 From: *The Lately Tortured Earth* by Alfred de Grazia (1983)

GENESIS AND EXTINCTION

Man is an exceptional creature, creative and destructive. He is a walking catastrophe for other kinds of life. Rashmi Mayur, in agitating for a "Kalotic World Order," projects that mankind will extirpate most species of life within this generation in exchange for 1.5 billion more people. J. W. Carpenter has cited estimates that 25% of all existing species may become extinct by the year 2000 [1] ; this is not the work of man alone perhaps, for the Earth itself may be enduring a longer-term decline stemming from its ancient cosmic bouts. But man is failing to protect the Earth.

If our approach is believable, nature requires high-energy forces to extinguish species and must need an equally great force to create them. The forces at the same time may be subtle and powerful, as with invisible radiation, or flagrant and powerful, as with the crash of a large body into the Earth. Such is quantavolution.

It appears to be easier to discover death than new life. The literature on biological extinctions is getting heavier all the time, but little is forthcoming on genesis. We wonder why. Could it be a taboo against one kind of creation? Perhaps. Might it be this, that eighteenth century economics picked up an idea that common people have always had - and some great ones like Machiavelli and Hobbes, too - that life is a struggle among men; there are few places at the top; one must eliminate competitors to get one's place; survival is a power struggle.

Early modern economists went along with the notion. Thomas Malthus (1766- 1834) pushed the line of thought into a world-wide view: goods are scarce, and men will compete for them; who is most effective gets the most; human populations are checked in their growth only by nature's instruments of famine, plague, and war. Later man was excused from the struggle, if he would develop "moral restraint" against excessive breeding. He has not done so. But the biological world, as young Charles Darwin saw, had no moral restraints and was operating continuously under the pressures of the environment. Nor was there any *rentier* psychology in nature: "Give me my little niche and I will give you yours." Pressure to expand was infinite and this aggressiveness led to the most marvelous adaptations (to other's niches) and actual physical evolutions. So went the line of thought.

The underlying amoral (but moral in its own way) view here found the idea of catastrophism disturbing, first because a moral agent called God was customarily employed to command the disasters and reconstitute the world afterwards, and second because catastrophism without divine controls appeared to be quite disorderly and not progressive, lacking the capacity to create species (Elohim promises Noah *this* Deluge would be the last; nor did the survivors anywhere talk of new species, these all having been created once before.)

Nor when Mendel appeared on the scene with proof of mutations, was it appreciated that a mutation was a micro-disaster, perhaps tied into catastrophe somehow. It was for a later generation of scientists and theorists, impelled by the logic of the atomic bomb, to bridge the gap between an invisible particle and a visible awesome destruction. It was (and is) still too early to say how catastrophe creates as well as destroys; a third line of theory has to be developed to explain the paths of genesis, which despite repeated extinctions, have led to new and different forms of life.

Nonetheless, biological quantavolutions appear to have a large creative element.

One of the rare early geologists to perceive this was Clarence King, and, in his attempt to assail evolution on its firmest historical ground, he penned several passages of beauty and importance [2] :

> Greek art was fond of decorating the friezes of its sacred edifices with the spirited form of the horse. Times change: around the new temple of evolution the proudest ornament is that strange procession of fossil horse skeletons, among whose captivating splint-bones and general anatomy may be descried the profiles of Huxley and Marsh. Those two authorities, whose knowledge we may not dispute, assert that the American genealogy of the horse is the most perfect demonstrative proof of derivative genesis ever presented. Descent they consider proved, but the fossil jaws are utterly silent as to what the cause of the evolution may have been.
>
> I have studied the country from which these bones came, and am able to make this suggestive geological commentary. Between each two successive forms of the horse there was a catastrophe which seriously altered the climate and configuration of the whole region in which these animals lived. Huxley and Marsh assert that the bones prove descent. My own work proves that each new modification succeeded a catastrophe. And the almost universality of such coincidence is to my mind warrant for the anticipation that not very far in the future it may be seen that the evolution of environment has been the major cause of the evolution of life; that a mere Malthusian struggle was not the author and finisher of evolution; but that He who brought to bear that mysterious energy we call life upon primeval matter bestowed at the same time a power of development by change, arranging that the interaction of energy and matter which make up the environment should, from time to time, burst in upon the current of life and sweep it onward and upward to ever higher and better manifestations. Moments of great catastrophe, thus translated into the language of life, become moments of creation, when out of plastic organisms something newer and nobler is called into being.

