until recently, especially when wolves and feral infants are tied to the mythical package, not to mention the hallucinogenic pantheon; the seeming circular confirmation of Etruscan-Greek-Roman interrelations; the ignorance and neglect of great natural disasters, such as Aeneas encountered in Crete; alternative explanations of the Dark Ages such as long-drawn-out climatic changes, restless northern tribesman, and normal decay of civilizations; the injection of artifacts and personages falsely into the gap of time; and the vanity of Roman noble families who had attached themselves genetically to the fictitious personae of the noble line of Alba Longa extending back to Lavinium, including even the Caesars.

We surmise, by way of contrast, that Aeneas was a Trojan noble, active around -800. He left a beleaguered Troy in an early stage of successive sieges, founded settlements in several places, eventually in Latium, near Etruscan relatives, and among a disastrously weakened native population.

A prompt acculturation and cultural homogenizing began, catalyzed by the disorganizing effects of a turbulent nature. His daughter Elia mothered Romulus (and one fantasizes that his godmother was Roma who led the female party which burned the Trojan ships to prevent further wanderings). The heavens were producing some of the disasters, and the planet Mars was connected with them to the point that the god could be the godfather to Romulus who eventually joined him in a cyclonic episode. The wolf of Rome was the symbol of Mars. The experience of Italy was being replicated throughout the world in those times; many peoples were practically destroyed; many new towns were founded. The Mycenean civilization was wrecked, so too the Cretan, so too many another including the Siculian of Italy and Sicily. The Bronze Age lurches abruptly into the Iron age.

Notes (Chapter 3: The Founding of Rome)

1. An extension of remarks at a conference of the Canadian Society for Interdisciplinary Studies at Lake Kashagawigamog, Ontario, August, 1983.

2. "Dating the Aegean Bronze Age without Radiocarbon," 20 *Archaeometry* (1978) 212.

3. W.F. Edgerton and J.A. Wilson, *Historical Records of Ramses III* (Chicago: U. of Chicago Press, 1936), 53; While J.H. Breasted (*Ancient Records of Egypt* (1906), IV, 37-8) translates "They came with fire prepared before them, forward to Egypt."

4. In *Enea nel Lazio: Archaeologia e Mito* (Milano: Fratelli Palombi; 1981), 5.

5. R.M. Ogilvie, *Early Rome and the Etruscans*, New York: Humanities Press, 1976, 16.

6. London: Benn, 1972; Malcolm Lowery provides this instance in I *Soc. Interdiscip. Stud.* 1 (Jan. 1976) 16. I cite another in *The Disastrous Love Affair of Moon and Mars*, "Crazed Heroes of Dark Ages."

7. *Enea nel Lazio*, 107.

8. Alessandro Guidi, in *Enea Nel Lazio*, 94.

9. *Enea nel Lazio*. 87.

10. *Ibid.*, 88.

11. *Ibid.*, 92.
12. *Ibid.*, 157.

13. *Ibid.*, 158.

14. P. Somella, *Rediconti 44: Atti di Pontificio accademia di Archeologia* (1971-2), 47-74; *Enea nel Lazio*, 157-8, 172-7.

15. *Aeneid*, III, 94-6 (Humphries trans.) pp. 64, 66.

16. *Histories* I, 94, (80-1 in the Penguin ed., 1954).

CHAPTER FOUR

MICAH'S ARK

Velikovsky persuasively traces the ruins of Baalbek to the ancient seat of a fine city constructed during the reign of Solomon [1]. Baalbek, too, was the second capital of Dan. "The Danites, migrating to the north, took with them Micah and his idol, and it was placed in Dan of the North." (3.14) The Oracle of Micah probably was set up in the "house of high places," a temple that was built at Dan by Jeroboam "to contest and to surpass the temple of Jerusalem." (3.15) The oracle remained in high esteem at least as late as the fourth century of the present era, when Macrobius in his *Saturnalia* wrote of Baalbek: "This temple is also famous for its oracles." (3.14) The Emperor Trajan questioned the oracle in the year 115.

Velikovsky's notes, compiled by Jan Sammer, show two more indications of what the oracle might have been. Of Baalbek-Dunip-Seti's Kadesh, "the place is known as Yenoam ('Yahweh speaks') which refers to the oracle." Then , "Yenoam-Dan (Yehu probably introduced the cult of Yahweh at Dan). Yenoam, read in Hebrew, could be interpreted as "Ye [Yahweh] speaks..." Writes Sammer: "Velikovsky evidently saw in the name a reference to the oracle of Dan." I agree, and Yehu might be interpreted as a form of Yahweh.

But Velikovsky did not proceed to identify the oracle further, although this would have strengthened his case all around. In my book on *God's Fire: Moses and the Management of Exodus* there occur the following lines:

> We hear that on one occasion the Ark was duplicated by a young man named Micah in his home, a surprising occurrence, reminiscent of claims that the nuclear bomb can be home-made. The lad's mother was quite proud of him; she had consecrated her silver for the purpose (*Ju.* 17:3) He made a graven image, a molten image, an ephod, a

> terraphim, and hired a priest. Nothing untoward occurred save that men from the tribe of Dan descended upon the household and carried away the ark and its Levite attendant. Later we learn that the true Ark was kept at Shiloh, whence it was occasionally employed.

I owe the realization that Micah's image was an ark to J. Ziegler (*YHWH*, 34-35). He points out that mere images of material are common in ancient Jewish household; that the word which is translated "image" as in "any standing image" comes from the word "neck," hence refers to any arrangement or instrument capable of discharging an ark, that Micah needed both insulating carved wood and metallic sides, that is, both "a graven image and a molten image" to fabricate his ark. Ziegler perceives that the first and second commandments go together, expressing the absolute preference for Yahweh followed by the prohibition of graven images, by which is meant any competitive presentation of the divine who was displayed on the true Ark.

The Danites, after stealing the image (ark), erected it in the capital of the country that they had savaged. "And they kept the carved image of Micah ..., all the day that the house of the God continued in Shiloh," an obvious reference to the prototype "true" Ark of the Covenant that rested at Shiloh for a long time.(*Ju.* 18:13)

Hence a functioning Ark, an electrical apparatus that has been described elsewhere (Ziegler, *op. cit.* A de Grazia, "Moses and his Electric Ark," *Midstream*, Nov. 1981), found a home in Baalbek, where appropriately, it was mounted upon a hill site. There, in the years of declining terrestrial discharges, it might still on occasion approach the norm of activity that its prototype (then in the temple of Solomon at Jerusalem) displayed during the Exodus under the direction of Moses.

In Velikovsky's article, the "thing" is an "oracle," an "image," and an "idol," vague terms applied to the Ark in conventional Biblical exegesis. Too, they are terms that the editors hostile to the Northern Kingdom would use to avoid suggesting that something approaching in shape, intent, and functions the most sacred Ark would be operative there, or anywhere else. The oracle of Micah was also called "a voice ...from Dan" by

Jeremiah, and "voice" was a term used literally and liberally in regard to the presence of Yahweh on the Ark.

The "oracle of Micah," or Micah's Ark, lends authenticity and credibility to Velikovsky's reconstructions of the history of Baalbek. Some fifteen years ago, during a rambling conversation that took in the crises over Lebanon, Velikovsky fixed me with a confiding gaze and said: "Baalbek was part of Israel. I have never published it because it might cause trouble." He felt that such proof would be made the basis for a claim to Lebanon by Jewish extremists. He was complex; here he was a man of peace; but usually his scale of demands paralleled or even advanced beyond those of incumbent rulers of Israel.

The complexity of his character is involved in the oracle of Baalbek, too. We note his statement about Jeroboam, who built the "house of high places" at Baalbek-Dan and had built the Jerusalem walls under Solomon; "before becoming king of the northern kingdom he lived as an exile in Egypt. He introduced the cult of the calf in Dan."

Velikovsky despised any Jewish minion of a foreign power. Nor did he like the "Golden Calf." He acknowledged its enduring presence in Hebrew religious history, opposing it to the "superior" abstractions of Moses Yahwism. Velikovsky did not see the Ark as a functioning electrical machine, and merely grunted in response when, a year before his death, I mentioned to him that an electric Ark was a feature of my manuscript of Moses. Two years earlier, I had raised the subject of Ziegler's book *YHWH* and it was obvious that, although he had received it, he would not read in it.

Probably he saw, in the image of the calf, which was the only ritual image turned up by the Baalbek excavations, a synopsis of Baalbek Dan's dedication to the apostasy of Jeroboam and the Ten Tribes, a taboo-guarded subject in Jewish tradition. In sum, Velikovsky probably regarded the Ark of the Covenant as a mere holy litter, in the modern scholarly conception of bedouin ritual apparatus, and may have assumed, with embarrassed haste, that the oracle of Micah related to the worship of the calf and embodied its image, whereas most likely the oracle was the Ark of Micah and preceded Jeroboam's assumption of power in

Baalbek; it was infuriating to the southerners, who later on supplied the editors of the Bible.

Notes (Chapter 4: Micah's Ark)

1. III *Kronos*(1981-2) nos.2, 3.

CHAPTER FIVE

THE CATASTROPHIC FINALE OF THE MIDDLE BRONZE AGE*

(A paper presented at the IX Congress of the International Union of Prehistorical and Protohistorical Sciences, Nice, 1976.)*

Catastrophes are defined as large-scale intensive natural disasters. All the world's religions are founded upon original catastrophes. Indeed, so obsessive is the connection between catastrophes and gods, that human cultures, even the most scientifically advanced ones, refused to turn over the study of catastrophes to science. As a result, science and scientific history made their way after 1840 in defiance of the very idea of catastrophes, that is, of a quantavolutionary as contrasted with an evolutionary primevalogy. Quantavolution promises, as I would like to illustrate here, an ability to penetrate some pre-historic and historic problems that have caused confusion in uniformitarian, gradualist, evolutionary theory.

We are dealing here with a large area of the Earth, and with 2500 years of time. We should guard against defining catastrophe by some measure that turns out to be a mere uniformitarian statistic. The incidence of catastrophe between 3500 B.C. and 1000 B.C. must be much greater than the incidence of the past 2500 years, an equal length of time, to support my thesis. That is, we should add up all the Vesuvius and Krakatoa eruptions, the Caribbean hurricanes and Kansas cyclones, the Siberian meteoroid falls, Swiss avalanches, sinkings and risings of town harbors, Yangtse and Mississippi River floods, frozen Baltic winters, prolonged Saharan droughts, etc. Then convert the intensity and rate of these events into 2500 year averages. Then, further, if these recent indicators appear to compare 1 to 1, or even 1 to 2, with the Bronze Age indicators of the expression of high natural energy, perhaps the thesis

should be abandoned... And many scholars would be pleased to confirm that the human record has been uniform, gradual, and linear, instead of catastrophic and cyclical. Furthermore, they would feel that the technological progression "from stone to bronze to iron ages" had some essential meaning, or that a sociological progression "from hominid, to hunter-gatherer, to pastoral, to agricultural, to industrial" also has meaning. They would further be reassured that the great gods that succeeded each other on the altars of ancient cultures were only the typical occasional results of the human pastime of inventing new gods whenever normal life routines were disturbed by the tides of fortune or war.

But suppose the incidence of catastrophe is 1 to 3, or 1 to 5, or 1 to 100, comparing the modern age with the Bronze Ages! Then the catastrophic or quantavolutionary thesis will be nailed upon the door leading to ancient history. If it becomes reasonably apparent that the Bronze Ages exhibited high energy expressions and effects in multiples of 2, 3, 5 or a hundred times the expressions and effects of high energy in recent years, then all fields of ancient history and ecology must undergo change. Many cultures would have been caused to disappear in natural disasters. Human nature may have acquired the character of desperation. Personal behavior and institutional practices may have become suffused with the effects and expectations of intense traumas. In short, the world of natural and social history becomes a different world and had better be studied differently.

Let us look briefly, then, into the middle of the second millennium B.C., that is, some 3500 years ago. (Because there is some confusion of chronology and much controversy about it, I shall mention dates between 1700 and 1400 B.C. and venture an opinion later respecting their simultaneity and succession.) Did the events so dated happen at the same time or not?

I shall commence by paying homage to Claude Schaeffer. For it was he who, despite onerous preoccupations during the French War of Liberation, assembled and analyzed the mass of data which was finally published in 1948 under the title of *Stratigraphie Comparée et Chronologie de L'Asie Occidentale, IIIe-IIe millénaires.*

In this great work, he compared some 40 important archaeological sites in the Near and Middle East for evidences of sudden destruction. And he found, without fail, that there had appeared several levels over a period of thousand years when destruction seemed simultaneously to descend upon Bronze Age cultures.

His general conclusions were several:

1. Certain outstanding events... struck simultaneously a definite number or even the totality of urban centers of Western Asia... Not only is this conclusion persuasive as originally inscribed, but many locations can now be added to the doomsday list.

2. The catastrophes struck six times: roughly, about 2350, 2100, 1700, 1450, 1365, and 1235 B.C.

3. “The various countries of Western Asia affected by the perturbations reacted according to their own resources. Now these varied considerably, sometimes from one region to another, as a function of the climatic and geographic situation. Thus the chronology of the layers deposited during the periods of real stability between the great crises may present a deviation from one site to another. That is, nevertheless, never considerable and hardly ever exceeds fifty years.” Even this discrepancy may be due to errors in dating the material uncovered.

4. The perturbations of cultures were caused by natural catastrophes, often giant earthquakes and fires, rather than by the hand of man. Cultural ruptures only rarely were caused by human elites, but “by atmospheric cataclysms or other calamities, such as earthquakes ... We perceive as yet only imperfectly the initial and actual causes of certain of these great crises. We put ourselves here expressly *en garde* against a generalization of the seismological explanation.”

5. Long-enduring hiatuses or lapses followed the destruction, as after 1700 B.C.: “In all the sites examined up to now in Western Asia, a hiatus or period of extreme poverty causes a rupture of the stratigraphic or chronological sequence of the layers around

1700 B.C., and revival began only around 1550 B.C., 150 years later."

John J. Bimson, reviewing "the Conquest of Canaan" in the time of Joshua, finds in the records of excavation half a dozen destroyed settlements beyond those reported by Schaeffer in Palestine alone - Arad, Hormah, Gideon, Hebron, Hazor, *et al.* All went down in violent conflagrations. It is noteworthy that Bimson, on the say-so of Epstein, excludes Megiddo, holding that there was no break between Middle Bronze and Late Bronze ages. In this case, Schaeffer is in contradiction: "The stratigraphic picture of Megiddo shows an interruption of occupation between 1650 and 1550 B.C. The excavators report a variety of remains from the Recent Bronze Age, subsequent to 1550, and of remains from the Middle Bronze Age, antecedent to 1650, in the zone of contact of the two layers." There do not seem exceptions to this world-wide disaster which so many scholars have perceived in their own digging but are blind to overall.

6. Cultures were transformed in the times that followed the disasters. Many movements of peoples occurred. Economies changed. Some sites were abandoned entirely.

Also working during World war II, carrying on in New York as a journalist and psychoanalyst far from his home in Palestine, was Immanuel Velikovsky. In 1950, after rejection by eight publishers, his *Worlds in Collision* appeared, followed shortly thereafter by *Ages in Chaos* (1952).

Like Schaeffer, Velikovsky reported the universal destruction of settlements in the Exodus period, which he assigned to around 1450 B.C. So all that Schaeffer says happened about 1700, Velikovsky says happened about 1450. We resolve the dating discrepancy in favor of Velikovsky. The two scholars are discussing the same set of events that brought the Middle Bronze Age to an abrupt and terrible end. Both inculpate natural catastrophe as the general cause, and relegate the usual causes of change in recent times (leadership, weather, inventions, wars) to a minor causal role.

Unlike Schaeffer, Velikovsky introduced a first cause, a comet that he identified as the erratic proto-planet Venus, which has a hundred names around the world. This comet, said he, first closely encountered the Earth in the mid-second millennium. Granted this single ultimate cause, Velikovsky could support strongly the theory of the simultaneity of the catastrophes, which Schaeffer espoused.

Velikovsky further asserted that the set of disasters repeated itself, in reduced degree, at intervals of about 52 years, as the comet dropped its tail and assumed a more circular orbit. When it *did* approach, extreme religious celebrations were inaugurated in places as far apart as Palestine and Central America, celebrations that continued until recent times and were invariably connected with planet Venus. The disasters on Earth diminished, then, until the 8th century B.C., when a new deviant celestial force began to play upon the Earth and a new and heavy set of disasters began. Also unlike Schaeffer, Velikovsky wove voluminous legendary, mythical and geological material into the fabric of proof offered by archaeology.

Spiridon Marinatos and the island of Thera (Aegean Sea) is another part of the mid-second millennium story. As early as 1939 Marinatos began to publish theories of the destruction wrought by the explosion of the volcano of Thira upon Minoan civilization. Minoan culture, centered in Crete, promptly and abruptly declined. Not only Thera itself but many places of the Aegean and Eastern Mediterranean were badly hurt by the extensive fall-out, hurricanes, and tsunamis from the explosion of Thera sometime after 1750 B.C. Isaacson, however, whom I follow, ascribes the Thera disaster to the Tenth Century, B.C., perhaps in the years of King David.

A part of the debate over the dating of this event has been occasioned by the expectation of some scholars that this one explosion could carry the full responsibility for all the human and ecological changes occurring over a large area in the mid-second millennium. My opinion is that, both at the same time as the Thera disaster and before and after it, a multitude of other natural forces were unleashed, adequate to explain the total hiatus found over a great region and for a long time.

Velikovsky was not the first to point to a comet as the instrument of destruction. I would only pause to mention others here -- William Whiston (Isaac Newton's disciple) in the 17th century; the brilliant young Nicolas-Antoine Boulanger in the 18th century; the American politician, utopian, and scholar, Ignatius Donnelly in the 19th century. Although they may not have been preoccupied with the Bronze Ages as such, there is no doubt of the proximity to the Bronze Ages of the events which they describe.

More modern (in the 1920's) is the case of F.X. Kugler. Kugler was a Babylonian scholar and astronomer of the top rank. His last book, on the Sybilline star battles and the Phaeton myth, is a tour de force. In it, as Malcolm Lowery has shown, are the conflicting moods of one who dogmatically accepts primordial catastrophes of creation and the Noachian flood, but who is stubbornly uniformitarian otherwise. Kugler, studying the hysterical lines in the poetry of the Sybilline oracle concerning the battles among the stars (which describes a shifting struggle among the animals of the Zodiac), concludes that this must be considered a metaphor.

However, he crosses the bridge to scientific catastrophism in his analysis of the myth of Phaeton. This, he argued, embodies a factual event of the mid-second millennium when "one and the same stream of meteors passed over Africa (in particular, Ethiopia) and the Aegean, producing respectively great fires and violent flood waves." Kugler, it seems, strives to limit the Phaetonic catastrophe as severely as he can, while allowing the grave reality.

A number of Soviet, American, and Bulgarian students are delving into the area of the Black Sea, with the mid-second millennium as one possible breaking point. Oceanographers of Woods Hole, for example, date to something over 3000 years ago a heavy precipitation of organic material in the cores that they have drawn from the bottom of the Black Sea. In my opinion, this is a layer of sudden death.

