

Chapter V

Part 1

4/1 The Bones and Stones of the Issue of Pre-Clovis

Differing opinions and a lack of consensus defines the controversy separating the two main camps entailing modern human evolutionary studies; "Multiregional Evolution" and "Rapid Replacement." Archaeologists have long acknowledged as given the theory that mankind originated in the Old World. If we did not then why would not humans have brought to the Americas more advanced Middle and/or Upper Paleolithic technologies than those actually found in mid-Pleistocene levels. Clearly, this is the main reason a pre-Clovis American habitation remains ambiguous. Tools similar to those defining the Old World Upper Paleolithic (or even Middle Paleolithic), were not produced in the Americas until the end of the last glacial (Krieger 1958; Jelinek 1992; Hanyes 1987a) marking the dawn of "Paleoindian Traditions." The controversy that continues to delay the acceptance of pre-Clovis or paleoarchaic mid-Pleistocene occupations revolves around the interpretation that the first Americans must have abandoned advanced subsistence behaviors that should have been brought from the Old World (Dincauze 1984, Lynch 1991).

However unfortunate 'pre-Clovis' sites (Amerindian occupations dating more than 11,900 years ago) not unlike Chile's Monte Verde, New Mexico's Pendejo Cave, Pennsylvania's Meadowcroft Rockshelter, and Brazil's Pedra Furada, suggest that mid-Pleistocene human occupations are, difficult to find, identify, and/or verify because they lack equivocal evidence affording modified stone tools (Carter 1980; Dillehay and Meltzer 1991 EDT's.). Yet, for what it is worth, all New World mid-Pleistocene or pre-Clovis finds are diagnostically similar with lithic tools (or even simple manuports) appearing to be akin, that is, of an unrefined nature. This begs explanation, as well it should!

Alternatively, should the presence or absence of refined stone tools be used as the sole criteria for accepting or dismissing New World mid-Pleistocene occupations? Perhaps Amerindians did not, in mid-Pleistocene times, as the evidence dictates, leave behind refined stone tools to aid archaeologists in their search for human occupations (Krieger 1958). Should we automatically dismiss them because it has been established that an advanced Paleolithic record exists earlier in the Old World? What is this picture telling us about evolutionary processes or should we ignore the limitations of what we are finding as scientists have done the past Century? Since pre-Clovis sites in the Americas do not exhibit highly modified stone tools, shouldn't we now be attempting to identify the significance of the cultural propensities of these unique human habitations (Adovasio and Carlisle 1986; Guidon and Delibrias 1986; Dillehay 1989; and MacNeish 1992).

Hypotheses concerning the initial presence of mankind (Indians) in the Western Hemisphere are chiefly defined as the result of migrations from Asia. These theories are often based on linguistic, genetic, dental, archaeological, or ethno-historical surveys, being cast from the nineteenth century contention that modern man could not pre-date the Neandertals (Hrdlicka 1912). The fact remains that all fossil man finds in the Americas are of anatomically modern humans, yet few of these potentially ancient specimens have been dated (Raemsch 1990; Richard Long (1998) personal comm.). Since modern man is known to have replaced the previous archaic forms known to have existed in Europe in

earlier times, the consensus has followed that anatomically modern man in the Americas could not predate the European evidence of, the Neandertals. But what if these New World sites *are as old* as some have come to believe? What does this imply concerning evolutionary process? (Moreover, what does this imply about scientific process.)