The breaking of an age is the occasion for instant creation and instant destruction. The quantavoluting high-energy forces concentrate upon reducing and at the same time increasing the variety of species. Otto Schindewolf, from 1950 on, was tracking what he called faunal discontinuities, for which task D. L. Stepanov called him the "most important and consistent spokesman of the idea of neocatastrophism in contemporary paleontology." In him one finds a more stringent scientific tongue than King's but the same view. "Faunal discontinuities... involve not just the dying out of old, but also the more or less sudden emergence of new phyla. This phenomenon can no longer be successfully accommodated under the term catastrophe in the true meaning of the word: it should rather be described as *anastrophe*." [3] (that is, 'upturn, ' not 'downturn'). It was partly for this same reason that the term *quantavolution* was chosen.

Probably most species are born or die out at the disastrous junctures of natural history whence the rocks and fossil seas, too, provide evidence of commotion.

Pietro Passerini cites estimates of 1.5 million extant species and between 3 million and 8.5 million species as existing but still unidentified [4] .

G. G. Simpson estimated the number of existing species at two millions. and the all-time average since the beginning of life at between 500,000 and 5 millions. He guessed that the average species endured from 500,000 to 5 million years. He put the time since life began at from one to two billion years. When he performed his arithmetic he emerged with a high total estimate of all species of four billions, a medium estimate of 341 millions and a minimal estimate of 50 millions [5] .

Sometime later, Teichert estimated the number of discoverable or fossilizable species at ten millions, lower than Simpson by a factor of five. The vertebrates among them were guessed at a round million. Cook used many less, accepting 1,105,000 for the living species, and then proposed that a figure of 130,000 for fossil forms discovered be considered a fairly complete sum of all past species. He asserts grounds for believing that most fossilizable species have already been discovered, implying that most or all species were created in short order and that a tenth or so have been eliminated. If algae and worms can be traced in the sediments, what would not have been traceable?

Schindewolf comments that "good conditions of preservation existed even for the most delicate, soft-bodied organisms in the Precambrian;" furthermore, it is incorrect that the

rock strata of quantavolutionary times are missing or totally destroyed along with their hypothetical fossils [6] . Cook's view accords with his microchronic view of Earth history, which would permit one or several catastrophes and a natural dissembling of the fossil record to tempt exaggerations of the expanses of time and the progress of evolution.

Between Cook's one million and Simpson's two million for living species, reconciliation is conceivable. Between his 130,000 (say 200,000), and Simpson's maximum of four billions, there is no hope of ultimate agreement. Even Simpson's minimal figure of fossil species, 50 millions, is 250 times larger than Cook's. Altogether we are in a state of ignorance on what nature has afforded as candidates for extinctions. For that matter, no one is so bold as to define absolutely a species, much less to maintain nowadays that the conditions for speciation have always been the same. There may indeed be one or more dubious premises in all reasoning on the subject.

We may be confident that at least all major forms of life and many manifestations of each have been recovered from the past. In this sense, for the philosopher anyhow, there are no important gaps in the record. Yet, evolution demands ancestors, and its theory becomes dubious if the extinct are not sufficient in numbers to provide ancestors. Or at least the same few ancestors would have had simultaneously to branch in numerous directions; this is not impossible to argue; and a shortness of time would be no handicap to the argument. For the moment, to hold in abeyance an opinion on stasis and evolution, I shall accommodate my thinking to a million or more living species and over a million fossil species.

For several additional issues beg introduction. With the painful realization of gaps in the record that refuse closure, the reality of quantavolutions, and the improbability of point-by-point evolution no matter how much time is allowed, some scientists have spoken forthrightly for a new look at the record. They find that the path of evolution has been irregular, that there are times to evolve and times for quiescence. (Nor is this an artifact of time estimates.)

Writes Brough, concluding an extensive review: [7]

> Evolution seems to have worked in a series of more and more restricted fields with large-scale effects steadily decreasing. Evolution at the present time is a slower and much more restricted phenomenon than it was earlier, and seems to be concerned with speciation in a pattern of larger systematic units which was laid down in the more or less remote past, and seems to have been standardized for a long time.

