PART FIVE

RIFTS, RAFTS AND BASINS

The globe is girdled by lines of fracture, and from these lines stretch perpendicularly hundreds of transverse fractures. The pattern of rifts and cleavages shows that they created basins (as in the Arctic and Atlantic) and exuded material to fill the Pacific Basin which was dug out by exoterrestrial force and assembled or dispersed in space. All of this happened fast. Continental drift is true, but not true enough.

Further, the major mechanism of drift - convection and subduction - is impossible. The major mechanism of sedimentation: uniform and gradual accretion by erosion and wind or water carriage - is likewise impossible. Quantavolution readily supplies alternate short-term mechanisms that are adequate to the facts and that also educe new facts.

CHAPTER TWENTY

THRUSTING AND OROGENY

When nineteenth century geologists departed from their original simplistic uniformitarianism, they found it useful to identify in Earth history several points of great diastrophism ("turnabouts" in Greek) or revolution. Whence came the Laurentian, Algonkian, Killarney, Appalachian, Laramide and Cascadian Revolutions, each marked by profound unconformities in the rocks. Naturally a quantavolutionist will wonder why these never evolved into a new catastrophist geology. First, there was the obstacle of ideology, which a social psychologist can appreciate more than a natural scientist: the social atmosphere of the times, the breakaway from religion, the need of biology to pursue prolonged development periods, and the empirical fascination of studying the processes going on before one's very eyes - these acted to subdue diastrophism and revolutionism.

Long periods of slow changes were supplied until the revolutions themselves appeared as continual skirmishes of the elemental forces. The search for internal forces capable of sculpting the Earth's surface went so far as to conceive of the massive core of the Earth wobbling within the globe so as to push out or pull back crustal features. Some have thought of shrinkage, so that as the Earth aged it wrinkled (apparently not willing to move out upon the seabeds). Nowadays radioactive decay, rising from the rock deeps and engendering heat, has been called upon to push the continents slowly about. And this is said to crumple the colliding edges of continents into mountains and to stretch and reform the landscape.

A second reason why catastrophist geology could not evolve is also related to the ideological: geologists have refused to look into the skies for the forces needed to accomplish the revolutions that they perceived; without a mechanism, they were left with mere names - and questions, such as ones asked by K. Krauskopf [1]; "What are the irresistible forces which can twist and break the strongest rocks?" "Where do the forces originate which can raise and lower continental masses vertically? ...Why have not forces in the crust long since reached an equilibrium? With questions like these we have long since reached an impasse."

Since we have essayed answers to questions of vertical movements for the sake of this chapter, we may add: "How can kilometer-high sediments be pushed over thousands of kilometers of the surface of the Earth?" Every thrust that has occurred or might happen can be described by the same few variables. The permutations resulting in reality may be numerous but are still intelligible. Price details several thrusts; Cook and Velikovsky describe a number; Burdick, Brock and Engelder have produced case studies.

It should be possible to conceptualize thrusting. Suppose a thrust as any lateral motion of a definite mass. The mass will have an initial velocity and acceleration, a momentum and inertia, a direction. It will have a surface to ride upon, and the interface will have a characteristic viscosity. The mass need not be solitary, even though it is definable; a limestone may be riding on a schist, or rock upon oil or water slurry, and so forth; hence there will be another set of variables for each definable component in a complex thrust.

Melvin Cook and Charles Hapgood employ prior ice caps as a mechanism of sudden diastrophism. Accepting prior calculations and proof of the existence of towering ice caps at the poles in recent times, they weigh the ice and decide that enough mass is available to cause unbearable pressures laterally (Cook) and a lever effect (Hapgood). The ice mass avalanches upon the world, perhaps in conjunction with the fracturing of the globe. The massive thrust of the ice bulldozes the surfaces of all sediments and biosphere in many areas; the fractured Atlantic region of Pangea, now the Americas, moves westward and the bows of the continents rise into high mountains as they plough through the oceanic crust. Hapgood adds a tilt to the Earth, product of the same event, and this permits him to add another string of disasters to that of the precipitating cause. I cannot criticize these works here. In general, to tie together the apparently interconnected Pacific Basin and continental movements I find a need for a more universal force.

Mountain ranges are folded. What is a fold and what is a thrust? There can be no fold without a thrust. Nor is there any major fold that comes from two opposite thrusts at the same time. There must be a source of the push that folds, and sometimes folds in two or three laps. And the push must be along a surface that is the base for itself and the fold. Conceivably an uplift might come from an expanding Earth or an attractive electrogravitational force above the Earth. In the latter case, however, irregular outbursts would occur, and the landscape afterwards would be volcanic or batholithic or like the seamounts of the ocean bottoms. In the former case the surface would crack, swell into circular rises of different sizes, cause gentle slopes, and also erupt in volcanism. There is no need to deny the ordinary idea of a fold as coming from a push.

Enough of the high mountain ranges of the world are poised at the edges of the continents to admit the possibility that they were pushed from behind by the moving continental mass. Their pitch, too, suggests a seaward thrust. If the thrust was initiated by ice blocks, they would ultimately take the form of a scow uplifted at the stern and bow. If in movement because of a forward electrogravitational slide and an upwelling and expanding lava flow from the rear, the bow would be much less pronounced than the stern. If the movement were accompanied by a swelling of the magma below, especially if the expansion were more pressing from the rear magmas, the scow would tend to nose down and come to its ultimate halt with towering mountains and deep roots. If the uplift were general beneath the thrusting mass, the prow and mass as a whole would lift itself, too, and ride more easily on the magma. Like a motorboat that rides higher as its speed increases, the continents would be elevated and move faster once in motion over a swelling magma. Unlike the motorboat, the continental blocks as a whole would not then sink; the supporting rock would be metamorphosized at a new density.

The emptiness of the Pacific Basin stands for an event quite capable of initiating global diastrophism once and for all. This would require the withdrawal from the Earth of a moon-sized body, in fact the Moon, an event that must call upon an enormous electro-gravitational attraction, which must come from a body even larger than the Earth that passed close enough to pull out over half the crust. And this event is described in *Chaos and Creation* and *Solaria Binaria.*

Thereupon all the terrestrial processes that Melvin Cook so well portrays proceed: the remaining crust fractures down to the mantle in an explosive network providing the globe-girdling rift and fault system. Orogeny occurs rapidly as the cut-apart continental blocks scramble for position. Cross-tides of water and wind race around the world. Rock and ice are in motion as great bulldozers, thrusting here and there. The immense number of faults, not only of the global girdles but practically everywhere, establish the infrastructure of the valleys and rivers of the world. The true ocean basins are created for the first time.

Under such circumstances and sequences of events, the vocabulary of science is strained. The most extreme case of thrust would be a force gripping or pushing the crust of the Earth like a shell so that it moves independently of the mantle and core. That such an idea may be rooted to some degree in reality is attested by studies proposing analogous movements in the Sun and Jupiter, and at least one suggestion that the Earth's core rotates out of step with the crust. The contacts of the crust with the plasmas of space and with its atmosphere may set up a continuous drag and eccentricity on the mantle, manifested for example in seismic and volcanic responses to heavy solar storms. Natural history may have witnessed, if not a complete and neat slippage of the crustal shell, some diastrophic approaches thereto.

I do not know where to place the finding of F.A. Vening-Meinesz: as related to lunar eruption, Earth expansion, rifts and fractures, landforms, or to thrusting? He studied the major topographic features of the globe in relation to the Earth's axis of rotation. Their pattern of shocking and shearing evidences a clockwise rotation of the crust in relation to the core of 70º. That is, as the Earth moved east, its landforms struck out south by east [2]. The unified nature of his finding suggests a single giant thrusting episode sequential to the evacuation of the southern hemisphere.

The continents move; this is a form of thrust. Often it is a thrust through water and basalt bottom; then, again, the Indian subcontinent thrusted upon Asia. Sedimentary rock layers are scraped and dumped over the sides of the awesome abysses; here is thrusting. Coal fields are forests bulldozed and deep buried: this is a form of thrust. Mountains are piled upon one another, again a thrusting action. Tides and winds lay down field upon field of debris, of vast extent; are these not thrusts, too? It is fruitless to argue over definitions. As with earthquakes, which are moving earth, and shaking, so with thrusting: beyond a certain intensity, the vocabulary is inadequate to the quantity of cleavage, the quantavolutions. Then, too, earthquakes and thrusting can come to a marriage; in a discussion of even the relatively mild seismism of our times, Frank Lane writes that "where an earthquake is concerned there is no such thing as an unmovable object, even mountains are moved." They are thrusted.

Yet it has been a long time since "the mountains skipped like rams," as the Biblical Psalm goes. Although the records of solarian geology are far from complete, we suspect that such a sight has not been seen in the past two millennia. The occasional spectacular rock avalanches and submarine mud avalanches that are presently recorded are not what the Psalmist had in mind. In an age that experienced earthquakes abundantly, he was celebrating and reporting Yahweh at a peak of power, probably in the centuries that remained vivid to him - the seventh to the fifteenth before Christ - reinforced by the cherished accounts stretching back to the breakdown of the pangean surface.

He was speaking for the hapless ones who watched the Alps rise up from the Tethyan geosyncline to be "shoved northwards distances of the order of 100 miles" where now are located Italy and Switzerland. The famous "nappes" of the Alps are but smaller thrusts laid upon great ones. The alpine massif smothered the long rift that once cut through the "Adriatic Sea" and "Rhine River Valley." Or the American cordillera, thousands of kilometers long, stretching from Alaska to Tierra del Fuego; there mountain uplifts amounting to thousands of meters have occurred, it is agreed by a range of authors from C. Darwin to I. Velikovsky, in absolutely modern times. The Sierra Nevadas of California are a single block, a thousand kilometers long, thrust up westwards. The Himalayas rose steeply in human times. "The highest mountains in the world are also the youngest," wrote

Helm and Gausser [3]. But the Himalayas are also reasonably accredited to the crumpling of the "Indian" subcontinent against Asia with the vast inertial forces initiated in continental rafting. And probably the rising of the Tibetan and African plateaus occurred under lateral and subterranean pressures of the same time.

One after another, explorers and writers have expressed surprise at the youthfulness of the mountain ranges until at least and at last all that are spectacular have been moved up in time to the age of humans. Velikovsky published a brief survey of this evidence citing the geological works of R.A. Daly, G.M. Price, R.F. Flint, B. Willis, A. Heim and A. Gausser, H. de Terra and T.T. Paterson, and R. Finsterwalder. He offered general catastrophic forces as the cause operating most often in human times. Melvin Cook placed orogenesis in a single set of great earth movements of human times. The present work unites the recent risings, the great global faulting, and exoterrestrial forces mainly of the lunarian age.

Cook uses huge avalanching ice blocks convincingly as the bulldozer of many thrustal incidents in America and, in one case, in South Africa. The ice sheets push the sedimentary strata for many kilometers, melt and flow around them, crack through them, scatter mounds of debris in their path "like loads of loose, dry snow thrown ahead of a fast moving snow shovel."[4] Possibly the only alternative to his mechanism would be rapid continental movement toward the south, deceleration of the basal movement of the crust, a swelling of the Earth beneath the rear echelons, inertial continued movement in the same direction by weaker overlaying sedimentary strata, in some cases even overrunning the halted forward elements. Under this scenario, one would have numerous cases of inverted strata, older on top of younger, and hence the fossil inversions sometimes deemed a disproof of evolution. One would also expect then the occurrence of thrusts in regions of the world where no ice sheets were at work; in fact the Alpine overthrusts, the Atlas mountains and other overthrusted areas were not near to overpowering ice masses.

Thrusting played a large role in the formation of coal, lignite, and fusain deposits, which range in depth from the surface down to over a kilometer. The distribution of world coal deposits, Cook shows, follows in significant part the radial avalanching of the ice caps. Coal deposits radiate from cracking and thrust points of the old ice cap and shell-slip. "Most coal deposits are found apparently squeezed by crustal thrusts, between the ice cap depression zones and the concentric, flow-resisting mountain ranges."[5] Ice cap fragments moved outwards upon the biosphere with the scooping and scraping motions of a giant earth-moving machine, depositing it, often smouldering, often slurried with ice and sky waters, into heaps, folded and thrust them over and in-between with thin sands, clay and gravel, and abandoned them in a state of thermal-retaining and heat-generating compression laterally and from above. Super-hurricanes, fast deep water tides, and typhoons can also scoop and pile up the total biosphere. Since the deep oceans did not exist during much of the quantavolutionary crises, the massive scoopers, scrapers, and in-folders might handle the marine life of shallow seas identically. Coal of different grades, and in thin beds, is interlarded with layers of ash, charcoal (fusain), clay, till, and pebble, that is, with all that goes before the blade of the bulldozer.

Velikovsky's summary of H. Nilsson's analysis of the lignite or brown coal of Geiseltal, Germany, is revealing. The original studies were the work of J. Weigelt and associates. There plants from contrasting climatic regions of the world are identifiable, as are insects, algae, fungi, reptiles, birds, and mammals, (including apes). "Plants are represented there from almost every part of the globe."[6] The material is well preserved: chlorophyll, colors, membranes, and nervature are in many cases apparent. The fossilization says Nilsson, happened lighting fast - "blitzschnell;" the catastrophic process is evident.

Nilsson explains the event by tidal waves moving in from around the world. The time is given as early Tertiary. Velikovsky is noncommittal. To us, more likely than tidal action would be cyclonic action: a great funnel of gases passed over a wide band of territory collecting the biosphere, macerating it, and finally dumping it. Little heat and pressure is needed to bake lignite. Carbon 14 would be low in coal deposits, not for the reason commonly given, that coal is an old deposit, but because it was not in a constant state of equilibrium and is, as Cook shows [7], not now in equilibrium and, when the rate of growth of carbon 14 is projected backwards, it arrives at a zero state around 13000 years ago - subject to much turbulence, of course, but pointing to a thoroughgoing reformation of the atmosphere around that time.

Where is the thrusting and folding of the ocean bottoms? There is very little of it, unless, as we said, continental drifting is called thrusting. The seabeds are flat, save for the steep oceanic ridges, the great rises, and the innumerable seamounts.

Geophysicist Edward Bullard marks the contrast:

> The mountains of the oceans are nothing like the Alps or the Rockies, which are largely built from folded sediments. There is a world-encircling mountain range - the mid-ocean ridge - on the sea bottom, but it is built entirely of igneous rocks, of basalts that have emerged from the interior of the Earth. Although the undersea mountains have a covering of sediments in many places, they are not made of sediments, they are not folded and they have not been compressed [8].

The last sentence points up an impossible predicament for conventional geophysics: a supposed situation in which the continental crust folds and thrusts and compresses into abundant mountains while the oceanic crust slides up and under and around without making mountains, having once and for all and by gradual processes made its igneous ridges and seamounts. That no continental mountains are to be found imbedded in oceanic basalts is remarkable. Considering how recently most of the mountain ranges of the Earth have formed, however, we surmise that the mountains came on the heels of the ocean basin creation or thereafter. But this points to the conclusion that the world has been flat until very lately. And this leads to the idea that quantavolutions of all kinds may have begun only recently.

The seamounts are igneous, and usually flat-topped. They came into notice during and since World War II. Their astonishing numbers point to a common and concurrent origin: almost all of them must have been both extruded and pulled up in the exoterrestrial engagement of the lunar fission period. There are no substantial currents to erode their tops and anyhow erosion creates peaks and gradual slopes. They are not volcano fields, connected underground by a piping system for magma flow.

Sedimentation on them is slight. Some have "surprisingly young" fossil-impregnated rocks on their beveled tops, write Heezing and Hollister [9]. Some of the fossils are subaerial, not marine. Could sea levels have been 400 meters and more lower than today, ask the same authors. (Actually, subaerial fossil species have been found at 1000 m depths.) Or could the ocean bottoms have subsided by that amount? Neither hypothesis finds favor.

They probably stem directly from the lava pavements of the ocean floors. They probably lifted up into a maelstrom of air and water, rather than grew up underwater like some volcanos, even now, are observed to form. For a short period they stood amidst a rising ocean of water. The water ceased to rise rapidly. Life took hold on some of them. After a couple of thousand years, an immense quantity of water was poured into the ocean. The seamounts now drowned.

The rhetoric of geology is overpowering in its stress upon time. It rolls along in the cadences of an epic poem, stressing eons of time like the pause at the end of the lines. But today has its poetry of the absurd, and this may drive the incessant echo for a moment from the mind. Consider, then, the absurd: that legitimate arguments can maintain, facing the geological world, an age of 10^9 years and an age of 10^4 years - ten billion against 10 thousand years.

The absurd, of course, is the theory of quantavolution: time is squeezed out of explanations of the Earth until only the minimal amount remains, like forcing the air out of a bottle until a nearly total vacuum is reached. The analogy is not so remote: some say that the Earth is losing its atmosphere, atom by atom, until one day, eons from now, it will move denuded of air in the vacuum of space. The same might be done in hours and days by the near passage of a body sufficiently large and electrically attractive to suck up the atoms of the atmosphere.

The absurd in geology makes statements of a related type. All the igneous rock and its formations of the Earth's crust, could be brewed by sudden heat over 1500° C and pressures over 5000 atmospheres within a few years. Igneous rock is the greater part of all rock. All rock that is metamorphic needs less heat and pressure to form, and the same short time. Metamorphic rock is a small percentage of all rock. Sedimentary rock, least common but plentiful nonetheless, by definition never boiled or overheated or intensely pressurized, can be laid and formed as fast as material is provided, this consisting of biosphere products, fall-out, and erosion of other sedimentary, igneous and metamorphic rock.

Slower than all of these in forming are the biosphere products. Still, if upon the crust of the Earth were laid the seeds of plants and the eggs of animals, and these were enveloped in an electrified atmosphere, and souped up with nutrient minerals, a passage of several thousand years would find the crust blanketed kilometers deep in biotic debris. If one were intent upon preserving the evolution of species, species would mutate to their present forms in two to thirty leaps, say, and this would provide the varieties of today. It would, of course, require several thousand extra years. It is no secret, actually, that the fillip of evolution has supported geology's claim to time, rather than the contrary (except for radiochronometry); life takes longer than rocks, and fossils can be used by the theory of evolution to push back the age of the rocks.

The absurd idea still has not gone far enough; the Earth's surface and crust are a complicated mixture, of thin and thick pieces, of sliced and hacked out layers, and of dense and light materials, under different pressures and temperatures. How is it to be fashioned to bring order? Dispense promptly with the word "order". The natural order is largely in the mind. The "order" is a wish and illusion. Pursuing the absurd, the mixture of forms and materials of the Earth's crust are but the work of a clumsy chef, who shakes his pot, stirs it erratically, burns the bottom and adds ingredients to his strange tastes. Or, to assign no blame to a divinity, the same effects are achieved by forces born within the Earth and coming from outside of it, but great forces, of the kind that can form the materials. The force that can suddenly slow or change the world's motion can thrust and scatter about the formed materials, and concoct others. What can chop and grind and break the materials can inject all the heat and pressure to make them in the first place, and again and again.

What is more, in this absurd scenario of quantavolution, processes occur simultaneously. The chalk cliffs of Dover do not wait to form until the Anatolian chalk cliffs are made; nor does the mutation of species await a sunny "bowr of earthly blisse." While the Earth's crust is reforming into the Moon, a multitude of volcanos blaze, and deluges of water and debris fall upon the world. All the rocks everywhere are in movement, under pressure and exerting pressure; electricity exudes from every pore and catalyzes the already hard-working floods and vapors; radiation and adaptive saltations are differentiating many species and exterminating many more.

How does one argue against the absurd conception of natural history? One would draw books on the Grand Canyon of Colorado from the shelves showing "two billion years of history passing before one's eyes." But the quantavolutionary vision of the Grand Canyon springs readily to mind: the complex can be put together in a short time in uplift and cross-cutting floods, then cleaved, supplied with torrents, and finally quieted down to make it attractive for tourists. Should one appeal to radiochronometry to resolve the vision, it occurs that the radioactive isotopes might have been stopped or raced in the catastrophic maelstrom. We recall again some of the features of the Earth's surface previously discussed. One by one, it would appear, the morphological features of the world succumb to quantavolutionary explanation.

"Long distance overthrusting has occurred (a) for whole continents over the ocean crust where overthrusting has been several thousand miles (continental drift), and (b) for the superficial Cambrian and 'younger' sediments over the continuous, strong basement rock." (Cook) The greatest thrust and rift and the smallest rock-crack can be considered as "faults."

"Shields [the flat barely covered rock of Canada, Scandinavia, and elsewhere] are here interpreted as crustal rocks denuded of sediments by thrusts of their original sediments from beneath the ice caps driven by the hydrostatic pressure and the friction of the ice flow" (quoting Cook).

"Welts" define pre-Cambrian rocks (that is, with slight signs of life), exposed at the surface as a result of uplifts and crustal buckling.

Huge troughs such as the Mississippi Valley are the result of an immense flow of turbid ice-laden waters and tidal flooding, so recent that spectacular anomalies such as the great New Madrid earthquake can occur.

Countless rubble hills are dumped in place by floods and wind from rocks expanded and broken up by earthquake. Most of the rubble orogeny has occurred in times of quantavolution, not by evolution nor uniformly bit by bit.

Uprisings occur through collision of rock masses, undercutting, compression, heat expansion of undercrust, and cooling of quasi-exploded material. Here would be included the igneous mountains of the world, such as St. Helens or Vesuvius. Here also would be earth that did not escape upon explosion and appears as mounds or hills swollen up (not buckled). Here too would be broad plateaus caused by a heat-expanded crust that cooled in its expanded form at great heights.