Regarding the region to the South, Robert Adams (who holds a triple interdisciplinary position at the University of Chicago) is urging a shift of archaeological and anthropological perspective

from the individual site to a pattern of sites. No longer is the paradigm to be the single urban center, he says, but rather zones of cultural interaction that "will require work in many countries and over many decades." He finds, for example, "a major westward shift in the Euphrates system of channels as a whole during Kassite times." That is, perhaps in the mid-second millennium, there occurred a "dark age," "a population nadir." He finds hundreds of unknown sites to plot. Regions of culture disappear, reappear, switch places.

In their Central Asian work, apart from the Black Sea simultaneities already mentioned, Soviet researchers have noted widespread destruction. In a popular but authoritative book, the linguist Alexander Kondratov writes, "In the middle of the second millennium B.C. the ancient cities in Southern Turkomenia declined and were abandoned by the inhabitants. The South Turkomenian civilization perished at about the same time as the proto-Indian, and the reasons are still unknown."

The case of the proto-Indians of Mohenjaro, Harrappa, and a vast area besides is well-known, if not well understood. There is one theory that they lived so well off the fat of the land that their economy declined and they were extinguished. (This strange theory reminds me of the long-accepted idea that the magnificently equipped Magdalenian hunters of France, after flourishing beneath mountains of ice, gave up everything when the ice melted, because their reindeer prey left the area.)

Yet another theory about proto-India is quasi-catastrophic, Robert Raikes holding that natural dams formed and then broke, swamping the Indus cultural centers. The formation and collapse of natural dams can truly create great destruction; in the State of Washington Scablands case, the scenario has also been well worked out by geologists. However the timing of this special proto-Indian dynamic of catastrophe is significant. Why not later? Why not today? Why were these floods coincidental with a world that was in the throes of general destruction?

Further, the proto-Indian related cultures were widely diffused and most of them would not have been affected by the special flood dynamic referred to. It is most unlikely that such a great civilization of vast extent, with its city-planning, excellent

cuisine, fine arts, and decimal numeration would succumb to swamping by mud, or for that matter to desperate invaders, themselves probably survivors of some northern sectors of the universal disasters. Further, Raikes has mentioned recent disasters of meandering rivers (but no culture has been destroyed). I suppose then that the conviction that catastrophe struck the proto-Indian cultures before the Aryan incursions occurred is correct.

Perhaps this was a time of great flood in Northcentral Africa or both flood and sudden desiccation. Who tipped or cut into the basin of the historically known Lake of Triton, said by Aristotle to be separated by a narrow belt from the Sea? The Lake may have been so large as to permit the luxuriant development of the Saharan region and its culture. Great rivers, including the Niger, flowed into it then. If Triton did burst into the Mediterranean, a Tyrrhenian flood catastrophe that destroyed western civilization may become a viable hypothesis.

The playful girlhood of goddess Pallas Athena (the Greek planet Venus) on the shores of Triton is suspicious. It was said that she accidentally killed her playmate Pallas and took the name herself in remorse. This same Pallas, however, is in another story a monster whom the notorious virgin goddess dispatched when he attempted to rape her. Even more, this Pallas is elsewhere identified with Typhon, the dragon and would-be destroyer of the world whom Zeus finally struck down in the middle of the second millennium. Pallas Athena was present in this episode, too, in the form of the protoplanet Venus, now tailless or without a phallus, by the loss of Typhon.

In Italy and Sicily at this time, abrupt cultural transitions are commonly reported, although none has conducted a survey of destruction levels. At Lipari, for instance, a totally new culture (the Ausonian) entered upon the scene. At Prato, in Tuscany, the Villanovan ruins, themselves separated from the Etrusco-Campanian period by “a colossal fire,” to use Nicola Rilli’s words, are based upon yet another enormous bed of ashes. I suspect that this bed may be tied to the mid-second millennium, but the question requires much more study.

Surveys are needed for the Western Mediterranean area and Northern and Central Europe generally. An abundance of legends of catastrophes is offered, and the shadow of catastrophe hangs heavily over prehistory. Vast forests may have swept into or been drowned by a Baltic Sea formed at this time. Offering themselves for mid-second millennium construction and abandonment are hundreds of megalithic monuments throughout the vast area. The astronomical interest of these peoples is now proven. But, even if one is not a psychologist, one cannot think it is normal for people to cut and lug 100-ton stones to do a job that a few sticks of wood would accomplish -- watching the Sun and Moon. I think that around this time, in despair and disgust, the survivor custodians of Stonehenge may have given up their job.

Suggesting a need for oceanographic archaeology are the legendary sinkings of lands mentioned in Eastern contemporaneous records, and in later classical and medieval sources. Where located and explored, as with Pharos at the head of the Nile, “the greatest seaport of the Bronze Age,” according to R. Graves, the question of the date of the submarine tectonism that sank the city remains. Off Cornwall, England, even a log has been recovered from the depths.

Rilli, to take another example, believes that the Etruscans were related, if not descended from, the culture of a sunken central region of the Tyrrhenian Sea. In 1971, B.C., Heezen and others reported in *Nature* magazine upon the evidence of continental crust that lies foundered beneath the Tyrrhenian Sea. Of course, the dates are impossibly divergent.

Across the Atlantic, we need not believe that the mid-second millennium was peaceful. The Olmecs, as William Mullen of Princeton University reported, relying on Michael Coe, appear to have been deep in trouble, floundering in ashes, tar, and destruction. Apart from the still flimsy archaeological evidence, there exists a mythology, well introduced in the analyses of Velikovsky and Mullen, that appears to treat of this disaster. In the southern part of the Valley of Teotihuacan, 28 occupation levels of an abri stretch from 1500 AD back to 10,000 B.C. The only great interruption, according to Richard McNeish, happened between about 2300 B.C. and 900 B.C. This is a wide

gap, but obviously no one there seemed to be in a culturally creative mood in the mid-second-millennium.

Both Schaeffer and Velikovsky attempted an appraisal of the Chinese condition. Both allude to mid-second millennium floods and earth movements which marked the practical destruction of one Chinese civilization and the beginnings of a new system of society. In my opinion those sinologists who take the evolutionary position that this break marked the transition from a legendary society to a historical society are wrong. The break separates two highly distinctive societies and ages; the Chinese "Bronze Age" bursts out with the Shang dynasty after 1500 B.C.

Apparently, the atmosphere was not a silent witness to the global events of this period. There appear to have occurred remarkable deviant ingestions of Carbon-14 by organisms of this time, as disclosed in statistical studies by P.E. Damon, A. Long and E.I. Wallick, and analyzed by G.W. van Oosterhout. If you had died in this period, the likelihood that your anniversary would be correctly celebrated by Carbon-14 today, supposing your bones were nicely preserved, is very low. The likelihood is high that any two readings of Carbon-14 for organic death happening around then will very greatly. This indicates, at the least, fluctuations of atmospheric nitrogen, or cosmic or solar particles, or carbon dioxide (or all of them) beyond uniformitarian norms.

All such fluctuations, one may be warned, are themselves possible reflections or opposite deviations. That is, we cannot say that the several forces causing atmospheric deviations or aberrations were tending in the direction solely of the increased deviation. A cloud of CO will act to age a living thing for future tests and a cloud of cosmic particles will act to young it for future tests. The same organism in its lifetime can become not only much "younger" but also much "older," depending upon the inconstancies of its Carbon-14 intake; it can thus falsely line up uniformly with the Carbon-14 "constant" owing to contradictory inconstancies.

We may conclude, I think, that the mid-second-millennium was a period of serious atmospheric perturbations. The chemical measuring device seems to agree with the mass of legends about

the catastrophic events of the mid-second millennium and may even underestimate their atmospheric effects.

Perhaps now I have inventoried enough evidence of devastation throughout the traditional region of the Bronze Ages and indeed over most of the world. The Middle Bronze finale composed a period of catastrophes certainly over twenty times as heavy as the past 300-year record shows, perhaps hundred times greater, perhaps much more. Even in the works cited, not to mention a hundred lesser compendia, more evidence might be adduced. I am inclined to convert the hypothesis into a challenge. No stratigraphic column, whether geologic or archaeological, can fail to show evidence of natural destruction dating from the middle of the second millennium.

BROADER CONSIDERATIONS

I shall rest the case for the mid-second-millennium catastrophes and move on to address additional issues.

First, I would stress one implications of the works cited. Earthquakes were only a part of the devastations wrought by natural forces. Schaeffer sensed this. The Middle Bronze Age civilizations and their counterparts throughout the world were too highly developed, organizationally and technologically, to have been overthrown by earthquakes alone, even if one could identify tectonic forces of the deep Earth that would strike to the tops of the Richter and Mercalli scales. The long hiatuses of cultures and the depopulation reported upon all sides suggest intense heat (causing death, plagues or vermin and disease), hurricane winds and tsunamis that can exterminate the biosphere, and an atmosphere often poisoned by volcanic and extraterrestrial particles and gases.

Second, if the *identified* destruction is plausible, probably an equal or greater amount of *unidentified destruction occurred*. Hurricanes of 250 miles an hour strip a land and all man-made works down to bedrock. Great tsunamis, such as are caused by huge earthquakes and meteoritic passthroughs of the atmosphere, do the same. Lava flows can cause the sudden deep burial of the surface. So can heavy tephra showers, not to mention the heavy burning rains of naphta that are carried in

various legends. If land can rise by kilometers, as is known, so can it sink, carrying forever from view what its surface contains.

Third, the clustering of disaster between the claimed dates of 1750 and 1450 points to a centralization of the cluster in time. This we shall know when the various claimed dates are brought into closer order. One thing is sure: the dates can only move *towards simultaneity* not away from it.

Such general simultaneous havoc strengthens the argument for celestial encounters as the first cause. Therefore, when one such as Velikovsky steps forward with the most persuasive kinds of legendary testimony, this testimony must be cast in the balance. If catastrophe on a grand scale occurs, and if all the voices of the age name the sky as its source, and if much of their behavior is organized around attempts to obey, placate, and predict the sky-beings, it becomes reasonable to incorporate *astral* events in attempting to explain the events of the age. In a flashing epigram, Friedrich Nietzsche once wrote: “to the sage as astronomer: as long as you still experience the stars as something ‘above you,’ you lack the eye of knowledge.”

When archaeologists strike a destruction level hovering around the middle of the second millennium, they are probably looking at a global event, a cultural fracture, a movement of peoples, religious revival and suppression, revolutionary regimes, despair, spectra terribilem (on earth and the sky), pandemonium, economic wretchedness, heavy atmospheric pollution, death on all sides.

To sum up, by my reckoning, the Bronze Age of the mid-second millennium experienced natural catastrophes on a scale inconceivable today. Hundreds of cultures were destroyed and their survivors were few in numbers.

The broad scale and intensity of the disasters, when aligned with much direct testimony, send us looking into the skies and then to the chain of earth-air-fire-water events that follow.

A SCHEDULE OF CATASTROPHIC AGES

What happened at the end of the Middle Bronze Age happened earlier and later. It is likely, for example, that the first dynasties of Egypt began on the relaxing slopes of a disastrous period, which brought new human cultures out of the West and South into the surviving neolithic milieu of the Nile Valley. The suggestions of catastrophe at the end of the Old Kingdom are likewise numerous. These extended straight through the Old Bronze Age, Neolithic and end on the Paleolithic, into the Ice Ages and therefore throughout the Holocene which may one day be defined, at about 14,000 years in length, as the Period of Catastrophes. On the more recent side, the catastrophes extend through the Recent Bronze Age and into the Iron Age of the Eighth and Seventh Centuries B.C.

Are we not therefore compelled to take up a new classification of the ages? I should say 'yes.' The present divisions should be reordered and renamed. Putting aside the absurd local categories in the hundreds, the division by metals is poor on five counts: it is parochial; misleading; presumptuous; non-anthropological; and undynamic. Actually various ancient classifications offered by writers such as Hesiod and Ovid are at least as useful. They furthermore introduce cycles of creation and destruction with each age, and sometimes a long linear or spiral development running through the cycles (that is, progress). Nor do I see any superiority in the optimistic, linear, evolutionary schemes of Fraser, Morgan, Engels, Spencer, and the others who perceived a rational technological sequence moving from hominid to contemporary mankind.

In dividing historical time, cultural change is the most logical concept to use. Where do the points of maximum cultural change occur? It appears that these points coincide with natural catastrophes. Lesser points of change can be connected with minor or localized catastrophes. Only afterwards come the uniformitarian periods, even with their brilliant episodes of Akhnaton's Thebes, of Periclean Athens, of Augustian Rome, of Medici Florence, Elizabethan England, or the France of the Enlightenment.

Since ages must be arranged, let them be arranged by peaks of change that correlate then with peaks of catastrophism. Since ages will be given names, let them perhaps be named after the sequence of great gods, those anthropomorphized expressions of disaster. For when the human race was cast down, it was from the natural forces; and the forces of nature originated from the skies; and these forces were called gods and as such invaded the mind and history. But to the scientific community, sensitive to its public image, an Age of Mars or an Age of Venus may be embarrassing. Whereupon we may resort to Roman numerals and speak of Holocene I, Holocene II, and so forth. Whatever the nomenclature, a revised conception of ancient times is in prospect.

Nevertheless I would suggest that we use the theological approach to fix our sights and ask "What gods ruled when?" If a certain god ruled during a certain time, and the same god flourished at the same time in different areas, then the same age could be distinguished in its natural and human condition by the nature of its god. From the blessed gods, all good things flow, just like Homer sang, so all the sciences would achieve inspiration and rejuvenation from a theological division of the ages.

If a revival of interest in catastrophe occurs, the sciences of pala-psychology, pala-politics, pala-theology, archaeoastronomy, geology, and history need to reexamine many of their findings an theories. The methodologies employed in ancient studies require both intermeshing and invention. An ideal archaeologist needs to know something of psychology and geo-physics, anthropology and astronomy, the history and science of human management. (I could make the ideal even more impossible, but why go on save to underline the need for interdisciplinary cooperation.) Claude Schaeffer, a generation ago already, was writing: "We have often had to deplore the absence, in the reports of excavations, of all information relative to these layers considered unprofitable by the searchers." (That is, the layers of destruction.) David and Ruth Whitehouse have recently published an *Archaeological Atlas* of some 500 sites around the world. There are, of course, a great many more. These sites are mostly reported with the same lack of attention to such details as Schaeffer refers to. Were these reports to be scrutinized as he examined the Middle East

reports, we would be already envisioning some five hundred man-years and woman-years of reading and analysis. It would be well worth the effort. A masterpiece of catastrophic analysis could possibly emerge, for example, from a review of the rich paleolithic-neolithic materials of the caves and sites of Aquitaine. Nevertheless, it is to be hoped that future archaeological technique will make such laborious information-retrieval unnecessary. This would surely occur if the revolutionary dimension were carefully provided for in the designs and operations of archaeology and human geology.

The question all can ask together is: “What happened so as to destroy and reconstruct past worlds?” The question is the foundation to quantavolutionary primevalogy, as opposed to evolutionary primevalogy. It seeks its evidence and benchmarks in the genesis and destruction of cultures.

CHAPTER SIX

UPDATING SCHAEFFER'S DESTRUCTION INVENTORY*

[A summary of Professor Shaeffer's findings and notes of a research proposal to extend his work. A memorial to Professor Schaeffer (1898-1982) by Geoffrey Gammon occurs in V* The Society for Interdisciplinary Studies Review *3 (1980-1), 70. The sites studied by Schaeffer and a map of them is contained in his work of 1948,* Stratigraphie Comparée *and this author's* Chaos and Creation *(1981).]*

In concluding his massive inventory and analysis of strata of destruction in Bronze Age settlements, Professor Claude Schaeffer of the University of Paris wrote as follows:

> The great perturbations which left their traces in the stratigraphy of the principal sites of the Bronze Age of Western Asia are six in number. The oldest among them shook, between 2400 and 2300, all of the land extending from the Caucasus in the North down to the Valley of the Nile, where it became one of the causes, if not the principal cause, of the fall of the Egyptian Old Kingdom after the death of Pepi II. In two important sites in Asia Minor, at Troy and Alaca Huyuk, the excavators reported damage due to earthquakes. Under the collapsed walls of the buildings contemporaneous with the catastrophe, the skeletons of the inhabitants surprised by the earthquake were retrieved. However, in the actual state of our knowledge, it is not possible to say to what extent the earthquakes are the direct cause of the disasters which, at a date situated between 2400 and 2300, fell upon so many of the countries of Western Asia.
>
> We are better informed in that which concerns the second of the great perturbations which in the order of time shook all of the Bronze Age civilization in Western Asia. In Anatolia, these brutal and sudden events struck fatally the brilliant

centers of Troy III, of Alaca Huyuk famous for the riches of its royal tombs, and Alishar I B and of Tarse.

As to the nature of this third great perturbation, registered in all of the countries of Western Asia at the end of the Middle Bronze Age, and whose effects, in certain regions, were prolonged into the midst of the Recent Bronze period, we are reduced, in the actual state of our knowledge, to hypotheses. In most countries occupancy suffered a notable reduction, in others sedentary occupancy was replaced by nomadic. In Palestine and the island of Cyprus the situation appears to have been complicated by epidemics; collective tombs without durable offerings and apparently established with a certain haste were brought to light in the necropolises of the end of the Middle Bronze Age and the beginning of the Recent Bronze Age. Calamities of the same nature appear to have caused the eclipse of the Hittite empire from 1600 on in round figures. Persia and Mesopotamia in their turn then went through a severe crisis; likewise in the North, the countries of the Caucasus; our study has shown that here too there is no continuity between the civilizations of the Middle Bronze Age and of the Recent Bronze Age.

This brilliant period of the Middle Bronze Age, during which flourished the art of the Middle Kingdom in Egypt and the refined industrial art of the Middle Minoan, and in the course of which the great commercial centers such as Ugarit in Syria enjoyed a remarkable prosperity, was ended between 1750 and 1650 by a new catastrophe, equal in severity and in scope to the two preceding perturbations.

However, around 1450, a new perturbation, the fourth since the middle of the third millenium, struck Western Asia, particularly the Mediterranean regions. Evidently less severe than the preceding ones, it was accompanied by revolts in Syria and in Palestine, resisted by Thutmose III and subdued by Amenhotep II.

A century later, around 1365, mean date, in the time of the reign of Amenhotep IV or Akhnaton, an earthquake of great violence ravaged several cities on the Syrio-palestinian coast as well as in the interior of the countries. In Asia Minor also the urban centers (Tarse and Boghazkeui and Troy) suffered damage in the same period. This fifth perturbation is very distinctly marked in the stratigraphic sections of most of the sites explored in these countries.

From about 1250 or 1225, the sixth and last great catastrophe fell upon the civilizations of the Bronze Age in

> Western Asia. Vast ethnic movements are launched again of which one, probably the most important, proceeds across the Syrio-Palestinian corridor and along the coast toward Egypt.

Professor Schaeffer then searches for causes and assigns the greatest weight to natural disaster, and not necessarily purely seismic disturbances.

> Our inquiry has demonstrated that these successive crises which opened and closed the principle period of the third and second millenia were not provoked by the action of man. On the contrary, compared to the amplitude of these general crises and to their profound effects, the exploits of conquerors and the machinations of statesman at that time appear modest indeed.