The alternative could be; there were *Homo sapiens* inhabiting the Americas before they arrived in Europe as acceptance of dates from sites like Pedra Ferada, Pendejo Cave, and Santa Rosa Island would suggest (Guidon 1986; MacNeish 1993; and Orr and Berger 1966)? Archaeologically speaking -- BLACK SWANS, or *what archaeologists have come to expect* -- might not abide in the depths of the New World's mid-Pleistocene record. Should not evolutionary concerns regarding the validation of mid-Pleistocene human occupations in the Americas - dating beyond 40,000 years - be seen as intensely significant (MacNeish 1992; Guidon 1987; and Orr and Berger 1966; Leakey and Simpson 1968 and others)? Clearly, there remains a persistent problem in finding a single collective consensus, be it concerning the first modern peopling of the Old World or the first presence of people during the American Pleistocene (Meltzer 1991). Perhaps it is time to apply the conservative archaeological perspectives to the Old World and in the same vane, modify the criterion required of Ice Age habitation(s) of the New. This is inherent in interpreting evolutionary processes and, in the same vein, in applying this principle to the evolution of scientific thought. An open investigation beckons researchers to test the null-Hypothesis that the American Indian did not arrive in the Americas from the Old World. It seems acceptable that there is uncertainty regarding the timing and origins for *Homo sapiens* while the Americas has never been included in the search for, *when man first was!*

I am asking anthropologists to bring into play research tools that were not available at the turn-of-the-century, when an *in-situ* evolution for the American Indian and with them, *Homo sapiens*, was first shelved (Hrdlicka 1912). Alternately, an attempt must be made to locate and/or relocate convincing physical evidence that would, ideally, confirm the subordinate hypothesis. For instance, potentially ancient human remains from the Americas (the early early man finds made before the discovery of C14), rest, for-the-most-part, undated (Raemsch 1990).

The best way to promote "pre-Clovis" research strategies might be to theorize, as many turn-of-the-century scientists did, that modern humans originated in the Americas. This argument carries with it the belief that *Homo sapiens. sapiens* have been anatomically modern longer than they have been in the Old World. The sudden rise of *Homo sapiens sapiens* and their total displacement of archaic Neanderthalic hominids 32,000 years ago remains the driving force behind genetic evolutionary interpretations directing current mitochondrial DNA research. This perception of a "missing link" between *Homo erectus* and modern humans has stimulated the search for an alternative place for our inception. A major underlying theme of this book offers a new corridor entry and dispersal of *Homo sapiens* throughout the Eastern Hemisphere.

Should we be investigating the likelihood of a human exodus beginning just before the onset of the Wisconsin I Glaciation? Untested is the possibility that a group of ancient American Indians migrated *from* the Americas *into* Siberia across the Bering Land/Ice Bridge. The sub-Arctic survival of the first modern humans to venture into the Old World required the deployment of specialized hunting tools. Here, the first true hunting tools were made from antler, bone, and ivory resulting from adaptations wrought

from the need to procure food from primarily animal resources. It is at sites like Old Crow in the Yukon that intermediary links to the initial appearance of big game Hunter/Gatherer societies can be found.

Will Louis Leakey's warning of a great antiquity for the indigenous Americans ever be addressed, verifying his and the late Ruth D. Simpson's work at Calico Hills, California (L.S.B. Leakey, R. Simpson, and T. Clements, 1978)? Peter Farb in *Man's Rise to Civilization, as Shown by the Indians of North America*, (1969, revised 1978) concludes that:

Such signs as the first dawn of man in the New World have been found in so many places that more and more respected archaeologists now believe that there might be some truth to them after all.

The earliest dates for early, early man in the Americas range from 50,000 to 200,000 at Calico Hill in California, and 30 to 150 thousand years at El Boaque in Nicaragua where flaked pieces of jasper are found associated with numerous bones of giant sloth, horse and other animals. If the European *Cro-Magnons* were from the New World, it could be understood why Amerindians remain of one initial blood group. M. Lampi and B.S. Blumberg in the chapter "Blood Polymorphisms" in *The First Americans: Origins, Affinities and Adaptations*, (J.B. Griffon; 1979) confirm this:

"In fact, it is assumed that a great majority of prehistoric Indians were of the O blood type, and that the Lewis A and Lutheran A are thought to occur in American Indian populations only as a result of (recent) genetic admixture."