Finally, closely related to the previous item, are the submarine ridges around the world and the myriad seamounts (guyots). The ridge mountains, the world's tallest, are igneous productions, still bubbling and bursting along their length. The seamounts, as noted earlier, are the taffy-like pullback, unexploded lava blisters of the lunarian outbursts.

Quantavolutionary theory, then, holds that any hill and mountain of the Earth can be explained by concepts such as these. All involve energies that erase millions, even hundreds of millions of assigned years of time. Nor is it difficult, either, to imagine a quantavolutionary definition of other features not before discussed.

Where a gorge, a rift, or a canyon is observed, we are traumatized into seeing faults, fissures and turbulent waters rushing to shape them.

Where others see placid lakes, long ago hollowed from rock and fed from melting ice, we see land sinks, quick filling with avalanching waters, now stranded and in all shortlived.

Where deep surface deposits of clay, pebbles, sand, till and their associated rocks occur, we see tidal catastrophes, cyclones, and exoterrestrial fall-out.

In lava fields are seen, not occasional flare-ups after long-prepared mantle heating, but the rivers of boiling rock forced up and out by large earth movements and expansion.

Fan deposits are not gradual accretions at the foot of a flow, but sudden dumps by turbulent currents, and the continental slopes are the largest of fans.

Catastrophic winds, tides, and floods form dunes and peneplains, abetted by seismism.

Basins are formed and erupted by catastrophic uplift, changed Earth motions, or meteoroid impact explosions.

What is left to mention in the lexicon of landforms? We still have to do justice in succeeding chapters to several major Earth features: the ocean basins; the rifts, canyons and channels; and the sediments, including the continental slopes. Otherwise one is driven into sub-classification. Faults, for example, can be classified into tilts, grabens, horsts, and troughs and each of these is divided into sub-categories; these are treated in textbooks and present no unsurmountable obstacle to quantavotutionary theory. Each of these pertains to its parent-category – faults - and cannot supply something which the parent lacks. Metamorphic rock is of many kinds - schists, gneiss, limestone, marble mycorites and migmatites - and a natural history museum will present an orderly array of them.

The world "order" occurs again. And again the order is in our minds. The several conditions of heat and pressure and the several minerals that altogether manufactured these rocks were a disordered composition baking inside a faulty oven. One is seduced by the vast quantities observed of each type into imagining orderly production. A tall mountain of sedimentary rocks appears orderly to us, but so does the simple snowflake under a microscope.

One is impressed also by the very many material compositions and forms. But this is an illusion arising from the many different combinations which a few conditions and chemical elements can create; a mere eight separate states of being, described in terms of a temperature, a pressure, and a chemical compound free to combine, can, after all, supply some 2^8 or 256 entities to contemplate. There is order in all things and alongside this order there is chaos in all things; that is, we can look at any event or thing as orderly or chaotic, just as Parmenides looked at the permanence of being and Heraclites at its eternal flux.

Where in the world is the remaining virgin land of Pangea? If one is to believe surveys of the presence around the world of all the conventional geological ages, the answer is "practically nowhere." Perhaps 2% of the world's land can claim a full geological column. The ages are either a fiction, or the victims of quantavolution.

Still, even at this early stage of quantavolutionism, when few minds - and even fewer resources - have been brought to bear on the issues, it appears that by employing only a modest increment of time, quantavolution can move from the absurd to some respectable level of probable validity. One can comfortably and scientifically operate given an Earth age of a million years, with a late resurfacing of the Earth accomplished during the past fourteen thousand years.

It might seem impossible to reconcile the 5000-times-greater time span of conventional geological theory. Actually it is not impossible. The processes reflected in the Grand Canyon profile could be temporarily collapsed by a factor of 5000, making every five million years become a thousand years, without scrambling ordinary explanations. The rules to reduce time are: increase heat; increase pressure; add motions; introduce electric potentials; and look into the skies. Says the sage to the astronomer, writes Friedrich Nietzsche: "As long as you still experience the stars as something 'above you' you lack the eye of knowledge."[10]

Notes (Chapter Twenty: Thrusting And Orogeny)

1. Quoted by Kelly and Dachille, *op. cit.*, 76.

2. Discussed in Velikovsky, *Earth in Upheaval*, 125-6.

3. *Ibid.*, 78.

4. Cook, *op. cit.*, 188.

5. *Ibid.*, 11.

6. *Supra*, 219-20. On Nilsson, further, see B. Gray, VII *Kronos* 4 (Summer 1982), 8-25.

7. "Continental Drift," *Utah Alumnus* (Sept. 1964) 12, and see discussion, *ibid.*, Nov. 1963, Oct. and Nov. 1964.

8. "Origins of the Oceans," *op. cit.*, 19.

9. *Op. cit.*, 521.

10. *Beyond Good and Evil*, Epigram 71.

CHAPTER TWENTY-ONE

OCEAN BASINS

The planet Venus, which has been shown to have had its share of astroblemes, lightning activity, melting, volcanos, plateaus, mountain ranges, great valleys, and closed depressions or basins, has a "curious dearth of great basins," whence we surmise that Venus never underwent the trauma of Earth, which resulted in most of the Earth being ocean basins. "The tectonic forces that have shaped the surface of Venus have raised only 5 percent of the surface into 'continental masses' and left only 15 to 20 percent of it as basins... "[1] Nor do we know whether these are "real" basins, that is, distinct from the continental material as they are on Earth.

The ocean's "trackless wastes" may be a nice metaphor for the 71% of the Earth's surface covered by water, but the ocean bottoms are marked by enough signs to revolutionize the earth sciences and natural history. Essentially the ocean basins are three in number, the Pacific, the Indian and the Atlantic. The Pacific Basin was the recent scene of the most awesome event ever to have befallen the Earth since its early times, the outburst of the Moon. The Indian Ocean appears to have been created at the same time by the migration of continental land driven to the scene of the disaster. The Atlantic Ocean was rather obviously originated from a great wedge that helped propel the continents east and west so as to distribute the mass, heat, and electrical charge rather more evenly in the expansion and filling initiated in the evacuated areas.

The only possible mechanism for the lunar outburst would involve an exoterrestrial body, to which I have alluded on several previous occasions. The clearest description of the event and the closest to our own theory was provided by Howard B. Baker in an obscurely published article of 1952 [2]. He was an American geologist, who from 1909 worked on the problem and completed a manuscript in 1932 that was never published. Both works were discovered by the present author after the manuscript to *Chaos and Creation* was completed; no changes were needed as a result, except to credit Baker for his achievement.

Baker stipulated an eccentrically orbiting planet, "Pentheus," as the intruder, and illustrated

> how by perturbative increase of orbital eccentricity alone, without any alteration of mean distance ... an orbit of mean distance 3 (astronomical units) might be so displaced that perihelion would be tangent to the Earth's orbit and aphelion well into Jupiter's danger zone, that is, greater than Jupiter's perihelion distance, which is 4.95...
>
> The planetary disturber is conceived to have been broken up by gravitational encounter with Jupiter, as suggested by Jeans (1934), and much of its ocean water, frozen with sand, gravel, and other debris, continued on a cometary orbit. The Earth occasionally met with these showers during the Pleistocene glacial epoch.
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> The Roche limit, as explained by Jeans (1934, p. 269), is 2.49 times the radius of the larger of two bodies in an expanded or a contracted state as computed to make the density the same as that of the smaller body. With equal densities, the volume and mass are both represented by the same figure and are proportioned to the cube of the diameter.
>
> Thus Earth, with mass 1 and diameter 1, and a radius of about 4000 miles, would encounter Pentheus with a mass 27 times greater, a diameter 3 times longer, and a radius of 12,000 miles. In this case, the Roche limit would be 2.45 X 12,000 or 29,400 miles from center.
>
> As Pentheus progressed in its orbit it occupied a path 58,800 miles wide, within which no body much smaller could survive. The earth is conceived to have been deeply touched on the Pacific side by the Roche limit of the larger planet at the latter's perihelion...with the result that

> the Moon was born... If Pentheus were a mass of 64, radius 16,000 miles, its Roche limit would be of 39,200 miles.

Baker's model path calls for a two hour passby between 10 PM and 12 PM, at a perihelion velocity of 23.5 miles per second. A bulge distending the Earth appears at l0 PM with a tide raising power 225,425 times that of the Moon. At 11 PM the Roche limit is almost tangential to the Earth with a power of 816,818. At midnight, the tide power is 1,170,701 times that of the Moon and the Roche limit embraces the whole outbursting section of Earth, which then escapes into space. The Earth has lost most of its crust, but has gained water and a fall-out of rock.

Baker does not use the electrical power that would also operate effectively to the same end as gravitation. The distance might be several times farther given the same masses, if the intruder had come from afar bearing an electrical potential much different from the Earth's charge. Also the model proposed by this author is of a more gaseous and heavily electrified body. Its detailed treatment is available in *Solaria Binaria* and it ought perhaps not be discussed further in these pages, whose subject is the bottom of the oceans.

The prevalent view of sea-floor spreading has molten material exuding from the great oceanic ridge volcanos, pushing into place as a strip and jostling the older strips that compose the floor to move further away from the ridges. Ocean floor chronology and drift theory are based upon observations that from one strip to another, every several "millions" of years, there occurs a magnetic field reversal.

However, besides the other problems, which I have recounted, one core (395 A) from the Atlantic ridge flank shows magnetic differences in depth; the upper 170 meters is normally magnetized, the next 310 meters is reversed: and the following 40 meters is again normal [3]. This is an unwelcome surprise to chronometry and the theory of convection currents.

Still, pursuant to our theory here, we should expect erratic magnetic effects to accompany the great outpourings of lava; as soon as a batch is dumped off the ridge it hardens with the magnetic orientation of the moment. Very soon, before it has moved away, another batch is dumped on top of it, then another, all occurring before the whole thickness of lava moves far enough to be free of additional burdening. If, as we think, the ocean basins could mostly be paved in a thousand years, during which time the Earth's field would be moving geographically and oscillating, the laminated magnetic structure of the floor must follow.

Allen Cox points out that "if sea-floor spreading has occurred at a constant rate, the marine magnetic profiles may be interpreted to yield a reversal time scale going back 75 million years. The apparent average duration of the polarity intervals was greater during the time $10.6<t<45$ million years than during the past 10.6 million years, and during the time $45<t<75$ million years the average length was still greater."[4] That is, periods between reversals of the Earth's magnetic field occupy ever broader stripes or bands on the ocean bottoms as we go back in time.

Cox realizes that this might be an effect of an inconstant rate but dismisses the idea. With our larger theory that negative exponential rates followed a catastrophic opening of the basins, we find this data supportive. The ocean basins opened fast and then ever more slowly, giving the appearance of a magnetic field that used to reverse more slowly than it does now.

The Arctic Ocean scarcely deserves the name [5]. The North Pole area is flatter than the lands to the south and some miles lower than the swollen equatorial belt. If it were not so, there would be no Arctic Ocean. By far the greatest pan of the Arctic Ocean floor is continental shelf, less than 300 meters below sea level. There are half a dozen abyssal plains with depths from 2700 meters to 5000 meters. The Mid-Atlantic ridge forks northwards around Greenland and the two prongs come close together north of Greenland, then move in parallel across the ocean bed sandwiching the North Pole abyssal plain between them. A third "Alpha Cordillera" meanders northwest from the North Greenland regroupment, with many seamounts. The three ridges enter the continental shelf of northeast Siberia. They seem to disappear. But the Nansen Cordillera moves into the continental shelf in a great "Sadko Trough" and, precisely in line with it, some 400 km on, there begins the delta of the Lena River and a great valley, probably a rift valley. This rift cuts down through Asia ultimately to join the Indian Ocean ridges.

Throughout the Arctic ocean bed the continental mass rises abruptly above the abyssal plains. Sheer cliffs of over 2000 meters are the rule. Although, on the one hand, a defender of erosionary theory would offer in explanation that the solid ice cover has preserved the "original" morphology, it may be argued that the fractures are new, occurred when the ice cap avalanched in Lunarian times and then were covered up during the Saturnian-Jovian age-breaking events that included a new ice cover, the present one. Semi-tropical, fully human cultures have been uncovered in islands only a few hundred kilometers from the North Pole. Iceland is apparently a high element along the North Atlantic (Reykjanes) ridge, volcanically produced.

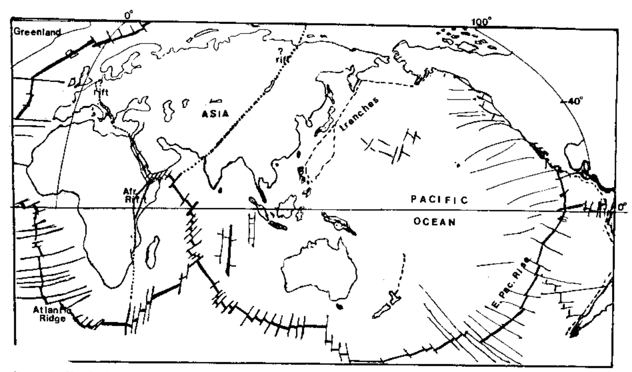

FIGURE A – Sketch of the main ridges and fractures of the Pacific-Indian Ocean bottom (———) with main trenches (- - -). Possible Trans-Asian and Trans-Euro-Mediterranean rifts are added (. . . .) to the drawing, which is adapted from O. G. Sorochtin, ed., *Geophysics of the Ocean* (in Russian), vol. II, fig. 17. The lithosphere (crust) is everywhere shallowest beneath the ridge lines. Thousands of seamounts shooting up from the ocean bottom are not drawn here.

Figure A (Click on the picture to get an enlarged view. *Caution: Image files are large.*) Sketch of the main ridges and fractures of the Pacific Indian ocean bottom with main trenches. Possible Trans Asian and Trans-Euro-Mediterranean rifts are added to the drawing, which is adapted from O.G. Sorochtin, ed., *Geophysics of the Ocean (in Russian)*, vol. II, fig. 17. The lithosphere (crust) is everywhere shallowest beneath the ridge lines. Thousands of seamounts shooting up from the ocean bottoms are not drawn here.

FIGURE B–The Arctic Hemisphere, indicating the largely continental (rather than basaltic ocean-type) bottom; and the North Atlantic Ridge passing by the North Pole and proceeding towards Siberia, where possibly it becomes a land rift proceeding to the Indian Ocean via Lake Baikal. (Pages B to F are author's sketches. In all of them, the outlines of the full continents, including shallow shelves, are drawn.)

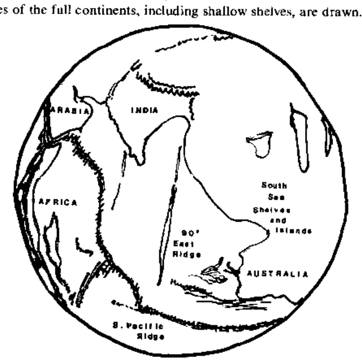

FIGURE C–The Indian Ocean Hemisphere, noting the African Rift on the extreme left, the East Ninety Degrees Ridge, and the largely continental rock platforms that underlie the vast Asia-Australia area.

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300 THE LATELY TORTURED EARTH

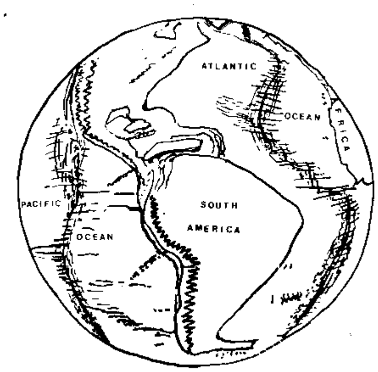

FIGURE D–The American Hemisphere, noting how both the Atlantic and mid-Pacific Ridges follow the shape of South America at great distances. A world-circling Tethyan shallow sea belt may once have passed through Central America, the Mediterranean and the South Seas, but can hardly be discerned because the ocean bottom growth and expansion and crustal slippages have largely erased it.

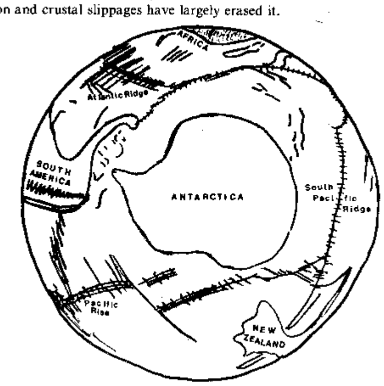

FIGURE E The Antarctic Hemisphere, showing how ridge-fracture cut the south polar Continent off completely from all land to the North, as by a circular saw.

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It would appear that the main fractures occurred before the main continental shift, (as in the Arctic Basin to the South), because there still is a semblance of order to their progression around Greenland and into Asia. Furthermore, Greenland adheres in shape to the North American continent and its neighboring western fracture does not seem to descend as deep as the eastern one. And on its East, Greenland seems conformable to the Scandinavian platform.

The simplest scenario for the mass movements that created the Arctic basin would call for a fracture, a swinging down of North America with a widening of the fracture valleys to create the abyssal plains. Northeastern North America was stretched out; Greenland and the many Canadian islands moved more slowly. Later Asia pushed northwards at one point in its generally southeast torque - the Yermak underseas Plateau - almost restoring contact with North America (Greenland) but letting the great ridge system pass through.

The total true ocean area created by and in consequence of the explosions and worldwide venting system amounts to 310 millions km^2. Its depth averages 4 km. A floor of 1.24 billion km^3 would have been laid almost entirely in a period of about 2000 years. After that time, the activity of basin-evolution would begin quickly to subside. The basins would continue to evolve at a greatly reduced rate. Most of the vents would have become inoperative. The ridges and fissures are still expanding around the globe but at a scarcely discernible rate; like today, rarely would the oceanic surfaces be troubled by seabottom volcanism and spreading.

A full life would have arisen in the warm oceans; the marine species of today originated in the shallow Tethyan waters. Men began navigating the oceanic surfaces now. Whereas ancient fossilized life-forms have been discovered on high mountains, they are absent from the bottom of the sea. It is presumptive, if not incorrect, for geological writings to state that the oceans have covered and uncovered the land on several lengthy occasions. The mountains have arisen from the shallow waters of Pangea, bearing the fossils, or the fossils have been laid down by flooding and tides, or they have been dropped by cyclones. The abysses of the ocean contain only species whose origins in shallower waters are patent. The oceans were born recently, and therefore hold only what has lived in these times. Heezen and Hollister, recounting the scarce record available of life on the ocean bottoms, conjecture that "either there was no abyss then, or the relicts of these ancient seas have been completely destroyed. The deposits of earlier seas are found exclusively on the continents." To us it is clear that these earlier "seas" were the only "ancient seas" and were the shallow Tethyan seas and swamps.

The length of the oceanic fractures and their transverse fissures (transform faults) amounts to some 300,000 linear kilometers. The funnel volcanos number in the tens of thousands. The emission from a volcano cone can be given a value equivalent to 5 kilometers of fissure volcanism, and the number, never counted, can be set at 50,000. Then 550,000 kilometers of venting area was available to produce on the average 2,254.5 km^3 of ocean floor per venting kilometer within 2,000 years, or an average of 1,127 km^3 per year.

In two days in 1902, the Volcano of Santa Maria in Guatamala erupted and emitted 5.5 km^3 of material. A fissure of Laki, Iceland, part of the Atlantic northeast ridge forking, was quite active in 1783 and along a 25 km line emitted 15 km^3 of material in 4 1/2 months. In the tenth century an Icelandic fissure one year erupted 9 km^3 of lava alone along a 30 km trench. It is evident that if its activity were continuous at its full rate of eruption, the fissure of Laki would eject about 3,000 km^3 in 1000 years, 9000 km^3 in 3000 years, far more than its quota.

The figure used as a base requirement, 1.24 billion km^3, is twice as large as required. The underside of the ocean floor, comprising half the thickness of the floor, appears to be not a product of lava flow but a melting and cooling of basaltic rock in place. As the gaps widened, and the lava flowed to fill the chasm, the floor of the chasm at first softened from the heat all around it and from the waters, and then quickly hardened beneath the lava flows. This is but the cooled crust of the exposed magma of the mantle. When geologists declare, as does Shelton, that "... we cannot yet explain *why* magma exists where it does or seeks escape when it does,"[6] they are not considering this kind of quantavolutionary and exponential solution.

The continents can be viewed as the rims of the ocean basins. They are steep-sided blocks, whether they plunge directly into the waters or have sea-covered shelves that then plunge down. The continental slopes, on the other hand, are water-covered moraines of continental debris laying on top of ocean abyssal basalt. They have a triangular profile, making nearly a right angle where continental block meets ocean floor; the hypotenuse is a lengthy stretch moving from the top of the shelf at an angle of 5° on the average. The declining rate of expansion of the ocean floor contributed to the profile of the slopes. By moving first rapidly, then ever more slowly, they heighten the illusion that a gradual off-flow of sediments has created the sloping figure. More likely exponentially declining rates of continental debris and seabottom spread worked together to provide the profile. Deep river canyons extend hundreds of kilometers into them. Elephant teeth are found far out on the slopes at great depth; probably the slopes were laid down, occupied by terrestrial life forms, and then lately flooded. Deep turbidity currents, if they were to transport them, would bury them or destroy them. They lay near where the elephant died not long ago.