Genesis may not work at the will of God, but it does not work uniformly either. "Given a more or less even mutation-rate, and Natural Selection as a cause in evolution, there is difficulty both in accounting for the early and relatively rapid phases of evolution giving rise to major groups and also for the great decline in this phenomenon in later geological time."

Brough holds to spontaneous mutation as the source of genesis and speciation, and "Natural Selection merely works on these;" furthermore, "changes in organic forms have nothing to do with external factors." So he gets into a tight corner.

> There seem to have been evolutionary surges in the past when large changes of organic form took place, and produced the larger systematic units... There is plenty of evidence suggesting that during these evolutionary surges changes produced by mutations were not random, but were directional; this is well seen in such groups as the mammal-like reptiles, and in the higher bony fishes where several independent phyletic lines undergo the same sort of changes at about the same time.

Natural Selection may have assumed more importance when this process slowed down. An example of the evolutionary surge would be the "sudden appearance of a highly-developed fauna in the Cambrian," after diligent search of undisturbed sandstone, shales and limestones of the pre-Cambrian for hints of what was to come.

We speak here of simultaneous physical changes in a collectivity of species that may be unrelated. Within a species a saltation of individual changes must be also occurring. Hence there should suddenly occur a heavy branching out of types, some to survive, some soon to die. But then we encounter two additional phenomena of the fossil record -a lack of transitional types and an absence of short-lived sports.

In the case of all the thirty-two orders of mammals, Simpson tells us, the ancestral record is very poor. "The earliest and most primitive known members of every order already have the basic ordinal characters, and in no case is an approximately continuous sequence from one to another known. In most cases the break is so sharp and the gap so large that the origin of the order is speculative and much disputed [8] . ' E. C. Olson, reviewing the literature lately, reports: "under the very best circumstances... morphological and stratigraphically graded transitions between classes and subclasses have been found. At the level of phyla and higher categories, any information on transitions as far as the fossil record is concerned is essentially non-existent." [9]

T. H. van Andel surmises that missing links "may have been expunged from the record." [10] The *Glomar Challenger* found one-half of the assigned 125 million-year record missing from deep cores drilled in the South Atlantic Ocean: he implies a catastrophic removal of the layers.

Other paleontologists, specialists in other evolutionary fields, agree: as with the rocks, so with the life forms, there are more gaps than record. In treating of this important point, discussion has focused upon "transitional types." It can be said that for no phylum, class, order, family, or species is there an indisputable succession of types that is predicted under the neo-Darwinian theory of evolution.

If, as Rodabaugh points out, micromutations must account for all observable variations between species, then the number of transitional species must be exceedingly large. "Furthermore, each species must be exceedingly viable in order to survive long enough to give rise to some 'evolved' descendent." [11] He then proceeds mathematically to demonstrate, with a probability approaching certainty, that transitional forms have not in fact existed. A "transitional form" is the species of life that is both intermediate and ancestral in relation to any two discovered fossil or living forms. "Missing link" would be a synonym for it. Where, for instance (if birds are indeed descended from reptiles), is the reptile who is just starting to sprout the wings of the bird? And the ancestor of the horse is nowhere to be found. D. M. Raup and S. M. Stanley [12] are quoted:

> "Unfortunately, the origins of most higher categories are shrouded in mystery; commonly new higher categories appear abruptly in the fossil record without evidence of transitional forms."

Until lately, the ape Ramapithecus was in favor as the possible ancestor of the hominids. In 1982, it was reported that close study of a skull of Sivapithecus dated at 8.5 million years, and regarded as practically identical to Ramapithecus, showed definite relationship to the orangutan and hence was deemed not to be a transitional form to man [13] .

Nevertheless, although it is already admitted that transitional forms are absent, Rodabaugh computes, from the number of fossil birds estimated to have been found, the probability that a transitional form will exist. He finds the possibility so tiny as to be absent, quoting Emil Dorel: "Events whose probability is extremely small never occur." Rodabaugh concludes that, either the present biological world got here by macromutations ('hopeful monsters') or by special creation.