In the 1970's the present author was introduced to Professor Schaeffer by Mr. René Roussel, then an inspector of air navigation system for the French government and an exchange of letters and meeting followed. Dr. Schaeffer expressed a willingness to collaborate and to supply the study with later materials of the period 1945 to 1975 from his own archives. I applied for support to the National Geographic Society, without success. There follows now the statement of the proposed study. The data to be obtained is to be found in the great libraries of the world and it is hoped that an institute or department of archaeology will undertake the task.

***

The project aims to inventory all excavated sites of the Mediterranean-Middle East (4000 to 600 B. C.); to scan their reports for indications of destruction by earthquake, volcanism and cultural periods or phases; to plot the sites on a seismic and geological background map of the large region: to test the hypothesis that all existing ancient settlement of the period 4000-600 B. C. were destroyed by concurrent natural disasters at points in time conventionally denoting the various Bronze Ages; and to publish the results.

The materials of research are those contained in Claude Schaeffer's published work and archives, which are being made

available to this project, and the many excavation reports contained elsewhere and obtainable by library research mail requests, and personal contacts. The data will be collected and systematically reported in manual and electronic form, and the subsequent analysis should provide a firm quantitative base on the degree of correctness of the hypothesis of the destruction of ancient civilization at significant time intervals by natural forces.

CORRELATING NATURAL DISASTERS

The reformulation of the Schaeffer Hypothesis can be summarized as follows:

A. All excavations in the Near and Middle East of the period 4000-600 B. C. will show levels of heavy destruction.

B. The levels of destruction are correlative.

C. The levels of destruction will have counterparts outside of the Near and Middle East here particularly the East and West Mediterranean.

D. Natural Disasters are demonstrable.

Phase 1

1. Review and updating of the same 40 sites as presented in Schaeffer's *Stratigraphie Comparée*.

2. Transfer to new standardized format.

3. Preparation of a list of all excavations performed since 1945.
4. Search the excavation reports for levels of destruction and categorize them as:

    a. no evidence of destruction levels

    a1. Unsearched and not definite

    a2. Demonstrably not destroyed

b. levels of destruction

b1. Concurrent with those previously reported in SC.

b2. Not-concurrent

5. In every case, Determine where possible whether naturally caused or provoked

6. Merge data.

Phase II

7. Determine the quantitative degree of correctness of the reformulated Schaeffer Hypothesis in all of its parts.

8. Write a narrative of the findings

9. Accompany the narrative of findings with

a. an up-to-date map of the Mediterranean-Middle East exhibiting *fault lines* as shown by NASA satellites, zone of modern *seismic intensity*, and the *location of excavated* sites plus

b. a differentiation of the mapped sites according to how many of the presumed destruction levels they actually reveal at the critical culture points. For example Troy shows all levels, and would be so symbolized on a map.

c. a supplementary plotting on a separate map, of all natural destruction levels that are not correlated with the presumed *major* destruction levels and of *missing* levels of destruction adverse to the hypothesis.

d. an appendix of all sites reported upon (and of those either unreported or lacking data).

e. a simple constructed Index of conformity of findings to the hypothesis.

f. an Appendix of techniques of discovering and reporting destruction levels and their causes.

g. photographs of selected destruction levels showing ashes and calcination (Troy, Tuscany, Alaca Huyuk, etc).

Phase III Theoretical Discussion

10. On the character of the natural disasters implicated.

11. On the exceptional or anomalous cases of verified concurrent non-destroyed sites, if any.

12. On chronological problems exposed in the study, and their possible solution.

13. On the degree to which excavation leader have responded to the challenge of Schaeffer's Hypothesis since 1948 (30 years).

14. On the implications of the findings.

    a. for the study of the rise and fall of civilization.

    b. On the comparative study of religion.

    c. On the causes of sudden, significant cultural changes.

    d. On the possibility that the boundaries of the Neolithic, Chalcolithic, Bronze and Iron Ages have been basically determined by natural forces.

In applying for foundation support, the word "exoterrestrial" or "extraterrestrial" was not mentioned. Now, with the publication of *The Lately Tortured Earth*, it should be more apparent than before that the destructions of the Bronze Ages could have been produced by several causes, acting together and initiating in celestial disturbances. Other regions of the world too will lent

themselves to an enhanced comparative analysis, especially in the U.S.S.R. and Meso America.

CHAPTER SEVEN

NINE SPHERES OF VENUSIAN EFFECTS*

(This paper is an edited version of a talk to a meeting of the Society for Interdisciplinary Studies, London 26 April 1980. The help of Mr. Peter James on important points of material evidence is gratefully acknowledged.)*

Whether from timidity or misapprehension, hypotheses of general destruction about 3500 years ago are felt to be based upon scraps of evidence from scattered and often unreliable sources, whereas their conventional counter-theses are solidly founded. To the contrary, as I shall maintain here, the evidence from this period points to an extraordinary destruction in culture and nature. I shall offer nine propositions to this effect, adjoin an example or two, and challenge anyone to present and defend an opposing case. Seven of the propositions govern large special areas of science. The balance cover all areas of knowledge.

Since the total effect produced many great changes, and the effect in each field was also large, I do not hesitate to give them the name of quantavolutions. Quantavolutions are abrupt, intensive, large-scale changes, and contrast with evolutionary changes which are, as they say, drop-by-drop and point-by-point. The time, about 3500 years ago, was that of Exodus. The catastrophe of the Exodus is described in detail in *God's Fire* and *Ages in Chaos.*

I.

We begin with astronomy and physics. We speak of calendars, reports of sky bodies in action, legends of the gods, sky-struck human behavior of the period. We say of the Astrosphere: "No available record of astronomical events from anywhere presents

astral, planetary, or solar movements as unchanged or uniformly changing from before that time to afterwards."

When Velikovsky's *Worlds in Collision* appeared in 1950, many a critic leaped at it claiming that eclipses of the times before 700 B.C. were known and hence the skies had been orderly for long before then. Over the years he and his supporters put to rest this claim. No such historical record exists; there is no anomaly present.

Other critics were discovering in Stonehenge and other megalithic constructions an astronomical orientation that went back to the New Stone Age and is still valid. This is not so. Dr. Euan MacKie wrote about his investigations: "In the 16th or 15th centuries B.C. a second period of crisis began during which the dressed bluestone setting was dismantled, and joints on its stones battered off where possible, and most of the sockets for a new circle of bluestones were dug. This project was abandoned before completion.." Again no anomaly.

A corollary of our first Proposition says that no calendar based on the present solar year or lunar cycles is available that comes from the period before 3450 B.C. or thereabouts. However we find a severe challenge. Hastings in 1910 wrote that "the Egyptian calendar [amounting to 365 days] appears throughout the whole of its history. However far back we may trace it, we cannot reach the moment of a change in it."

Malcolm Lowery stresses the anomaly in correspondence to *Zetetic Scholar* (3/4, April 1979, p.60):

> To cite a case in point: according to Egyptological authorities, monuments from Old Kingdom Egypt unimpeachably and unequivocally record a year consisting of twelve thirty-day months plus five days of the year; and this 365-day year is confirmed by students of other Near Eastern civilizations.

His footnote reads:

> "Two references must suffice here (a) Hastings: *Encyclopaedia of Religion and Ethics* (Edinburgh, 1908-1926), II (1910), p. 93: "As it has just been described [with

> a year of (3 x 4 x 3 x 10)? 5 days] ... the Egyptian calendar appears throughout the whole of its history. However far back we may trace it, we cannot reach the moment of a change in it." (b) Helck/Otto (eds.): *Lexikon der Ägyptologie* (Wiesbaden, 1975), III, 298, article: Kalender by J. von Beckerath: "Auf der Grundlage eines [unregelmassig 12- bzw. 13-monatigen] Lunisolar ahres wurde in Ägypten schon fruh ein... Kalender... geschaffen, der aus unveränderlich 365 Tagen bestand. Er war nach dem Vorbild des natürlichen Kalenders in 12 Monate zu je 30 Tagen eingeteilt, wozu noch 5 Zusatztage (Epagomenon) kamen."

An attack from Peter Huber in the same issue (p.67) reads:

> Another one [problem with Velikovsky and his followers] is that they tend to repeat the same, clearly wrong assertions ad nauseam (for example, the 360-day year mentioned by May is a fairytale, it has no more physical reality than the 360-day year nowadays used in interest calculations).

Several days before his death, Velikovsky indicated to me his impression that we had only to answer one ultimate source for these statements, a single ancient document, and Malcolm Lowery and Christoph Marx helped me locate it in Breasted's *Ancient Egyptian Texts*. It is a business contract mentioning an addition of five days to the year of 360 days. Until this matter is thoroughly investigated and rebutted, it stands as an anomaly.

A most common expression of critics is that the orbits and behavior of the planets, including Venus, were known before -1500 and are the same as today's. This has been shown to be untrue, much to everyone's surprise. The records are not there, nor can they be retrocalculated, for this would beg the question. Venus has been shown to have been perceived and observed to take an eccentric course that is compatible with the behavior of a comet. This finding, along with those mentioned above and in many other works beyond recitation here, tends to confine strictly and cast into doubt the 365 day year anomaly mentioned above.

II.

The *Atmosphere* seems intangible as a source of evidence for events of 3500 years ago, but in fact much evidence of atmospheric turbulence is available. A rationalistic and literal interpretation of the Bible at the time of Exodus reveals high electrostatic levels, high radioactivity levels, dense and persisting cloud covers, high carbon content in the air, oppressive darkness and falls of a spectacular type -- quail, manna, barads, fire etc.

We are entitled to say, "There were radical disturbances and some lasting changes in atmospheric electricity, radioactivity, temperatures, winds, climates and solar radiance in the mid-II Millennium." Radiocarbon dates for the years involved require adjustments of serious consequence, as Suess and others have disclosed. The prevailing view that the Exodus was a gambol of truant slaves or a return of some bedouins to their ancestral desert is absurd and useful to divert attention from how bad conditions really were. The Jews were operating in the middle of catastrophe; there is no anomaly here.

III.

The *Geosphere* was disturbed. The world was shaking. Rivers were stopped and changed their courses. Mountains were moved. We are obliged to hypothesize: "Every geophysical feature or process in the world capable of exhibiting the effects of continuous stress will show that such stress occurred around -3500." Here we share problems with conventional students of Holocene geology: what tests can pinpoint geological events in time -- radiocarbon dating, possible chemical changes in rocks and soils, changed stratigraphy and morphology that can be tied to historical or protohistorical events?

So when we read a contrary statement in the *Encyclopaedia Britannica* to the effect that the Euphrates River bed was unchanged over many thousands of years, we must juxtapose to this a statement by R. Adams, for instance, that there occurred in the mid-second millennium "a major westward shift in the Euphrates system of channels as a whole during Kassite times." And when Robert Raikes, a quasi-catastrophist, theorizes that

giant mud dams formed and broke and flooded out the Indus River civilization of this time, we have to carry his argument farther and, viewing the tremendous destruction throughout northern India and the bases of the Himalayan Range, insist upon a much more universal disaster than the mud-barrier floods. We have Sagan in his "An Analysis of *Worlds in Collision*," Scientists Confront Velikovsky, p. 66:

> But the claim that there were extensive lava flows and volcanism involving "all volcanoes" is quite another story. Volcanic lavas are easily dated and what Velikovsky should produce is a histogram of the number of lava flows on the Earth as a function of time. Such a histogram, I believe, will show that not all volcanoes were active between 1500 and 600 B.C., and that there is nothing particularly remarkable about the volcanism of that epoch.

How does this anomalistic claim stand against the evidence of volcanism put forward in my *Lately Tortured Earth*, against the finding of Phoenician vases embedded in lava dated to 3500 years ago, against the plinian explosion of Mt. Rainier in America dated concurrently? Not well. Volcanism was not behaving normally. Velikovsky was speaking loosely and deductively, meaning all volcanoes must have erupted if the Earth paused and a great attractive celestial body was close. Elsewhere, insofar as the data allowed, he spoke in statistical language, foreshadowing the vaunted histogram. When Sagan says "volcanic lavas are easily dated" he is mistaken, even on the premises of radiochronometry. My own position is that many volcanoes were initiated, many fissures opened, all active volcanoes erupted, and furthermore a great many eminences erupted electrically.

More difficult to dispute is the claim that recent ice cores drilled from beneath the Greenland Ice Cap pass through the mid-second millennium with an extraordinary appearance of debris, but not enough to suggest world disaster. I shall have to deal with this anomaly in a future study. (See below.) The cores by the way are not showing other expected effect around this time anyway. Oceanographic theory has a drastic drop of catastrophic proportions in the ocean levels of the age. Could there have been a great freeze, a deluge, a breaking into new basins such as the North Sea and Baltic Sea (actually in both cases indicated)? Or

could the land have risen around and below the seas -- just as disastrous an event?

IV.

"Every biological species underwent radical change around 3500 years ago in numbers, habitat, behavior or genetics:" such would be our fourth proposition, concerning the Biosphere.

There is much evidence regarding numbers -- including human destruction as for instance among the Israelites and Egyptians, also much concerning changes of habitat, abandonment of settlements, changes in behavior. Ovid is not to be believed when he said that the passage of Phaeton at this time burned the Earth and turned Africans to black from the heat, but it is not unbelievable that so many of the non-black peoples of Africa were destroyed that the continental population noticeably blackened after the event. Those who deny marine disasters can of course rely upon the absence of datable fossil events, but there are mammoth destructions datable to the time, and a Woods Hole Oceanographic Expedition to the Black Sea uncovered a general layer of coccoliths that occurs at the -3500 level and could not simply have died normally and drifted to the bottom *en masse*. The ancient historian Josephus said that nature, in a revolution, produced "mutations in the bodies of men, in the earth, in plants, and in all things that grow out of the earth." There is little fossil evidence yet uncovered from the period or most of what there is has been assigned to later or earlier times or ignored or is of current species. Apparently "very fresh" fossil mucks have been found, but the assignment of dates to them has progressed little.

V.

The situation is different when one turns to the Ecosphere, the human settlements. Here the evidence is abundant, and has been presented in a number of works discussing every region of the world. Europe, the Mediterranean, the Near, Middle and Far East, and Meso-America provide evidence. Every advanced civilization suffered destruction, whether in China, Africa, the Causasus, Anatolia, Crete, or elsewhere. So we add the hypothesis: "No human settlement in the world escaped heavy

destruction from natural causes in the midsecond millennium." I discussed this proposition with Professor Claude Schaeffer two years ago, and he agreed with it. Hundreds of sites that he had not included in his massive volume on comparative stratigraphy might now be added. A corollary of this proposition, which is also related to the one on astrophysics, is that "No religious temple that was built before about -3500 and rebuilt afterwards shows the same astronomical orientation afterwards as before." Peter Tompkins, for instance, carries a diagram in his work on the Great Pyramid that shows four different historical orientations of the Temple at Luxor, one of which was probably at the end of the Middle Bronze Age. René Roussel has written a report (unpublished) showing that a rupestral temple at Ouadi es Sebous (Upper Egypt) was oriented to different winter solstices before and after -3500. A disaster occurred to the temple in between; great fire damage and layers of ash are to be seen.

VI.

We can call the human documentation (the oral and written records, of the mid-second-millennium period) a kind of history and coin the following hypothesis regarding the "Historisphere":

"All legendary or contemporary historical accounts from any people in the world which discuss events of, or attribute events to, the mid-second-millennium mention a general and natural disaster."

Much of Greek myth centers upon catastrophe-born Pallas Athena, upon Hephaestos and Dionysus. The Books of Moses center upon the Exodus disasters. The Vedas of the Hindus focus upon momentous natural events at the time of their main descent upon India from the North, which time has been generally accepted as mid-second-millennium.

The Ipuwer papyrus which conforms rather closely to the Biblical Exodus account appears to be datable to the end of Middle Bronze, hence confirms our thesis. Ancient pagan accounts of the doings of Moses, often unfavorable, as often agree that plagues and natural destruction were occurring then.

Are there exceptions? None that I know of. Only evolutionary modern writers have presumed a benign history covering this period, and I await any contradictory thesis referring to any document or legend. I await the *uniformitarian anomaly*.

VII.

The seventh thesis, the *Anthroposphere* or cultural sphere, says: "Every culture complex in the world changed radically in mid-second-millennium." Here we refer to social organizations, religions, and modes of life.

We know that the Egyptian Middle Kingdom underwent the political and social traumas of a takeover by the Hyksos. Most often, as Schaeffer has shown, "sedentary occupancy" of an area "was replaced by the nomadic." In Persia, Mesopotamia, and the Caucasus, he writes "there is no continuity between the civilizations of the Middle Bronze Age and the Recent Bronze Age."

A recent corollary of our hypothesis number 7 is this: "No god of before mid-second-millennium B.C. remained without change of status or family change or serious incident."

Zeus found a new daughter, Athene, and what a daughter she was! The Hindu goddess Devi conforms to all appearances with Athena, with the same violent entrance upon the skies and the human mind.

Yahweh appears and explains to Moses, rather unconvincingly: "I am the same god of your fathers, but different." "Not different enough," replied a great many Jews and they insistently chased after Baal - represented in the young Baal-bull.

Can any scholar offer an unchanging religion for this period: I think not. Certainly, if so, it would be an *anomaly*.

VIII.

At this point, I am prepared to assert that all major spheres of existence have been incorporated into a quantavolutional scheme

of the mid-second-millennium: astrosphere, atmosphere, geosphere, biosphere, ecosphere, historisphere, anthroposphere.

Let us then generalize a Holosphere, that which contains all modes or forms of existence, and offer an VIIIth proposition, thus:

"All spheres of existence change together by a mutual interaction in the mid-second-millennium," or conversely,

"No major quantavolution in any special sphere occurs independently of quantavolutions in other spheres."

The Exodus case represents the best studied and perhaps the most documented history of the times we have, and, viewing it, we can confidently say:

"When all spheres are quantavoluting, then the whole world is involved and the cause is universal."

The forces at work are so strong and transactional that we may add an event to the workings of the Astrosphere:

"There can be only one necessary and sufficient cause of the quantavolutions of the mid-second-millennium, and that must be a large-body encounter with Earth; by definition it was a cometary encounter, if a comet is considered as any substantial body pursuing an elliptical or changing orbit."

The challenge is to be phrased thus:

"Nothing but a god-like comet could have produced the quantavolutions of 3450 ± 60 B.P."

IX.

There occurs, then, a Ninth Proposition. It concerns the subsequent history of effects of the Quantavolution of Venusia: the present-day lingering of the tail of the flattening logarithmic curve of the catastrophe. We can call this the Neosphere.

"Every institution, behavioral pattern, and natural setting that exists today, if its history is complete, will reveal an inheritance of specific effects from the Venusian Quantavolution of -3500."

"Arabia Felix" - Happy Arabia - of 3500 B.C. is a waste of sand with vast fields of stones and hundreds of dry stream beds resting upon layers of petroleum.

Zvi Rix wrote extensively on the sexual complexes derived from the human experience with Venus. Nicolas-Antoine Boulanger related basic human problems to the everlasting fear of a great comet.

Moses was a reconstructor after the catastrophe of Exodus. The Jews gave in to Moses or got out of Judaism. Jesus Christ was the child of mosaism and of the morning star (as W. Sizemore and others are showing in a book underway). Islam is more mosaic than Christianity is.