As told in the previous chapter, the continental slopes are free of continental mountains, as are the true ocean bottoms. The logical implications of this fact have evaded geology. If most great mountain ranges are new, whether by our chronological reckoning or by that of conventional geology, why have none appeared on the continental slopes? The answer suggests itself: the mountains rear up at the edge of the precipices of the continents; they dump their debris into the abysses.

Immense floods and tides traversed the continents and poured off the miles-steep continental blocks into the ocean. The canyons occur where the blocks were fractured, and consequently where the waters poured out most heavily. The canyons, which will be treated soon in more detail, were not submerged beneath the oceans until the ocean basins stopped growing and their waters crept up upon the continental blocks and shelves. The seas do not come in and kidnap the land; they beat back the detritus and even build land. Thus the great slopes could not have formed under uniformitarian conditions or even underwater.

Prolonged, universal run-off of deluge and catastrophic tidal water produced slopes; the blocks were often towering water falls, dropping sheets of slurry into the abyss to form the slopes. The coarse gravel typical of the slopes far out to sea signals the impetuous rush and transporting power of the waters going to fill the basins. The scale would have dwarfed even the scene pictured by K.J. Hsη for the Mediterranean Sea (our dates and events differ, of course), "a giant bathtub, with the Straits of Gibraltar as the faucet. Seawater roared in from the Atlantic in a gigantic waterfall." If the falls delivered 10,000 cubic miles of seawater per year, they would have exceeded Niagara Falls 1000 times, and filled the Mediterranean basin in 100 years. "What a spectacle it must have been for the African ape-men, if any were lured by the thunderous roar."[7] The Mediterranean basin requires in its complexity an analysis that we cannot afford here. It appears to have been primordial, that is Pangean, and shallow. Then it may have suddenly closed and as suddenly opened, dry for a few years, and then overwhelmed by floods of water much greater than at present.[8]

The ocean basins are composed of sima, rich in silicon and magnesium elements. They are of basalt. They are igneous, formed in red heat. They are thin. They are denser than the continental sial. The continents probably sit upon similar material, but much deeper, perhaps directly upon the upper mantle, save where the magma of the mantle may have expanded and intruded upon the continental granites.

The continents and the ocean basins are distinct formations that were produced at different times and by different mechanisms. The sial is old. The sima is new. The fact that the shell of the ocean bottoms is only one-tenth as thick as that of the continents in itself suggests that the ocean crust is the product of a melt, that the seas are new, and that the continents were somehow in a position to resist complete volcanism or explosion. The fact that ocean crust is more basic or less acid than the continental crust indicates that it separated from the primeval melt after the granitic crust; so says M. Cook.

The continents were produced by a cooling of the Earth's surface and by their own erosion and debris, and in direct contact with ultra-basic material of a heavier composition. Hence, the igneous marine floor does not cover a former continental surface, and density probes show this to be the case. Nevertheless the floor probably contains continental debris in small amounts. With all the sinking of lands reported in legends, one would expect ocean-bottom drills to collect continental material here and there. Very little appears, leading one to suspect that most sinkings have occurred on the continental slopes or shelves.

The ocean basins are scarcely sedimented; they hold only 1% of all sedimentary materials. Under uniform conditions, this would represent only 16 million years of runoff deposits amounting to 10^{18} tons[3]. Dissolved solids in the ocean waters compose 3.5% of their mass, far from making up the difference, nor can these solids be allocated to detritus removed from the continents.

Often the rocks are bare along the circumglobal ridges. They are 20 meters thick or less. The thickest ocean sediments are not on the basins proper but on the continental shelves and slopes. Further, next to these areas where the abyss begins, sedimentation is thicker and can reach 1000 meters in exceptional areas.

All of these oceanic sediments come either from cataclysmic off-pourings from the flooded continents, or from fall-outs, both volcanic and exoterrestrial. Material lagging at the end stream of the fission of the Moon might have dropped back to form islands of continental crust in mid-ocean. The time required for such sedimentation is calculable in a couple of thousand years or less under quantavolutionary conditions.

The character of oceanic sediments varies. It differs markedly from much continental sediment that is rock. It is clay and ooze. The shelves carry clay; the polar regions, the slopes, and some of the abyss carries ooze; and the deep abyss carries clay. The polar basins also carry sand and boulders.

Carbonates are heavy on the shelves and bottom oozes, but compose only from 2 to 10% of the clays (since they dissolve in the colder waters). Layers of distinct calcination and ash are interlarded with the oozes and clays in many parts of the world. An unknown proportion of additional ash has been incorporated chemically into the clay and ooze and remains to be distinguished. Much clay is igneous in origin, a product of volcanic tephra, volcanism, and cosmic fall-out. Much manganese has been precipitated onto rocks, pebbles, fish teeth, and bones over many areas, and pure manganese has been found on the bottom near the ridges.

The towering ridges that girdle the world have flanks that descend gradually. They present almost no underseascape for many hundreds of miles. There is no thickening of the ocean basin crust beneath the ridges, unlike the so-called isostatic thickening beneath the mountains of the continents, much of which is probably due to blunted thrusting. This occurs despite the fact that the ridges rise higher than the continental Alps. Thus they are distinct in origins, as was pointed out in the last chapter. The continental mountains were shaped by horizontal forces, with the intense, sporadic assistance of electro-gravitational forces from outer space. The ridges were formed by vertical forces from within the Earth, with similar assistance; unlike continental mountains, they lack rock roots, evidencing that they were not thrusted.

An impossible predicament is presented to conventional geophysics; how can uniformitarian forces produce this contrast? The continental crust folds and thrusts and compresses into abundant mountains; but the oceanic crust, having made its igneous ridges and seamounts once and for all, slides up and under and around without making mountains, but exudes lava in discrete amounts, and shakes seismically from time to time.

The Pacific Rise conforms generally to what one would expect from an exploded, as contrasted with a cleaved, basin such as the Atlantic. Worthy of quotation here is a passage from the *Encyclopedia Britannica* (my remarks in brackets):

> Fast spreading... as is characteristic of the Pacific [because the basin was already blasted out], produces a rise. Slow spreading...results in the formation of a ridge. Sea-floor spreading is a symmetrical process that accretes new ocean floor equally to both flanks of a rift; [The East

> Pacific basin obviously did not accrete symmetrically.] When a former landmass splits apart, the ridge maintains a median position as the newly created ocean basin increases in size. This phenomenon occurred in the Atlantic and Indian Oceans, but, in contrast, the rise in the Pacific did not rift a landmass when it was formed, and consequently there is no reason for it to be median. [Again, no land mass.]

A slash wound upon already swollen human flesh produces a swelling along the line, but a lower ridge than a single slash wound upon healthy flesh; so the Pacific rise is swollen high off the middle of the ocean bottom, and has a less marked ridge from the slash wound cutting it than the Atlantic basin has from its same slashing.

The Earth expanded as well as exploded; whatever can explode can expand: a chapter has been given over to this subject. Although the Pacific Basin is concave, no one can examine a relief map of the Pacific Rise, for example, and say that the volume of the Earth remained unchanged thereby. Since this rise occurred, along with many other bulges, then a considerable expansion might be demonstrated by survey without resorting to theoretical physics. The globe has many slight bulges. Russian geophysicists have recently described its shape as formed by at least two geometric networks of lattices, a many-faceted figure [9]. So there may even be a pattern to the expansion of the global crystal. The latticework can be viewed as expansion joints; the total pattern makes the surface of the globe a set of convex plates rather than a perfect sphere.

Under the conditions imagined here, much of the expansion would be expressed simply in a hurrying of the basin-paving process, accelerated by inrushing waters. The salt of the dropping canopies would also promote magmatic melting. Molten lava takes up more volume than solidified basalt; wherever the crust was boiling, it would expand the surface of the globe. The tidal pulls of the Intruder, temporarily, and the new Moon, permanently, would draw the surface of the Earth outwards; there the surface would pause, *cool,* and harden.

The ridge mountain volcanos, and the ridge and transverse fault fissure volcanos, differ from tens of thousands of sea mounts, atolls and guyots that rose tall and slumped back upon the escape of the Moon from the Pacific Ocean Basin and smaller crustal material elements elsewhere. Some of these became instantly created volcanos and continued activity after the others had collapsed back. The Pacific seascape differs from the Atlantic by its incomparably more numerous holdings of seamounts. Morphological examination would indicate that the seamounts do not have the extensive piping systems of continental volcanos.

As the main blow struck and the fracture opened in North America, it drove that continent as a block southwestwards until it overrode the East Pacific Rise (fracture) that had just appeared off what was now its west coast. Much of this western area promptly erupted into *volcanism* and was *covered* by huge lava flows and extensive, faulted desert plateaus and plains. The Asian and Australasian coasts and islands do not fit into the North American continent because vast spaces opened up and the whole arc from Alaska to Southern Asia broke away with the explosion of the Moon. A boundary ridge is not easily visible but extends down the Pacific basin on the West from Kamchatka Peninsula to the Campbell Plateau and ties into the Emperor Sea volcanic seamounts and the Line Island Ridge.

The Indian Ocean bottom, unlike the Pacific and Atlantic basins, appears to have been well-traveled. Antarctica has been shoved southward some hundreds of kilometers, and girdled by two great ridges. A newly discovered rift pierces the Waddell Sea, probably a transverse fault from the ridge to its north, and is lost under the great ice plateau hundreds of kilometers inland.

Australia has been ushered eastward by a fork of the same fracture that pushed India north and Antarctica south. Indeed, if one wishes an up-to-date definition of the continents of the world, useful for some purposes, one may say that a continent is a body of land surrounded by an oceanic cleavage. Even in the case of Europe and Asia, some believe the fracture to exist, going up from the Indian Ocean through the Persian Gulf, the Caspian Sea, the Ural mountains and into the Arctic complex earlier described.

Contemporary geological theory has also traced the path of the Indian subcontinent from Southeast Africa to the Tibetan Plateau. "The vast Himalayan range was created when a plate of the earth's crust carrying the landmass of India collided with the plate carrying Asia some 45 million years ago, having travelled 5,000 kilometers nearly due north, across the expanse now occupied by the Indian Ocean."[10] The drift itself took much longer, since it occurred at the rate of 6 to 16 cm/year, if one were to accept the belts of magnetic reversals that mark the stretches of ocean bottom along the line of march and the dates given the lava from one belt to the next.

However, cores drilled into the Indian Ocean bed not far from the observed course produced gaps in dating of sediments by fossils of many millions of years, perhaps fifty millions in some cases. "Why these accumulations are missing," commented the directors of the survey, "is at present a mystery."[11] Fifty from a hundred million or so years is a big proportion. That "there are more gaps than record" is, of course, a familiar complaint among paleontologists on land as well as under the sea. In the other great basins, gaps of twenty million years in the fossil record are common. With sediments so thin, the gaps are not so important, say some - a turbidity current or two, and there you are. (Geophysicists and paleontologists can be catastrophists *à la minute,* when it is demanded of them.)

Still, when there is a gap in the fossil record of between 50 to 70 millions of years ago, we are speaking of late Cretaceous times and of the disastrous end of the dinosaurs and most marine species. A layer of unfossilized chert tiles the floor just above this zone, "as though some catastrophic development killed off most of or much marine life." One begins to suspect that the Cretaceous boundary may be considered as the primeval age of the ocean beds and that all which is found in the abyss arrived there afterwards; further, the finale of the Cretaceous may have been the end of Pangea and the outburst of the Moon, even if both are to be dated at a few thousand years ago. Almost all of the sea floor assigned to a date is Cretaceous or younger [12].

We mentioned earlier that the Himalayas are agreed to have risen steeply within the last dozen thousand years. We called to the attention of Raikes and other students of the destruction of proto-Indian civilization that their "uplifts" were part of world-wide catastrophe. Today, the people of the southern Himalayas are suffering from a horrendous erosion of their soil. They are blamed for improper farming practices and overpopulation. This may be true enough, but, considering the youngness of this region, it is also fair to suggest that the Himalayan slopes have simply not existed long enough to have come sliding down on their own accord.

The cruxes of the internal activity of the Earth during the lunarian period occurred at two well-marked belts of discontinuity. One is the Moho discontinuity just below the shell in which the oceans and continents are fixed. Here the upper mantle boundary preserves an almost liquid character before it resumes a hotter but hardened condition farther down. This boundary of difference would scarcely be noticeable if it had not marked the torque and twist of the surface in the phases of shock and adjustment. For a simple unagitated melt produces, except in purely statistical terms, an undifferentiated transition of rocks up to the sedimentary level. The Moho boundary marks a breakdown of viscosity on a worldwide scale.

The second crux occurred at the 2900 kilometer-deep level of the lower mantle, some 50.0 kilometers before the upper core's boundary. Suddenly the density index, that had been moving at a fairly even rate of increase through the rocks after leaving the lighter crustal regions, leaps from 5.42 g/cm^3 to 9.91, a difference of 4.49 g/cm^3. This is about one-third of the total value of the scale, which begins at 3.31 and ends at 13.00 at the center of the Earth. No marked changes in pressure, gravitational intensity, or incompressibility are notable at this level. The largest secondary torque of the globe in reaction to axial displacement and rotational torque and retardation happened here. Lesser torques occurred at the 400, 1000, 5000 and 5100 kilometer depths where seismic discontinuities are observed.

Several points deserve stress in reviewing what has just been said and looking ahead to the next chapter.

An immense part of the Earth's shell is simply missing. It had nowhere to go except into space, for it cannot be decomposed, mixed with plutonic material, or shovelled under the sea bottoms.

A psychological fallacy pushes us to believe that the ocean basins were made by and for the primordial waters. That the basins exist is one accident; that waters fill the basins is another accident. The accidents added up to a "miracle" of good fortune for mankind. Better near extinction than a totally frozen or drowned globe. At first, the waters were below the rims of the basins; now they slop over the rims.

The East Atlantic Basin corresponds to the West Atlantic Basin. Their former juncture is plain. The Pacific Ocean is deeper. The East Pacific Basin is sharply marked where the southern, western and northern margins are arranged as a giant set of arcs detached from a blasted area.

All the ocean basins are young, thin, and scarcely sedimented. Oceanographers who recently discovered these facts were amazed; in a few years, the basins became four billion years younger. Only potassium-argon datings, which are vulnerable to catastrophic events, let the bottoms achieve even this young age. The basins are not 200 millions as against 4,500 million years old. They maybe only aged a dozen millennia. The surprise is greater: not one-thirtieth as old, but one-ten-thousandth as old.

Three additional, related points are stressed in other works of the author and have only been mentioned in this book:

Despite the almost total destruction of the biosphere by heat, explosion, suffocation, and famine, many species survived. Marine life soon found vast new breeding grounds. So did plants and land animals. Even before they were drowned in the later deluges, the cooled seamounts harbored many forms of land life on their summits.

Horrified, stunned, fully human beings saw all of this happen. Wherever archaeology finds "paleolithic" and "early neolithic" sites, it finds not slow soil coverings but fast disaster coverings. Much legendary and physical evidence points to a newly emplaced Moon and a worldwide catastrophe about twelve thousand years ago.

The network of fractures around the world is unitary. Mechanically it must be considered as the effect of one and the same event. The Moho discontinuity recorded today beneath the Earth's shell at from 5 to 50 kilometers depth may denote where the shell rafted and where it was peeled off. The next two chapters deal explicitly with the fracture and rift system of the world.

Notes (Chapter Twenty-one: Ocean Basins)

1. Richard A. Kerr, "Venus...," 207 *Science* (18 Jan. 1980), 291.

2. Baker was born in 1872. In 1932 he mimeographed *The Atlantic Rift and Its Meaning* in Detroit. Fortunately a copy reached the library of Congress. The article is "The Earth Participates in the Evolution of the Solar System," Detroit Acad. Nat. Sci., 1954 (pamphlet).

3. "Testing Vine-Matthews," *Open Earth* 3 (Apr. 1979), 28-9.

4. *Geo Rev*., 244; and see A. Cox R.R. Doell, 189 *Nature*(1956), 45 which contains summery of paleomagnetic tests; and "Geomagnetic Reversals," 163 *Science* (17 Jan. 1969), 237-44.

5. See *National Geographic Magazine*, map, "Arctic Ocean Floor" (Wash. D.C., 1976).

6. *Op. cit.*, 69.

7. "When the Mediterranean Dried Up," *Sci. Amer*. (Dec. 1972),33

8. E. Smith 28 *Sea Frontiers* (1982), 66-74.

9. Chris Bird, *New Age J.*, 36-41.

10. D.P. McKenzie and J. G. Schlater, "Evolution of the Indian" *Sci. Amer*. (May 1973), 63.

11. Sullivan, *op. cit.*,172.

12. See map in Sullivan, *op. cit.*, plate 22.

CHAPTER TWENTY-TWO

FRACTURES AND CLEAVAGES

In the past few years, the public has become well aware of the revolution in oceanography, a major element of which was the uncovering of an immense integrated global fracture system. It is a kind of reverse harness which works from the inside instead of the outside to control natural behavior around the world. The question is whether the harness emerged from deep within or whether the globe was harnessed by an exoterrestrial force. Except in westernmost North America, in East Africa and the Near East, through Iceland and Central Asia, through the Adriatic-Rhine River rift, and beneath India, the fractures course below the sea, where they are rendered visible by the ridges running alongside of them. Many years ago, De Lapparent and Howard Baker had recognized the oceanic rifts and called them recent, while Heer had assigned the boundaries of the Mediterranean to the era of the drift [1].

The system is worldwide. It may be said to begin in the arctic region, moving south from both sides of Greenland. It shoots down to the antarctic region, forks west and east, and forks again north and east. The east fork traverses the South Pacific and rises northwards when it strikes South America, proceeding up to and around the North Pole where it is reconnected with the northward fork that has shot up through the Asian continent via the Persian-Indian coast, Lake Baikal, and northern Siberia. There it probably connects with the fork around Greenland, completing a circuitry of the globe. Less apparent is a worldwide rupture that carries through the East-Central Pacific, Caribbean, Mediterranean, and South Asian areas, possibly a fracture along the line of the old Tethyan Sea equatorial belt.

The present globe does not portray the original situation. A Pangean globe would show nothing but land and shallow seas. Today's named areas stood unbroken. The globe then was without ocean basins. Its main body of water was the Tethyan Sea, corresponding to the present Caribbean, Mediterranean, and trans-Pacific northern tropical region. This was the equatorial region. The South Pole was bounded by lands now disappeared, unless New Zealand and a few other continental areas are remnants of them. The continents of South America, Africa, Australia and Antarctica were far to the North, and part of the Pangean land mass.

The fracture originated at the old North Pole and proceeded rapidly towards the old South Pole, bending as the north geographical axis of the globe shifted to the northeast and as global rotation slowed and resumed. The globe must have jerked suddenly as the Atlantic cleavage passed through what are now the Brazilian and African humps, and then resumed its more direct southerly course.

The polar ice cap is said by Weyer to have shifted its position by 10 to 15 degrees along a line 60 degrees west and 120 degrees east [2]. Possibly the cap was cleaved and the rift began running; then almost immediately the Intruder began to cut its swath from the Pacific crust and staggered the Earth to a momentary pause, driving the rift eastwards in Mid-Atlantic.

When the fracture reached the South Pole, losing momentum but cleaving the Earth rapidly at the full depth of the continental crust, it veered sharply eastwards slicing through the then polar south region until it met with the westward shifting "American" continents, whereupon it veered northwards until it reached the northwestern fork of the north polar fracture. It skirted the eastern rim of the great pit of the Moon material that had been blasted up and away.

A secondary forking sent the fracture northwards shortly after the south polar fracture occurred, slicing through "Africa/India," then, after crossing the Tethyan fracture, resumed in diminished depth its course across central Asia.

Meanwhile the initial point of rupture at the old North Pole sent a forking movement northeast and northwest, isolating Greenland. Both of these fractures joined the trans-Asiatic fracture at different points.

Earlier, as the main "Atlantic" fracture encountered the equatorial Tethyan area, it incited a trans-world secondary fracture, that moved more rapidly east than west. The western Tethyan fracture cut through the continental mass then occupying the Gulf of Mexico and lost itself in the inchoate molten mass occupying the blasted crater of the fissioned Moon material. It may scarcely be perceived to end at the West Pacific Rise (rupture). The eastern thrust moved, however, through the "Mediterranean" and "Near East" then through a blast area which soon was overrun by a jumble of lands moving southwards.

Finally major rifts struck out from the Tethyan fracture north and south. On the south a Mediterranean and a Syrian fracture join the Red Sea rift and continue south across East Africa to join the proto-Indian fork. In proportion to a number of submarine fissures, this rift was a moderate addition to the world fracture system. Africans of the Rift countries retain legends of great structural changes in their land. To their stories are to be added similar Arab and Hebrew stories.

From the beginning to the end, the fracture system might have been the work of a day; geophysicist Cook speaks in terms of hours. It conceivably inspired the "Third Day", during which "God created the oceans" in Hebrew story. "And God said, 'Let the waters under the heavens be gathered together in one place, and let the dry land appear.'"[3] At the end of the day, the continents had been carved out, many islands had been sliced along the Tethyan way, the antarctic region, the arctic region and the "East Pacific" area. The continents were in motion. The Earth was girdled by chasms and ready to move and expand. Pangea was ended. The climax of chaos had passed.