The "hopeful monster" is the new species, containing many changes, thrown out by a general mutation, and hopefully satisfying the conditions of survival. Rodabaugh declares that the concept "is rejected by nearly all evolutionists." Still, it has been reported,

"within certain of the dying families [of Upper Cretaceous ammonites], an increase in size and the presence of bizarre-looking forms may be noted. This is a common accompaniment of extinctions of many groups." [14] It suggests catastrophe, accompanied by radionic mutating storms that both alter and destroy species. At the end of an "age" (defined as a "more settled" period), the species-mix and distribution of the biosphere suffer revolutionary change. Whereupon the struggle for life niches renews under more and more uniform conditions, which may, however, not be the uniform conditions of the past age.

Charles Hapgood, another catastrophist, whose work has already been cited, confronts the same problem and although admitting that the major proponent of macromutation or "systematic mutation," Richard Goldschmidt, is opposed by the majority of writers, believes that a sudden shift of the Earth's poles and crust could produce the requisite shortening of the tempo of evolution.

I am treading upon uncertain ground. In what has been said of the sacred and divine elsewhere (in *Chaos and Creation* and *The Divine Succession,* both works of the Quantavolution Series), I maintain that the historical gods are scientifically explainable within the framework of natural causes and human nature, but merge into a philosophy of religion that is not germane here. Hence enlightenment on the scientific level has to come through a uniform explanation of the fossil record or through macromutation in a catastrophic setting.

It is possible that a trillion "sports" have been disposed of by quick extinction, and that the few fossils that come down to us represent trillions of individuals of the standardized species. In this case, the absence of transitional "missing links" is not so improbable as some make it out to be. That is, if during a billion years, the average number of individuals per "long-lived" species has amounted to, say, a trillion and the average aborted and transitional form had to "make" or "break" on no more than one thousand specimens, then the chances of finding and recognizing such a necessarily handicapped form in the fossil record are negligible. That is, the transitional species would be a small population. If successful, it would spread with exponential rapidity.

If, for every significantly mutated species which survived there were 10,000 that did not, then even 10 4 Xl0 3 would give only 10 7 . By contrast, the surviving species averaged l0 12 specimens that might enter the hall of fame of the fossil record. The relative chance is then 100,000 to 1. Consequently, if even a single showcase of transitional freaks has entered into the fossil record, there is enough to satisfy mathematical expectation.

It is more likely that a form of quantavolution operates (it is discussed in *Homo Schizo I* and *Solaria Binaria).* The absence of transitional types, if it proves anything, probably goes to prove that something like quantavolution must exist in genetics; there is then no expectation of transitional types. A mutated reptile has wings and it flies, without a long time of flight-prone ancestors.

However, transitional forms are not the most bothersome problem. Nor is it the continual relapse into Lamarckian environmentalism that characterizes the literature of many professed Mendelian-Darwinists. It is the nagging intuition of purposefulness that afflicts both the religious and atheistic observers alike. The species, from the virus up to the human, appear to be put together meaningfully. The species function in the wierdest, meanest, most wonderful ways to exist -not to progress, adapt, change, or intelligize, but simply to carry on an existence as best they can. Every species appears probabilistic to the point of impossibility.

A species may be "fantastically" constructed; but it is functional. A billion cases of an animal or plant cannot be denied. Its every trait relates to every other trait, just as in a culture every culture trait relates to every other culture trait somehow, no matter how "senselessly." The species is a whole, just as a culture is a whole. How can it be that,

amidst the millions of chemico-physico transactions always occurring in the human body, a shot of adrenal hormone, prompted by a scare, is practically simultaneously counteracted by a hormone to prevent over-reaction to the scare, as the classical work of Cannon on homeostasis, or *The Wisdom of the Body,* first elaborated?

Stanley's calculations show that species of European mammals of today have on the average survived for one to two million years by conventional calculation (middle pliocene mollusks had a mean duration of 7 my). Very few species of short duration (less than 0.4 my) occurred in the record. No ephemeral species appeared and disappeared.

He concludes that "much more than 50 percent of evolution occurs through sudden events in which polymorphs and species are proliferated." [15]

So here we find no sports, no transitionals, and a suggestion of macroevolution or quantavolution or "punctuated equilibrium." Also Stanley and Harper have noted a lack of correlation between rate of evolution and generation time [16] .