The Iranian mosaists are telling the other Islamic mosaists that they must kill the Jewish mosaists; and the Christian mosaists and Russian Stalinist mosaists are urging a similar business upon themselves and others. And American mosaists are contemplating nuclear war a) because they believe god is on their side b) god will take them into heaven.

But the Cambodians, Indonesians, Ugandans, Vietnamese, Chinese, have no Moses; and flutter toward the same candle flame of destruction.

What I am finally saying is this:

Because of the lingering effects of past catastrophes mankind has long been in the business of producing catastrophes in order to recapture the madness of ancient disasters. Wars, aggression, suppression, compulsive and punitive behavior are connected with the primordial past. It is as if we are congenitally convinced that good comes only from greater evil -- to roast a pig we must burn down our house.

The psychological de-programming of the catastrophized mind is still a little-understood process. Both the morale, and the rational

invention of means, for moving directly to good without the intercession of great evils are very weak currents or motifs in contemporary civilization.

But, to an existentialist and pragmatic mind, there can be no alternative to trying. We must keep trying. Like Sisyphus we must push the great rock of reason up the mountain, time after time, prepared always to see it fall, until one day, who knows, *mirabile dictu*, whether by invention or luck, the rock will stay fixed up there and we shall have surcease from our labors.

CHAPTER EIGHT

THE OBLITERATION OF HUMAN SIGNS

The conventional scientist says to the catastrophist:

"How convenient it is for your purposes to place your catastrophes just out of reach of true history, tantalizingly so. Is it so that the falsity of your views cannot be proven, that your assertions can remain forever in the limbo of seductive fable?"

The answer is another question:

"How is it that your accuse me of something for which I am not accountable? You ask me to provide records of an event whose great force was exercised precisely in the destruction of those records? Does this not make our scores even?"

Both feel frustrated, but perhaps become a little more sympathetic, too.

Nearly every work dealing with prehistory and antiquity must lament the paucity of evidence. If there is pride in this study, it comes from having made so much out of so little -- a jaw fragment, an arrowhead, a doll, an artificial pile of stones, etc.

Under *evolutionary* primevalogy, there seems to be little need to build lament into a *missa solemnis*. If the human past was developed modestly and uniformly, a sigh over the incidents that destroyed or silted over a single site is enough and then on with the work. And so forth at whatever sites turn up. For instance, if it is believed, as Childe has said and most have agreed, that paleolithic mankind began in the British Isles with a few hundred souls, that a few hundred more dwelt there thousand years later, and so on, primevalogy might as well proceed as usual with the question of obliteration of evidence.

On the other hand, if quantavolutionary theory is postulated, then a different attitude and approach are called for. Every sign of human presence in the distant past has to be taken as a survival of one in a thousand or even a hundred million events that had the potential of surviving to this day for the shovels and eyes of the primevalogist.

Furthermore, the perspective in which the residue or remain is viewed has to be radically altered. It is looked upon as strange aberration, something of an event that had a rare quality to it in addition to its bare survival, something that kept it from being obliterated along with millions of like events from the eyes of the future. It must have had a marginal quality, some special features to augment its chance of survival, and therefore is rarely to be considered typical *prima facie* of its culture.

The revolutionary primevalogist must also become a macromorphologist of the earth, while the evolutionary theorist can and indeed is impelled to rest with micro-morphology. The former has to look at whole areas, regions, even the globe itself, asking where the centers of human activity may have been and what might have happened to them. She or he makes different demands upon geology.

“Can you tell us,” she queries, “what quantities of what material were moved, how, from where to where, from what elevation to what new elevation or depression in an area of such and such dimensions and where, if at all, would indications of settlement exist, and, if indicated, what would be the chances of detecting matters of importance, considering the capacity for obliteration of the forces involved?” The complex question is bound to elicit productive answers sooner or later. And, or course, accidental macroscopic primevalogical discoveries do occur s when cliffs fall away and streams erode canyons or coal mines are dug.

But meanwhile one should have at least some conception of the possibilities that what one has discovered micromorphologically is likely to represent but one-millionth of what was there. Or, to invert the issue and specify a hypothetical situation: assuming a population of a half-million persons in Britain in the year 12,000 B.C., what reasons can you give for the fact that only a few scattered stone tools and bones will confront the scientist of

today who is working with conventional theories at the present "state of the art?"

To answer the question, one must tell what has been discovered in the nature of remains and legends of this period. Then one must say what kinds of events would reduce "then-time" surface evidence to "now-time" surface evidence. Afterwards, one queries the likelihood of such events, matching present evidence with the proposed history.

If the resulting theory is as plausible as or more plausible than the evolutionary theory, then, of course, it must be pursued, and similar inquiries launched in other macromorphological settings. A first procedure then could be to see what is left in Britain of its hypothetical 12,000 year old culture.

Whereupon one continues by conjecturing upon the events necessary to destroy beyond rediscovery the hypothetical British culture of 12,000 years ago.

After much reading and discussion, I came to realize some years ago that there was no simple checklist of kinds of disaster - all the forces, chemicals, and conditions that can destroy the biosphere. But before I came to realize it, a long time passed when I could not even think of the need for one; I could not ask the question. In modern times, both because of specialization and because disasters on a large scale are unusual, theory in its primitive form of simple questions and basic classification is missing. Frank Lane's *The Elements Rage* turned up as a rare and valuable discovery, because he uniquely takes up a fairly full list of disastrous natural forces, one by one. From that position, I could go on to offer a general classification in *Chaos and Creation* of super-disastrous forms and, by the time I was writing *The Lately Tortured Earth*, I could think easily of a set of very heavy, "cosmic" mega-forces interacting as such and with a given biosphere, atmosphere and lithosphere.

High-energy forces and chemical outbursts reach toward the extermination of evidence of a biosphere. Low-energy uniform and gradual forces also tend to exterminate such evidence. The truth of the past thus remains for us in the evidence of niches where high-energy forces acted but were not totally destructive -

- mountains that were not leveled, elevations by-passed by cross-tides, humans buried swiftly in a clay that quickly hardened, and so on.

If at the time of Stonehenge about 3500 years ago there were a million people in Britain (for they were building other sites as well and carrying on the chores of living), and if we find no sign of them, either we have not searched very well, or there was some catastrophe that erased all signs. The very existence of the megaliths does, however, discount the notion of complete disaster -- there were no Washington Scablands barrier-bursting floods, or giant oceanic tsunamis or Biblical overturning of mountains.

And of there were a few utensils found, as there have been, and even more remarkable, a few bones (unfortunately yet not found), we should say that certain forces such as atmospheric and chemical ones may have occurred - an icy climate may have come and gone, a great flooding may have happened, a devastating fire may have fallen from the sky, and so on. Now these actors, too, might be eliminated from consideration, and we might end up with an historical view that Stonehenge has been relatively peaceful and insofar as it represents the Earth, the Earth has been likewise peaceful. Of course, some force toppled some huge stones, and several stones have disappeared, or have they?

This shows what I mean: there must exist, and we need it, some manual for quantavolutionary appraisal of sites and regions, a set of 1001 questions to ask and the kinds of answers to expect. Since we have nothing like this Field Kit of Quantavolutionary Questions, we scarcely realize that there is anything to ask about. It took a long time for science to work itself up to a set of questions about Stonehenge and we have hardly yet broached a full array of them. So when we ask how many people lived in Britain 12,000 years ago, we find that we have no intellectual tools to address the question; we lack the 1001 questions that follow the leading question.

One would think that we might find a model to consult in paleontology. But the field has not gone far beyond associating some life forms with some rock strata and not even this is done

with full microscopy and chemistry on computerized data banks. The leading question, “How many species have existed at a given point in time, or ever, or even at a given place and point in time?” is not well-answered. Estimates of all the species that have ever existed have been argued on figures around 200,000 up to some 20,000,000. That’s like asserting that there may be half a million people living in Canada, but then again there may be fifty million of them. We need to have surveys of what existed before, in order to learn what and how much was obliterated.

CHAPTER NINE

ANCIENT ASTRONAUTS

Seeing that humans are very different from primates and yearning to stress that difference without the help of current religion, many people have taken an interest in the idea of the "ancient astronauts"[1]. Popularized especially by Erich von Daniken, and given intellectual respectability more recently by Robert Temple, the view maintains that primitive "backward" humans were visited by anatomically compatible beings from outer space, and taught the arts and sciences, including finally an enduring reverence for the visitors as gods.

Most sets of myths do include a belief that god-heroes walked the Earth in early times [2]. They are connected with the skies. Some early signs and pots bear sky-references. Evidence accumulates, too, that the earliest civilizations were far more sophisticated than scientists believed until recently. All of these are connected with the suspected foreign visitors by the theory of ancient astronauts.

The idea is not catastrophic (although scholarly catastrophists fear it will be catastrophic to the reputation of their work). It enlists catastrophes merely as a convenient means of explaining why the evidence of visitations is almost totally lacking: it has been buried or destroyed.

Moreover, the idea is eclectic. Much of the material that finds its way into the writings about "ancient astronauts" consist of exotica ("Did you know that...?" and "Believe it or not, but..."), or of questions aimed at needling archaeologists and pre-historians about their many anomalies, oversights and unknowns.

Catastrophists and uniformitarians alike usually reject the theory indignantly. Von Daniken himself is excoriated for his meanderings, his lack of logic, pretentiousness, vagueness,

unscholarly innuendos, and profit-taking in the market of ideas. Still it seems odd that scientists such as C. Sagan, who earned fame and fortune in part from writing science fiction, should denounce the analogous efforts of others. At the least, Von Daniken's work is like the newspaper comic strips, which get people to buy the newspaper, encountering thereupon whatever else it may contain in the way of information and ideas.

In any event, humanoid development in other planets or areas may have been possible in recent ages. We know the climates and resources of Mars, Mercury, and Venus today. They were probably quite different even a few thousands of years ago.

It is even possible to imagine that foreign astronauts, highly advanced, would have foreseen the doom of their planet and taken off for a habitable place (a favorite theme of science fiction). Or they may simply have undertaken a routine exploration and been stranded and assimilated, or taught and disseminated peculiar human qualities, and exited forever.

There exist, further, infinite possible combinations of genes of which only a few have been exercised to create life on Earth as we know it. It is conceivable, but quite unlikely, that parallel developments of being and existence could occur in isolation, one development (the foreign visitor) ahead of the other (potentiated primitive *homo*).

The chances of two assimilable races developing independently are practically nil, despite the narrow band of evolutionary choices referred to earlier. They are rendered nil when the timing factor is considered: in all eternity, why did the two races converge at the moment when man was ready for everything except reflective thought? Although it is true in a sense that "everything is miraculous," it is false that therefore every highly improbable idea must be true.

And, even if the improbable were accepted, and a fully technologized modern type of human developed elsewhere, one would still have to explain their evolution. If backward Moonmen had existed and surrounded our landing craft on July 20, 1969, and had been impregnated culturally and otherwise by

our doughty astronauts, the Moonmen's descendents would still have to figure out how the astronauts evolved.

Those who flirt with the idea of ancient astronauts are justifiably critical of the absence of evolutionary explanations for the great leap from pre-culture to culture. But being dissatisfied with existing evolutionary theory does not permit one to believe in all far-fetched substitutes. The "ancient astronaut" is too much like the "magician's rabbit, pulled from a hat."

It is also true, as von Daniken insists, that the early humans were sky-watchers. It is fundamental to catastrophic theory that this be so. But the gods that were watched for were not his god-heroes. They were the displays of natural forces as perceived by an aroused, deluded mind.

There is no evidence, anywhere and earlier, of a human skill of powered machine that goes beyond the technology employed during the "Old Bronze Age" of Egypt. These would not have been paraphernalia typical of a hypothetical culture that travels through space. It is conceivable that machine civilizations, now completely destroyed, may have existed on Earth millions of years ago, (although we are arguing in *Solaria Binaria* that these millions of years have not existed in Earth's history); but even this idea will not advance the question of whether living culture inherited advanced techniques.

The famous Peruvian Nazca ground patterns may not be fully understood; but if "aeronautical direction-finding" is contained in them, it is more suited to a Piper Cub plane than a space vehicle. They may have been laid out under instruction from heat-lofted balloons or from look-out points on heights. Theoretical geometricians could also achieve the patterns, and may have ordered them along the lines of meteorite falls. All ancient monuments -- megaliths, pyramids, temples -- were sky-oriented; the Nazca lines may have followed star-lines, also.

There remains a possibility that only the theory of Solaria Binaria permits. I mentioned this theory in a talk to the Society for Interdisciplinary Studies in London in 1975 and have since developed the model in collaboration with Professor Earl R. Milton. It calls for a binary system of the Sun and Super-Uranus,

electrically connected by a pulsing axis of fire and enveloped by an electromagnetized tube reaching between the binary partners and providing a vast intervening space with a viable atmosphere for planetary and biological genesis. The breakdown of Solaria Binaria occasioned the set of catastrophes that originated and imprinted homo sapiens.

The rotating magnetic tube that enveloped the planets in the age of Pangea on Earth endured for a long time. Hence the planets would have shared an atmosphere, and might possibly have engendered similar life forms. Passage from one planet to another would have been possible without highly specialized airborne vehicles. It is also possible that several planets were grouped close together. Something like the “Piper Cub” plane just referred to would not appear so ludicrous. For the vehicle would not have to cross through “outer space.”

If the “ancient astronauts” theory were true, and adapted the scenario of *Solaria Binaria*, the knowledge of genetics and evolution gained in field studies of earthlings would not have been wasted. It can be transferred to the exoterrestrial location that had produced the visitors, because both on Earth and on the other planets within the plenum of the solar system the same atmospheric and hence life conditions would prevail.

Then one may go on to conjecture that these intelligent beings from far away were human in a way that was related to the hominids of Earth, but had progressed much farther along. And that these ancient astronauts, coming upon the hominids of our Earth, bred with them [3]. The resulting strain, now dominant on Earth, with both astronauts and hominids having disappeared (bred out), would be the *homo sapiens schizotypus* that is described in *Homo Schizo I* and *II*. However, the present author, despite his attempts here to rationalize the idea of “ancient astronauts,” regards the slight evidence behind it and its logic as sufficiently disposed of within the scenario of his Quantavolutionary Series.

Notes (Chapter 9: Ancient Astronauts)

1. The literature is large. A scholarly work to be recommended is Robert Temple's *The Sirius Mystery*.

2. See Joseph Campbell's collection and analysis of *The Hero of a Thousand Faces.*

3. A suggestive legend is carried by H. Bellamy in *Moons, Myths and Man* (1936) p. 269.

Part Two

GEOLOGICAL ISSUES

CHAPTER TEN

INDIANS OF ILLINOIS

June 14, 1974

To: Professor Howard Winters
Department of Anthropology
New York University

From: Professor Alfred de Grazia

Dear Professor Winters:

Thank you for the materials on the S. Illinois digs at Modoc, Riverton, Koster (et al), and the U.S. Corps of Engineers surveys on Southern Illinois. I am returning them herewith, since I shall be leaving for Greece soon, but I would like to talk to you more about them before leaving, if that is possible.

My problem was this: the stratigraphic work of Schaeffer and others show heavy ashes and calcinated debris from natural disasters over "Old World" settlements and cities, ending the Old, Middle, and Recent Bronze Ages; that is, effectively terminating these civilizations. Therefore, the "New World" in some likelihood would show the same. If, however, the stratigraphy of American Indian settlements of the Mississippi Valley is continuous and shows no catastrophic effects between, say, 3,000 B.C. and 600 B.C., then the hypothesis of world-wide catastrophe is disproved. (The same would hold for Meso-America, which I am not considering here.)

Catastrophes are indicated by effects of violent flood, wind, fire, and material fall-out. Hence I examined your materials for evidence of such effects.

First I considered cases without reference to carbon dating, which in all cases produced dates during and before the mentioned critical period. I note the following:

1) The strata in all cases involve very narrow bands of settlement, measurable in inches. For instance, the Modoc case is said to move one foot per 1,000 years (in the earliest period) to one foot per century in the latest. But the question arises whether we are dealing with short-term values. The cross-sections show only thinly settled camping materials; nothing indicated the presence of women and children.

2) The fauna and flora remain unchanged throughout the period of several millennia, even from 9,000 B.C. The same mammals, fish, birds, nuts, and vegetation characterize all periods with frequency distributions that could be annual or irregularly annual. One wonders, then, too, about the Indian campers whose successive waves occupied a great stretch of time.

3) The technology scarcely changes. Even the mix of material does not radically alter.

4) The area in general is subject to flooding even nowadays. The stratigraphies show effects separating older layers of artifacts an hearths from newer ones; that is, silt, loess, and clay. Again these are in thin layers.

5) The area generally exhibits frequently strata of lignite and coal near the surface, which is mined farther north. These can be scenes of catastrophic combustion (See e.g. State Coal Circ. 332, table 5,3 and Francis, COAL, new ed.)

6) The stratigraphy of the area in general permits the hypothesis of catastrophic swirling cross-currents of flood occurring in a short period of time (i.e. weeks or centuries), depositing in rapid succession thin layers of loess, silt, clay, and organic matter that are noted everywhere. Whereupon in a late period, after the

catastrophes, human occupancy resumed in periods of resettling of the landscape and regrowth.

7) The descriptions of the limestone "foundations" that underlie the more evident material are typically vague. Limestone, I imagine, could signify a conglomerate of sudden sediment soaked by heavy floods and solidified by heat [electricity] and pressure.

8) The settlements are sunk into the same "alluvial" material that they rest upon. That is, the pit sides, except for the ploughed area, contain the same material layers as the bottom projections of the pits up to a certain rock depth. Hence, unlike the sites of the Near East, apparently nature was building up as rapidly as the human settlements were accruing. That is, either the land mass was building up enormously, or the occupancy of the sites was exceedingly thin, or was sinking or dug in. If the first, 30,000 years would have built up an extensive plateau.

Therefore, I ask myself (and you) the following questions:

1) Apart from the superposition of artifacts, is there any proof of a succession of ages?

2) If a succession of ages is granted, is there any proof that more than a century or two of occupancy were involved?

3) Could not the occupancy take the typical form of returning to a site, clearing the brush and grass to a clay and pebble base, and thus digging in the site over a period of time under a couple of centuries?

4) In view of the major catastrophic hypothesis, might not catastrophe in the central Mississippi Valley region take the form of devastating floods and fire, wiping out most of the biosphere? The old biosphere would be represented in the near surface lignite, fusain, and coal deposits where flood waters and tides, driven by wind and surface plate movements, would dump the burning debris, cool it by flooding and bury it with successive waves of

> sand and silt dragged from other mostly denuded surface areas. In a few years, a new growth would occur overall, but evidences of antediluvian human occupancy would be totally absent. Also absent, of course, would be any calcinated debris of settlements, and in this area of America, any huge aqueous intrusions or lava flow.

If this set of questions is answered in a way tending to support the possibility of neartime catastrophe, that is, between 3,000 and 600 B.C., then there still remains the defiant evidence of radiocarbon dating.