Two characteristics of the world fracture system deserve much more attention than geophysicists have allowed them. Only Cook, to my knowledge, has frankly expressed what is so apparent, that the total system was the work of hours; perhaps he could utter the shocking sentences because he had won a Nobel prize for his work on explosives. That our precious globe could be treated so abruptly and cruelly is inconceivable to most people; it is like an innocent child coming upon the scene of an autopsy. Cook remarks that "there is evidence for the hexagonal structures characteristic of shock fracture..." This is no less than what many geologists have been trying to say in the "tectonic plate" school of thought and the Russian "crystal grid structure" theory that C. Bird has described, all hesitating to give voice to the necessary implications.

Cook goes on to add the clause, "but this evidence is by no means perfect." He may be saying this because he does not deal with the two essential components of the epoch-making event, the intervention of a great exoterrestrial body and the blasting of the Moon from the Pacific Basin. These elements of the scene tend to obscure what would otherwise appear as a more normal hammer fracture of a solid crystal globe in rotation.

The Antarctic continent (including the continental shelf of the Ross Sea) is steep-standing in its surrounding ocean. About half of it executes a remarkable circular tour, from 0° to 180° east. The other half presents a more jagged coastline, deeply retracted from the imaginary circumference of the eastern arc. Opposite the uniform half circle are the continental masses of the world. Opposite the retracted half of the continent occurs the South Pacific Ocean, between New Zealand and South America, where by our theory the Moon was drawn forth.

The Antarctic continent, we surmise, must have been located north and east, and its south and west side was the limit of the exploded crust. Its north and east portion was broken off from the neighboring continents by the forking of the Atlantic fracture, east and west along the circular arc, and had just been isolated to its west and south by the lunar explosions. Forced down by the fracture and up by the new abyss, it settled centrally over the new South Pole, contained there by lava flows from all directions. Its slopes are heavy with debris, indicating that the separation and explosion happened when the continent was ice-free and/or that an ice cap, if there, melted catastrophically. The lack of fossils more recent than the Cretaceous in Antarctica seems to pose a challenge to short-term time reckoning in quantavolutionary theory. If the terminal Cretaceous was the time of lunar fission, however, the lack tends to confirm the theory. Thereafter Antarctica was isolated.

The puzzling fractures of the Pacific basin north of Antarctica invite puzzling quantavolutionary assumptions. The Nazca Ridge and its associated seamounts moving west off northwestern South America find their mirror image in the Tuamotu Archipelago far on the other side of the mid-Pacific Rise (Albatross Cordillera). Also the whole of the western coast of South America conforms in shape and fit to the same cleavage. The cleavage image is shifted southwest.

Are we seeing double? These features must have originated together. The Rise must have pulled away from South America faster than South America, impelled from the east by the Atlantic, moved to follow it. This is understandable if the Rise had no crust, but a yawning basin, to its own West; meanwhile it was being pushed reactively by its own east side lavas as these were blocked and pushed by South America.

Farther North, the Rise loses itself in the great transform fractures of what we call the Tethyan Belt and is then overriden by the North American continent which has been shifting southwest with the opening of the Arctic and North Atlantic Oceans.

A second matter calling for attention is the form of the fracture system: the ridges move rectolinearly with sidewise steps and with a great many perpendicular fissures. Perhaps the successive torques to which the globe was now being subjected shifted the main line of fracture. Every time there occurred a glitch in the crustal velocity of rotation, the main fracture line would shift to the East. At the new equatorial belt, a great shift to the East is observable. Several more 'glitch-points' occur before the fracture cuts through Africa-Antarctica and then, perhaps because the slowdown of rotation had terminated, the sidewise steps are no longer in evidence.

Nor are the transverse fissures any longer apparent. The long east-west fractures seem independent of the main ridge. Instead, passing now for the rest of its journey through evacuated surface, the major fracture, in its bifurcation, is accompanied by myriads outbursts of lava mountains, the seamounts. Seamounts occur in large numbers along the Atlantic ridge and in various evacuated regions of the basins. A close statistical analysis may ultimately use the seamounts as indicators of torque, time of fracture, velocity of the land masses, and other events, now quite obscure, of this period.

The striking conformity of the Mid-Pacific Ridge with the shape of South America and its passage beneath western North America persuades us that the original continental land on the east of the fracture is still there. But there exists no sial continent west of the Rise, that has any kind of morphological association with it. There is no well-defined boundary of the oceanic expansion to the west, nothing to compare with Euro-Africa on the other side of the Mid-Atlantic Ridge, no well-defined boundaries such as tie South America, Africa, and Australia to Antarctica. The "Circle of Fire," which marks an arc of volcanism and seismism from Southern Chile to the Aleutians and down through Japan, stops; so the Circle is not a circle and not a fitting image of the American side either. The morphology of the basin of the Pacific would be an incredible coincidence, a gross improbability, without our positing the disappearance of its entire crustal covering west of the Rise.

Attempts to produce a unified time-scale for the spreading away from the ocean ridges have not been successful. Heirtzler and his associates found that relative to the time scale for the spread of the South Pacific, the North Pacific time scale was in error by a factor of two. The principal technique employed has been potassium-argon radiochronometry. Nor do the spreading patterns moving from the ridges around the world agree on the location of the North Pole around which presumably they would evidence rotation. Still, because of similarities in the spreading pattern of widely separated regions, it is believed, and we think rightly, that the spreading of lava was a universally concurrent phenomena. The similarities, where they show a discontinuous floor-laying off of one ridge show the same off of another; such similar discontinuities connote simultaneity.

Earlier Cook (1963) had advanced evidence for the recent rupture of the continental crust that would probably have erased most of the perplexities just evidenced [4].

1. The uplifts observable in Fennoscandia and Northeastern America *"began at the same time and followed essentially the same relaxation equation.* This

equation, derived by Vening-Meinesz, is an *exponential rise equation characteristic only of a sudden unloading of the crust followed by a normal relaxation."*

2. The maximum depression at the center of the ice cap was along the seashore where presently stand Baffin Bay, Davis Strait, and Labrador Sea.

3. Without the missing land in these northern areas, no great ice masses would have collected: "the ice would simply have rolled off into the sea." The seas of the region could not have existed prior to 10,000 years ago.

4. The uplift data fits into the extended fracture that thereupon moves down the Atlantic and around the world.

5. The ice stored in the ice cap is calculated as equal to providing the water that would fill the Arctic and Atlantic basins.

6. A "Great Arctic Magnetic Anomaly" defined by E.R. Hope from the magnetic remanence of crustal rocks exhibits "a *surface* dipole magnet in the North Pole region." One apparent pole is in Northern Baffin Island, the other offshore from Severnaya Zemlya in Siberia. These two apparent poles appear to be at one and the same location, if the two separated lands represented are pushed back together at the location of the former pole. "In other words, it would only be necessary to return all the land masses in the northern hemishpere to their original position by reversal of the process described by Du Toit [the splitting and rafting of the Arctic crust] in order to completely remove this magnetic anomaly."

Two sets of conditions governed the occurrence of the world-girdling fracture and the Earth's expansion. The first condition of fracture is an unevenly applied pressure on a shell. The shell is the Earth's surface down to a level which presently can be called the Moho discontinuity but which in the Age of Pangea was the point when the coolness of the Earth's surface disappeared into the mounting temperature of the crust and mantle, caused by primordial rising heat convection from the center, by pressure from the rocks above, by radioactive flow blocked from emission by the surface charge of the Earth, and by the greater centrifugal force of rotating material of greater density than the surface material.

The unevenly applied pressure consisted of ice caps rapidly formed in the thousand years before by falling ice and icy waters; these did not need to be melted at the equator, then raised by evaporation, then blown to the north, and then dropped again. They contributed directly to the ice cap, and to such an extent, that shortly there formed a tall mass of ice covering Pangea around its North and South Poles.

If the Earth had not had its magma sources opened up by fission, fracture and expansion, it might have been frozen completely over. Great depressions were formed in the rocks, depressions which have still not relaxed after 12,000 years. This pressure was a mechanical potential exercised around the circumference of the ice bowls. The fact that oceans did not exist permitted a much greater piling up of the ice caps, for a deep water basin cannot hold the same amount of ice.

A second condition of fracture is a formation that can be split. Millions of geological faults of the Earth attest to the potentiality of rocks for splitting and shearing. If the body to be split is spinning, the slightest delay in spin along a line of fault will drive the one side of the fault away from the other side. The centrifugal force in the Earth's rotation achieves this.

The setting up of a massive horizontal circular pressure against weaker rock and the resistance of denser and stronger rock below incline the potential event towards a split rather than an implosion or collapse. The buildup of ice will continue until the horizontal walls will give way through folding and thrusting. But the ice mountain does not thrust over because it is sunken in, with the form of a cap.

The horizontal strain to the depth of the ice cap causes a continual heat at its edges. It leaks water, but accumulates more ice than it loses. The heat augments below, too, from the pressure of the ice upon the non-basic sedimentary rock and granites below. These grease the cap undersurfaces.

If there were now to be a sharp blow upon the center of the cap, the cap would crack radially. In addition the weakened crust beneath the cap would give way. The Earth's axis of rotation would be tilted to meet the first blow; the Earth's spin would take up a new figure with an axis towards the direction from which the blow came. The fracture would leap out of the blow and race around the globe in the manner described above.

All of these conditions were fulfilled. The blow struck. The hammer could have been a lightning bolt from an Intruder from the northeast. At a distance of a million kilometers, it began to agitate the space sheath of Earth. The axis of the Earth tilted to meet it. The bolt struck the ice cap and sent radial fractures in all directions. At the same time electro-gravitational force was applied, with particular stress upon the pole, wrenching the Earth by its cap against its rotational direction. Earth's rotational velocity slowed sharply.

All lines of weakness were stressed. The Globe shuddered from the blow and fractured deeply. The eastward rotation of the Earth sent the deep fracture rushing down the "Atlantic" and "Pacific" sides to the other end of the spin, the South Pole. The Intruder swooped closer and passed over the Southern Hemisphere, the "Pacific Basin," where it flayed the Earth of half its crust, and then passed on. The crustal debris shot up into space in pursuit. Most of it turned aside and became the Moon. Some fell back to Earth, now and in the succeeding years. After centuries of a ring of debris, the Moon was fully assembled. The Earth came to see the new great light and the Sun and other planets as well.

The globe was probably spinning east before and during its exoterrestrial encounter, and the Intruder apparently approached from the northeast. Thus a swath of crust was removed that began narrowly in the North, barreled out at the epicenter of the encounter in the Pacific Basin, and continued to explode for thousands of miles until it passed into farther space. The "crater of the Moon" was elliptic in form.

Because of its possibly being remembered and because of its continental geography, the great Rift Valley of East Africa might be recalled for discussion. Viewed from the south, it appears to begin where the Island of Madagascar was detached from the African continent, proceeds north, bifurcates, resumes a unified path and leaves the continent at the Afar Triangle, thence moving northwest below the Red Sea, bifurcating once more to pass up the valley containing the Dead Sea into Syria (where it loses itself in the jumble of mountains observing the burial of the old Tethyan Sea and Tethyan welt that is moving generally west and east; the western bifurcation is questionable, but is likely to pass across the Mediterranean, up the Adriatic, beneath the Alps, and out along the Rhine graben that ends far to the northwest beneath the North Sea.

Arabia fits cleanly into Africa across the Red Sea. Why the Rift should turn northwest at this point may be explained by the westward thrusting Gulf of Aden-Indian Ocean faults, which have sent out a powerful arm in this direction, thus reinforcing each other and cutting a neat right angle around the Arabian peninsula. The narrows where the Gulf of Aden enters the Red Sea are called Bab-el-Mandeb, the straits of tears, after the legendary devastation the rupture caused. The Olduvai Gorge and Afar Triangle, whose hominid fossils have been assigned ages up to 3.5 million years, sit upon the Rift Valley, which is kilometers wide and houses its own world beneath the towering plateaus and mountains abutting it.

Opinions differ as to the age of the African rift. That it has been active in human times seems evident from legends and excavations. Its origins have been set as far back as 2.7 billion years, however, by R.B.M. McConnell, speaking most directly of the 4000 kilometer section from the Red Sea to the Zambezi River [5]. He speaks of "transcurrent movement" between more ancient shield rocks, but also of "perennial" reactivation. So eminent an authority as Flint accorded the Rift an origin in the late Pleistocene, well within our ken [6].

If India and Madagascar were dissociated from the continent some 100 million years ago, as is currently believed, certainly the Rift would have been strongly activated then. Also, if Africa and the Americas had separated not long before that time, then, too, the Rift would have been agitated. The great platform that hovers above the Rift might represent the kind of worldwide swelling expounded earlier as an accompaniment of the general global cracking.

From the standpoint of this book, the arguments giving a long history to the Rift are worth no more or less than the arguments for long time-scales elsewhere in the world. In *Solaria Binaria*, which is primarily a work in astrophysics, the age of the Earth's rocks is put at less than a million years; in this work, which concentrates upon the recent reworking of the Earth's surface, we are not interested so much in the older rocks as in their recent upheavals.

In this context, we see the swift movement eastwards of the African continent and the lifting of its great southeastern plateau region as concurrent. The Rift had already happened; two masses were pulled apart in the global fracturing; but reactive pressures from the even larger fracture to the east, now below the sea, compressed the Rift and let the dropped rocks fall only a small distance before halting, trapped as they are today, covered with lakes, volcanic ash, and plains.

The Olduvai Gorge has been assigned 200 million years; it was then a late fault branching off the main faulting of the Rift. If it is so old, it becomes difficult to explain the hominid and mammal fossils protruding from its walls. They could not be cliff-dwellers; so the Gorge must be younger than they. How young they are is in question; the legends of heavy rift activity weigh upon our mind, and there is a variety of evidence that the hominids may be much younger, material that is treated by this written *Homo Schizo I.* The evidence extends to the Afar Triangle, a flat land-fill actually, born of the pull-out of Arabia, where related hominids are found. It also extends to the Palestinian portion of the Rift where Olduvai types of hominid sites are discoverable.

The Gulf of Aden and the Red Sea, we have said, seem to have been produced out of sharp lateral faulting shifting the end section of the Carlsberg Ridge of the Indian Ocean northward. This might indicate that the total area east of the Owen Fault Zone, including the African Rift-Gulf of Aden-Red Sea rift occurred at the time of or only a little later than the globe-girdling rift of which the Carlsberg Ridge forms part.

Further activities of the Rift advance into proto-historic times, particularly into the Bible. The occasion of the destruction of the Cities of the Plain, including the story of Sodome and Gomorrah (see below, Chapter 29), treat specifically of the same rift. M. Blanckenhorn placed the age of the Syrian section of the Rift in the early glacial period [7]. W. Irwin retrojected the influx of magnesium salts into the Dead Sea, on uniformitarian principles, and arrived at a 50,000 year approximation of its age.

Velikovsky gives several reasons for reducing this age drastically, and estimates both the Dead Sea and Jordan Valley have an age of 5000 years. In all the disastrous effects of the biblically described destruction, a sea is not mentioned; yet when the Israelites under Moses and Joshua arrived on the spot around 3450 years ago they encountered the Sea.

The Jordan River, argues Velikovsky, had changed the direction of its flow, too. "Prior to the Exodus, the Jordan Valley was on a higher level than the Mediterranean Sea. With the rupture of the tectonic structure along the river and the dropping of the Dead Sea chasm, many brooks in Southern Palestine which had been flowing to the south must have changed their direction and started to flow towards Palestine, emptying into the southern shore of the Dead Sea." Legendary references indicate that heavy bursts of lightning were involved in the production of fire, smoke, and sulphur, whether by cosmic stream injections in which the planet Jupiter (Marduk in Babylonian, Zedek in Hebrew) is insistently implicated, or by subterranean upheaval along the rift (by no means excluding an exoterrestrial prime mover).

Allowing therefore that some of the major rifting of the Earth occurred as late as several thousand years ago, we conclude this chapter. All of the great rifts of the world are connected in time and by cause. They form a system that harnesses the world to the recent fission of the Moon. The individual histories of the sections of the world fracture system are insignificant by comparison with the common historical experience of the whole. The system functioned to balance the world by redistributing the crust and by expansion and to vent gases and heat during the process. The climactic event was tangibly sensed by the Pangean Earth days in advance; it occupied a day in establishing the new morphology of the Earth-Moon system; thousand of years were required for its major effects to devolve into the processes recognizable in the world today.

Notes (Chapter Twenty-two: Fractures and Cleavages)

1. Beaumont, *op. cit.*, 190, 197. For Baker see the preceding chapter.

2. V *S.I.S.R.* 2 (1980-1) Discussed by Warlow, 34-5.

3. Genesis I:9 and fn *Oxford Annotated Bible* (NY 1965), 1.

4. 40 *Proc. U.A.S.A.L.*, part I, *op. cit.*, 74-7, also in *Prehistory...*

5. R.B. McConnell, 83 *Geol. Soc. Amer. Bull.* (Sep. 1972), 2549-72.

6. *Glacial Geology*, 523; *Glacial and Quaternary Geology* (1971).

7. Velikovsky, "Destruction of Sodom and Gomorrah," VI *Kronos* 4 (1981) 49, and see the accompanying note by Frederick B. Jueneman; also J.E. Strickling, "Sodom and Gomorrah," 2 *S.I.S. Workshop* 4 (1979), 3-5.

CHAPTER TWENTY-THREE

CHANNELS AND CANYONS

The model river channel combines the history of an earth fault, a catastrophic torrent, and an erosional runoff bed. Most large rivers, perhaps all of them, are children of Okeanos, whom the Greeks called "the Father of Rivers" who personified the sky waters before the first deluges, as we said in Chapter 13, and then came down to Earth. His children carried his waters into the new ocean beds.

Many myths appear to conjure rivers where none exist, and, of course, a great many dry river beds of once tremendous rivers are to be found around the world. During the Universal Flood of Deucalion, a small chasm was said to open in Athens into which the waters emptied. According to Lucian the people of Hieropolis (near Aleppo, Syria) "say that a great chasm opened in their country, and all the water of the flood ran away down it." Again, myths warrant hypotheses. In the Volta River Project (West Africa), a onetime shallow river bed was suggested by a deep river bed with a jagged bottom. Local legends spoke of upheavals in the now quiet area, and when the water was lowered prior to constructing a dam, several protuberances became islands, and at a depth of 35 feet revealed carvings whose age was estimated at 3000 years [1].

The Po River is probably an extension of the African-Rift-Red Sea-Rhine rift valley that connects with a buried rift in the Adriatic Sea. It carried down the immense debris of the sudden uplift of the Alps. It may be the ancient sacred river, the Eridanus, of Greco-Roman legend, long-lost because later a sea. The Po serves in truncated form to water and drain the Po Valley. The Rhine River picks up the graben northwest of the Alps, and moves it far out into the North Sea; not long ago, it shared its burden with a westward flowing river that was then naturally dammed so as to reduce the Loire River of France to more modest proportions.

The Colorado River may be a ramification of the East Pacific Ridge, that runs up the Bay of Lower California and strikes through the desert into the raised platforms of the southwestern states, abetting the disintegration of the Rocky Mountain uplift; once its tectonic work was done, it began its present work of erosion.

The great rivers of China flow in the direction they do, says a Chinese myth, because the goddess Niu-Kwa made the waters of the great flood stream off towards the southeast; the whole Earth had tilted and sunk into the sea there [2]. Most great rivers of the world understandably conform to the processes set into motion by the lunarian outburst. Many hasten along courses conveniently provided them and their tributaries by fractures, the Rhine, the Colorado, the Susquehanna, the Indus, the Congo and others.

In decoding the natural history of river beds, geologists fighting the ghosts of catastrophism have refrained from extremes. M.G. Wolman and 3.P. Miller in 1960 essayed an analysis of the "Magnitude and Frequency of Forces in Geomorphic Processes."[2A] Using mainly four rivers as their cases, they conclude that "dwarf" gradualist forces operate steadily to perform most transport of sediments, that "man-sized" moderate forces of brimming "bankfull" waters supplement the "dwarf" work in carving banks and valleys, and depositing sediments, thus accounting for perhaps 90% of the changes effectuated. The rare work of "giants" make up the balance, including many switches off channels and movements of erratic boulders.

Unfortunately they lack respectable data over time even for these "giant" events, which they estimate at 50-year intervals; yet they call them catastrophes. Like the experts on seismism, their extremes are historically confined to what noone doubts have been uniformitarian times. Of course, then, they must pass over with the weakest of scenarios the grand metamorphism and concentrate upon pygmy processes playing out recent history. They realize that they are dealing with exponential, logarithmic processes, but excise the peak curves. In the only concession to longer history, they murmur at one place about "materials inherited from a period of greater stream competence which possibly existed during glacial times." As we have noted, "the end of the ice ages" is a cover-up fiction of all that has happened to the lately tortured Earth.

Not alone of river channels do they speak but also of beaches and winds. With regard to beaches they introduce the commonly accepted concept of an "equilibrium profile." It is "an average form around which rapid fluctuations occur. Waves from storms may periodically destroy the equilibrium form, but over a period of years there is an average equilibrium profile by which the beach may be characterized." The more meaningful question is where does this profile come from in the first place - these millions of profiles, we should add, unique in themselves but in distribution worldwide? Where is the "supergiant's" place, that smashed out the profile to begin with, in the analysis and theory. As for the effects of winds upon river and beach morphology, many analyses, they say, "indicate that a log-normal frequency distribution of wind velocities is a general rule." The log-normal winds, like log-normal river flows and sea waves are what recent experience and the authors give as "log-normal"-curves that rise scarcely enough to make their uniformitarian hearts skip a beat.