Life forms have widely varying generation-lengths. The human, who lives relatively long, reproduces from dozens to millions of times more slowly that most animal species. The human, therefore, should have had less evolutionary change in his past than a great many 'lower' and 'simpler' forms. Too, if the capacity to mutate is considered a positive feature of a species in "natural selection," then the human and many another 'advanced' species should be regarded as handicapped in the struggle to survive and adapt.

The biologist will probably agree with this and go in search of other advantages afforded these handicapped species in natural selection. When his search fails, he must grant that biology has always had an in-grained prejudice for the complex 'higher' animals, especially man. Man, like other advanced mammals, and indeed like all specialized as opposed to primitive, general, and simple organisms, is poorly designed for survival.

Nevertheless this dismal picture includes a seed of hope, indeed a new hypothesis of quantavolution. If generation rate and evolution rate do not correlate, it may be that evolution occurs, whether in simple short-lived forms or complex long-lived forms, at an instant time that is absolutely short and therefore, reversing the history of the Colt revolver, "makes a big man equal to a little man."

More importantly, a long-lived form may inherit a genotype which all life forms share, no matter their generation time. This would be the ability in a mutation to change instructions for the largest and most *complicated* cell assemblage as readily as for a single-celled animal. One result would be equalization of evolution effects; the concomitant would be quantavolution or macroevolution, that is, the instant all-around change when a mutation occurs.

We have already noted the conspicuous absence of flora and fauna of the ocean bottoms and high mountains. The matter is relevant here again. The charts of extinction of species are also charts of genesis of new species. When species are exterminated in large numbers, new forms follow. Paleontologists question whether the new species are alterations of the old, or descended from earlier forms that failed to appear in the old fossil record, or evacuees from other zones of life. The first would seem logical but we are given to believe that first the old die out and then the new appear. This is an aspect of the problem of missing transitional forms. Yet it seems inexplicable.

Should not the dying dinosaurs and mutated mammals appear in the same strata? If heavy radiation is killing off one form but creating another, the stratigraphic gap should

be inconsiderable, or the old and new forms should grade continuously into one another. It should not require more than several centuries to prove the fitness of a new form and to find it in numbers upon the next catastrophic occurrence. Perhaps this is what did happen; however, we are used to placing a million years between any two highly visible events in the record. Or at least one should be able to locate first a catastrophized conglomerate of fossils and then in succeeding uncatastrophized strata the new forms appearing as individual fossils. Else we should have to double the number of catastrophes, one for extinction and a second for genesis.

But is it "flesh or fowl?" Or, as Velikovsky asks: "Were all dinosaurs reptiles?" [17]

Live birth among dinosaurs seems now fairly certain and not rare and there may have been a large mingling of important features hitherto believed distinctive between dinosaurs and mammals. Western USA rocks (Hava Supai Canyon, Colo.) produces drawings of dinosaurs, elephants, ibex, and human figures, as well as pictographs. If this ensemble is of the same time, a shocking reconstruction of the holocene period must ensue, absorbing time all the way back into the Cretaceous and up into the neolithic. But all those creatures exhibited may be pre-selenian, and were extincted, even the particular human race of the artist, around 12,000 B. P.

Leaving this perplexing issue, we return to the problem of the ecological niches. These should be quickly occupied upon the demise of old species. Cameroun and Benoit found algae, fungi and bacteria thriving in volcanic lava laid down by volcanic eruption on Deception Island in Antarctica. Elapsed time was one year [18] . Krakatoa's little island received new life, too, within several years of being exploded and completely burned out, not only microscopic life but amphibia, reptiles and birds.

Yet, to repeat an earlier fact, large attached organisms are rare on the most recent oceanic ridges, according to Heezen and Hollister [19] . At 1000 to 4000 meters of depth, the ridges should be rich in flora and fauna, of established species. This signifies either an extremely young age for the ridge system as a whole, or for the most recent millennia a very heavy general eruptive activity.

In the end, so far as concerns genesis, we hold to quantavolution in biology and geology. The holospheric principle continues to be productive; the lithosphere, atmosphere, hydrosphere transact continually with the biosphere: all are affected by high-energy forces ultimately originating exoterrestrially. Genesis or the new in life occurs hand-in-hand with the destruction of the old life forms. This is nothing more than Schindewolf's "anastrophism."

No more revolutionary times than the present have struck geology and biology since the victory of gradualism and evolution over a century ago. The most striking signals of the change are emitted from the new studies of the extinction of species.