These data, as given, are often irregular and sometimes conflicting. At Modoc, for instance, Stratum 3 which goes from 15.3 feet (below the ploughline?) to 22.3 feet moves from 3314 B.C. to 9246 B.C. or 6,000 years more or less in 7 feet (with one gross anomalous reading). This seems excessive for a "continuous occupancy" site. I cannot conceive of any kind of settlement building only about one foot per thousand years. (I knew the American Indian was a great natural recycler of materials, but this is too much, especially since the occupants were carelessly dropping their hard-worked stone implements all about.)

Radiocarbon dating is known to present three types of problems. The first involves stratigraphic techniques of sampling and cleaning, that is, selection malfunctions. These can be serious and amount to a general bias in a set of cases.

Another C14 problem is presented by water-soaking. Water is known to wash out C14 and produce great age even for young organisms. The materials of Illinois Indians were frequently flooded and therefore may give old readings.

A third is in the atmospheric mix and flux that builds up the Carbon-14 residue in the organism to the point of death. Here the difficulty lies with the factors creating Carbon-14, the flux of cosmic particles and the density of the earth's atmosphere. The geo-physicist, Melvin Cook, argues in a fully detailed quantitative study, that the carbondating method in itself gives us an atmosphere that is only 12,000 years old. ("Carbon 14 and the Age of the Atmosphere," *Creation Research Society*

Quarterly, June 1970.) Apart from this, it is apparent that carbondating as a test begs the question of an inconstant atmosphere. That is, like so many tests, the IQ for example, it tests itself.

All of this leaves us, don't you think, with thermoluminescence tests, if the antiquity of the Illinois Indians is to be proven, and then not for pre-ceramic periods?

CHAPTER ELEVEN

ICE CORES OF GREENLAND

There is a certain grim quality to the confrontation of uniformitarians and catastrophists. The antagonists prowl in the jungle of natural history seeking the one definitive test that will finally discomfit and silence the other. If only the evolutionist could show that some major change in the world has come about with exquisite gradualness -- the ice ages, new species, the ocean basins -- then the opposition might be forced into silence. Just as relentlessly the quantavolutionary stalks among the events of history searching for the one indisputable catastrophe that has introduced a major change in the natural world -- a wholesale simultaneous extinction of species, a brush with a large comet, a meteoroidal crash, a deceleration of the Earth, or some similar expression of great effective force. Each must avoid the thrust of the other, even if it is blindly delivered in the course of an "empirical study" whose deadliness to the opposition was not originally intended.

Such would be the study of ice cores of Greenland and Antarctica. Their purpose is multiform; a Danish group of glaciologists writes: "Ice cores have become an important tool in geophysics and atmospheric chemistry. Langway (1967) first perceived the great and many-sided aspects of extending physical and chemical analyses of snow and ice to what Crary (1970) calls: 'the thin dimension' of glaciers, thereby adding time to the parameters considered. In a more recent paper, Dansgaard and others (1973) listed the potentialities of polar ice-core and bore-hole studies relevant to glaciology, meteorology, climatology, geology, volcanology, atmospheric chemistry, cosmic and solar physics, and 14C dating"[1].

No mention is made of the small group of catastrophist scholars shuddering at the brink of the bore-hole, but it happens that if the ice core were to demonstrate the regular passage of a long

stretch of uneventful time, quantavolution would simply have to surrender its claims to serious scientific consideration.

The glaciologists begin their investigations with a natural pastiche:

> All kinds of fall-out from the atmosphere, including airborne continental dust and biological material, volcanic debris, sea salts, cosmic particles, and isotopes produced by cosmic radiation, are deposited on the ice sheet surface along with the snow.

The passage of time, it appears, has little effect on the frozen material, except by tiny regular increments:

> The snowpack is gradually compressed into solid ice with small cavities containing samples of atmospheric air. In the coldest areas of the ice sheets, the impurities remain in the ice as indicators of the chemical composition and physical condition of the atmosphere at the time of deposition. Nothing is added, nothing runs off or is displaced, and no chemical reaction takes place; in fact, the composition of the ice layers changes only by decay of radioactive impurities and by extremely slow diffusion processes in the ice crystal lattice.
>
> The ice layers sink into the ice sheet in an undisturbed sequence with continuous horizontal stretching and consequent thinning; in areas with no melting at the bedrock, the ice layers approach zero thickness close to the bottom.

The results, though complicated to obtain, produce marvelous evidence of historical conditions.

> This is why, under favorable conditions, an ice core obtained by drilling through an ice sheet can be used to establish continuous and detailed time series of many geophysical and chemical parameters reaching several hundred thousand years back in time: the carbon dioxide concentration in the atmosphere; climatic changes in terms of accumulation rate and, with certain reservations, surface temperatures; the chemical composition of the atmosphere; volcanic activity and its cooling effect in the troposphere; fallout of cosmic dust; and the cosmic radiation flux [2].

The implications of this work has not escaped the nervous eye of the quantavolutionist. One student, R. G. A. Dolby, writes:

> The Earth's upper atmosphere is convected downwards in the polar regions, and with it some of the finer extraterrestrial dust that falls on our planet. A proportion of this is deposited on the snow falling on the ice caps of Antarctica and Greenland. Thus, samples of the extra-terrestrial material are trapped with other atmospheric dust in successive levels of the ice and snow that have built up the ice caps. In recent years, deep holes have been drilled through this thick ice, and the cores of the holes extracted, to provide a continuous record of what was in the atmosphere over many years. The interesting question arises: could this record be made into an empirical test of Velikovsky's idea?
>
> According to Velikovsky, large quantities of cometary material fell upon the Earth in a number of catastrophes, the most recent being nearly 2700 year ago. Some of this material would have reached the polar ice caps, and should still be present at the appropriate depth in the cores that have already been collected. It is simple matter to study the cores carefully for signs of this material. To the best of my knowledge, the only significant nonaqueous material reported is a certain amount of dirt in six layers up to 0.5 mm thick of the Byrd Station Antarctic core, at depths between 1300 and 1700 meters. This dirt was tentatively identified as volcanic ash, and attributed to eruptions from volcanoes less than 300 kilometers away [3].

Another perplexed correspondent, C.L. Ellenberger, writes:

> I have heard some fantastic intellectual gymnastics from people trying to refute the Greenland core evidence... With them [the ice cores] we have a chance to observe a dust layer(s) and/or volcanic acid layer(s) that one would expect to be significantly thicker or more concentrated than those which are known to have been produced by large, single, historical eruptions [4].

Hitherto, analogous technologies have threatened, namely carbondating, soil varves, and dendrochronology, but quantavolutionaries have learned to coexist with them. In at least the first two instances, the catastrophic event may itself adjust the hands of the geological clock, while in the third case, the trees to provide the data are limited in space and time.

Setting up Mother Nature to count out past time has inspired other technologies rather less close, and sometimes more helpful than threatening to catastrophists. The rates of growth of coral and of stalagmites and the cutback of waterfalls come to mind. Because they are an example, but also because they may bear upon the ice bore-hole issue, the studies of Richard F. Flint and F. B. Taylor (1963) may be mentioned. Speaking of two late Wisconsin Ice Sheet invasions of the St. Lawrence region, Flint turns to the date of formation of the Niagara Gorge. Retrocalculating the current rate of recession of Horseshoe Falls, Taylor claims that the present flow channel was freed between 3000 and 3500 years ago. The time is surprisingly recent.

It happens that the Greenland ice core exhibits some dust concentration around this time; -1390 ± 50 is given. The connection is made with an explosion of the volcano of Thera-Santorini in the Aegean Sea, in the early Late Bronze Age. Are the breaking of a new Niagara channel and the Thera explosion connected? Conceivably, for, after all, hundreds of extraordinary and catastrophic events seem to cluster around the middle of the second millennium B.C. [5]. If the ice core of this period shows only a modest increment of dust, no more than is revealed by a dozen other known incidents of the past 4000 years as measured in the core, then little in the way of disaster would have struck upon the Earth at a time that practically all quantavolutionaries regard as a moment of worldwide destruction, most probably exoterrestrial in origin.

Several stations have been boring into the ice caps of Greenland and Antarctica; bedrock has been reached in both continents. Annual or close to annual series of ages achieving 100,000 years have been claimed for the cores. One core, already referred to, drilled at Camp Century, Greenland [6], exhibits the following characteristics on its test of “acid rain” fallout.

> 1390 ± 50 BC. This is the only signal exceeding 2.6 uequiv $H^{+}Kg^{-1}$ between 1100 and 2700 BC, and we therefore interpret it as being due to the large eruption of Thera (Santorini) in the Aegean Sea, which is generally agreed to have been of the same magnitude as that of Tambora (1815). The tephra production has recently been estimated

> at more than 28 km^3 (13 km^3 of dense rock equivalent) [7]. This unusually large eruption has been radio-carbon dated at 1720±50 BC on the calibrated radiocarbon scale... However, archaeological evidence from the excavation of the Minoan settlement near Akrotiri on Santorini strongly suggests that the island was inhabited least up to 1500 BC judging by Egyptian pottery style chronology; it was apparently abandoned shortly before the eruption, and in good order because no valuables have been found nor people killed by the heavy ash fall (10-40m). The discrepancy between the datings may be partly explained if the organic material used for the radiocarbon dating were partly built up by radioactively dead carbon-dioxide exhausted from the volcano before the eruption (an effect which has been observed recently). Our dating around 1400 BC supports Marinatos' theory of a causal connection between the Thera eruption and the decline of the Minoan civilization centered on the island of Crete. The dating can be further improved to ±10 yr, if and when a deep Central Greenland ice core becomes available.

Since the date assigned, -1390, confronts a radiocarbon date of -1720, a 340-year difference, the authors say that the destroyed Akrotiri settlement lasted until -1500 "judging by Egyptian pottery style chronology." Apparently they are prepared to throw carbondating to the wolves; even so, granted Velikovsky's reconstructed chronology of Egypt, which is achieving some acceptance among younger scholars, this will not suffice, because the Thera artifacts at the time of destruction now move down to about -1000. Several centuries of discordance would be excessive, given the evidence that the ice-core method is accurate within several percentage points. Either the method is rendered unreliable by the time that history loses its specificity, or carbondating, conventional dating and reconstructed dating are wrong.

We cannot know whether there may have been other large volcanic disturbances that are not recorded in the same ice core. Icelandic volcanism is certainly overrepresented because it occurs not for away. The Antarctic cores reflect only volcanism of some several hundred kilometers distance. The Greenland record will not readily signal disturbances unless worldwide or above 20? south latitude. Krakatoa (1883) and Tambora (1815), two large Indonesian blasts seem to have registered with acid

fallouts. Mt. Mazama, Oregon, seems to be responsible for a strong signal assigned to -4400±-110 years.

Perhaps because it lacked an acid effect, the great exoterrestrial intrusion of Tunguska (Siberia) in 1908 is not signaled in the core; it seems to have produced no sharp deviation in the tests of oxygen isotope extremes, or in dust micro-particles, or in acid rain. Since this blast was more powerful than others that did register, and since it raised enough dust to darken the skies for a long period of time, its absence from the lists is strange. Furthermore, Tunguska's blast produced nitrogen oxides in the Earth's stratosphere that lowered the Earth's temperature 0.3? C for a decade (1908-18)[8]. The unusual gases and temperature drops should have affected the O^{18} measure for those years as well as provided ample microparticles for an exhibition of deviance.

Nor are climatic crises such as the Maunder Minimum (1645-1715) noticeable in the published record of the cores. In this case, a "Little Ice Age" around the world has been attributed to a cessation of sun spots. The period should evidence itself in the ice core in some manner. Nor can we locate unusual years around the times conventionally assigned to the end of the Upper Paleolithic cave culture of the Dordogne, although the general view is that the people of that Age were forced to follow their animal quarry to cooler northern regions. The enormous quantities of ice could not disappear while the Greenland ice cap was still picking up its usual ration of new ice each year.

In 1982 we read of the Soviet discovery of well-developed Bronze Age settlements in the Kola Peninsula, about the same latitude as the Greenland drill sites, with materials (slate) imported from far to the South [9]. Velikovsky pointed long ago to the discovery of human artifacts beneath the huge hecatombs of mammals and trees jumbled en masse in the Fairbanks District of Alaska; he reported, too, the hills of smashed bones on the islands of New Siberia, product of very recent events, and the findings of paleolithic, neolithic, and bronze age settlements in northeastern Siberia. The coasts of the Arctic Ocean permitted well-developed cultures in early historical times; metallurgy was practiced at Yakutsk "to make axes, beautiful bronze tips for the spears, knives and even swords"[10]. "Organic vestiges in the

drift of the last glaciation have been found to be of a radiocarbon age pointing to a time 3500 years ago" [11], while the ice appeared to be advancing about 10,000 years ago and therefore the last ice age decline or collapse must have occurred more recently. If this last figure were valid, and compared with the muddled ice of the "last glaciation" assigned 20,000 years in the ice core, most of the ice core would be foreshortened by 50%, throwing of all historical and prehistorical calibrations. Be it as it may, the chief problem is the undeniable occurrence of geophysical activity quite incompatible with the radiometric, varve, and microparticle indicators of the Greenland glaciologists.

Nuclear blasts of recent years do put in an appearance. Why is it then that remote events are apparently prevented by wind patterns of the upper atmosphere from carrying signals to Greenland? A cyclonic explosion large enough to expel material from the Earth into space might not send dust the great distance to the Greenland ice cap, but I doubt this.

The most remarkable feature of the ice core records is their uniform quality. Could this be a "defined" hence spurious uniformity? Precipitation of water and oxygen isotopes, climate, and underlying rock temperatures are surprisingly constant over thousands of years. "Post-glacial" times show "surprisingly stable accumulation conditions"[12]. The 800 top meters of the Camp Century core count off 4000 years with uniform temperatures. No other climatic indicator on this planet shows such a uniformity.

Microparticle concentrations do alter substantially with "the end of the Wisconsin glaciation;" they "suggest high storminess and/or atmospheric turbidity at that time"[13]. Considering that Greenland was so-named not only because Eric the Red was hustling immigrants but because he found the land more verdant than today, the waxing and waning of pollen signals should have by now prompted another technique of validating the use of ice varves in setting up a time scale. A continuous series of annual (or decennial) pollen density rates have not been published, to my knowledge.

The Greenland scientists report concentrations of volcanic activity in this latest millennium and in the millennium from -6000 to -7000. This does not conform to the impressions left with us by ancient history and geology. The first millennium and the second millennium B.C. were both marked by very heavy volcanism so far as legend and archaeology can be depended upon, and heavy disturbances may have been almost continuous before then.

The Danish group speaks of a dry period 18,000 years ago in the ice core period [14]. In other places [15] it marks dusty turbulence, but not in the dry period. Why does not the dryness raise dust in noticeable amounts? And why does not precipitation in dry years contain more microparticles than in wet years?

The Greenland core ends in many meters of debris, which may or may not originate from a grinding of the bedrock; it may be a settling of debris when the undermost ice diffuses and spreads out leaving the debris behind, or turns to water and seeps out. In the Antarctic, the lowest meters constitute a shallow lake, rendered so perhaps by the pressure of the ice sheet alone.

Or is the pressure supplemented by warmth emanating from the rocks below? And is this temperature constant? Does an ice cap melt from the top or from the bottom, or both? Does it glide off and calve from the top or the bottom? Most scientists will agree that ice is disposed of from below. If such is the case, the time measured by different cores will probably be affected by the conditions of the Earth - the depth of the crust, the proximity of mantle magma intrusions, the stresses and strains horizontally suffered by the ice.

Will dust and particles descend in a given column faster over time than the original ice varve to which they pertained? Probably so, because of greater density and hardness. This may be the source of the bottom debris, but the bottom debris may not be so immobile as we conjectured above and may be moving out laterally at a faster rate than its bulk presence would indicate.

An accelerated rate of bottom removal would only make the core younger and the present ice age longer than the scientists believe. Instead of registering the 100,000th year at the bottom, hundreds of thousands of years may have slipped away, and only the latest 100,000 years is present in the core. That is, provided the years are registered accurately.

But the core is measured annually for hundreds of years at the top, and then in averages for the balance of the core. The statistical projection may depart far from the reality. The curve adopted to portray the rate of thinning of varves in the first hundreds of years will take very different shapes with only slightly different initial assumptions and observations. Also, the warmer the base of the core, the younger the core averages above.

The Greenland cores have been synchronized to some extent by the investigators, and they are well aware of the serious discrepancies that begin to appear, and of how at one slice a core will signal an event that is not signaled at what should be the corresponding slice of a second core. That is, local conditions on the Greenland ice cap itself, operating in what is logically the most uniform of environments, will occasion salient differences between presumptively equivalent crosssections. If this is happening within Greenland, how well can Greenland register events around the world? Not even the Laki (Iceland) eruption of 1783 correlates. This immense disaster registered high at the Crete drill site in acid fall-out but at best feebly at the Dye 3 and Milcent drill sites. The incongruity demands a satisfactory explanation.

Some small and large parts of each core are defective for analysis, for various reasons. The defects do not, in the investigators' opinion, occur because of external events destroying the validity of the rest of the cores, and we must accept their judgment in this regard. But suppose that there occurred a severe temperature rise over the whole of the cap and much of the ice melted and flooded away, and upon their remnant was founded a new progression which endured for a thousand or even three thousand years; would not this catastrophe go unnoticed in the ice core, and the remnant be dated as a regular recession from rates calculated from the

layering of the new ice? Is this not very similar to a typical problem of unconformity in stratigraphy?

Again we turn to the unreal niceness of the rates of accumulation and the neatly descending diminishing varves. The oxygen 18 isotope, annually giving us a high and low of its deposition as the year cycles from warm to cold, seems like a measures too good to be true. Is it possible that the measure works only in those years that have a high and low between certain limits, and that when the limits are exceeded, one way or the other, the ratio no longer registers? Is it possible indeed that the O^{18} ratio is defining, rather than measuring, temperatures?

And what is true of the ice may be true of the measuring instrument. Why should the oxygen 18 isotope be constant in vapor of the atmosphere (apart from normal temperatures that affect whether it falls or does not fall)? Would not cosmic and solar storms, and everything else affecting the atmospheric gases tend to disturb the measuring gas, too? The O^{18} uniformity may be both judge and executioner of time and occurrences. The investigators have endeavored heroically to stabilize irregularities of the isotope signal by checking microparticle density, varve thickness, and acid content against the gas test, and one can observe in their efforts the progression of the common sense idea of varves into a nightmare of adjustments, extrapolations, complex indices, and averages. No articles can contain and describe for the outsider all the reassurances that he may need and should have; good faith and the objectivity emerging from teamwork will have to be involved.

The anxiety of the external critic is augmented by the inattention of the literature to seeming contradictions of the type previously alluded to, the studies of glacial conditions elsewhere which indicate decisive events that somehow should be called forth from the ice cores-cases like Niagara Falls, for instance. Another example would be a study of the late ice-free period off of Labrador, when a considerable flora grew on the land nearby at 21,000 carbon-14 years B.P., and where postglacial vegetation had hitherto been dated at 8,000 to 10,000 years B.P.[16]. Other examples would be the massive recent deposits and arctic human communities referred to earlier.