Their last paragraph is naive, but so unconsciously significant as to be worth quoting:

> Perhaps the state of knowledge as well as the geomorphic effects of small and moderate versus extreme events may be best illustrated by the following analogy. A dwarf, a man, and a huge giant are having a wood-cutting contest. Because of the metabolic peculiarities, individual chopping rates are roughly inverse to their size. The dwarf works steadily and is rarely seen to rest. However, his progress is slow, for even little trees take a long time, and there are many big ones which he cannot dent with his axe. The man is a strong fellow and a hard worker, but he takes a day off now and then. His vigorous and persistent labors are highly effective, but there are some trees that defy his best efforts. The giant is tremendously strong, but he spends most of his time sleeping. Whenever he is on the job, his actions are frequently capricious. Sometimes he throws away his axe and dashes wildly into the woods,

> where he breaks the trees or pulls them up by the roots. On the rare occasions when he encounters a tree too big for him, he ominously mentions his family of brothers - all bigger, and stronger and sleepier.

In their last sentence, they suggest the truth as in a dream. This should be the extreme dimension of their theory, accounting for the largest facts before their eyes. Thus the larger catastrophic origins of the morphology under examination are excluded.

A century ago, geologist Clarence King was describing the river system of the Pacific coastal area of the United States [3].

> A most interesting comparison of the character and rate of stream erosion may be obtained by studying in the western Cordilleras, the river work of three distinct periods. The geologist there finds preserved and wonderfully well exposed, first, Pliocene Tertiary river valleys, with their boulders, gravels and sands still lying undisturbed in the ancient beds; secondly, the system of profound caZons, from 2000 to 5000 feet deep, which score the flanks of the great mountain chains, and form such a fascinating object of study, and not less of wonder, because the gorges were altogether carved out since the beginning of the glacial period; thirdly the modern rivers, mere echoes of their parent streams of the early Quaternary age. As between these three, the Early Quaternary rivers stand out vastly the most powerful and extensive. The… present rivers are utterly incapable, with infinite time, to perform the work of glacial torrents. So, too, the Pliocene streams, although of very great volume, were powerless to wear their way down into solid rock thousands of feet, at the rapid rate of the early Quaternary floods. Between these three systems of rivers is all the difference which separates a modern (uniformitarian) stream and a terrible catastrophic engine, the expression of a climate in which struggle for existence must have been something absolutely inconceivable when considered from the water precipitations, floods, torrents, and erosions of to-day.

> Uniformitarians are fond of saying that give our present

> rivers time, plenty of time, and they can perform the feats of the past. It is mere nonsense in the case of the cañons of the Cordilleras. They could never have been carved by the pygmy rivers of this climate to the end of infinite time. And, as if the sections and profiles of the cañons were not enough to convince the most skeptical student, there are left hundreds of dry river-beds, within whose broad valleys, flanked by old steep banks and eloquent with proofs of once-powerful streams, there is not water enough to quench the thirst even of a uniformitarian. Those extinct rivers, dead from drought, in connection with the great cañon system, present perfectly overwhelming evidence that the general deposition of aerial water, the consequent floods and torrents, forming as they all do the distinct expression of a sharply-defined cycle of climate, as compared either with the water phenomena of the immediately preceding Pliocene age or with our own succeeding condition, constitute an age of water catastrophe whose destructive power we only now begin distantly to suspect.

These passages, according to the model for which we are groping, refer to the three phases of recent quantavolution. The Pliocene river beds represent a period of increasing disorder and deluge in the world for about two thousand years prior to the climactic lunar fission. The awesome dead rivers of the Early Quaternary are relics of the phase of mountain thrusting, westward movement of the American continent and the deluges associated with it, which broke down and flushed away the elevated landscape onto the shelves and slopes along the Pacific scarp. The rivers of the American heartland do not exhibit so obviously the recent catastrophic forces. Still, in the late Pleistocene, both the Mississippi and the Ohio rivers changed their courses markedly along an east-west axis, provoked by great seismism [3A], and watched, most probably, by awestruck humans.

Today's third phase finds "pygmy" rivers, many in new channels, watering and draining the country. We group all three phases in the latest of holocene period of the past 14,000 years. "Nothing comparable" with the second phase river action, "ever now breaks the geologic calm," writes King. Then, with prescience of the concept of "collective amnesia," he adds that the idea of "catastrophism is therefore the survival of a terrible impression burned in upon the very substance of human memory."

Some rivers possess drowned deltas of enormous proportions. The collision of India with Asia produced, besides the Himalayas, two equally large-scale, if less visible, phenomena in the deltaic fans of the Indus and Ganges River. These stretch into the Indian Ocean, one to the west, the other to the east of the subcontinent, covering with detritus ocean basin areas together as large as India itself. Like the raging torrents of yesterday in North America, these great transporting systems are today inactive. Although the rivers still carry two of the largest flows among all of the world's rivers, they are, as King would say, "pygmies" compared with their ancestors, their "fathers," or "holy fathers" at that, because all of this work that conveyed the tumbling slurry from high places for hundreds and thousands of kilometers had to do with mountains and plateaus just created. There stand no millions of years behind these works of nature.

It would seem appropriate to pass from the subject of rivers to that of undersea canyons by way of the most famous of natural monuments, the Grand Canyon of the Colorado River. Grand Canyon is a monument also to deceased uniformitarian geology. It is so well-studied and rationalized, with long-time-term reckoning, that every geologist is expected to recite its history liturgically. Not so Cook, nor Kelly and Dachille, nor the present writer.

Conventionally, following Woodbury, Shelton, and Redfern, we commence with an age approaching two billion years ago. Radiochronometry supports the great ages found in the canyon. The canyon proper is allowed an age which Derek Ager, for example, sets at ten million years, but, pursuing a negative exponential principle, gives one million years to the mere latest fifty feet of erosion [4]. (That is, a practically catastrophic rate is seen to have occurred at times.)

The floor of the Grand Canyon complex is an unknown material supporting what is called Vishnu schist, composed of mud, sand and lava. Thereupon the miles of sediments begin to pile up, most of them now missing, and probably eroded, but today some three miles can be accounted for: one in the bottom and main canyon itself, a second mile from the brink of Grand Canyon to the top of Zion Canyon, and a third up the face of the higher plateaus to the top of Bryce Canyon. Wind and water bring in the sedimentation layers. Many in variety, several distinctive deep beds of schists, sandstone, limestone and shale compose the great bulk of deposits. Discoverable in the series are ten major unconformities and many minor ones, where intervening layers existed and were worn away before being covered by new deposits.

The area was uplifted and submerged a number of times with relation to the seas around. Some lapses in the record are so prolonged that whole mountain ranges on site could be worn down and planed off by erosion, succeeded by new tall deposits. Fossils of algae, primitive and later vertebrates, fishes, and footprints of amphibians are discovered in ascending. Fossil trees, fishes and reptile tracks are found in higher Triassic rocks. The fossil record stops at the Eocene epoch of the early Cenozoic (recent) era. In the Cenozoic, the entire region was uplifted from near sea-level to the present elevation. During uplift periods the Colorado River system has washed away materials and cut the gorges. So goes the gradualist solution of the Grand Canyon scene.

The quantavolutionary view, as may be supposed, stresses high energy forces, fractures and quick deposition. "Many of the pools and rapids in the Grand Canyon are located where the river crosses regional and local fracture zones."[5] Cook points out that the Canyon is narrow at Supai Village and that the gorge appears to have ruptured open in a brittle fracture. The Grand Canyon, as was mentioned earlier, is perceived as a branch of the earth-girdling rift system; numerous other branches of the fracture system are observable north and south of Grand Canyon also. All of this occurred when the continent was thrust westward over the Pacific Ocean rift and the ocean rift fractured the continent. A number of orthogonal embayments of the Canyon are perpendicular to the main fracture or canyon, and these have been filled with debris from the outpouring of temporary great inland lakes known to have existed in the region.

The three miles of sediments, all heavily fractured, were products of overthrusts from afar and of great slurries that brought in and laid down beds of fossiliferous sand and mud. Speaking of the sediments of hundreds of feet, "if all this was a very slow process requiring millions upon millions of years, how did it happen that the rivers carried nothing but clay for millions of years and then suddenly changed to sand?" And "nowhere today do we find rivers producing deposits of such uniform nature..."[6] The erosion was generally prompted by heavy seismism. The fossils found in the beds would have quickly disappeared if they had not been buried in sudden local and general disasters. The radiochronometry employed is of dubious validity, or, let us say, requires a specific set of challenges going far beyond these rudimentary paragraphs. All may agree that in the deep non-marine but water-deposited Eocene limestones of Bryce Canyon may be found some excellent carvings.

Grand Canyon would be a minor feature of the continental slopes of the ocean and a minor canyon among submarine canyons. Even the Hudson River possesses one as awesome; it proceeds underseas for hundreds of kilometers, first cutting into the continental shelf, and then extending down the continental slope to the abyssal plain of the ocean, 4.5 kilometers below sea level. The difference is not that the one has grown sub-aerially and the others aquatically; both types have been sub-aerial for all their active lives. The seas encroached as the lunarian period created the sea basins, slopes, and canyons. Grand Canyon and several other such remarkable sub-aerial features are of the ilk; a comparison of a profile of Monterey Submarine Canyon (California) and of Grand Canyon [7] reveals very close similarities and indicates strongly a common ancestry.

Scores of impressive submarine canyons extend the courses of rivers around the world. The idea that they were once active as rivers was resisted for a generation. In 1936, Francis P. Shepard could formulate the predicament, which still stands unresolved [8]:

> Investigations of submarine canyons carried on for a number of years with the cooperation of the Coast and Geodetic Survey, the Geological Society of America, Scripps Institution and other organizations have revealed

> that these sea-floor canyons have all the characteristics of river canyons and are distinctly different from fault valleys. Also tests of the idea that the submarine canyons might be the product of currents have produced negative results so that they have evidently been cut by rivers. The significance of this sub-aerial erosion on the present sea-floor is particularly disturbing, since the submarine canyons extend out to depths of from 2,000 to as much as 10,000 feet and are found off practically every coast of the world. Also all available evidence favors a Pleistocene age for the canyons. Accordingly, there is the implication that the coasts of the world were greatly elevated above their present positions during the glacial period. That all the continental margins both off stable and unstable coasts could have been subjected to such movements in comparatively recent times is scarcely credible. The alternative that there have been sea-level changes connected with the cause seems much more reasonable. Such changes are indicated not only by the submarine canyons but also by many of the phenomena of coral reefs and by oceanographic data from various parts of the world. The only cause of sea-level change which does not meet with almost insurmountable objections is that of glacial control. It seems quite possible that the continental glaciers during some of the earlier glacial epochs may have been sufficiently thick and sufficiently extended to have allowed a lowering of 3,000 feet or more. While such a lowering was probably insufficient to account for the deeper canyons it is felt that it would have resulted in the development of a universal canyon system which, connecting with much older sunken canyons in some places and modified by subsequent sinking elsewhere, would account for the present situation.

The world would have to be a great ice mountain to provide such waters. The waters had to come from elsewhere, and be accompanied by great tectonism. We hold rivers to be based upon faults.

In the same year, geologists Harry H. Hess and Paul MacClintock presented a striking solution. They saw in the canyons evidence of recency, a late Pleistocene age, of suddenness of creation, and of worldwide simultaneity. Here are the three primary tests of quantavolution, all passed by the submarine valleys. Then they are compelled, with reluctance, apologies, and special consultation with H.N. Russell (who advised against it), to advance the quantavolutionary mechanism, exoterrestrial encounter. The passages deserve quotation [9]:

> The valley-cutting conditions resulted from a sudden change in the shape of the hydrosphere, depressing sea-level in low latitudes, raising it in high latitudes; in other words, a change in the ellipticity of the sea surface. At present we can think of no orthodox cause for this change... However, a speculation comes to mind; if a sudden decrease in the rate of rotation of the earth took place, the hydrosphere would respond by being drawn into polar latitudes. The solid body of the earth would less rapidly adjust itself into a new spheroid in equilibrium with the slower rotation, which adjustment, when complete, probably would restore sea level to approximately its present position. But during the adjustment, it is postulated that there would have been time enough to allow rivers to cut valleys on continental slopes. While of course we do not know what could have caused the sudden change in rotation, it is conceivable that a collision with a small extra-terrestrial body would be competent to produce the effect.

The authors then sought for evidence that the depths of the canyons would decrease from the equator to the poles, and, second, that there would be found high marine terraces in the northern latitudes where the shores would have been temporarily flooded. Indications of both were deemed favorable.

The failure of theory to move along such lines is unaccountable, except in terms of the psycho-sociology of science of which we speak in the *Velikovsky Affair* and The *Cosmic Heretics*. Many years later one reads in a study by Landes approvingly [10]:

> I claim that the finding of graded clastics and misplaced (shallow-water) faunas deep beneath the sea is *not prima facie* evidence that they were carried there by turbidity currents: that the finding of cobbles does not prove that

> they were transported by submarine landslides; and that photographs of ripple marks lying at a depth of 4,500 feet do not necessarily mean that they resulted from current action operating at depth... I likewise believe that deep-sea-floor current ripples, like the truncated seamounts, are relics of shallower water.

At this point, Landes should be looking into the ancestral skies. Instead he suggests that the deep ocean basins might once have been over 20,000 feet deeper. Even this idea might lead somewhere, but, instead, the *ad hoc* argumentation that so often passes for geological theory obtrudes; when in trouble, call upon isostasy, diastrophism, time, lifting, and, as here, sinking, and thus by name-calling the problem is solved and the matter ends; the data are not pushed to their ultimate meaning.

Landes writes: "What manner of logic allows us to accept evidence, such as marine strata, of a sea-level far above present datum of 25,000 feet, but causes us to run from evidence of a sea-level depression of 25,000 feet?... What is so sacrosanct about current sea level?" The trouble here is that the logic is not good enough. One ought not to have indulged in the notion of a sea-level 25,000 feet higher because of the marine fossils up there, especially while he was laughing over Noah's Ark. Furthermore, the present sea bottoms and therefore sea-levels can be depressed by another 25,000 feet, but again no mechanism is perceived.

He, and others, should be asking the deeper questions: "What are these deluges that humanity has been clamoring about since the dawn of history?" "Must every drop of water bear the holy stamp, 'Made on Earth'?" "How long does it take a pre-designed fracture trough to make a river channel, complete with fractured and non-fractured meanders? .... What is so sacrosanct about the ocean basins having always been filled with water?" I think that we have progressed far enough along in this book to dispose readily of the submarine canyon problem. The canyons were instantly created great river courses that rushed down, first, precipices, then, steep slopes, then gradual slopes, into the ocean basins that were only partly filled with water. Drainage of the water-logged continents and successive deluges filled the ocean basins to overflowing. As the seas encroached upon the rivers, the rivers were also receiving far less water to give to the sea. The underseas box-like, sluice-like channels ended their careers as turbulent rivers within perhaps two thousand years.

They have not filled with sediments. Gross, in his *Oceanography,* says that submarine canyons would soon fill up if they were not being emptied by turbidity currents. Geology has invented some bizarre mechanisms to circumvent catastrophism and here is one of them: turbidity currents. They have never been actually observed; they are "intermittent;" they are caused by earthquakes; they have speeds of 20 km/hr; they account for anomalous continental sand and fossils found on the ocean floor. A rare study assigns them credit for having broken a trans-Atlantic bottom cable. (Still, no one denies seismism.) Would not such currents act as bulldozers instead of sweepers, and fill, rather than clean out the canyons? Our quantavolutionary theory is adequate for all that bespeaks turbidity currents, including the oceanic sands and fossils.

A question remains to perplex: if the continental blocks were meanwhile rafting over long distances, would they not have left behind their detrital slopes? The slopes would then be flat and spread over the abysses. A logical answer is available here, too. We have but to recall that the continents travelled because they were both pulled and pushed. If they had been only pulled they would have left their ocean moraines behind. But they were standing on a kind of conveyor belt, as has been said by Harry Hess and others, and their slopes moved right along behind them; the belt was being pushed by the lava currents issuing from the ridges, fissures, and volcanos. Anyhow, the canyons were working rivers after the continents ceased to move rapidly, and before new ocean waters drowned them.

In concluding the chapter, a few words may be in order on the more puzzling problem of the deep sea trenches. These deep, narrow and often long slits in the crust are found in various regions but are especially prominent around the Pacific. There they gash the sea floor off of South America, Central America, the Aleutians, Kuriles, Japan, the Philippines, Java, and various island fronts, including a long stretch north of New Zealand.

In a typical large trench, a depth of ten kilometers is precipitously achieved, with a slant toward the continental rock against which it is emplaced. Its sediments are shallow, its walls bare. Trenches were never rivers. A function for them was hard to discover until the tectonic plate theory of continental drift went shopping for its mechanism. Then it occurred that the ocean floor being made at the ridges had to be disposed of somewhere else, if the world was not expanding. For lack of better, the trenches became locations into which the sea floor plate crept upon encountering another plate, thus disposing of itself tidily. The next chapter will handle this theory, but we cannot leave the trenches without an explanation.

Trench walls are igneous for the most part, straight, and nearly vertical, like fault scarps, say Heezen and Hollister about the Puerto Rican Trench. They belong to the period of great disruption. Their oceanic sides abut continental walls that are much taller and deeper; the connection between the two may not be binding in many or any trenches. The continental wall is of varying chemical composition; the oceanic wall is purer basalt of the mantle. They heat and expand, cool and contract at different rates. The gap or trench may occur as a pull-back of the oceanic basalt or the continent, a drop fault where nothing drops. "The crustal block which forms the floor of the Puerto Rico Trench resembles the dropped keystone of a rising ramp, which once bridged the transition from the thin oceanic crust to the thick foundation of the island arc."[11]

Sediments of the trenches are scanty. The same writers say: "It is a general lack of sediment accumulation which is the most notable feature of all the deep-sea trenches. This lack... demands a recent origin of trench topography."[12] Recent must mean holocene or pleistocene, it appears. But now, the plate tectonicists chase in full cry after the trenches as fulfilments of the need of convection cells and subduction of continental and oceanic material. Are trenches barren because they appeared lately or are they barren because they have just digested hearty meals of sial?

Notes (Chapter Twenty-three: Channels and Canyons)

1. Anon., 229 *Nature* (5 Feb. 1971), 371.

2. Bellamy, *M.M.M*., 261-2.

2a. 68 *J. Geol.* (1960), 54-74.

3. 11 *American Naturalist* (August 1877), 449-70.

3A. A.C. Johnston, "A Major Earthquake Zone on the Mississippi," 246 *Sci. Amer.* (Apr. 1982), 60-83.

4. *Op. cit.*, 48.

5. R. Dolan, A. Howard and D. Trimble, "Structural Control of the Rapids and Pools of the Colorado River in the Grand Canyon," 202 *Science* (10 Nov. 1978), 629-31.

6. Kelly and Dachille, *op. cit.*, 113.

7. *Ibid*., 81.

8. 83 *Science* (May 22, 1936), 484.

9. 83 *Science* (1936), 332-4.

10. Reprinted in W. Corliss, compiler, *Strange Planet* (Glen Arm, Md: Sourcebook Project) vol. El, Doc. ETS-002).

11. *Op. cit.*, 490, 467-9.

12. *Ibid*., 483-4.

CHAPTER TWENTY-FOUR

CONTINENTAL TROPISM AND RAFTING

A Texas association proclaims the slogan "Stop Continental Drift," in its attempts to foil the trend to believe that the Earth's crust has been, and is, in motion. The crust is thin below the ocean bottoms and thick beneath the continents. It is broken up into a dozen major plates whose boundaries are defined by faulting, heat, and turbulence. The plates show signs of having moved great distances over time. Most scientists have been converted to this mobile perspective from a static one during the past generation. "We now have a new, mobilist orthodoxy, as definite and uncompromising as the staticism it replaced." So writes Stephen Jay Gould in *Natural History Magazine* [1].

Now and then, goes the theory of continental drift - that is, every couple hundreds of million years, the plates renew themselves. The continents do not. They may be split asunder, or bash their fenders, but they move on and on, majestically riding upon the same material, their own mantle magma.

They carry a two-billion-year record of life, while the ocean bottoms have deposited their sediments periodically beneath the sea shores of continents, or beneath other plates which they may be jostling, so that now they carry no more than the last 160 million years of sediments. The plates are pushed around, it is said, by convection currents. These are hot rock moving up to the cooler surface areas and pushing them aside until these bump into other plates which are being also pushed; then they are forced to descend (or force the other plates to descend); they melt once more and become deep mantle material.

Much of this theory is incredible, we shall argue. We accept gladly the facts that the continents were once together and then moved long distances and still exhibit minute motion. We accept also the facts showing the ocean bottoms to be geologically very young. Several other facts are grist for our mill, and some minor theories are also credible; we have mentioned several of these and will mention others. But we shall concentrate upon the quantavolutionary theory that an exoterrestrial catastrophe brought about the movements of the Earth's crust recently, and we begin with the most obvious fact in topography, namely that the continents of the Earth are concentrated opposite the oceans. "This means that 82.6 percent of the total continental area is antipodal to oceanic area."[2]

So saying, C.G.A. Harrison goes on to describe how, on a computer, he rotated randomly coordinates representing the continents on a sphere, in order to discover how often the actual antipodal percentage would appear. He simplified the continental areas into circles and fed their numbered forms into a computer which then randomly placed them to see how much land would be antipodal to oceanic area. He repeated the random placement 2000 times. "The median percentage of continent opposite ocean to be expected from a random distribution of circular continents is 68.0 percent of the continental area. The observed figure of 82.6 percent is exceeded in... 9.6 percent of all cases. Thus from this evidence alone it would appear that there is a probability of only 0.096 that the present distribution of continents is random over the surface of the earth." He repeated the test with triangular instead of circular simplifications of the proper areas and the results were similar. He concluded that "there is less than 1 chance in 14 that the present antipodal distribution of continents and oceans is the result of a random process."