Numerous isolated traits found intact in today's Amerindian population provide remarkable evidence to the singularity of their origins. Amerindian people contain only blood groups A and O, share little or no red/green colorblindness, and their skin tans more readily than other races. They share as a group a lack of facial or body hair, nearly never go bald, and they have a high frequency of arches rather than whorls in their fingerprints. Farb indicates that:

"Unimportant as these and other characteristics may seem, they provide conclusive evidence that sets the American Indian apart from all other human populations."

Farb describes late Pleistocene "midland woman" here:

"She had a long skull with delicate features, her brow ridges were light, her teeth and jaw small. There is nothing primitive about her. None of the early skulls possess the classic Mongoloid characteristics...All are unmistakably modern of the same species as ourselves."

It might be safe to assume that the first *Amerindian* migrations into the "new" Old World contained people of the single blood group "O". The development of A, B, and AB blood groupings and other regional variations in Old World people could represent population divergence and evidence of drift due to natural selection and adaptations to *new* Old World environments. Interspecies contact between nomadic *Homo sapiens sapiens*, and Old World *Homo erectus* groups would have laid the foundation for the

emergence of new blood allies bonded from non-sexual interspecies encounters in the Eastern Hemisphere. The earliest Cro-Magnons would have been, conceivably, susceptible to Old World pathogens encountered in these new environments. Only later, through adaptation, did they eventually gain immunity through the evolution of new Old World blood types. The catastrophic effect of Old World diseases (smallpox, measles, polio, tuberculosis, malaria,...) on the post Colombian Indian Population can be seen as evidence of Amerindian isolation. Moreover, since the vectors of disease primarily effected Native Americans and not Old World populations on the other hand, it could be assumed that the environments of the Western Hemisphere were *Homo sapiens* original wellspring.

Part 2

Part 3

2/4 The Australian and New Guinea highland populations are closer to each other than they are to coastal populations indicating that coastal populations represent a much more recent people from an as yet determined source that was not present in southeast Asians when these ancient Old World colonizers crossed the Timor Strait. “[C] Considerable diversification has occurred since that time as it has in nearly every population that has settled the Globe. Regional mtDNAs are new to these regions just as language evolves differently. That the 9bp deletion is not a founding lineage in interior populations, (except in the Americas) or found in high frequencies outside of coastal populations, suggests that it’s lateness can be traced to the spread of Polynesians to as far as Madagascar. As evidenced by its predominance in coastal populations and near fixation in Remote Polynesia the only place where it occurs incomparable frequency is in Equatorial America. Why are Indians always confined to the Americas? Given the belief that they Peopled the vastness of the Americas why would they not return to northeast Asia as Boas believed or accidentally discover Tahiti when the currents affording accidental discovery are favorable only to them?

5/3 The later arrival of today’s native coastal groups, American Polynesians, can be distinguished against the backdrop of genetic background of the original Australia and New Guinea Populations. For this reason Polynesians must be identified as an outlying population that has displaced many of the first inhabitants of Sahul or “Oceania” , Without an earlier widespread distribution in the interior of Asia or the Island Continents of Sahul, the 9bp deletion has only the Americas to turn to for it’s original source.

This 9-bp deletion is largely absent in Melanesian populations—for example, aboriginal groups of Australia and highland Papua New Guinea (PNG)—while it is present in coastal populations of PNG that are thought to be more recent arrivals to the island (Hertzberg et al. 1989; Stoneking et al. 1990). While the frequency of this deletion has been reported for many populations throughout Asia, the frequency alone does not reveal either the source of the deletion or the origin of Polynesians. However, patterns of variation in hypervariable segments of the noncoding mtDNA control region can provide insights into the evolutionary history of Polynesian mtDNAs (Hagelberg and Clegg 1993; Lum et al. 1994; Redd et al. 1995). In particular, Hagelberg and Clegg (1993) identified

an apparently unique pattern of nucleotide substitutions in the control region of Polynesians. Three transitions, at nucleotide positions 16217, 16247, and 16261 (Anderson et al. 1981) have been seen together in modern Polynesians at high frequency (80%-100%) as well as in ancient DNA from sites in the Chatham Islands, Society Islands, Hawaii, and Easter Island dating from ≥ 400 years B.P. (Hagelberg et al. 1994; Lum et al. 1994).We have termed this trio of substitutions the "Polynesian motif." These three changes are temporally embedded within each other and the 9-bp deletion—that is, the nucleotide change at 16217 occurred on the background of the 9-bp deletion; the nucleotide change at 16261 occurred on the background of the nucleotide change at 16217; and the nucleotide change at 16247 occurred on the background of the change at 16261 (Redd et al. 1995)(p. 404).¹