There have been severe recent climatic changes, say most glaciologists, natural historians, and historians of ancient cultures. It is inconceivable that these are not, in one way or another, sometimes if not always, registered in ice cores of 100,000 years of age. Climatic and disastrous events would clump together at times, guaranteeing a more effective signal to be registered in the ice; Tunguska would be only a single instance of this. That the proven inconstancy of solar storms, hence of particle bombardment of the atmosphere, would not affect O^{18} concentration in atmospheric vapor from one year to the next and from one century to another, is highly unlikely.

Walter Sullivan of the *New York Times*, himself author of a formidable treatise on geology, *Continents in Motion*, reported directly upon the Greenland drilling expeditions (August 9, 1981). He describes the physical set-up at Dye 3, a multi-national effort with scientists of five nations as participants, that has drilled 6600 feet to bedrock. He writes:

> Like the North Sea drilling platforms, it is a community on stilts, with extensive living quarters, dining facilities and recreation rooms. Every few years it is jacked higher on its stilts to keep it well above the accumulating snow.

Bemused by their predicament, I inquired of Mr. Sullivan on August 20, 1981:

> Perhaps you can solve this puzzle which has occasioned some friendly arguments hereabouts. If the stilts of the living quarters of the scientists have had to be raised considerably since the project began, because of the accumulation of snow, say 10 centimeters of snow [actually the true fall is more], and this 10 centimeters represents at the same time a compression downward of the ice (that is, it is a true rise in the altitude of the ice cap) would not, at a uniform rate of precipitation, the ice cap of, say, 2 kilometers depth, have been built up from bed rock in 20,000 years?

Sullivan replied on Sept. 10, 1981 that “the station’s true elevation above sea level does not change substantially,” for “The snow accumulates; Dye 3 is jacked up; and the ice beneath it flows away toward the coast.” Also, “Central Greenland has probably been covered with ice considerably more than a million

years, but the older ice has long since gone out to sea as icebergs."

For the moment, it may be that the altitude of the camp remains the same, although this may be difficult to measure from "8700 feet above sea level." This means that roughly every decade about 100 centimeters moves out toward the sea. But this bottom 100 centimeters represents many hundreds of years. All of this ever-worsening bottom record is finally destroyed each decade.

A warming period with high precipitation might wipe out long stretches of time, younging the entire core, fattening the top layers and pressing out larger sections of the bottom, even while the total column length might remain the same. The action might proceed rapidly, under certain meteorological conditions. Even though the recent period of several centuries might be well-marked, the lower sections of the core would be uninformative. But as we have seen, there do exist problems with the recent sections.

I have implied that the altitude has not been measured, or at least precisely measured, within the limits demanded of the problem, that is, over several decades and in centimeters. All glaciologists are divided into three parts: those who say the ice caps are growing, those who say they are diminishing, and those who say they are constant. If it happens that the cap is here growing, and has grown by an average of a meter per decade, then the drilled core will be only 20,000 years old or less, which would suit short-time quantavolutionists well.

I cannot think that the glaciologists, so apparently scrupulous in their methodology, have calculated coefficients of correlations between the a) ? (O^{18}) and b) particle and c) varve-thickness measures of the cores drilled at the several Greenland sites. Yet I have not come across them, and my cursory ocular inspection leads me to fear that the correlations are low, perhaps even to the point of insignificance. But these measures are themselves complex indices and the several variables that compose them also require correlation. Multiple correlation techniques need to be applied.

If the correlations are absent, but can be raised to significance by grouping annual varves into decades, or even centuries, then some claims of ice core glaciology will be damaged but the large claim that interest us, from our radical perspective, will possibly remain strong, namely, that no worldwide catastrophe involving atmospheric contamination can have occurred over the past 20,000 years. If this single claim is or were to be firmly established, it would have to be concluded that glaciology has eliminated the theory of recent quantavolutions in natural history.

Has this claim in fact been established on scientific and empirical foundations? The more regular that glacial history in Greenland is portrayed by the tests, the more a critic is inclined to see some major and fatal flaw in the system. It is too early to take a final position on ice core chronometry, and incomparably more research into the matter would be required than is presented here. As with sedimentary varves and tree rings, a great confidence must be devised upon the investigators, or the outsider must be guided hand in hand through the process to appease his doubts; some of the greatest catastrophists have been persuaded of their views by intimate contact over long periods of time with the morphology of the regions of their work-the Utah deserts, the Sierra Nevadas, and so on, yet they are not believed by most scientists.

Meanwhile, every interested scholar will take up his position in terms of his interests, biases, and hopes. Acting as one of them, the present writer must shepherd his own flock of theories. These contemplate a world history that experiences a half-dozen major quantavolutionary episodes over the past 14,000 years. During this period of catastrophes, Greenland would have been severed on all sides from a Pangean land mass. It would have been deluged by ice, then overrun by tides, then subjected some 6000 years ago to another deluge of ice. Much of the ice (and snow) would have originated exoterrestrially. Cataclysms are pictured that would build a kilometer of ice in a short time. Many successive waves of snow and ice, whirled about, as pure and free from dust as outer space itself, would have plunged upon Greenland. Would some semblance of a calendar of the years finally remain to be manifested when, on top of it, two

thousand fairly regular years succeeded, lending a false conception of what lay below? Probably.

Notes (Chapter 11)

1. Hammer et al., "Dating of Greenland Ice Cores by Flow Models, Isotopes, Volcanic Debris, and Continental Dust," 20 *Glaciology*, 82 (1978), 3.

2. W. Dansgaard et al., 218 *Science* 4579 (24 Dec. 1982), 1273

3. Unpubl. note of August 1977. Cf. II S.I.S.R. 2 (1977) 31; *Soc. Interdisc. Studies R.* 4 (1980), 82.

4. Letter of Sept. 20,. 1983.

5. See I. Velikovsky, *Worlds in Collision*, Part I, A. de Grazia, *Chaos and Creation*, and V. Clube and W. Napier, *Cosmic Serpent*, together with other studies of the same writers and numerous other authors, cited in these texts and in the pages of the *S.I.S.R.*, *Kronos* and *Pensée* magazines. See also Part I, here above.

6. C.V. Hammer, H.B. Clausen, an W. Dansgaard, in 288 *Nature,* 20 Nov. 1980, 233.

7. *New Scientist.* Sept. 2, 1982, 620.

8. *Soviet Weekly.* June 26, 1982.

9. *Earth in Upheaval,* "Supplement: Forum Address," (1953).

10. *Ibid.* 287, citing studies of Suess, Science, Oct. 24, 1952.

11. *Glaciology*, 20.

12. *Ibid.* 12.

13. *Science,* March 15, 1976.

14. *Glaciology*, 12, e.g.

15. G. Vilks and P.J. Mudie, “Early Deglaciation of the Labrador Shelf,” 202 *Science* (15 Dec. 1978), 1181-3.

CHAPTER TWELVE

A FAILED EXCURSION TO THE CAVES OF AQUITAINE

When the Ninth Congress of the International Union of Prehistoric and Protohistoric Sciences announced an excursion to the paleolithic sites of Southwest France, I joined up. It was September 1976.

The Guidebook of the Excursion was admirably executed and was prefaced by a motive for the excursion: “In the first place, to return as a pilgrimage to the sources of the science of prehistory; to see or revisit these world-renowned sites, which have given their name to the great epochs of Prehistory: Abbevillian, Acheulian, Mousterian, Aurignacian, Solutrean, Magdalenian and so many others of the Mesolithic, Neolithic, and Protohistory.” What’s in a name? - something of national pride, I fear. Who dares to question “the great epochs of Prehistory?”

My personal motives were sinister, as is discoverable in a journal entry upon arrival at the Hotel Terminus in Bordeaux, August 30.

> I go to the Hotel Terminus, whose dignified greystone mass juts out from the trystone facade of the station. It is quiet and polished at the reception. “I am a day early but am reserved for tomorrow night with the archaeological group.” No problem with the room. But no archaeological group is expected. “Wait,” says the pretty receptionist to the handsome assistant-manager. “There is a letter here about a Monsieur Halloway, from an archaeological society.” (I wonder whether it is the anthropologist Halloway.) I know at least that something will be happening with the tour. “Please ask Mr. Halloway if he might phone me when he arrives.”
>
> My room is broad, tall, and old-fashioned. The hotel was built to outlast the recent growth of the city. When I draw the long draperies and throw open the large windows, I am

just above the melee of the railroad station. A paradisiac room for an urban sociologist. I am content. I feel like working immediately. I clear the little mirrored table, pour out a glass of Glenfiddich's whisky, and begin to leaf through my folders, stopping at a point where it occurs to me to write down the kinds of questions I must be asking myself and others throughout the field trip through the country of the famous prehistoric caves. I copy them here.

1) Is superposition the same everywhere?

2) How clear are the separations of "cultures"?
Nearly always very sharp and clear?
Sometimes very sharp and clear?
Only occasionally very sharp and clear
Never very sharp and clear

3) At how many sites are: all cultures represented? 'x' cultures represented?

4) Are animal remains found? In what % of the caves?
Are human remains found? In what % of the caves?

5) Are C14 dates compiled from 'x' caves? and available?

6) Has any K/A [Potassium 40-Argon 40] dating been done? Where?

7) Any other radiochronology, e.g. on ceramics?

8) What is the substance of "sterile" layers inside a cave? Why formed? Do these layers correspond to ash or in the same type of material outside the cave? (Where can I find statistics of the caves? Dating (absolute) of the reported 5 ash-levels around the Cro-Magnon dig?)

So the questions. But these are only a beginning. For several years, I have wondered who these people of the caves where? Where do they belong in time? Are they truly a presence that ranges from 5,000 to 15,000 to 30,000 or even 100,000 years in age?

What created the caves? Opened them up? Sealed them? Opened them and sealed them repeatedly?

What natural forces were playing about the world outside? The caves must have been used and disused while the last ice age came and went.

The great paintings. Were they to celebrate the presence of animals or pray for their return? Where are the heavens represented in the caves? Could some of the animals be a zodiac of the caverns?

I begin once more to riffle my pages. I am unprepared for the trip. This summer, until now, I have been writing of other subjects, related to ancient catastrophes - on schizophrenia among the first humans, of sudden destruction of cultures in the Middle Bronze Age, of the science of catastrophes. Now and then I would come across some mention of the cave country of France, of Spain, of grottoes of Africa and Italy, of the great Choukoutien cave of pithecanthropus in China. I know of ice caves as in America where ice lies deposited between layers of lava and schist, and melts very gradually over thousands of years. Why are none of the caves of Aquitaine 'ice caves'? The ice was near.

But I know nobody - neither expert guides nor "congressistes," as the group of us are called. I have found no geological map of the area: how can I ask questions, or ask the all-important critical follow-up questions without sub-surface and contour information? I have not read enough about the caves to be more than a sponge of information, too little to be a cross-examiner.

The telephone rings. It is Halloway, just arrived. He is pleased to know, too, that someone besides himself has appeared on the scene. He is from Providence, from Brown University, a classical archaeologist. We arrange to have a drink together in half an hour. I take a hot tub bath, rearrange my tangled jumble of possessions, and walk down the broad stairs of the foyer to meet him. There I note a puzzled couple, and hear the receptionist clerk saying to the man: "You are not by any means the first of this archaeological group of which we know nothing."

Halloway appears. About 40, bearded, sturdily built, bespectacled. We shake hands. "Let's try the competition across the street," I suggest. We go to the bar-restaurant of the Hotel du Faisan, and order Pernod. He is just in from the States, changed planes in Paris. Tired. He will go to bed directly. He has been digging in Southern Italy for several years, an early Bronze site particularly, where metal and pots are cooked on platforms of vitrified rock that they made. There is an abundance of ash. I inquire where the ash comes from. "From their work. When it got too high, they

> built another platform." "Any signs of a level of destruction?" "None," "Why did they stop?" "The work simply stopped. We don't know. Maybe if we dig up the area around we may discover why." We pay 12 Francs and leave. I return to my room, glance through Whitesides' Archaeological Atlas for a while, and descend to the Buffet-Restaurant of the train station. A vegetable soup, merlu fried with lemon, crème caramel, bread, wine (Bordeaux, of course). I discover I can see faces in the distance distinctly better with my bifocal glasses. This is a surprise. My eyes are getting old. To bed, quite tired, at 11:30. The Atlas drops from my hands.
>
> The next day I bought for the trip a Masson geological guidebook to Western Aquitaine and a camera. Back at the room in the evening. I am writing: " 'Why did they have to close the caves at Les Eyzies?' And the answer, as often as the question: 'The pollution of the crowd was destroying the images.' The heat, the torches - I recall one beautifully printed book saying something about thousands of sweating bodies and the vanishing images. What of the sweating caves themselves?
>
> "Do caves not sweat? Stalagmites, stalagmites. An image in paint. Who can seal it in a wet tube of dripping walls and clay bottoms for 10,000 years and find it intact afterwards? I can understand the images carved into rock, but the paint that outlives them and the paint laid on flat - what preserves it? There must be good answers. Geologists and specialists on paints have visited the caves by the hundreds. How stupid I am not to figure out why! Just as I felt stupid when I stood at a headland day before yesterday, at St. Jean de Luz, and watched belts and streams of thinly laminated rock plunging crazily, tortured at all angles, into the sea, which rushes at them, foaming. What manufactured these fine layers in the dozens and then pushed them negligently over the sea like a jumble of tissue, like rolls of toilet paper?"

Within three days, I gave up the idea of an extensive account of my observations. At 11 p.m. September 3rd, I am writing in my journal at Périgueux:

> Three heavy days and two bad nights have brought me to think that I shouldn't continue. Nothing ever works out the way that is expected. When the mind lacks coherence, everything lacks meaning. When the environment is confusing, it is difficult to be coherent. Why be so abstract when the simple fact is that I have been struggling for three

> days merely to keep pace with a group that is moving all the time with little sense of itself through strange country and unanticipated petty troubles of existence. The beds have been bad, the meals poor, the bus-riding tortuous and prolonged, the days of forced company ranged around the clock... What is the writer to do?
>
> But most of all, the prehistoric times as they are advancing towards me from Aquitaine are a rough and dismaying array whose frightening aspect makes me want to retire from the fray.
>
> In 3 days, we have ridden hundreds of miles, inspected 3 caves (I have gone into Lascaux today), 4 sites, 22 cuts, and spotted a number of caves, sites and cuts from the halted or moving bus. In addition we have visited three museums. Sets and trays of paleolithic or later artifacts march through my head in silent columns.
>
> The people of the group are of greater interest, what they say, who they are. It is pathetic, in a way, to watch the paleolithic age scholar with his or her miserable accumulations of evidence and desperate concentration as if by specialization on the edge of a blade one can pierce the gloom of the birth of mankind. I am imitating them as well as I can, gazing fiercely at the cobbles and chips, hoping, too, for the Message.

Sporadic entries followed, but in the end I was left with handbooks and notes and questions, whereupon we all lost ourselves in the melee of the great Congress at Nice. There was nothing left but to reminisce. I was overwhelmed by the organization, the discipline, and the assuredness of the Masters of the Caves. I do not see how any individual, unless he could lead a precarious double life over a decade of time, could treat with the Ideology of the Caves. Lacking access and resources, an outsider could only work with the printed materials, a few visits, and a deductive theory bringing to bear the general materials of archaeology and geology.

Could not some authoritative scholar, long versed in the intricacies of Aquitanian archaeology, emerge in due course to say, “Dear colleagues, we must review and reevaluate the conventional theory of the Upper Paleolithic.” Impossible, sociologically impossible. One would have to reverse his spin of perspective and contemplate a strange new model. Then, once

persuaded of its utility, he would need to persuade others to listen to him, obtain resources for seemingly absurd research, and hold onto his job - not likely!

To compose a new theory of the caves, one must consider the origin of the caves. Could they have been quickly formed and folded in the orogeny of the Massif Central and the bursting of hundreds of volcanoes in the Holocene, even while the great Atlantic cleavage shoved Europe to the East? Heat and steaming waters can form caves quickly, and so the interesting natural sculpture within the caves, as I noted in our visit to the caves of Oxocelhaya and Isturitz.

> Does any animal besides man penetrate into these grottoes? What geologically explains the great variety of forms? Different floodings and temperatures? The impossibility of any informed layman or ordinary scholar gaining much from visiting the caves. Bronze Age is found in the cave at Isturitz. Each chamber looks as if done up by a distinctive decorator. Red and black paint on the walls still from Paleolithic, little black horses. (Humidity constant? Young?) Stalactites make different sounds when struck. Any evidence that they were used as producers of sound? Recall: guide ("untrained") who made anthropomorphic figures out of every calcite formation. Recall: the glass cases where hundreds of objects were arranged "technologically" with no indication of where they were found, how originally, etc. (Compare with taking 2 congresses and by putting all Republicans in the first and all Democrats in the second, you show that a pure Republican was succeeded by a pure Democratic age.) All the hoopla (the comic strip ascendancy of man from Neanderthal to Cro-Magnon, etc.)

At Eyres-Moncube, we come upon the Gisement of Pennon, dug out by Professor Thibault, who explains it to us. He is:

> very confident, certain in his modes of expression, polite, direct, says when he rarely doesn't 'know.' Shows occasionality of use of this site. Maybe used as a flint-cutting site. Again deposits of sand that could be laid in a week or 100,000 years, followed by occupation, then another huge deposit contrast, another occupation... No hint of catastrophism among the 45 people... Time calendar not even discussed by anyone so far... Interest is general, attention good, but questions almost entirely factual and answers accepted. No controversy. Is this science: maybe

> so. Some complaint about not enough manpower to dig. Not one mention of skies. One American, expatriate in Canada, says unusually, 'Why did these people use the caves?' Practically no interest in psychology. No talk of institutions. I probably initiate (stimulate) one half of the total volume of psychological or theoretical talk, now here, now there, often walking off, never completed. Desultory.

As we near Lascaux, I jot down a nearly undecipherable note, written on the bus.

> I notice how often 2 or more (or all) of belts of deposits in Aquitaine look exactly alike save for a slight color and grain change. If you don't peer at it, it looks like a huge subsoil of the same sand (except here and there are stones). Yet they are dated even in a single profile as far apart as Holocene, Pleistocene, Quaternary, Tertiary and maybe even earlier. (And of course Riss, Wurm, Mendel I, II, III, and all of that, in between). Strange! Highly improbable.

At Lascaux:

> Whenever calcite grains capture color they hold it. When the powdered rock is painted it has lost the paintings. Thus Case A: Bottom half of horse clearly and nicely painted, little affected... top half has disappeared, "because it is on calcacerous stone but not on the calcite like the lower half is." Quite persuasive. But what does this indicate about time? Two factors are involved in question whether a color will be preserved: the surface (calcite or not) and the pigment (whether organic carbon as in oil smoke or inorganic as in earth-oxide colors).

At the overhanging Gisement of Micoque:

> Almost no assemblages are in order, and could be disastrous. Lots of open air digs. More than caves. Everywhere in Dordogne you dig you find some paleolithic artifacts. Never cases of reversed superposition of cultures: one is always earlier (below) other according to the progression. Sometimes contemporaneity, causing concern, but, to repeat, never true *bouleversement*... No tectonic *bouleversement.*

Settlements occurred even during the cold glacial periods, as at Aschenheim during Riss II. Different types of limestone form in different caves. I was watchful for signs of ashes. Very little

reported or to be noticed. Where, in one place, carbon flecks were noticeable amidst clay sands laying over a silt bank and solid reddish soil, there occurred white bones on the same level. The carbonized bits could have been percolated from an occupancy location, or wind-blown or carried in by a flood that swept in and dispersed hearth ashes, or they dissolved into a soil. No systematic testing of soils for organic carbon content seems to have been done. In one case a 20 X 20 meter area carried an 8 inch band of carbonization; it is explained as the effect of many hearth fires, which I accept.