This is hardly surprising. If the Arctic-Atlantic ocean were closed up, if Australia and Antarctica were fitted to their apparent points of departure from southern South America and Africa - that is, if the continents were rendered into a single mass as they appear to have aggregated before the present age of "drift" began, then all of the existing continental land would be antipodal to oceans.

The implication is strong that before the drift began, the ocean areas were in fact land-covered. The major differences between the Pacific Basin and the other oceanic basins, we have noted, indicate that continental material was blasted out of the former and pushed aside from the latter. The movements of the continents since this time can be interpreted upon the premise of a sudden removal of over half the Earth's crust in what is mostly now southern hemispheric ocean. The land of both the eastern and western hemispheres has traveled towards this vacated area. So have Australia and Antarctica.

The so-called plate movements have not been random, nor can they be interpreted in any other way. The continents all exhibit "lunagenic tropism" and nothing much else. They have moved in the particular direction of the lunar-vacated, now south-central Pacific Basin under the special stimuli of global fracturing, electrogravity slide, earth expansion, hydrostatic equilibration, and isostasy. We define isostasy here (and elsewhere) as the process by which all mutually affected elements in a system, consequent upon any change in one of them from within or without, share the effects of the change by changing themselves in closest accord with their peculiar sites and natures. When a change is introduced to Earth from outside, all possible responses of the Earth's motion and masses are drawn upon to incorporate its effects and to do so in accord with their ranked most possible behaviors. Isostasy has to have a function; in the great post-lunar diastrophism, isostasy functions as a tropism. It moves the continents not randomly, nor to the poles or the equator, nor to gather surviving animals for the Ark, but to repair and redress the lunagenic basin.

Propelled by three rifts in all and with a blasted out area east of it, the exception to lunagenic tropism would appear to be the Indian subcontinent. India moved east faster than Africa. But since the continental world was moving generally south as well as east, why did India move north? Relatively Eurasia was moving south, and this is part of the suggested answer. Also India and Australia were simultaneously and together disconnected with a large land mass from Africa and Antarctica by the Atlantic-Indian and Mid-Indian Ocean Ridges; India was simply at the northern end of a plate and could not pivot southwards; northward lay the old Tethyan Sea region, which was now being compressed and closed up. India was pushed by the largest expansive fracture complex per land unit: this "lava grease" worked upon it like the currents of a powerful river moving a raft downstream. When it arrived at the southern shores of Asia, it encountered the Tethyan shear with weakened rocks and islands, all of which it overran, thrusting and folding its edge over them until the Himalayas were produced, meanwhile elevating, with an assist from the swelling mantle, the great Iranian plateau area. (Two surviving races, one African and the other Indo-European or Tethyan, found themselves on opposite sides of the great mountain mass. They encountered one another thousands of years later, when the Proto-Indian civilization was battered by natural disaster and the Indo-Europeans came down from the Plateau.)

The low continental Pangean mass to the south and east ultimately was partly flooded by the waters of the sky, never to reappear again. Higher elevations constituted the South Seas islands of today. This can be called Australasia. It is a land that has the Tethyan shear and moon basin through its northern belt, the northern trans-Asiatic rift to its west, and the South Pacific fork moving eastwards and finally up to mark its southern and eastern limits.

The northern extremity of Pangea was depressed originally by the ice cap and is still rising, although at a decelerated rate. The fjords mark sheared continental mass, sharp, clear, new; the low-lying lands that compose the great flat watery islands and the Arctic Sea (which is mostly continental) signal the former land mass under the ice cap load. Some of it was additionally compressed by the new ice cap formed in the Age of Jovea.

The Antarctic Sea was opened up at the south polar forking fracture, and the Antarctic continent, denuded of ice, was pushed southwards to center upon the new south polar axis. It, too, received a new ice cap beginning in the later "Age of Jupiter," but, to follow Hapgood's "Maps of the Ancient Sea Kings," possibly not until exploration, after a period of civilization, when maps of the coastline were drawn to a considerable degree of accuracy.

Some 450 specimens were recovered at Coalsack Bluff, Central Transantarctic Mountains. Found there were terrestrial amphibians and reptiles of lower Triassic, typical of the same age in Africa, India and China, especially genus *Lystrosaurus*. These creatures had no "long way around." "The interchange of Lower Triassic tetrapods between Africa and Antarctica could have been only by a direct ligation of the two land masses," probably at Southeast Africa [3]. The Labyrinthadont, the first land vertebrate to be found in Antarctica, has also been found in Africa, South America, and Australia [4]. Marsupials are now placed in South America, Antarctica, South Asia, and Australia.

The infinitely complex faulting of the Earth's surface rocks, aside from the major morphological transformations, is an expected phenomenon of the multiplex pressures of rafting land masses. Additionally, the phenomenon expresses surficially what were more profound upward pressures during the Uranian period. The "latest" evidence supports Alfred Wegener's view that the continents moved only once, this in the Mesozoic, and that there were two continental masses, one to the north and the other to the south [5]. These "findings" are expected in our theory. The Tethyan equatorial waters of Pangea probably are the source of the belief that there were two masses. As for the Mesozoic, 65 to 225 million years ago by conventional reckoning, this period is being rapidly invaded by similar species from both directions, but there may have been a period of terrestrial isolation when the Tethyan waters intervened.

If the continents split asunder or were "born separate" and moved several times, there should be abundant evidence of the events. There is little fresh data on this score. The most prominent basin, the Pacific, hardly gives evidence of having been traversed by continents, though they all drift toward it. Mostly, old theories of the lifting and dropping of land during ancient orogeny have been dusted off and varnished to claim the several periods of movement. Fossil ice ages have been claimed, too, as proof of former dislocations of the continents, but these have been embarrassments to ice age theory from the earliest discovery of pertinent evidence; the presence of pebble drift and till, and of glaciers or high mountain freezing may be referred to dense material fall-outs such as were discussed earlier.

"In the whole of geophysics," Defant once wrote, "there is no other law of such clarity and certainty as that there exist two preferred levels in the Earth's crust."[6] Continents are like ships in a frozen sea. "The continents, steep-sided massive blocks surrounded by an enormous world-encircling sea, have deep roots which project 30,000 or 40,000 meters into the earth's mantle while the ocean crust is but a thin 5000-meter-thick film frozen over the earth's massive mantle." Thus report Heezen and Hollister. These continental blocks, I have maintained, are splittable only by a great external force and a responsive expansive force, while the ocean basins are easily producible by fissure volcanism.

The post-catastrophic process is followed by a rapid relocation of the continents and reencrustment of the globe. The continents were not "just drifting"; they "were going somewhere." A.L. du Toit was veering toward reality when he offered in his early (1937) book, *Our Wandering Continents,* the idea of a "gravity slide," the creeping of continental masses toward rimming geosynclinal depressions. He gave at the same time perhaps too much encouragement to the idea of thermally driven currents in the mantle. These were, as we may establish, an accessory after the fact.

When F. Tuzo Wilson, reviving du Toit, and the spirit of Plato's ancient words for that matter, exclaimed, "the earth, instead of appearing as an inert statue, is a living, mobile thing. The vision is exciting. It is a major scientific revolution in our own time...,"[8] he was thinking of continental drift but could better have been speaking for a continental trot, or rafting, or lunagenic tropism of the continents.

Continental drift theory has invented convection currents to move the Earth's plates with whatever continental land may be aboard on long journeys over the Earth. The convection currents cycle vertically between the mantle below and the crust above; the currents push the plates about the surface like the uplifted trays of waiters in a crowded café, except that waiters as they weave and duck are known to descry paths between the bar and the tables, while noone can even guess why the convection currents go one way or another, if indeed they exist. For example, Harrison, after proving that a non-random process had to account for the counter-oceanic distribution of land, mentioned large-scale convection currents in the Earth's mantle as a possible cause. This seems to put too much directiveness into convection currents, which are already overloaded with the task of pushing huge tectonic plates around the globe. A better hypothesis would have been "lunagenic tropism," the tendency of the continental land to move toward the crater of the Moon and to fabricate new crust in compensation for the excisions. Still, the convection current hypothesis is worth considering, if only because at the moment it is the height of fashion in geophysics.

Tall mountains, a trillion geological faults, islands, bays, and most other morphological irregularities denote that the continents were not peaceful bystanders to the creation of the oceans. The Earth is slightly flatter at the poles than its present rotational velocity would explain. The difference is 1%, which is a disappearing relic of the period of rotational deceleration. The great depressions found in the Hudson Bay, Greenland, and North Eurasian areas, which when refitted, fit the shape of the destroyed ice cap, are also relics of the lunarian crisis.

The trans-Atlantic coastlines, above and below the Tethyan transverse fracture area, fit together well. The probability that the jagged and curved pieces would fit as they do by random development is negligible. South America and Africa, North America and Europe, have many points of topographic, lithospheric, and biospheric identity. The blocks of the continents on both sides of the Atlantic Basin are steep and sharply outlined at the edges of the continental shelves.

The west coast of the Americas are also steep and sharply marked. The western mountains seem to be a unit from Alaska to Chile; this in itself must have great significance: the nearly 180 degree belt of rock had a single, simultaneous experience; how can geology, geography, and geophysics ignore the simple meaning of so magnificent a display? The Andes are so continuous with the Rocky Mountains, and the Mid-Atlantic so parallel to the two Americas, and South America so congruent with the Albatross Cordillera that they must all have been engaged by approximately the same vector forces during lunagenesis.

The force of lunagenesis affected profoundly the now western terrain of the Americas even though its epicenter was probably emplaced on the old equatorial Tethyan belt and thousands of kilometers west of Central America. The western shelves of the Americas are of the same age as the East and West Atlantic shelves. But they poorly match the continental shelf morphology across the Pacific Basin. If the steep shelves of the Americas represent one side of a fracture, where is the western fracture to match? The Americas have moved westward; they have risen greatly; they have probably climbed over and rest upon their once opposing land as upon the fracture itself in the north. Part of the sunken continent of Mu, to pre-empt some wag, is below California and explains why it is so.

The East Pacific Rise pushed up and out rapidly; its transverse fractures struck out far to the West. It met little resistance. The crust had been vaporized, and the upper mantle was boiling, just as it was along the great fractures. To the west of the craters was the larger land mass of Asia, to the southwest the morphological disorganization produced by the fracture system and to the southeast that affected by the elliptoid Moon Basin.

The new coasts of the south and west of the Basin were attracted toward the basin; fragments separated and rafted faster than the larger mass to become the offshore islands of South and East Asia. Oceania was born, much of it in arched array, moving inward upon the swatch cut by the main explosions.

The wide Tethyan tropical belt of Pangea was generally trampled upon by the shifting continents, disappearing beneath the Middle East, South Asia, and the Moon Basin. The "Mediterranean" seas were swept north and south and the area was partially fractured and closed as Europe moved down. The Pyrénées, Alps, and possibly the Balkans were then created by shearing forces as Africa rotated southeast beyond Europe.[9] In the withdrawal of Africa the Mediterranean Basin opened up and waters from northeast, east, south and finally the Atlantic filled it. Later movements may have sunk the Tyrrenian plateau. Later, too, the Triton Sea of the Sahara was emptied leaving a great desert.

The complex Mediterranean morphology reveals deep bowls and large shelves. Hsü has reported investigations of its western bottom, evidencing a dry, desert terrain at one time. The deceleration of the old globe would have promptly dispatched its waters north and south to higher latitudes, supposing it had before been tropical. Huge submarine canyons depict a scene of inpouring waters afterwards. The mouth of the Nile River discloses a narrow, deep gorge cut 700 feet below the sea level of today, which may at that have been several thousands of feet deeper, according to Chumakov. Libyan off-shore canyons are also impressive, as reported by F. Burr and associates.

Geophysics, not having yet considered our hypothesis, has not clearly expounded the original torque of the continents. Earlier I wrote that the Mid-Atlantic ridge veers sharply east at the Equator and explained it as the result of the Earth's sudden deceleration of axial rotation. To this I may now add that five major occurrences signify the same slowdown of rotational velocity. At the same time they explain the location of several land masses.

The first is that the larger of the two branchings of the Mid-Atlantic fracture, arriving at about 50° South Latitude, swings in the direction of the Earth's rotation, east, that is. The fracture is pursuing its original route and continues while the Earth as a whole is slowing. It is following the direction of greatest stress, too, where the greatest need to fracture exists.

Second, this bifurcation of the fracture may have happened where the old South Pole may have been; but, more likely, the fracture had not achieved its 'objective,' the old South Pole, before it was forced to split into two. This giant forking might, as M. Cook has suggested, be the normally expected effect of the decelerating explosive fracture of a globe; it might also be an effect of the resumption of mondial rotation, within an hour or so following the halting that may have produced the aforesaid Mid-Atlantic transverse movement of the fracture. The split to east and west now cut off Antarctica, which because it was in a low latitude and neither east nor west, was rendered safe from lateral movement and became a polar continent.

But, third, the fracture, continuing, divided again. This was logical, too, one fork continuing east, but the original torque reversing on the sphere and heading back north. The east fork severed Australia from Antarctica and the north fork cut between Australia and Africa.

Fourth, Australia proceeded swiftly eastward propelled by the crustal slowdown and the attractiveness of the lunagenic basin to the east. Fifth, India, cut off from Africa, rotated clockwise, as expected, and headed, also as expected, north by east.

Since the world-girdling fracture system will be encountered sooner or later no matter in what direction one goes, any area enclosed by fracture boundaries can be called a plate. Ignoring most fractures or rifts that traverse the continents, one may conclude that some ten (Gould) or twelve (Toksöz) such areas or plates exist. Curiously, they are of greatly different size; the

Pacific Plate, for instance, covers most of the Pacific Basin, while the Cocos Plate encompasses a smallish region between Central America and the East Pacific Ridge. Inasmuch as a very slight annual movement of several centimeters seems to be occurring at the edges of most plates, and the boundaries of most plates include some portion of the volcanically and seismically active oceanic ridges, it would appear that the whole of the Earth's surface is somehow in motion, and therefore, a science of "plate tectonics" must be devised to account for the "drift" of the combined, inseparable continental-oceanic lithosphere.

That the Earth may have expanded or be expanding in volume along its fracture lines is a theory not to be dismissed, but geologists for the most part prefer to portray crustal, lithospheric drift (carrying the continents) as a perpetual steady-rate movement, which disgorges molten rocks from deep in the mantle, along one and another plate boundary, while engorging rocks at other boundaries of the plate, thus maintaining a constant global surface area. To account for this upwelling and subduction is no small task; "an area equal to the entire surface of the earth would be consumed by the mantle in about 160 million years" at the presently calculated rates of movement up and down [10]. That would be about 510 million square kilometers, of which 310 would be true ocean basin of about 8 kilometers in depth of rock. Granted a uniform rate of exchange and the time allowed for it (which is roughly based upon the age of the oldest portions of the oceanic rocks), something like 1.55 cubic kilometers of crustal rocks has to be subducted annually.

The preferred instrument for subduction is the once altogether mysterious but impressive submarine canyons. These line up along the coasts of western South and Central America, also along the western Pacific Basin arc from the Aleutians down to New Zealand, and then too stretch westward off the southern boundaries of Indonesia. Lesser lengths can be discovered in the

Caribbean, and in the extreme South Atlantic ocean. Altogether over 10,000 kilometers of submarine canyons are notable.

The time allowed for subduction is conveniently long, so that very little work is required at any given time and place.

To the average kilometer of these canyons is assigned the task of ingesting .00015 kilometer or 1.5 cubic meters of the Earth's surface per year. This is a modest undertaking, but also one can call for help from the old standby, orogeny. India is still smashing into Asia, hence the Himalayan range is piling up debris from the plate edges. South America is being pushed away from the welling-up Mid-Atlantic Ridge and also away from the East Pacific Ridge; perhaps it too is rising from the east while the oceanic crust of its west is being subducted into the long western trench.

The convection cell is a natural heat machine. Hot material deep in the Earth's mantle rises to the cooler regions of the surface, breaks through as a plume or fissure and pushes aside the colder rock; the colder rock is moved along to a subduction zone where it is mechanically forced downwards into the deep mantle. There it assimilates to the hot surrounding material, and may even return to an area where it will rise once again to repeat the process. The scheme is almost entirely theoretical, although one may, by watching a stew pot, see a similar occurrence, the heated mixture arising from the bottom of the pot to displace the cooler surface mixture which then sinks to the bottom, is heated, and then rises once more.

To observe any part of the convection process, even indirectly, is difficult, but bits of data can be made to fit. Thus, the fact that submarine canyons are coincidental with earthquake and volcanic and mountainous zones implies a turbulent function, such as subduction would be. One cannot deny the evidence of upwelling magma along the great oceanic ridges; there is an output, and there is a movement away from the output.

But is there a subduction? The submarine trenches appear to be cleared for action tomorrow, but not the scene of yesterday's action. They have scanty sediments, whereas they ought perhaps to be full of oceanic sediments, not to mention continental sial that would happen to be subducted. In what was the first attempt at observing an actual subduction of sea floor, Heezen and Rawson made four dives to the floor of the Middle-America Trench in a U.S. Navy submersible, *DVS Turtle,* at around 1600 meters of depth. They observed a set of escarpments moving steplike down to the bottom floor, then an "apron", which shortly encountered the abrupt landward wall of the trench. The apron was bisected parallel to the wall by a "line of contemporary deformation;" this "is interpreted as the sea floor trace of subduction." [11]

But the scene is peaceful. "We observed no features which could be attributed to turbidite erosion or deposition." Further, "at the present time no movement is occurring at the base of the landward wall and… probably no significant deformation has occurred there for decades or centuries... Perhaps the most surprising observation was that most of the steep wall is covered by smooth undisturbed ooze." The trench here is obviously long defunct or inadequate for the task assigned it. The stepdown escarpment into the trench seems to be a normal faulting occurrence, like much of the African rift, denoting dropped blocks, in connection with a pull-back motion of the landwards wall of the trench. Still, even if this were an "average" point of a trench, the activity of subduction might be too miniscule to observe.

Several years later, the *Glomar Challenger* was drilling into oceanic sediments north of Barbados at an apparent plate boundary and discovered older Miocene sediments overlying younger Pliocene deposits.[12] The phenomenon was explained by plate tectonic theory as a product of an underthrusting (subducting) sediment-loaded oceanic plate. As the plate went down its older sediments were sheared off and ended up overlying its younger sediments. All of these formed now part of a mass that culminated in sub-aerial volcanic mountains. The volcanism would be an effect of the descending slab, which generates heat by friction, shear stresses, and rock faulting. Channels for explosive heat escape would be provided in the course of structural adjustments between unlike rock masses. Earthquakes occur until the masses become thermally indistinct, never below 700 kilometers; there the rock can no longer behave in a brittle manner [13].

The occurrence of earthquakes up to this point is taken to indicate the correctness of subduction convection cells, and plate tectonic theory.

Here is Toksöz' summary of the current theory of the subduction of the lithosphere.

> The lithosphere, or outer shell, of the earth is made up of about a dozen rigid plates that move with respect to one another. New lithosphere is created at mid-ocean ridges by the upwelling and cooling of magma from the earth's interior. Since new lithosphere is continuously being created and the earth is not expanding to any appreciable extent, the question arises: What happens to the 'old' lithosphere?
>
> The answer came in the late 1960's... The old lithosphere is subducted, or pushed down, into the earth's mantle. As the formerly rigid plate descends it slowly heats up, and... is absorbed into the general circulation of the earth's

mantle."[14]

Interestingly, "in certain areas convection currents in the asthenosphere may drive the plates, and… in other regions the plate motions may drive the convection currents." Lest the reader hoot at the picture of a driver driving the car but sometimes the car driving the driver, it should be interposed that this latter possibility is a broad hint of what may be the truth of the matter, namely, that so far as the evidence goes, the paving and expansion that went on in the past, and their faint stirrings today, would have to, and do, generate currents, even cyclical currents, in the mantle. How could they not do so?

Where plates collide, to resume the theory, a trench is forced open and one or the other plate descends the trench into the mantle, thus letting the ridge, perhaps thousands of kilometers away, continue to churn up lava and pass it along, so efficiently indeed that folds or thrusts are hardly to be found in the vast expanses of the abyss nor alongside the ridges. The trenches "accumulate large deposits of sediment, primarily from the adjacent continent." (This contradicts another view, Heezen and Hollister's, that the trenches are scarcely sedimented.) "As the sediments get caught between the subducting oceanic crust and either the island arc or the continental crust they are subjected to strong deformation, shearing, heating and metamorphism... Some of the sediments may even be dragged to great depths, where they may eventually melt and contribute to volcanism. In this case they would return rapidly to the surface, and the total mass of low-density crustal rocks would be preserved."

Skillful drawings enhance the text by showing some sediments being scraped off on the opposite side and other sediment being miscilated and conveyed below. Without wishing to burden this one article with problems universal to its genre, one cannot but allude to additional contradictions. There should be enormous masses of plate-served detritus on the inward side of a receiving trench. Indeed, the whole of a previous world of sediments should be dumped in such heaps or carried down into a mantle reluctant, because of its higher density, to receive it.