In 1961 Schindewolf prepared for the 113th General Assembly of the German Geological Society a status report on neocatastrophism [20] . He claimed major faunal discontinuities on the boundaries of the Precambrian-Cambrian, Permian-Triassic, and the Cretaceous-Tertiary eras. "On the divide between the Precambrian and the Cambrian there was a relatively sudden and thorough-going transformation of the animal kingdom, in which durable hard parts were deposited for the first time." There is a partial species overlap of short duration as the Permian moves into the Triassic as he notes in 4 groups of fauna, but he names 24 that expired and 24 that newly appeared.

At the Cretaceous-Tertiary boundary, "the dinosaurs represent only one aspect of the much wider extinction process and the profound change in the composition of the faunas..."

The larger mammals then came into being.

P. S. Martin and others trace the extinctions over most of the world [21] . D. A. Russell draws a picture of losses of 50 out of 250 terrestrial genera, a third of floating marine genera, half of the bottom-dwelling genera, and least of all in losses, about a fifth of the swimming marine genera [22] . He estimates that 75% of all species died alongside the dinosaurs, and in a period of only 1000 years, in conjunction with magnetic field reversals instigated perhaps by blasts of supernova radiation from a nearby star.

He argues that "it is beyond the capacity of forces within the crust of the Earth to produce global catastrophe on this time scale;" conjectures of glaciation are inadequate, especially since no evidence is to be had of a general temperature change. Nor does Russell grant that the Sun could expel such high bursts of radiation. Schindewolf here denominates 16 faunal groups as exterminated, 3 as overlapping briefly, and 24 as newly arising. As young Darwin wrote in his *Journals* (Jan. 9, 1834), "certainly, no fact in the long history of the world is so startling as the wide and repeated extermination of its inhabitants." (How could such observations end up in uniformitarianism?)

Schindewolf also dismisses explanations offered for these quantavolutions, none of which he deemed valid, such as gaps in the rock and fossil record, epidemic diseases, climatic changes, ice ages, differing depositional characteristics of species, reduced salinity of seawater, competition and natural selection, mammals eating dinosaur eggs, and changing sea levels.

Then he reaches into the skies. "Since faunal discontinuities are universal phenomena, they must arise from *universally active causes.* This has compelled me to look for agencies that would (1) have worldwide effects and (2) could extend to the totality of biotopes in the sea, on dry lands, in freshwater and in the air, as well as to stocks of most varied habitats and ways of life." [23]

His explanation lies in radiation storms:

> Since 1950 I have favored the hypothesis that sharp fluctuations in the high-energy cosmic radiation reaching the Earth should be considered among possible causes... I proposed that, on the one hand, the direct impact-effects of ionizing radiation should be considered, and, on the other, especially the increased generation of radioactive isotopes, which would become incorporated in the living organic matter and the molecular compounds of the chromosomes. Here they would unleash a twofold mutagenic activity, through ionizing radiation, on the one hand, and by the liberation of electrons in the decay of the isotopes on the other.

He cites theories of supernovas as the source and media for the transmission of the anastrophic material, and credits E. A. Ivanova with "a connection between the faunal discontinuities and the migration of radioactive elements." Schindewolf points out that the exceptional survival rate of insects compared to other fauna may be due to the fact that "the resistance of insects to radioactive radiation is about ten times greater than that of human beings and other organisms."

Schindewolf's conclusions, including his exoterrestrialism, have been supported by later studies. In a summary report of 1982 [24] , W. Sullivan added the Devonian-Carboniferous and the Pleistocene-Holocene boundary periods. In the former some 30% of the animal families disappeared. In the Pleistocene climax, 70% of the large mammals extincted. In both eras, marine life suffered greatly as well. He separates the Permian-Triassic into two extinction periods, 50 million years apart. Raup estimates that 96% of all marine species may have died out in the late Permian. Valentine and others before him (1974) have noted the petering out of highly innovative evolution [25] . The origination of phyla, classes, and orders came successively to a halt; families declined, but diversified in the Mesozoic-Cenozoic. A macrochronometrical paleontogist would say that there has been no major innovation in life for 40 million years (present company excepted).