It appears that peat is heavily deposited in Aquitaine. How would this peat relate to Mackie's study of a peat deposit about half a meter deep over a megalith otherwise dated at about 800 B.C.? Neolithic farmsites are found under bogs of peat in Ireland. Over 10 meters of peat formed in the Holocene and is found below the river valley of Eau Claire. Another river running parallel runs on top of a peat bed of the same proportions.

La Cluna abri-cave contains a one-meter level of Mousterian culture stuffed with bones of different species, including large mammals. Mousterian sites often end with blocks of animal and human bones *mélangés*. Magdalenian sites were usually smashed up sooner or later by seismic disturbances, or so it is believed.

A scholar present told of the extinct volcano, now Laacher See, 80 km South of Bonn. It lacks cone or crater lip. Over 100 extinct eruptive sources of same type are found in the same region. Laacher is said to have exploded during the Allerit Period, around 11,000 B.P. Deep tufa is scattered around and to the East as far as Thuringia. A band of carbonized vegetation in the coastal area of the Netherlands is placed at the same time. We have only begun to fathom the fire remains of the Paleolithic. At Langerie Haute, for instance, a meter of ash rests on top of the Upper Magdalenian culture, coinciding, it is believed, with the very end of the Ice Age.

I note (Sept. 7) that the excavators do not find materials of recent times, and it would seem that after Magdalenian VI, the sites were abandoned. Upper Magdalenian is loaded with doubts and controversy. Some experts see sub-periods when others do

not. Magdalenian III, IV, V are often clumped together; some argue this is an effect of seismism, others that warmth may have cracked and caused rock overhangs to fall. Water action, too, is blamed. But also some say there were no plural periods.

The walls of Ruffignac contain two groups of mammoths marching towards each other. They exhibit a fine sense of order, a disciplined composition. Elsewhere a parade of mammoths is overdrawn by serpentine lines. At Ruffignac, all corridors are very soft and wet, both floors and walls. One senses big water nearby. If in historic times, as reported, a flood covered the first kilometer of the cave up to the ceiling, a larger earlier flood would have swamped the whole tunnel complex and wiped out all artwork.

I make note that an anthropologist from the University of Massachusetts speaks doubtfully of an arrangement of a circle of crystals and a triangular display of the skulls of a deer, bison and horse uncovered at Nice. He says that this same site contained post-holes to support shacks, which postholes remained unchanged over 100,000 years except for small movements here and there. I questioned the time, saying that it was impossible for such a composition to remain unchanged for longer than a few hundred years. A physical anthropologist from Cornell asserted that people made the same kind of tools for 100,000 years or more, citing the Acheulian. I disputed this as well; he agreed with me on the first, which concerned Pont d'Ambon, though not the second. The psycho-sociology of invention would lead me to doubt that the strongest conservatism can prevent technical adaptations to the forces of the environment. Technology may often change faster than prayers.

The trip continues and I jot down another note:

> The Pont d'Ambon site can be critical. A stream runs parallel to the bluffs, quietly, slowly, 100 yards away. No allowance here or in numerous other gisements for violent inundations from time to time. Yet, considering that the period is said to occur here from 12,300 to 9300 = 2800 years, more or less, river floods must have occurred 50 to 100 times, enough to wash out the place. (Heavy climatic changes were said to be occurring.)

> The best defense is that originally the stream was deep and not until the whole shelf was filled up and abandoned in 9640 B.P. did any flooding of significance occur. We discussed this question, some saying that the river started as a "V", but then it would have been caused by a catastrophic flash-flood to begin with, which in any event would slowly fill with sediments and broaden. But it is narrow. On the objection I thought they might raise, that the stream might have been farther away, the land rises on the other side gently. Further the men of the shelter would wand to be close to the water, so the stream would not change that much. Further, if a stream did change its course, it would do so in the course of catastrophe that would have inundated the living or occupation site. One said that this area might have been spared glacial flashfloods or heavy drainage, but I doubt this and, furthermore, heat and humidity, by pollen tests, indicate watery climate part of the time.

In sum, there are grounds for believing that the neat-appearing stratigraphic profile at Pont d'Ambon may testify to a rapid succession of a few seasons with stages of Magdalenian and Azilian occurring with different occupants carrying the "latest" stone chippings. The "climates" vary remarkably but may be erratic seasons; the flora and fauna change, but so they will change even now from year to year. The correlations among all four - technique, climate, flora and fauna are quite poor. There is a considerable mixing of artifacts as well. The dates are based upon five radiocarbon tests done on unscorched deer bone.

Over a thousand years (half the whole time) seems to have slipped away between the earliest two strata of the Azilian levels: erosion? abandonment? never existed? The absolute dates are probably far too old, to my way of thinking, which views radiocarbon as having little knowable association with the passage of time before 3000 years ago. With due caution for what may happen in the laboratory, the relative dates may be significant, but there is one contradiction in dates among the five possible ones, and the Azilian and Magdalenian periods are so close as to overlap when allowance is made for error (i.e. 12130±160 and 12340±220).

The lack of profuse material deposits of the Upper Paleolithic would be explained by the hunting-gathering complex, which seems to permit only a few inhabitants and these usually on the

move. Still, where are the permanent settlements of the age? We cannot believe that the cave-users were dwellers therein; else they would be very neat housekeepers (and, in fact, what material exists is strewn about in disorder). How deep is 1000 years of an average Near Eastern tell? How deep is the typical thousand years of paleolithic occupancy? No answers are given to these answerable queries.

Despite arduous labors of classification, the cultural divisions of the Upper Paleolithic are not absolute, and may not hold out much longer, especially as the geographical areas studied expand toward Asia and Africa. The Solutrean may be contemporaneous with Magdalenian, with, it has been suggested, the tools developed by horse-hunters especially. Some tools (including Levallois bifaces) that are classified as Mousterian (Neanderthal) penetrate the kits of Upper Magdalenians.

I resort to my journal:

> The typical stratification of an excavated abri, cave, or open site permits various wash-outs and wash-ins of material, and gaps of flooding, of quick "decade" or "century" pollen and faunal changes. The reason why this short-term stratification is ignored or neglected is that C14 dates of charcoal and bones generally produce "acceptable" dates from 9000 B.P. to 18,000 B.P. for these strata. From the earliest level, say 15,000 to latest, say 10,000, there are 5000 years of time to account for in the strata and hence they are regarded as long-term deposits, rather than short-term ones.
>
> Many of the papers and discussions of the IXth Congress centered upon the climates and ecologies of the various hominids and men. Talk of 'warming' and 'cooling', of interstadials, of Wurm I and II, of moist and dry, consumed much of the week's work and hundreds of papers. Then came 'shards,' and them came dates, which are intended to bring order to the discoveries but, like climatic schedules, are a source of confusion in themselves.

The chronologists and the stone-flake classifiers are preponderant elements of a profession that has few findings with which to work, and a deep suspicion of theory. Prehistorians prefer to study coprolites rather than human thought. They are like pollsters who, by getting rid of anomalous, misunderstood, or complex responses, present the public as speaking in "baby

talk." When it comes to fields of megaliths weighing tons, they go so far, under great pressure from a few cranks, as to believe that early man wanted to find the solstices and equinoxes and plot the Moon's course, but hardly attend to the question of motives underlying the movement of great stones. But the megaliths of Stonehenge and Brittany are a better measure of the fearful memories and expectations of their builders than of their astronomical skills.

The excursion ended at the Congress of Nice, subject of my last note.

September 13, 1976

> French domination of the field of prehistory is especially evident in the grand trappings of the IXth Congress whose name is emblazoned in giant letters upon thousands of posters around Nice as if it were a World's Fair or at least the Cannes Film Festival.
>
> The field was taken up by the French a hundred years ago when the rest of the world ignored pre-history, thought it was amusing (as with the American Indians) but not a great discipline, or was deficient in all field research areas of historical science (as e.g. Thailand, India) and relied upon legends.
>
> But the concentration of leadership means the concentration of concepts and their imperialism in many places where they are perhaps inapplicable. Written during a thoroughly boring grand reunion in the Hall of the Parc d'Expositions. 1/5 of the 3000 people is listening, the rest gaze here and there, listen absentmindedly, think of other matters, talk to their neighbors or as I, read and write. There are 21 on the high, semi-circular rostrum. 2 hours are given over to it. I was able to be only 30 minutes late.
>
> The Program is intimidating. Hundreds of papers are listed, among them mine. Yet calculate the time per paper permitted, and it comes to 3 minutes each. Obviously some will not have come to Nice, others will scarcely cover the sub-titles of their talk, some will cling fiercely to the rostrum, some will summarize for others. The usual main function of coming to meet one's kind is rather poorly provided for because the residences are widely separated and as yet I've not seen the central "hall of encounters" that should be the central focus of all such conventions. [Later I

concluded that the vast list of papers was an effective method of helping hundreds of scholars to get a vacation from their repressive governments, to boost their local reputations, and to qualify for travel funds and foreign exchange.]

The Congress ended, I posted a score of volumes of preliminary reports to America, I met Dr. Elizabeth Ralph, Director of the Radiocarbon Dating Laboratory of the University of Pennsylvania Museum of Natural History, and we went home together.

Princeton, September 18, 1976

Elizabeth Ralph told me among many things, that:

a. She thought Velikovsky was difficult and wrong.

b. That the Ramses C14 dates of 13th century from at least 3 types of material disproved him and that there were 19th dynasty 7th century readings.

c. That she almost lost her job in the fracas over doing some tests for Velikovsky (those were the ones that FOSMOS of which I was President authorized circa 1970 but Bruce Mainwaring carried on all the negotiations and asked all the nasty questions in his sweet way.) I doubt this but she was scared by her boss Rainey, I suppose, as well as the unusual excitement over the matter of testing Velikovsky's stuff. She is a tough, durable woman, masculine, straight-talking. Like just about everyone in the controversy vs. Velikovsky, she is not as fully informed as she thinks nor understands all the branches of logic involved.

d. I raised question after question with her during the 12 hours we were altogether on the ground and aloft, eating, drinking (she drank a lot) smoking (ditto) and talking. I wasn't arguing, which is useless, but finding out what this remarkable woman knew about many questions that bothered me. Most, of course, she couldn't answer. It was important, I think, that she liked my rough sketch on an Air France route map of the outlines of a Hudson Bay Crater (Chubb Islands as the center), a second circle of lakes and water all around the center of Chubb Islands, including the Great Lakes and Great Slave Lake, etc. She had no objections either to my theory of all-around mid-second millennium destruction.

e. She said, in answer to my question about magnetometers, which she has employed in Greece and elsewhere, that they aren't too useful and are useless where ash and pumice are measured. There must be metal in the rock to take a direction after the melt, so she wasn't able to do much on Thera with Marinatos.

f. She said that for political reasons, that is, the insistence of Marinatos, they've held off their latest Thera measure for years, because it was 1650 ± while he was convinced of its being 1450 ± . I know the Thera dating is in confusion, quite apart from this incident.

g. Yet Elizabeth said in answer to my careful questioning that all their dates were published, for better or worse, even if they did not turn out well for the investigators. (I cannot believe this, as see above [with Marinatos].) She takes several runs on every date and if they aren't close to their average, she throws them away and starts over again. "Throws them away" bothers me, although at the moment I cannot stop to pursue the effects of the logic of throwing things away.

h. She says all labs do the same, publish all in the carbondating mag, including British Museum, of which we have contrary evidence (Mainwaring's report).

i. I asked her whether she knew of the old article by Folghereiter that showed Etruscan vases with South-North clay-iron filings orientations instead of North-South, which would be expected if baked in the Northern Hemisphere. This is a sharp proof of magnetic reversal of the Earth for some period of time in the 8th and 7th centuries B.C., and was uncovered and advanced as such by Velikovsky.

Elizabeth says yes, but unfortunately kilns are stuffed with vases so as to bake more ceramics and conserve heat. Therefore, a vase might have been baked on its head.

Yesterday I had a two-hour visit with Velikovsky in the course of which I asked his opinion of the matter. He replied that the direction of the vase in baking can be told by the glazing which drips a little in the time before it hardens. Very well. But did the glazing occur in a simultaneous baking with the clay or might the ceramic body have been backed earlier and then heated a second time for glazing perhaps at a lower temperature. This is a neat and important little problem. If one absolute case may be proven of a vase

that was baked upright and acquired an opposite orientation magnetically, then we have an important proof of 8th-7th century troubles. For, as I explained to Ralph, the magnetic reversal, important in itself, would also be an effect of causes with huge other effects.

With luck, this study might take a week.

1) Restudy the articles of Fohlgereiter and Mercanton (see citation in Velikovsky's work).

2) Read Monley's *Science News* (Penguin, 12, 1948 or 9) report on magnetism on vases.

3) Consult experts unless one or more of these are perfectly precise in handling the glaze-sequence problem.

4) Conclude:

a) Further experiments on vases needed, or
b1) All OK for Velikovsky
b2) Problems in glazing, or
b3) Problems in position, or
b4) New problems

Then conclusions: How long does it take for the magnetic field to reverse itself, and were vases dated accurately, and when did it reverse itself to the present?

Incidentally, if this test were performed with a large number of vases from the Neolithic to present, a sample of each culture should have a modal group that is logically positioned to show the N-S axis, and this axis would be presumed to change when the modal axis changed. This might be one way of resolving the Etruscan vase mystery. (Velikovsky said Mercanton, who praised Folghereiter, was Director of the Meteorological Observatory at the University of Lausanne.)

It appears in retrospect now that my excursion to the Caves of Aquitaine was a failure, yet the experiencing of it and its sequel were successes, if doubts of my own mind and the minds of others are thrown into the balance. Almost nothing of importance can be said of the Paleolithic that will stand up as fact, and almost nothing that I can add as constructive counter-fact can be proven, either. Conventional and quantavolutionary scholars dispute in a darkness like that of the caves. But we

caught for a while the exciting sense, around us, of another, an ancient contest, between vast, marvelously ornate natural sculpting and determined, hard-lined drawing by tight, defiant human minds.

CHAPTER THIRTEEN

THE LATECOMING OLDUVAI GORGE

In September 1976, I happened to meet Ofer Bar-Yosef, Ernst Wrestler, and other archeao-anthropologists from Israel on an excursion through the caves of Southwest Aquitaine. There I learned of the work that had been done at Ubeidiya, a location two and a half hours' drive from Jerusalem. Stekelis, who died in 1967, had brought in Louis Leakey to examine the site, and they got the idea that the Olduvai and Ubeidiya remains were closely related. Yet the latter were placed well under a million years while the former was considered a million years older. For sixteen seasons the Israelis had been on the site, but work had been suspended now for two years.

I was impressed; then and now; with the probability that the East African Rift, including Olduvai Gorge, was connected in time with the Dead Sea-Syrian Rift via the Red Sea. Therefore cultural contemporaneity, I ventured to say, had also to be watched for along the whole length of the Rift. My further speculations about the extreme recency of human beginnings along the Rift were mentioned diffidently and heard with some amusement.

In 1983 the Ubeidiya scholars emerged in *Nature* magazine with a reevaluation of their hominid remains; they redated them to coincide in time with some of the oldest of the African Rift hominids. Having gone this far, I expect that one day they will go farther and will have to claim that all along the Rift, the hominid sites, "oldest" in the world, must be brought up to the Holocene, perhaps only 14,000 years ago. Earlier in the same year, I had been considering the radiometric datings along the Rift and wrote in my journal of my doubts:

March 10, 1976;

Bones of humans are destroyed by weathering, animals, and disasters - fire, flood, hurricane. Bones are preserved by burial in dry tombs or sand, and by dry ash or tuff at low heat.

? All Rift burials and findings are from fall-out or quick wash flood and dry-out (i.e. volcanism or flood.)

Dating by K/A [Potassium 40-Argon 40] in Rift questionable *in re:*

1. Erraticism of some of dates.

2. Choice of small grains with more argon because more surface ratio to volume and therefore older dates since argon from air contaminates surfaces.

3. But younger dates may come from escape of argon at near melt temperatures following flow or fallout.

4. Questionable behavior of potassium.

5. Averaging may be used questionably.

6. Fudging and rejection unjustifiably of “impossible” dates; “reasonable” choice is unreasonable.

7. Superposition over short term can be achieved by an atmospheric condition of initial high argon content which is absorbed by first-laid rocks and then as successive rock layers are laid down (or sediments) the argon in the atmosphere is escaping and therefore less and less proportionally absorbed, giving upon test a gradient of pseudoage from bottom to top in seeming accord with super-positioning.

8. ?? Were accepted test results all reported and all blind, all from same size specimens and sampled by same procedures?

9. Regardless of age gradient of tests, tests give old readings. Since 0 argon is found on new deposits and some argon on 3000 and 36000 year old (???) deposits, how can it be said that the argon test is inapplicable to under 1,000,000 y? Such tests should be highly erratic.

> 10. Is K/A a test of the amount of argon in atmosphere at time of deposit?
>
> 11. Couldn't argon 40 be exuded from K 40 by earthquake and intruded into volcanic lavas and kept there as these cooled, giving them long ages? Yes.

If "trace elements" rise to the top of the Earth's crust, and if "daughter" concentrations follow suit; if "trace elements" are essential to methods of measuring rock ages; if rocks are igneous; if igneous flow (fissure or cone) proceeds by erupting lavas from the top rock melt layer, then the next to the top layer of melt, et seq., - then, radiodating will show old dates at bottom of the column, and younger dates as measurements move up.

This is as expected and found. *But* the layering could occur in a *very short time* set of eruptions and evidence a series of old ages in some kind of proportions because the daughter traces will be most abundant in the lowest samples and decline progressively as the samples are taken from lower in the plasma melt.

Addressing himself to that part of the African-Red Sea Rift which stands on the continent, R.B. McConnell argued a 2.7 billion year age for its beginnings and limits severely the changes of recent times [1], compares it with the Rhine Graben and Baikal depression. I have linked all three with the simultaneous world rifting or fracturing of only a dozen millennium ago.

With such old dates, McConnell has to confront a general opinion nowadays that the rift system of the oceans (and, by inference and otherwise, land) is no older than 200 million years. Moreover, the great rifts of the world, oceanic and terrestrial, seem to have been in motion as part of a world system. Spreading in widely separated regions show similarities, including correspondences even when discontinuities are compared [2].

Gregory, an early explorer of the African Rift Valley, dated the vast diatomite deposits of the lakes to the Miocene Period. But Louis Leakey found hand axes embedded in the lake deposits and therefore called them Pleistocene [3].

Olduvai Gorge appears young to the geologist's eye. All of East Africa seems so, too. The Victoria Falls and Zambezi Gorge seem very young. Suppose the Falls to be of the same age as Niagara Falls; this would place a spectacular bit of Africa within reach of 3500 years of age. A quantavolutionary view of geology tends to bring more and more features more and more together; the Earth's surface tends to be hologenetic and is seen in holistic perspective. Olduvai Gorge could have been created during the Bronze Age of Egypt.