There are, of course, no such masses. The sediments by the trenches, if they exist at all, are mostly igneous masses, which foregather there in as ordered or disordered a condition as anywhere else. As for the metamorphosed rocks, they show no preference for trenches and can hardly amount to the quantity under consideration, unless this is to be the origin of new granites. The balance of new and old sediments, it appears, is impossibly askew.

The trenches, according to the prevailing notion, have good appetites, but are slow feeders and neat eaters. Perhaps that is why they have never been observed while at dinner. Toksöz refers to low and high subduction rates and draws several diagrams of the subduction process, but offers no proof of subduction other than gravity anomalies (whose findings, he grants, are belabored by uncertainties) and seismology. "The most compelling evidence of the subduction of the lithosphere comes from seismology." Seismic wave behavior in the vicinity of the trenches, where earthquakes are common, has exhibited differences, as might be expected, showing different depths of activity and these have not been interpreted satisfactorily. Now these seismological differences have been assumed to be measures of different depths of the mantle's alimentary canal, so to speak, where different stages of rock digestion are occurring. The argument is almost totally deductive.

If the oceanic plates and basins have been completely renewed every 160 my, then they will have been renewed about 35 times since the Earth originated. Each time these plates would have scraped off some of their sediments upon each other. By now the continents of the Earth should be presented in heaps of sialic rock randomly distributed as islands around the globe. Such sediments scarcely exist. Or they are unrecognizable as such. The sediments of the oceans are less than a kilometer deep on the average. Call them a kilometer; double this to match the disproportion of sea to land; and multiply this volume 35 times. The result, a column over all the land of 70 kilometers, far exceeds the present continental sediments (if the only source of these is oceanic sediments) nor does it appear in any large sedimentary masses distinct from the indigenous continental mass.

The present mass of sedimentary rocks is about 32,000 X 10^{20} grams. It is about 5% of the crust. From the deepest trench to the highest mountain of the Earth is about 20 km. Some 44% of this is pre-cambrian, 56% of it of later origins. Most has been recycled several times, but not all, else we should not possess fossils indicative of all ages. "The whole sedimentary mass has been turned over five times."[15] The oceans are thought to have been in a steady state throughout all of this time, picking up and delivering sediments.

Most of this conjecture becomes nonsensical if a single fact is considered: consistent stratification of species around the world, such that exceptions are considered anomalies. If oceanic plates repeatedly dumped their "young" sedimentary contents at the base of the onshore sedimentary heaps, the phanerozoic order would be reversed, as in the *Glomar* discovery just reported; the older the sediment, the higher up it would be stratified. Such not being the normal case, one is compelled to reject the theory of subduction and perpetual plate renewal. Marine sediments are the majority of all organic facies; they are loaded in temporal order according to the principle of superposition. They did not arrive on the land by plate tectonics; they arrived by tides, floods, land rising, and other quantavolutionary mechanisms.

For subduction, forceful convection cells are required. “All the fountains of the deep must be broken up," in a parody of the unique event of the Bible, not once but continuously and forever, over billions of years, enough to move the furniture of all the Earth's land around the world every 160 million years, inch by inch. The path of upward and downward movements cannot be smooth; at the least it is different beneath the thin sima than beneath the thick sial; furthermore, some interception must occur at the two or more levels of the mantle where striking seismic discontinuities are observed; indeed, it should perplex the conductionists that these seismic barriers even exist, for would not eons of convection have effectively erased what, after all, can only be levels of chemical mineral differentiation? Seismic studies show that the Earth below the surface is stratified; what else could seismic discontinuities mean?

The thickness of the Earth's crust, as the physicist P. Jordan once said, is a breath of air blown upon a desk globe. The breath should be unevenly blown, for the continental portion is 40 km and the oceanic crust is only 5 kilometers thick. This is using the Mohorovicic Discontinuity as the boundary between crust and mantle. At this "Moho" boundary the velocity of a seismic signal increases sharply, indicating a density increase from 3 to 3.3, the mean for the crust being 2.8 g/cm^3 and that for the incomparably more massive mantle 4.5. The increase in velocity (and density) occurs within a band of rocks of under five kilometers thickness. Below the oceanic crust, the Discontinuity zone is less than half a kilometer thick. The Discontinuity seems to be caused by "a difference in chemical composition between crustal rocks and the underlying mantle rocks. "[16]

The theory of plate tectonics visualizes the conveyor belts of ocean crust moving along between ridges and trenches just above the Moho Discontinuity. In cases where the plate is oceanic and encounters a plate carrying continental material, whether supposedly built up of primordial granites and sediments or of trench debris folds, the conveyor belt (convection current) dips down, and, of course, the Moho dips too and resumes at about 40 km below the continental rock. In all of this process, the Moho is conceived to be independent of the tectonic process presumed to be taking place.

This is incredible. It is much more likely that the Moho Discontinuity marks the level at which the continents marched around the world after the Moon erupted, and, below the ocean, the level above which new crust had to be created from the uppermost magma of the mantle with atmospheric chemical participation. A new, subaerial, low-pressure, hydrated factory produced the oceanic crustal basalts out of upper mantle material. The continents and ocean bottoms are probably still in motion along the Moho Discontinuity, as they were, but much more rapidly, when the Discontinuity was born as the boundary between crust and mantle.

There are, besides the Moho, two more major discontinuities in the mantle, one at 400 km depth and the other at 650 kin. In both cases density and chemical composition are believed to change markedly. Inasmuch as both of these discontinuities, as well as the Moho, pervade the globe as "shells" they must be continuously penetrated by rising, falling, and lateral convection currents. It is perplexing to consider how the currents could be maintained throughout Earth history without erasing the discontinuities. Since there is evidence of the Discontinuities but not of the convection, the existence of the convection cells must be doubted. Moreover, as with the Moho, these other discontinuities may represent secondary and tertiary torsion levels, as the Earth, more than once, suffered deceleration of its rotation.

The fact of the general uniformity of depth of the Moho

Discontinuity around the world is also an indication that it was formed at the same time as part of an epochal event whose negatively exponential tailing-off was temporally brief. The fact that the continental blocks move at a distinctively different, lower depth in the mantle has less to do with their "greater weight" (relative to the oceanic crust) than with the historical fact of their quite different genesis.

Quantavolutionary theory explains the occurrence of earthquakes along the global fault system, even where no trenches are subducting. And the convection cell theory is susceptible to challenge simply on the basis of insufficient energy, while the theory of plate tectonics as a whole does not pass a number of tests.

Regarding the first point, earthquakes have long been associated causally with faults, even before the oceanic ridge system was known. The submarine trench can be construed as a magnificent type of fault, almost always near an earthquake zone. But a great many earthquakes occur away from trenches. If they occur because material is being stuffed into the bowels of the Earth by a plate, there is yet no evidence of it, and one may as well maintain that the seismism denotes the relative motion of rocks, as was said earlier. The movement is often vertical so that, relatively speaking, some rock is often moving down, but that is not the point. It would be more in order to demonstrate that all the earthquakes occurring landwards of the trenches (and this is mostly the case except in the Java-Sumatra region) bring about increased elevations as the debris is refused by the depths beyond the trenches.

Moreover, if the continents shifted and the ocean bottoms were repaved by an exoterrestrial and hence surficial force, then the disturbance of the Earth's crust and mantle would form a large area of surface directed as a narrowing cone into the mantle until it reached a point below which seismism could not be energized. Such may well be the case. The points would lie along the global fracture system and also where meteoroidal impacts have occurred.

The fact that an overwhelming majority of earthquakes is registered on the sial of the continents rather than upon the sima of the oceanic crust has surely to do with the greater depth of the continents as contrasted with the oceanic crust, but it also has to do with the greater age and rigidity, hence recent disturbance, of the plutonic land rocks. One may surmise that the sima is "better adapted" to movement because it was "born of movement." The very planar, uniform, featureless character of the sea bottom evidences that it has not participated in terrestrial diastrophism, but has, like the water itself, filled in with molten and flexible rock wherever the land has been removed.

The heat required within the deep mantle to expel excessively heated rock up to many thousands of linear kilometers on the surface is, of course, great; and, at the other end of the conveyor belt, or surface convection current, the rock must be dense and cold enough to sink, with a mechanical force assisting. Elaborate calculations have been made to demonstrate the possibility. None are convincing. It must be in many thousands of degrees celsius, enough to burn the bottom of the pot, if the favored analogy of the boiling cauldron is pursued.

However, although the presence of radioactive minerals deep within the Earth is only a postulate, rising radioactivity-produced heat is given as the source, rather than some internal fire. Metaphysical figures are not difficult to come by, my critics will have been observing; so I can assert the same. There must be an irregular distribution of giant kettles and small kettles (because the surface areas of the convection process are vastly different) and hence some zones of radioactivity must be chemically different than others.

It is well known that volcanism gives off great heat into the atmosphere and beyond. Why, with this naturally effective heat venting apparatus, would the cumbersome convection cell be required? There is no limit but the universe itself to the heat ejected sub-aerially; the bubbling stew is without a lid. Why should there be vast surfaces (between plate boundaries) bereft of volcanic outlets while the enormous mass of molten rock is pushed so delicately sideways as to not break the surface? Repeatedly the convectionists and subductionists use the quantavolutionary words "collision" and "plunge" to denote operations occurring at a scarcely observable rate out of "collisions" between bodies which are already impacted and therefore scarcely able to collide, though capable of jostling perhaps (wherefrom we might receive the submarine trenches). Still we read often that plates "collide"; one plate "plunges" beneath another.

They are in a desperate theoretical fix: their instruments tell them that they have only about 160 million years to sweep around the globe; the energy for this must occur by a relative heat emanating from radioactive decay. Some scholars must long for a young Earth whose interior might still have its "primordial heat" to give away. Their belief in stable astronomical motions of the globe and its solar system neighbors precludes their introducing thermal and inertial forces to abet the heat emerging from radioactivity and pressure.

To speak of flowing rocks as the convectionists do, and to a degree all must, is to employ the word viscosity. "Viscosity is a function of the chemical composition, temperature... and pressure..."[17] A high viscosity marks a slow flow: measured in poises, water flows with a 0.01 poise, honey creeps with 100 poises; and the rocks of the Fennoscandian uplift (where presumably once an ice cap and a polar region had produced Earth-flattening) exhibit by one estimate 2.4 X 10^{22} poises [18].

Summarizing and developing several studies, Cook publishes figures of about 10^{22} poises as the average viscosity of the crust and upper mantle, a viscosity of 10^{13} to 10^{14} poises at the bases of continents and about 10^{11} poises at a depth of 150 kilometers. A minimum viscosity or maximum fluidity would occur at about the 150 km depth, both geochemical and seismic observations being seemingly in agreement on the matter. But if there are no reasonably short gradients of viscosity thereafter, it is hard to visualize a large-scale convection dynamic in operation, much less a host of a dozen giant cells or a pattern of a thousand smaller convection cells working within the mantle. Not unexpectedly, then, Cook and Eardley calculated that to move the continents even in 200 million years would require forces "a billion to a trillion times greater than those that should be generated by the postulated mantle convection currents."[19]

Some scientific creationists, as exemplified by G.R. Morton, cannot accept continental drift, much less rafting as here described, because by their calculations, "neither convection cells nor any other [lateral] forces could have separated the continents within a few thousand years, if the viscous forces were involved in that movement."[20] The heat generated would have to be in the millions of degrees and would vaporize the Earth. Morton concludes that "either God separated the continents outside of natural agencies or that the Earth expanded in such a way that the viscous forces were not involved." Creationists generally avoid naturalistic exoterrestrialism, Patten being exceptional. So Morton does not consider the possibilities that led the present author to the model of Solaria Binaria: heat can be exploded and fresh atmosphere brought in from a fuller plenum rather than the thin present air of Earth. However, Morton remarkably adds a final sentence, irrelevant to all that he has said before: "The expansion of the earth caused by an expansion of each individual atom due to a change in the permittivity of free space (the electric force) is a possibility which could avoid the viscosity problem." Thus he finally grasps for "the electric force," which, we have seen, is a heat-saver.

We are led back to the only mechanism that can produce low viscosity and provide it where needed, an exoterrestrial and hence surficial force suddenly applied to set the crustal blocks containing the continents - that is, the remaining blocks - into lateral motion. First, an explosion of surface must occur, with heavy electrical attraction and expansion. Then what Cook writes (and he uses the northern ice cap as a self-mover, without exoterrestrial assistance) is *à propos:* "Crustal distortions under a force sufficient to cause continental drift should then have amounted to from hundreds to thousands of times more than witnessed in the recent uplifts. In a catastrophic drift process viscosity breakdown along the shear surfaces would permit relatively easy flow compared with that of a threshold drift process."[21] Once in motion away from the rifts, the blocks (or plates) will have provided their own "grease" for a movement enduring several thousand years and exponentially declining to today's minute rates of drift. Overall, the pattern of movement was lunatropic, directed at resurfacing the Earth.

That nevertheless some collisions would ensue was to be expected, for the fractures around the globe necessarily expanded to move crustal fragments towards one another as well as toward the lunar basin. It is not surprising that modern studies detect contrary motions, as, for example, South America is being pushed westwards from the Atlantic Ridge and eastwards from the East Pacific Rise at the same time. These are not contradictory motions, so far as the theory of lunagenic tropism is concerned.

Most geologists and geophysicists today are satisfied that the heat generated and in part used to move the dozen plates of the world around is not so great as to make life impossible today or for a billion and more years past. A minority, as here, is not so sure. The issue is complex, technical, and abstract to the edge of pure speculation. This, however, is certain: an exoterrestrial and sub-aerial force can require less continuous heat and dissipate it more quickly; it operates with heat as more of a waste product than the key to the movement of the crust. The greatest portion of the heat given off to set the continents in motion would be explosive and would disappear into cold space with the exploded crust.

The resistance to the movement of the remaining crust would be much less than if the crust of the Earth had remained intact throughout Earth history. The continental blocks would require much less energy to move into the large areas heretofore occupied by continental material but now unoccupied save by an erupting and boiling mantle material. Only several soft kilometers of depth would need to be ploughed through by the continental blocks heading toward the lunagenic basin.

Further the quantavolutionary theory, as proposed here, would rely upon earth expansion, largely owing to electrical discharge, as a precipitator and facilitator of the crustal movement. Except most rarely, as with Carey, the writers on continental drift ignore an obvious probability and even necessity, that when continents drift around the globe and the whole Earth's surface moves - no matter how slowly - the Earth's surface cannot remain a constant quantity, as if some secret ordinance has determined that the globe must have retained its precise figure of today through hundreds of millions of years, no more, no less, no matter what heats burn, what pressures invest the rock masses, what atmosphere bears upon it, what collides, what escapes.

Lately, orogeny has come to be added to the marvels created by plate tectonics; the Alps and Himalayas are thus explained; so too the mountains and islands that stand landwards of some submarine trenches. The aforesaid secret ordinance must decree that extra plate is created for every mountain rise, or else admit some expansion of the crust. But if some expansion, why not much expansion? The material that is rising from the hot mantle must bring with it an expansive pressure; it is less dense; but when it cools upon erupting at the ridges does it become more dense? Not if it is like the famous stew pot or porridge in the analogy of convection cells. What remarkable chemical properties the magma must have: having had its backside scraped of sediment by the razor-bladed trench, it returns to the deep mantle millions of years later and hundreds of kilometers away and resumes its former thermo-chemical state.

Scientific advance of an important kind occurs when an acceptable interplay of theory and fact occurs. On the issue of the movement of continents, tropism towards the lunagenic basin was suggested as long as a century ago, by Osmond Fisher. But little was known of the ocean basins and the time scheduled for the event was in the dim beginnings of the Earth. W.H. Pickering of the Harvard College Observatory argued the case in 1907,[22] and it was well publicized. Meanwhile H. Baker was evolving his theory. "The separation of the continents by fission," wrote Pickering again in 1923, has for 18 years "been attributed to the great convulsion that occurred at the time of the birth of the Moon, from the side of the Earth. This explanation of the origin of our Moon is at the present time almost universally accepted by astronomers. We see the same phenomenon occurring in many close double stars."[23] He placed the "center of origin" of lunagenesis off the southern tip of New Zealand.

However, Pickering held to the view that, although terrestrial lunagenesis and the Atlantic fission must have occurred late enough so that the continents possessed their modern forms, the time had to be early: "that a catastrophe involving the sudden removal of three-quarters of the Earth's surface could occur without destroying all life, both vegetal and animal, appears impossible." Therefore he disputed Alfred's Wegener's contention that the Atlantic Basin opened up at the end of the Cretaceous period or in the early Tertiary.

Thus an impasse occurred until the present day. Wegener's continental drift theory is accepted but not its cause. Instead geologists cling to their terrestrial ideology and posit convection currents. The effects of ripping some 50 kilometers in depth off of most of the Earth's surface were conjectured to be utterly destructive of the biosphere. Today much new geological and geophysical evidence can be adduced from an examination of the Earth and Moon, tending to support the terrestrial origin of the Moon and the connection between lunagenesis and continental break-up and movement.

Moreover, the Cretaceous-Tertiary boundary is increasingly understood to mark the extermination of most species. Whether this boundary happened at sixty million years or twelve thousand years ago (which I construe to be the case) does not much matter on the issue of biosphere survival. I have pointed out elsewhere that biosphere annihilation was not necessarily predicated during lunagenesis. The immense typhoon that conveyed the crust of the Earth into space would have carried away with it most of the heat generated in the transaction, while at the antipodes of the event, downwards draughts of the then much more voluminous atmosphere would have cooled and regassed the land.

This is only one instance of the physical arguments that can be brought into play to establish that the biosphere would survive. To be borne in mind, also, is the prolific regenerative capacity of all species, no matter what their method of reproduction. The proper question to ask regarding biosphere survival is: what chance did one or more reproductive units of each of a million species have of surviving the conditions of lunagenesis?

To conclude, the tectonic plates are with declining force moving to restore the global holospheric symmetry lost in lunagenesis. They are constrained and directed by the global cleavage system. The subduction theory is demonstrably incorrect. The convection theory, which aside from its weak force and its dependence on subduction theory, depends upon a place to go, is impossible. Quantavolution theory, on the other hand, copes well with continental drift theory, assimilates it, simplifies it, and gives it a strong foundation in cosmogony.

Notes (Chapter Twenty-four: Continental Tropism and Rafting)

1. "The Continental Drift Affair," 17.

2. "Antipodal Location of Continents and Oceans," 153 *Science* (Sept. 9, 1966), 1246-8.

3. D.H. Elliot. E.H. Colbert. W.J. Breed, J.A. Jensen, J.S. Powell, "Triassic Tetrapods from Antarctica: Evidence for Continental Drift," 169 *Science* (13 Sep. 1970), 1197-1200.

4. "Continental Drift," V Ency. Britannica (1974), 112.

5. *Ibid*., 108.

6. Quoted by Jordan, *op. cit.*, and see the chart there (and *in Chaos and Creation*) of the frequency distribution of altitudes of land and sea bottoms.

7. Heezen and Hollister, *op. cit.*, 521.

8. "Static or Mobile Earth: The Current Scientific Revolution," in *Gondwanaland Revisited*..., 112 *Proc. Am. Philos. Soc*. (Phila, 1968), 309.

9. "Mother Earth...," *op. cit.*, 12.

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11. Bruce C. Heezen and Michael Rawson, "Visual Observations of the Sea Floor Subduction Line in the Middle-America Trench," 196 *Science* (22 Apr, 1977), 423.

12. Roger N. Anderson. "Surprises from the Glomar

Challenger," 293 *Nature* (1981), 261-2.

13. Toksöz, *op. cit.*, 97.

14. *Ibid.*, 89.

15. Fred T. Mackenzie, "Development of the Oceans," 13 *Ency. Britannica* (1974), 480.

16. A.E. Ringwood, "Structure and Composition of Earth," 6 *Ency. Britannica* (1974), 51.

17. M.A. Cook, "Viscosity-Depth Profiles...," 68 *J. Geophys. Res*. (June 1963), 3515.

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19. "Analysis of Crustal Deformation by Mantle Convection Currents," 1962, unpubl., *cf*. Cook, "Continental Drift: Is Old Mother Earth Just a Youngster?" *Utah Alumnus* (Sept. 1963), 10-12; also critiques and debate, Nov. 1963, Oct. 1964, Nov. 1964.

20. "Creationism and Continental Drift," 18 *Creation Res. Soc. Q*. (June 1981), 43.

21. Cook, *Prehistory and Earth Models, op. cit.*, 271.

22. *Am. J. Geol*. (1970), 23; *cf*. CXV Harper's Monthly (1907), 120; *Scot. Geog. Mag.* (1907), 523.

23. 61 *Geol Mag*. (1924), 31.

CHAPTER TWENTY-FIVE

SEDIMENTS

We have entertained the possibility that till might have originated from the tail of a comet or cyclonically (tempestites). Using the typical approach of an intruder with an unwelcome hypothesis, I introduced statements of anomaly and bafflement. Thus, where is the till of the seas? Why is the correlation between till fields and glaciated areas not strong? If tektites can be exoterrestrial, why not till - remember that the feather and cannonball of Galileo fall at the same speed? And so on.