Species, as we have indicated earlier, are an unknown quantity, with gross discrepancies in estimates of their historical numbers. Species are also more susceptible to genesis than the statistically concocted general groups with their assigned, more basic features; this is in accord with theory, whether microevolutionary or macroevolutionary. Probably species have been extincted and ramified on disastrous occasions that did not affect the existence of the basic forms to which they pertain.

Mankind may be one case in point; small differences are all that can be observed between man and ape, but as with the absence of major differences between men and women, in the words of the French deputy: "Vive la petite difference!" In the two volumes on *Homo Schizo,* the origins of the differences between hominid and homo are discussed.

We uneasily recognize the need to consider together at the same time a new chronology, a new theory of mutations, better data on numbers and extinctions of species, and the observed quantavolutions of the Earth. For only by such means will we be enabled to answer a question such as the suddenness of extinctions. Somewhere in the space between a day and twenty million years, a line has to be drawn to distinguish catastrophe and gradualism.

The studies and critiques of the work of Alvarez and associates on the Cretaceous-Tertiary extinctions illustrate the point. The superseding of dinosaurs by large mammals is known, with their accompanying less dramatic extinctions and creations. Also now a chemical boundary is known. By one count, "Iridium-rich layers marking the end of the Cretaceous Period have now been found at more than two dozen locations around the world." Freshwaters and seabottoms were affected along with dry land. Iridium is much rarer in the Earth's crust than in presumably exploded and space-affected meteorites. Hence a cosmic event is predicated, the Alvarez group holding to a middle-sized meteoroid explosion as the source, and a several months darkness accompanying the explosion as the killer of the dinosaurs.

Critics argue that the dinosaurs did not extinct with the end of the Cretaceous and took much longer to die out anyhow. Others say that the iridium is a product of heavy deep volcanism and slow sedimentation. Another maintains that the dinosaurs died from a drying up of their swamps. Still another claims that a mere several degrees of temperature rise or fall would halt the incubation of reptilian eggs and in a short time destroy the species.

After the Cretaceous comes a "nine-million-year" period of the Tertiary known as the Eocene. Geologists (Ganapathy, W. Alvarez *et al.,* and O'Keefe) now speak of a "terminal Eocene event", a catastrophe marked, as in the case of the end of the Cretaceous, by high iridium concentrations and microtektite fields. Do tectites and iridium always occur in exoterrestrial crashes? Or does this suggest that the two events, post-Cretaceous and post-Eocene, were one and the same, the "Eocene" and other eras having been concocted for differing fossils and strata of the same time.

An impatience and frustration seizes a person who is imbued with the perspectives of quantavolution and recency in biology and geology. Ordinary accounts of animals, plants, volcanos, winds, rocks, etc. become lame and foolish. The author, riding a KLM plane across the Atlantic in 1982, puts aside this chapter and glances through the *KLM News* magazine. There a puff is given KLM for flying seven small lemon sharks from Florida to Holland. The sharks needed "tender, loving care," "had to be massaged constantly," "sprayed continuously," "given extra oxygen," -these being beasts "having inhabited the oceans since some 50 million years before man made his first appearance." How, one wonders, could the sharks have prospered through one catastrophe after another: either the extinction would not be complete and exponential reproduction would quickly make up the difference, or else sharks are young species

and much of their ecology must be young as well, including, say, manganese nodules that form around shark teeth in the abyss.

There are then the meteoroids and the supernovas as sources of anastrophic radiation. Could "cosmic" radiation come from volcanism? If deep, heavy, and worldwide, radiation closely akin could fall out from volcanism. But such volcanism, as we explained earlier, must look for high-energy excitation from the skies. As for the supernovas, in *Solaria Binaria* Milton and I attribute heavy radiation to at least three novas -a preliminary outburst of the Sun creating its binary, and two explosions of its binary in subsequent millennia. We also designate several other possibilities of radiation, that would be heavy enough to account for periods of intervening radiation, not from novas but from impact-explosions and crustal removal in passing encounters.

Here and there now reports are issuing of excessive radiation levels in rocks and fossils. Kloosterman was earlier quoted on the subject. Salop speaks of a primary enrichment of uranium in dinosaur bones. Numerous similar findings have been reported since 1956 in Brazil and Argentina. Some bones from an undated red sandstone were radioactive. J. E. Powell summarizes these findings. Fossils from Mongolia also show high levels of radioactivity. Kloosterman located these facts and also discovered that almost none of the world's natural history museums have measured radioactive levels in specimens of their collections [26] .