Willis speaks of a geologist's (Combe's) knowledge allowing him to tell that pebbles of tin ore found in the Kafu River came from "downstream" instead of upstream, because the course of the river had been reversed as a result of the great rifting.

Since the pebbles could not be of ancient origin, the story bespeaks the recency of the change and of the Rift.

Flint, in his *Glacial Geology* (p. 523), refers to the Rift as late Pleistocene. S. Cole discusses some of the material in a manner to support skepticism: the near total confusion of climatic periods (52 and chap. 2); the unreliable use of advances and retreats of lake sands to date Rhodesian cultures (53); the great tectonic changes of the Pleistocene; the fact that neither neolithic nor bronze ages have been found in Africa; the astonishing slowness of culture change (million years of the same hand-stone); the great destruction of mammals notable in Olduvai beds I and II, then separated by "a million years."

She says (113-4) that Olduvai Gorge "assumed its present form, with narrow floor and steep sides, in Post-Pleistocene times, when erosion cut right down into the Pleistocene deposits, thereby exposing the great series of sediments seen today." Erosion, however, does not "cut right down;" Olduvai Gorge split open quickly, hence the "narrow floor and steep sides."

Cole, like L. Leakey and others, have a way of speaking of "people cultures," "industry sites," "living floors," and "living sites" for the hominids, making one wonder whether they had tile floors and awnings. A uniformitarian image is thus purveyed, and one is led to think in terms of extremely gradual sedimentation as creating the scene. Yet the australopithecine

(1959) Zinjanthropus' skull "had been broken by expansion and contraction of the bentonitic [i.e. volcanic] clay in which it lay, 22 feet below the top of Bed I, which at this point is about 40 feet thick; but the bones had not been distorted in any away, and even such fragile pieces as the nasals were recovered." (117-8) And she remarks that three or more relatives were found on Floor I and 4 meters away with "a worked bone tool." She surmises that the hominids lived upon the tortoise and catfish of the shallow waters at hand (120-1).

Legbones were found standing upright; this seems impossible, given the undisturbed condition of the clay encasement, unless the long period of "sedimentation" were in fact the ash fall of a single day. "Coarse vertical rootmarkings are common in many of the tuffs..." (III, p. 11). About one-fifth of the strata contain them. They also carry through beds of sediment, evidencing other instants of high production to create the geological column above the earliest hominids. Elsewhere, in *Homo Schizo I.*, I have spoken of the human traits of australopithecus. A perplexed discussion has long centered upon the "people culture" of Leakey's first-found hominids, and much effort has gone into depriving him of his human qualities, to no avail; Australopithecus Bosei was probably the maker of Olduvai implements, of a "two-million year old" circular stone barrier of the lowest level of Bed I [4], a selective cracker of animal bones, with a "frequency of implemental patterns of behavior"[5].

Bed II rest conformably upon the older Bed I. Yet "a million years" has passed. Conformity suggests continuity and absence of a gap in time, and an absence of natural catastrophe. But both are evident. The fossil assemblages connote disaster. Groups of mammals and primates or people do not congregate voluntarily to await death. An elephant skeleton without a skull was found. The method and motive for separating the two are found in natural forces. The hominid finds are not nicely segregated by time gaps (see v. III, 229, 234).

Strange to say, a toe bone, possibly human and modern, was found in Upper Bed I (Tuff If), belonging to an "upright, bipedal, hominid possessing a plantigrade propulsive gait." (p. 230). Many years later, modern footprints of a three person-group were found at Laetoli by Mrs. Leakey. These go towards

establishing the humanness of australopithecus, or else a most embarrassing confusion of time has occurred, and australopithecus consorted with humans; the latter is possible, if all artifacts were made by beings other than australopithecus.

Dr. B. Willis published in the 1930's two books which treated of the African Rift system. He remarks, as is well-known, upon the foundation rocks exposed throughout East Africa, where they are intruded or covered by volcanic products. Sediment are lacking or thin. He asks, where does the great melting below the surface that lifted the continent come from [6]? To my way of thinking, the melting came from the immense catastrophic push of the Atlantic Ocean cleavage that moved the African crust eastwards and from an accompanying expansion of the Earth. The plateaus rose. Then the great arch cracked and dropped, forming the Rift valley. Inasmuch as the Atlantic cleavage veered East and shot up a northern branch, and this fracture cut off Madagascar and India from the African continent, the Eastern rim of the new African format could accelerate into the widening basin, and hence an auxiliary fracture, not so deep, the Rift Valley, opened; in effect, it dropped between the steep plateau walls. Volcanic products are everywhere and in all forms, ash, lava, tephra; Olduvai gorge was cut through many strata of volcanic emissions.

Willis writes of meeting Louis Leakey, then of merely local fame, and J. D. Solomon, a colleague, at Lake Elmenteita in 1919. "They even think he [man] may have witnessed the later developments of the rifting to which the valley owes its character. If so, we shall have to change the time scale, either by hurrying geologic processes or by greatly prolonging the stone age of man's evolution" [7]. The latter course has been taken [8].

Yet since Olduvai Gorge fractured open after hominids and hominoids were already on the land and long buried in the area, the catastrophic event must have been witnessed by humans. Considering the topography, the Gorge is directly connected to the Rift; it is 370 feet deep; about 40 strata are identifiable in some 300 feet of depth, averaging thus about 7 feet per stratum. The fossils are found embedded in the cliffs on both sides of the gorge; the fossil beds are sandwiched between lava flows on

both sides; the oldest fossil bed is termed Bed I, the youngest Bed IV.

Alternative possibilities are weak: if the Gorge came first, then hominids of successive ages dug themselves into the cliffs, taking care not to disturb the lower strata as they climbed up to dig into their proper superposition. Or the Gorge may have been a small stream valley, was settled by hominid I, then lava poured over one lip, filled the valley, and covered the opposite rim, while on other occasions, volcanic fall-out layered over the whole, and in both cases the stream washed away the valley deposits; hominid II came in while the stream was cutting away the valley deposits, but then the whole process repeated itself four times until today.

A third possibility is that the area was heavily settled. Then volcanic eruptions brought in ash and lava and caused evacuation of the biosphere, except for rare trapped remains. New settlements occurred, and then by the same means, Bed II occurred and was covered; and so on. Then came the rifting and gradual erosion and exposure. Gradualism contradicts evidence brought out here. And what kind of volcanic system is it, which covers the region but conveniently lays down a blanket every quarter of a million years and is resting in between-times?

By far the most plausible explanation for Olduvai Gorge and its contents is successive, heavy rainfall, floods, lava streams, and ash falls, occurring over a period of a few centuries. Human types moved in and out, chancing sudden destruction and quick burial here as anywhere else. Finally the risen plateau ruptured, Olduvai being a local incident in a global frame. The climate turned dry, the volcanoes became more peaceful, soda springs hissed harmlessly and began to expire, the surviving mammal population gathered near the remaining sources of water, as did the surviving and incoming humans.

To sum up, I would make several points. General quantavolutionary evidence of recent global transformations supports a short-time or microchronic view of Olduvai Gorge and its biosphere outcroppings. Potassium-argon datings support the conventional macrochronism but they are discordant and may be basically flawed. Numerous geological and paleontological

indications support microchronism. The recent claim of equal age for rift remains in Israel adds support, although both these and Olduvai remains should be moved up, not back, in time. The Rift, hence the Gorge, split open late enough for human legends to carry down a report of the events.

Notes (Chapter 13: The Latecoming Olduvai Gorge)

1. The reference here may be to a passage from Curtis and Everden, in Louis Leakey, p.91: "...the few volcanic sanidines of historic age dated by us have yielded ages inconsistent with the concept of zero argon content at the time of eruption. Both the 1912 eruption of Katmai and the 1304 eruption of Ischia yielded zero potassium/argon ages. Also dates of late or post-Pleistocene event have given reasonable ages. A late Gamblian tuff from Lake Naivasha in Kenya gave 28,000 years and a prehistoric post-glacial pumiceous rhyolite done near Mono Lake, California, gave 5600 years..." However, two paragraphs later, they report a possible 11,000 year feldspar (sanidine) gave them datings of several hundred thousand years.

2. 83 *Geol. Soc. Amer. Bull* (Sept. 1972), 2549, at 2565.

3. Heirtzler, Dixon, Herron, Pitmann and Le Pichon, "Marine Magnetic Anomalies, Geomagnetic Field Reversals and Motions of the Ocean Floor and Continents," 73 *J. Geophysical Res.* (1968), 2119-36.

4. Sonia Cole, *The Prehistory of E. Africa* (London: Weidenfeld and Nicolson, 1964).

5. L. Leakey naively compares his "fort" to those erected by the Okombambi tribe today (vol. III, p. 24), a two-million year old tradition!

6. P. V. Tobias, *Olduvai Gorge*, vol. 2 (Cambridge U. Press, 1967).

7. *Living Africa*, 289. And see his *East African Plateaus and Rift Valleys* (Washington, D. C.: Carnegie Institution, 1936), publ. n 470.

8. *Ibid.*, 270.

9. It is instructive to compare the processes of science that moved toward the acceptance of Olduvai hominids of great age and the rejection of Calaveras man in California, as reported in W. H. Holmes, "Review of the Evidence Relating to Auriferous

Gravel Man in California," *Annual Report of the Smithsonian Institution,* 1898-9, 419-71.

CHAPTER FOURTEEN

ATHENS QUAKES*

*(*Part of article appeared in The Athenian Magazine, April 1981.)*

They left without paying their bills, but that is not why the waiters hurried after them. At 22:53 hours of this evening of February 23, 1981 a strange deep bassoon called the patrons of Philippo's Taverna to attention, and seconds later they found themselves altogether swaying like a ballet, their faces turned on in the unique poseidonian awe of earthquake recognition, and some were jostling at the door even before the lights went out. Once outside, there were those who hurried to their children, those who walked the middle of the streets towards home, and those who stood about in the little open plateia exclaiming at the marvel of Athens' first earthquake. Several sheets of lightning played over the scene. A car drove agitatedly by the human clots on the street, bewildered, one driver shouting: "Has there been a coup?" The failed Spanish coup had been the topic of the day. Shortly another tremor vigorously nudged the city, but it was the last until hours later and, by then, many Athenians had left town in their cars. Others cowered in their autos during the night; the plateia were crowded; so too the seashore; but most people lay nervously in their own beds, hoping for surcease.

The tremors were counted in hundreds over the next several days. Only the most sensitive people - and animals - could detect them. One woman - no doubt there were others - exhibited a surprising ability to feel trembling that no one else could sense. (It would be useful to investigate scientifically this acute sensitivity.) The next day, one could park anywhere and the ordinarily crowded center of Athens was empty of workers, a sort of class B movie setting of a city struck by plague.

The Athenians who took flight behaved like true Spartans. These doughty ancient warriors, who flinched at no army whatever, would invariably be sent flying home at the rumble of an earthquake. It amounted to a psychological complex. The Hebrews, for instance, had the reverse complex. They might actually time their assaults with shaking of their enemies as witness the battle of Jericho where Joshua's men paraded around the town until the walls came tumbling down and they might rush through the breaches.

Ancient precedents were not the verbal currency of these several days, however. One heard only that "Athens has never had an earthquake." Well, almost never, and never in this generation. No matter that, in the times of its founding, Poseidon, god of the sea and of earthquakes, wanted to take over Attica, and you know what that means. Pallas Athene had other ideas, and Zeus lent her a helping hand, so Athens survived.

But Plato's Criton tells us that Solon was told by the Egyptian priests that, once upon a time, his Athenian ancestors lost an army that was struggling for the control of Atlantis when that fair land sank in furious trembling beneath the waves. This was fixed at 9000 years before, but possibly the years had been shorter in an earlier age - since a cosmic disaster, a comet or meteoroid, can both cause catastrophic earthquakes and slow down the movements of even a planet.

More and more, the archaeological evidence would indicate that earthquakes were anciently more terrible, not only in Greece but in Thrace and Anatolia and all over the world in fact. As Helen Churchill Semple's book on ancient geography argues: "If earthquakes would break the nerve and nullify the life-long training of Spartan troops, there must have been abundant reason."

Ambrayses was able to trace 3000 earthquakes of the Eastern Mediterranean since Christ's day, and perceives little change in frequency or intensity. So it appears that there were in the founding of Greek civilization great seismic eras, but that the seismism has petered out over the ages. Rome, to take another example, which presently is as "free" from earthquakes as

Athens, had a couple of hundred in one year according to the encyclopaedist Pliny.

Plato also tells us that the fresh water springs that once flowed on the acropolis were blocked forever by an earthquake. Pliny and Plato lacked a Mercalli or a Richter scale, so it is hard to say how strong the early quakes really were. The Mercalli scale is the common man and the politician's scale. It provides as scale markers the sensory perception that accompany the different degrees of trembling.

The Richter scale was all that we heard about. It registered 6.6 and 6.3 at the epicenter below the northeast waters of the Gulf and Corinth, and a lot of other jiggles that duly engraved themselves upon the turning paper drums of the seismic instruments in Greece and around the world. What does 6.6 means? It means that Southern Italy's extra point months before was not just worse; it was many times worse - as if you moved not from 99F to 100F fever but from 104 to 105, whereupon your mind and body begin to fall to pieces.

Registers of intensity around 6.5 means that many structures will be destroyed at the surface below which the rocks are slipping and sliding, and less damage will occur as one moves out along the same rocks and the rocks with which they are connected by origin or proximity. Those nice circles that are drawn around epicenters do not means much; the area of spread should have been a splotch of many measurements at specific locations. Nor was the graph with its kind of fever chart useful to people; but to feed the public craving for "hard data" the newspapers publish these.

Perhaps Athens may be protected by its peculiar schist, a rock that has millions of cracks, all in fact tiny fractures that have their own slip and slide patterns. So that Athenians are provided with a kind of cushion that sends shocks flying in every disorderly direction and has space to take up shock as well. If the city were glued to the bedrock that was the prime mover, it would have suffered more extensive damage. As for the origins of this Athens schist itself, I think that it must represent an age when the ground below was in a continuous grinding torment of electrical and mechanical churning at high temperatures.

Earthquakes are frequently a time to placate gods, go to war, and change governments. For a while we shall see not only a brisk commerce in plastering and selling bric-a-brac, but also a certain heightened religious enthusiasm. Something of this religious feeling must be behind the notion bandied about that the Mother Earth of Attica was rejecting the body of onetime Queen Frederika from burial in its soil (an event which had taken place only days earlier), an idea actually foreshadowed by one newspaper, although unaware of the imminence of the earthquake. Such absurd ideas can spread easily; an unscrupulous party might readily persuade an unsophisticated third of the Athenians of its relatedness.

The quake was a tragic but local event; none will be swooping down upon hapless Greece like the sons of Herakles during the huge earthquakes that ended the Mycenean culture. War is not in the offing.

Blaming the government is another matter. The communists have already declared that the government was forewarned of the quake to the very day by the seismic station at Uppsala, which was “99%” sure, according to certain dispatches. We can doubt that this “information” was provided or providable. That an earthquake or a set of them will soon occur is hardly a useful prediction, but is more likely the prediction that was provided. These paranoid rumors of “what others knew and we didn’t know” were produced largely out of the inferiority complex many Greeks have about foreign expertness and at the same time fed upon the complex. (The American military’s radio station, by the way, was almost totally useless for information and advice despite the urgent need felt by tens of thousands of English-speaking persons in the area.)

True, too, a science of earthquake predictions is slowly developing. Successful prediction within a day or two can occur, as in Mexico recently, this by an American scientist practicing for the momentous earthquakes building up along the San Andreas fault in California, where the San Francisco Bay area is at stake. But for every one such, there are numerous incorrect expert predictions. We can also be sure that, like election prediction by sample surveys, the predictions will not be able to

go beyond 90% in accuracy as to the general time and place, and less and less accuracy as the moment of the quake arrives, until, of course, the dogs begin to bark and the birds take flight.

What can the government do? In one way, the state is more secure if earthquakes cannot be predicted. It is not a matter of incompetence alone. Imagine a 90% sure prediction for the long-range and the short-range of a 7-intensity quake in the Athens area, something now quite unattainable. Regarding the long-range, would you build a permanent vacant tent-city for three million people? And if so, where? And provide it unceasingly with its blankets, cots, freshwater, canned rations, toilets and medical supplies? Or would you rebuild Athens to withstand a 7-intensity tremor? Or would you design a new city to replace a ruined Athens, perhaps the only solution for many of Athens' urban problems, allowing, say, that three million people will live in tents or go home to No-where until it is finished?

And it is well to bear in mind that none knows how intense earthquakes can be; the measuring and reporting systems are less than a century old. I can hear the voices now: "I told you we should have built against a number 8, not 7, quake." And they would flaunt a study in *Science* magazine. (Or, "we should evacuate at the prediction of 6, not 7.")

In the short run, the curse of predictability is no less. Suppose you could march the population out of Athens in an orderly fashion upon receipt of an expert opinion that tomorrow or the day after all hell will break loose. Will the people resist? What essential services will be risked to remain in the city -- police, fire, water, light, bulldozers, building maintenance engineers, army units? Who will evict those who remained in the city from their quarters in the houses of others who are returning? Who will compensate businesses that must close down, some suffering damage, others very little?

Then what if the earthquake does not happen? Who wants to decide at what point to order everyone to return? Something like that occurred in Guadeloupe, in the French West Indies, a few years ago: a volcano was about to explode, said various experts, and half the people were sent to safe locations upon order of the prefect. The volcano did not oblige and ever since then the

French have been arguing over the decisions and the restitution of losses in agriculture, business, and tourism. Too, should people be forced to leave, even if they swear to take all responsibility upon themselves? Can children be left to abide by parental decisions; can the injured then be left to scream from beneath the debris?

No doubt, steps can be taken to minimize damage and deaths: public education should go hand in hand with predictibility. A code of disaster behavior should be enacted and taught to the whole people.

European and American media were talking about the Attic quake right away. In France, where demonstrations had been held against building a nuclear power plant very near a major Alsatian earthquake fault, the media, which are controlled by the government, restrain their own coverage, especially in emergencies. In peaceful periods, it is best not to build up fears that can turn quickly into panic. But, in the crisis itself, prompt and full information and advice should be the policy. Much can be on ready-to-play tapes to begin with, approved, say, by a parliamentary commission engineers, political scientists, social psychologists, and seismic scientist. The same commission could be convened immediately upon the emergency to oversee the diffusion of instructions; if the commission holds public confidence, it can lessen the dangers of panic and of senseless orders.

The problems are so grave, in sum, that only deliberately partial procedures can be followed before, during, and after an earthquake crisis. Poseidon is tricky, cruel, implacable, surprising and infinitely destructive; human foresight and reactions can adapt to him but not prevail over him. He is no respecter of persons, no more than Yahweh. The Pharaoh’s son and the slave’s as well were struck down in the Passover before Exodus. The clients of the Hilton Hotel and Neofaleron cheap rooms sway in the same ballet.

Someday it may be possible to explode or grease the faulting rocks threatening the earth. Meanwhile, one might take comfort in the thought that the risk of being harmed by nuclear missiles is

thousands of times greater than from an earthquake. And what is being done bout that?

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