Dreimanis could be quoted: "Most of North America, particularly Canada, the entire northern part of Europe and considerable portions of other continents have been glaciated several times during the last two million years, and covered by various thicknesses of till and other glacigenic deposits... It sounds like a paradox, but till appears to have become more complicated with time, in spite of detailed and extensive investigation... "[1] And Kujansuu showed that "the flow directions of the ice sheet in Central Lapland," as indicated by five beds of till, followed five largely different directions [2]. And G.W. White: "In almost any excavation in the glaciated northwestern Allegheny Plateau, a till different from the surface till will be encountered, and in an excavation of 15 feet or more, several till sheets of different ages are to be expected... The tills vary in texture, composition, compactness, permeability and in joint spacing...the till sheets may be separated by a sand layer or a silt layer of varying thickness...unweathered till may lie upon weathered till, or a paleosol, or another unweathered till."[3]

As with till, so with all sediments: none is perfectly simple, or, if so, can be proved to be. Sand occurs as 10% or less of deep ocean sediments. Basalt does not give up sand; sand is continental. Is this fall-out, turbidity currents of unobserved ferocity coming off the slopes, early winds over empty beds? Shelton ends his book on geology much as I end this chapter, musing about hypothetical studies, "and finally, before we can do any of these things, we must be able to tell one rock from another - which is just about where we started."[4]

About 5% of all crustal rock is composed of sediments that remain in something approaching their state after deposition. They veneer about three-quarters of the continental surface to thicknesses ranging from the merely visible to a dozen kilometers in height, with the average for the globe at over two kilometers. Sediments have been classified by priority of deposition and anywhere from ten to hundreds of major and minor strata have been allocated positions, sometimes only after prolonged controversy, some only among certain believers. Besides containing chemical and mineral traces and distinguishable fossil remains, an estimated 80% of sedimentary rock are shales composed of mud or clay, 10% are of sandstone and 10% are of limestone.

The old problem of sediments missing from the geological column became more worrisome with the discovery that the ocean bottoms do not carry their proportionate burden of sediments, much less the extra quantity to fill the gap in the geological column. The continental slopes are formed of shaken down, wasted down, and blown down debris from the shelves of the continents; but they would constitute only a small part of the supposed accumulation. The composition of the slope deposits is unknown. Perhaps half was carried off the shelves in the continental movements and orogeny following lunagenesis. A fifth may have descended from the sky preceding and accompanying the event. A tenth might have been washed in during the Noachian deluge. The small balance may be divided between river run-off into the oceans and cosmic and volcanic fall-out. Ager reports that "...chaotic deposits and slump topography have now been found at the foot of many present-day continental slopes."[5] The continental shelves and the abysses carry clay. The polar regions and half the remainder of the basins carry ooze. Sand and boulder are confined largely to occasional polar sediments. However, sand composes 10% of the ocean bottoms, too much for long-term sedimentation to have occurred. Carbonates, suggesting organic detritus, are common in the shelf and ooze sediments. Little suggests the continental rock in the oceanic sediments; it is a different world of unconsolidated material.

Perhaps the granite that forms the massive substructure of the continents down to about ten miles is composed of melted sediments, making the original crust out to be a thin basalt covering where the upper mantle has cooled. The chemical composition of granite would deny this idea, however. Nor does the location of the granites or sediments suggest that granitization has consumed sediments. Granite is found below, and intrusively, among sediments, not apparently where it might have been transforming them by conveying some special electrical or thermal force.

Old sediments do not appear to be far less common than new sediments, which they would be if they had been formed and consumed in a special earlier time on Earth. Granites can be formed by subjecting a mixture of albite, orthoclase and quartz minerals to high pressure (30,000 lbs/in^2) and melting temperatures, and then allowing cooling. Hence it was surmised by O.F. Tuttle that the origin of granites was in hot magma of the mantle [6]. This idea may be the best of the three considered by him (the others being the metamorphosis of mostly sedimentary rock through hot chemical solutions, as above, and metamorphosis of proto-granites from ion exchanges causing crystal changes even while in a solid state); but he does not consider, nor do others, the possibilities of an accumulation of granite from atmospheric (plenum) deposits in an earlier state of the solar system, or of a massive electrical discharge between Earth and external bodies, or of a melt of an earlier crust by an exoterrestrial encounter.

In this book, granite is presumed to be the creation of a period during which the Earth gained dust, charge, water, and heat from the gaseous tube extending between the Sun and its binary partner. We suppose that granite is an exoterrestrial electric welding of a crustal covering for the Earth. It lay under such sediments as have formed out of largely 'cool' fall-out and heavy erosion.

That granite and basalt, both with the hardness of steel, can be quickly reduced to debris is attested by the well-defined Washington scablands; there closely-spaced rushes of water cut many channels of many meters of depth through hundreds of kilometers of basalt plains, before dumping some of their debris in hills, and more debris into the Pacific Ocean basin, where perhaps it was overrun by the continent. It may be added that most of the granite once possessed by Earth was ripped off and exists in a reconsolidated state on the Moon.

With the granite went half of the sedimentary rock as well. Still, much sedimentary rock is found in a largely disarranged condition on Earth, in some places being miles thick, in other places scanty or even nil. And the geological ages of the Earth, largely founded upon the layerings of sedimentary rock of the continents, have long been suspect simply because of the disarrangement and, indeed, chaos of the sediments.

Geologists customarily still speak of erosion as the source of all sedimentary rock [7], following a process of weathering of source material, transportation, deposition, and lithification which compacts and cements the material into a coherent rock. But to address such rocks with the fixed idea of gradual erosion is inappropriate.

Geologists, writes Ager, generally act on the belief that "the stratigraphical column in any one place is a long record of sedimentation with occasional gaps... But I maintain that a far more accurate picture of the stratigraphical record is of one long gap with only very occasional sedimentation... The gaps predominate .... the lithologies are all diachronous and the fossils migrate into the area from elsewhere and then migrate out again."[8] Ager does not presume to measure gaps of time, perhaps because if nothing happens, there can be no measure of it. Therefore the gap may be long or short. Here we prefer the brief gap to the long. Indeed, often it can be argued that no gap exists.

In a remarkable survey, Woodmorappe has denoted the presence or absence of the ten conventional geological periods on a sample of 967 equal square areas of 406 square kilometers of the continental lands [9]. Ideally, every square on Earth should exhibit some rocks of all ten periods. Natural history assumes that all areas have undergone similar weathering experiences during any given long period of time; if, as is known, rocks of all ten periods are not found, it is because field surveys have not been competent or complete, or because the weathered debris of given age has been transported as such or as rock later on to somewhere outside the 406 square kilometer area (a journey of a maximum of a dozen kilometers), or because the rock did actually form but was eroded and carried off, or because the rock once formed was later subjected to metamorphosis. Some credence can be given to all these explanations, but, too, it is noteworthy that the "presence" of period rocks in Woodmorappe's study often refers to a minor outcropping within the area and not to full coverage of the area.

The departure of reality from the myth is impressive. In no more than one per cent of this sample of the areas of the world are all ten periods of natural history represented. Some of these widely scattered areas are doubtfully complete (in the Himalayas, Bolivian Andes, Indonesia, South Central Asia, and Cuba). Rarely does one find even three of the ten geological periods in their expected consecutive order. Moreover, "42% of earth's land surface has 3 or less geologic periods present at all; 66% has 5 or less of the 10 present; and only 14% has 8 or more geologic periods represented..."

> Individual geologic periods' coverage of the earth's land surface range from a high of just over 51% for Cretaceous ...to a low of only 33% for Triassic. Only 21% of the Lower Paleozoic is represented in 3 or more of its periods; the complete Upper Paleozoic is found in 17% of the areas; the Mesozoic is complete in 16% of the areas. A complete Paleozoic record is found in 5.7% of the areas, and a complete Upper Paleozoic plus Mesozoic in 4.0%. Some percentage of *every* geologic period rests directly upon Precambrian 'basement', especially high percentages of Ordovician (23.2%) and Devonian (18.6%) doing so.

The data confirm the belief of those who argue, with Ager, that there are more gaps than record. Too, the chances are painfully high that one stands upon a seriously incomplete geological column wherever one may be on Earth.

Although the statistics will not suffice to show causation, they support the line of thought here: the Earth's surface has been reconstituted; the reconstitution has camouflaged the earlier surface and the earlier surface has disguised the reconstruction. Many of the "gaps" in the record are illusions. Fossils are probably as often the perpetrators of unconformities as the indicators of them; they must often have gathered where "they didn't belong" in the course of catastrophes.

The strata of all periods prefer to rest directly upon their prior strata, showing a tendency towards a time-consistency in superpositioning, as conventionally believed; that is, each era tends to be more on its preceding era than on any other era. There is one important exception: all have a greater chance of resting on pre-cambrian than on the last post-cambrian eras. Except for the two periods just prior to it, a period has a better chance of resting directly on pre-cambrian than on any other stratum; the correlation except for two directly preceding periods must be nil. This indicates a pre-cambrian basement preference of all strata. It also suggests a simultaneity for deposits that have previously been assigned as successions [10].

So what Price once called the "onion skin theory" of sedimentation is untenable, if it is indeed still retained by many. The essential principle of sedimentation should probably be called "quantavolution." Actually the idea has many antecedents and precedents: this we now well understand. Specifically applied to sedimentation, it means that the rocks of the phanerozoic era convey by their composition, strata, geography, quantities, and geological columns a patterning that suggests intensive, large-scale sudden and brief events, that is, a lately tortured Earth.

Derek Ager takes the position of a macrochronic quantavolutionist. "Changes, cyclic or otherwise, within the solar system or within our galaxy, would seem to be the easy and incontrovertible solution for everything that I have found remarkable in the stratigraphical record."[11] The secondary mechanism, which he employs repeatedly but without criticism of its fundamental origins, is plate tectonics. "The theory of plate tectonics now provides us with a *modus operandi*."[12]

He sees a distinction between the exoterrestrial cause and the drifting continents as cause; thus, "we come to one of the great anomalies of the stratigraphical record, with the widespread extinctions of the Frasnian/Fammenian junction" of the Devonian. There is no evident explanation to be found in drifting continents or colliding plates. It seems that here, at least, we must appeal to an exoterrestrial cause. He has several additional preferred temporal locations for exoterrestrial interventions in geology.

He can use plate tectonics to discover and discuss numerous "periodic" and "episodic" catastrophes around the world. This enables him to be macrochronic: "the history of any one part of the Earth, like the life of a soldier, consists of long periods of boredom and short periods of terror."

He offers a wide range of examples, from numerous eras, of the worldwide distribution of various rock-types and fossils; this leads us to the supposition not only of a Pangea in which sediments and life forms might readily become worldwide but also, and perhaps more important, of species that never reached their potential limits, suggesting forceful interruptions of their spreading. Further, it implies worldwide equal conditions for even very special kinds of sedimentation and rocks to form.

He illustrates the bizarre differences in depth of the deposits of the same age in separate regions both near and distant, pointing out, for example, the one foot of Jurassic sediment in Sicily in contrast to the 15,000 feet of one Jurassic zone's sediment in Oregon [13]. Since they do not form on mountains, sediments, which can fill basins to a depth of up to 20,000 meters, would have been below sea level if the oceans existed when they grew.

He alludes to numerous wide differences in rates of sedimentation: a 38-foot fossil tree stands amidst the late Carboniferous Coal Measures of Lancaster; but for the flow of sediments from rivers into the seas he quotes Holmes' measure of only one centimeter per millennium. He estimates the Grand Canyon at under 10 million years; the gorge, that is, provides a case of rapid erosion. "The periodic catastrophic event may have more effect than vast periods of gradual evolution:" this he calls "the phenomenon of quantum sedimentation."[14]

As there are more gaps than record, it is also true that there are more rapid deposits than slow ones, and the two facts may be connected in quantavolution. Rapid rates are easy to discover; Vita-Finzi cites a mid-Atlantic rate of clay deposit that increased suddenly from 0.22 to 0.82 grams/centimeter^2/year about 11,000 years ago (conventional dating), along with a drop in total carbonate deposition from 2.80 to 1.34 g/cm^2/y [15]. Nearly a 400% increase over an immense area; was it a type of Worzel ash fall-out? Or another case of rapid sedimentation?

At Nampa, Idaho, a well-carved human image in soft stone was recovered at 300 feet depth during well-boring [16]. The drill had penetrated 60 feet of alluvium, 15-20 feet of lava, and 200 feet of quicksand beds and clay, coming upon the sculpture in coarse sand, just below which was vegetable soil, followed by sandstone. One recognizes here a probable catastrophic sequence; the statue's presence, if admitted, wreaks havoc upon anthropology or geology or both.

Doeko Goosen has developed a wealth of related material, yet unpublished [17]:

> Two of my students collected undisturbed samples of a transition zone between a soil of less than 1 m thick and the underlying shale. My hunch was that the soil had not developed from the shale, and minerological analysis proved me right. Within cracks of the shale multi-layer cutans were found. Traditionally such is explained by the one-layer per season theory, but when I looked through the microscope I saw oddities not compatible with that theory. [An expert on micromorphology confirmed his conclusions.] The phenomenon must have been caused by very strong tectonic vibrations, causing cracking of the slate and a sudden influx of clay and lime. At the same time fragments of the slate must have been projected upwards violently, passing through the soil, and now found on the surface.

Such tectonic miscibilation must be worldwide and visible under examination according to the quantavolution hypothesis in ground not believed to have experienced tectonism historically. Furthermore, a probable catastrophic cause may be assignable to soil processes that are considered ordinary and gradual. Goosen writes:

> The formation of a laminated deposit via the season after season theory occurs only in highly exceptional circumstances. Wherever flooding occurs, there is also biological activity. The Rhine in the Netherlands each year floods pastures within the zone between the dikes, and leaves a thin deposit of clay. In the thus accumulated soil there is absolutely no lamination. The growing grass plus organisms like worms lead to homogenization. Indeed, it will be difficult to find on earth an environment where the season after season theory could be demonstrated. And then, upon seeing a laminated sediment, the inevitable conclusion must be that it is a

catastrophic sediment, including the famous Scandinavian varves.

"Sedimentation goes on all the time, for ever moving from place to place, for ever cannibalizing itself."[18] It accumulates also from erosion of igneous and metamorphic rock. All sedimentary bodies, other than deep sea oozes and volcanic ash deposits, are likely to be diachronous. They stretch and spread out from a node over a small or large region, so that the elapsed time from the center outwards may be considerable. Two contrasting illusions, we note, can be created if the same sediment is thinly spread over a large area, first that the sediment is all of the same time, whereas it is not, second that the time itself must be long because of ambiant indicators applying to some central segment. That is, dating the indicator, one applies it to the whole, which brings about an illusory dating of adjacent rocks, too.

Rejecting the "layer cake" and "gentle rain from heaven" images as explanations of sedimentations, Ager introduces a rolled carpet that is gradually unrolled with time. We can extend the analogy. A producer of carpets lays down his roll and rolls it out before a salesman; the salesman rolls it up and carries it away to sell to buyers. Sometimes the producer has no carpets; at other times he brings only part of his collection; sometimes he brings in many rolls. The salesman sometimes rejects carpets and they are not sold; sometimes he buys one, or several, or all. A pile of rugs accumulates in the producer's showroom. Piles grow elsewhere. The salesman may even return his defective carpets. He may decide to deal with several producers, even as the producers may deal with different salesmen. Some buyers save carpets as a form of money; others wear them out quickly. In critical times for the economy, heaps of unsold carpets are laid out and accumulate, or are desperately sold in heaps; in inflationary periods, carpets become quickly and widely distributed. These last time periods would quantavolutionize the rug business.

When he is not imagining rugs, Ager's picture of the stratigraphical record is "of one long gap with only occasional sedimentation."[19] But his "occasional" sometimes is rare and sometimes frequent. I have noted this earlier in his view of tsunamis. Also now avalanches: "the frequency of landslides is quite enough to account for a major part of the wearing down of new mountain chains." Three cubic miles dropped in one slide at Flims, Switzerland; 40 million cubic meters of mountains fell into Lituya Bay, Alaska, in 1958. Still, a single earthquake of 10 or more on the Richter scale (and what was the number of the rising of the Sierra Nevadas?) would shake a new mountain range into well-worn shapes with garlands of debris all about below, and enough detritus to provide many moraines; the rise of a mountain range, indeed, may be its own heaviest eroder, then and there. The more rapid its rise, the more eroded it will be when it ceases to rise.

Ager argues convincingly the origin of deep sediments. The production of sediments is independent of subsidence. "It is only when sedimentation and subsidence coincide that the conditions will be right for the preservation of the vast thicknesses that constitute the stratigraphic record."[20] Again, we encounter a falling back upon the old notions of subsidence and uplifting. The phenomena are not mistaken; they are only insufficiently explanatory.

Ager partly realizes this, and sets up a very busy plate welding shop operating episodically over vast periods of time. A number of plates (and he seems to accept many major fractures everywhere as plate boundaries) spend history in roughly their original geographical locations, jostling heavily against one another periodically, episodically, spasmodically. "The continental plates, rather than sailing about the earth until they met in catastrophic collisions, separated and came together again repeatedly along the same general lines. In other words, there were many catastrophes and certain parts of each plate were particularly accident prone."[21] He would better have taken up the simple concept of ocean basins being created *before* the oceans and filled by debris washed down and fallen out of the catastrophic deluges.

We should not diminish one whit or alienate so expert and staunch an ally. We may, as mildly as we can, offer a suggestion. Let us give one more turn to the screws on the lately tortured Earth by computerizing its morphology. Suppose only one index to be composed for a sample of, say, 5 100 sedimentary sequences chosen at random from the 510 million square kilometers of the Earth's surface (one in 100,000; this ratio and size of sample is typical for discovering the political opinions and predicting the voting behavior of the American population).

Call it an Index of Quantavolution "Q/a" (actually this could be a composite of a set of indices). It should contain and combine the number of distinguishable strata; an index of conformity to the ideal sequence of geological ages; the number of discontinuities that might be of diastrophic origin; the proportion of igneous and metamorphic intrusions; the proportion of the square kilometers (as judged by a hexagonal reading from drilling or otherwise) occupied by the central sequence of strata; and a total of the estimate of the lowest possible elapsed time for the deposit of each stratum to the column. Determine the usual statistical parameters of the sample, the sums, means, modes, quartiles, standard deviations etc. of the 5100 sedimentary sequences, and perform the obvious analysis and comparisons.

Some will say that the general information sought here is already known and taken into account, others that it is largely unknown and impossible to achieve, and many (rightly) that it is a caricature of a carefully drawn index. Many will comment that if the MOHOLE could not be financed to drill into the underseas mantle at an especially flushed period of American government finances, this project could never be funded. Many would want "add-ons": for example, "why not get samples of all strata in every sequence while we are at it?" We would eagerly agree. However, plausible conjectures and semi-data might be developed for all aspects of the index by library research and questionnaires addressed to many experts. Substitute sampling could be extensively employed.

Ultimately I would suppose refined summations to emerge such as the following: that the number of strata increase with recency; that superposition is 90% or better, but less than 50% of the recognized sequence is present; that 95% of the discontinuities might conceivably indicate diastrophism; that possible intrusions occupy over 50% of 80% of the sequences; that few sequences preserve their integrity over a square kilometer; that 80% of all sequences might conceivably have been laid down in their totality within 1000 (sic) years and that individual sequences would never exceed 10,000 years using conceivable assumptions.

The report would be entitled, *Reductio ad absurdum*, Part II. Perhaps one of the more entertaining aspects of such a study would be the objections that it is too literally empirical, and that the "total picture" is needed to disprove it and set it aright; the "total picture" is, however, what hitherto has given rise to the cosmogonies and science fiction that have commonly caused distress among geologists.

It would be possible to elaborate the hypothetical findings of such a study and to explain their heuristic and substantial utility, but not here. Thus, if the data is rotated topographically, significant summaries of continental and regional data would be generated. Moreover, as characterizes discussion of empirical data, no matter how crude, the air would be cleansed of some of the purely terminological pockets and gusts that cause turbulence and mental cloudiness. I see in such a project, also, a confrontation of the facts and their consequences that even a most learned and iconoclastic scientist does not consistently afford himself. He may come to realize that microchronism must be employed as a hypothetical model if a catastrophist is ever to integrate his facts.

Notes (Chapter Twenty-five: Sediments)

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2. "Glaciological Surveys for Ore-Prospecting Purposes in Northern Finland," in Legget, ed., *op. cit.*, 225.

3. "Thickness of Wisconsian Tills in Grand River and Killbuck Lobes...," in R.P. Goldthwait, *Till: A Symposium* (Columbus, Ohio State Univ., 1977), 160.

4. *Op. cit.*, 424.

5. *Op. cit.*, 38.

6. O.F. Tuttle, "The Origin of Granite," 192 *Sci Amer*. (Apr. 1955), 81.

7. As for example, W.G. Ernst, *Earth Materials* (Englewood Cliffs, N.J.: Prentice Hall, 1969), 111.

8. Ager, 34.

9. "The Essential Nonexistence of the Evolutionary-Uniformitarian Geologic Column," 18 *Creation Res. Soc. Q.* (June 1981), 46-67.

10. *Ibid.*, Table II.

11. *Op. cit.*, 83.

12. *Ibid.*, 100.

13. *Ibid.*, 40.

14. *Ibid*., 41, 44, 50.

15. *Op. cit.*, 73.

16. G. Frederick Wright, 11 *Amer. Antiquarian* (1889), 379-81.

17. From letter to author, 15 Oct. 1982, Enschede (The Netherlands).

18. Ager, 58, 52.

19. *Ibid*., 34.

20. *Ibid*., 20.

21. *Ibid*., 86.

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