However, the prevalence of fossil conglomerations around the world implies brief periods of extinction, and forces not alone of radiation, and pre-existing ecologies quite different from those that came after the catastrophic periods.

So many rich fossil deposits occur in circumstances that reveal high-energy processes to be at work. In Baja California, fossils were laid down over hundreds of square miles of the desolate terrain, exposed by surface erosion. Living and extinct species mingled in broad confusion. Flint and obsidian artifacts lay also upon the fossil sediments. The bones of mastodons, ancestral horses, a giant tortoise, camels, bison, sharks, whales, sea cows, and fish were plentiful. A shark species found in Mississippi turned up here in the Pacific. Assigned times, prior to investigation on the spot, ranged from 50,000 years (in the case of the artifacts) to 60 million years. Dating aside, the giant, confused, and rich fossil fields signal a catastrophe or a series of catastrophes at short intervals of time, from floodwaters sweeping in from land and sea.

S. J. Gould, who has pursued assiduously the study of extinctions, has had to go well beyond gradualism, uniformitarianism, and natural selection. Luck or chance figures heavily. Random macromutation can substitute for isolation, by creating two species in the same niche without the benefits conferred by travel.

Commenting on the Permian-Triassic catastrophes, where an estimated ninety-six percent of the families of marine organisms ceased their existence, he says:

> There are few defenses against a catastrophe of such magnitude, and survivors may simply be among the lucky 4 percent. As the Permian extinction set the basic pattern of life's subsequent diversity (no new phyla and few classes have originated since then), our current panoply of major designs may not represent a set of best adaptations, but fortunate survivors.

Would the stripping of half the Earth's crust and an associated expansion and cleavage of the Earth, together with a paving of the ocean basins, all occurring within several thousand years and most of it very quickly in a single action complex, exterminate entirely the biosphere? Even the most determined catastrophists have passed over so frightful a concept. If, as has been conjectured, a meteoroid explosion of a few kilometers' diameter would destroy the dinosaurs, the colossal event portrayed here would annihilate all life.

To counter this universal scepticism, there is the fact that life does flourish today despite the event, so that if the event were proved, then the scepticism would have to vanish. However, taken as a problem in its own right, instead of an inference determined by an external logic, we should stress certain possibilities in the event of lunar fission.

1. The atmosphere at the time might have been enormously greater and so extending far into space to permit a reviving reverse flow to replace the escaping atmosphere, and to act at the same time as a great vacuum cleaner against the heavy dust clouds and heated air.

2. Although an enormous number of species may be extincted, only several survivors of a species may guarantee a replenishment of continental scope within centuries.

3. The possibility must be entertained that hitherto unused intra-species genetic adaptability can permit survivors of modified form under stresses seemingly quite destructive.

4. Holospheric catastrophes by their very complexity can block each other's effects, allowing some life-preserving niches to survive and even fabricating niches where none existed before.

It is no longer rare to hear scientists arguing an intervention from outer space to push evolution along. Objections arise from extreme proposals, whether of intelligent visitors or of lower orders. "Extraterrestrial footsteps on the sands of history," R. E. Dickerson has remarked, "do not seem to be mandatory." [27]

They would be superfluous, for that matter, if a quantavolutionary theory has laid down the sands. Further, as detailed in *Solaria Binaria,* if exoterrestrial voyagers had landed on Earth they might well have felt at home. Until quite recently, their former planetary abode would have provided a genetic milieu in the same vast plenum of atmospheric gases that the Earth enjoyed. However, Mars and Mercury have lost practically all of their life-support systems while the Earth has retained a crucial halo of air and a vast supply of water.

In itself this can be made into an argument for a short term of life on Earth. The more one studies the possibilities of natural disasters the more likely it appears that, over long stretches of time, these would have been so frequent as to make a total disaster much more likely to occur. That is, if several disasters are granted, given the same Earth and Universe, why did not many occur and why not worse? Assigning the Earth and its species five billion years of self-development may turn out to have been a frustrating detour in the history of the human mind.

By contrast, encapsulating the disasters within a unified theory, quantavolution, may prove enlightening and progressive.

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Notes (Chapter Twenty-seven: Genesis and Extinction)

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