Even the 9bp deletion in Polynesians has mutated from its original Amerindian source. This would be expected if the later mutations were more recent to the ancestral condition, as it is found in the Americas.

We observed that the Polynesian motif, this trio of nucleotide changes in the control region at positions 16217, 16247, and 16261 (CGT), occurred exclusively on the background of the 9-bp deletion. This motif, seen in 79.2% of Samoans and 73.9% of coastal Papua New Guineans, was observed in 20% of east Indonesians with the 9-bp deletion. These east Indonesians were from the islands of Alor, Flores, Hiri, Ternate, and Timor. Remarkably, it was not observed elsewhere in Southeast Asia (including Borneo and Java in Indonesia), except in 1 of 81 Malays, and probably 1 of 176 Filipinos (ibed. 1995 p. 409).

The above results can be interpreted to indicate that the Polynesian motif arose in east Indonesia, although an origin in Malaysia or the Philippines cannot be ruled out. Alternatively, the presence of this combination of substitutions in east Indonesia might reflect back migration that occurred from Polynesia and/or coastal New Guinea to this region. The amount of diversity associated with the Polynesian motif might distinguish between these competing explanations (ibed 1995 pgs. 409-410).

The 9bp deletion has been found in Polynesians only the past 3,600 years post-dating its native continental distribution in interior Central and South Americans. Simply, the common motif found in most Polynesians is younger than the "Amerind" lineages containing the 9bp deletion. Nonetheless, the 9bp deletion - without the Polynesian motif(s) - is believed to be older in the Americas. Simply, the 9bp deletion found in the Americas predates the colonization of Polynesia. The marker is found in coastal southeast Asian Island groups but not the interior populations. It is not popular to assume Amerindian origins for Polynesians and, with this, Amerindian migration into Polynesia, Southeast Asia and beyond.

The deletion occurred in 4 of 156 Aboriginal Australians from Western Australia: two (AK27 and AK1110) from the Kimberley region and two (AW218 and AW220) from the western desert population. None of the 134 individuals screened from the Northern Territory had the deletion, but it did occur in 4 of the 20 Cantonese

¹ Melton, Terry, Raymond Peterson, Alan J. Redd, N. Saha, A.S.M. Sofro, Jeremy Martinson, and Mark Stoneking 1995. Polynesian Genetic Affinities with Southeast Asian Populations as Identified by mtDNA Analysis. *Am. J. Hum. Genet.* 57:404, 409, 410.

(HK3829, HK3850, HK3919, and HK3992) (pg. 429).²... None of the eight individuals we found with the deletion shares the "Polynesian motif" comprising the C at position 16217, plus G at position 16247 and T at position 16261 (ibed pg. 429).

This result has several possible interpretations. If the AW222 mitochondrial genotype does form part of the major Asian-derived clade, then it may represent either an ancient divergence or a later introgression, or both. Alternatively, the few shared variable sites described above could represent homoplasmy in a region with known high rates of mutation; in this case, *AW222 could represent a third independent origin for the deletion* (ibed pg. 431, *emphasis added*).

In summary, analysis of control region sequences from four Aboriginal Australians with the 9-bp deletion indicates that three of them represent two independent origins for the deletion. These findings are consistent with the time depth of occupancy of the continent: humans have been in Australia and New Guinea for at least 50,000 years (Roberts et al. 1990; Flood 1995), with little apparent intermarriage with later Southeast Asian or Pacific populations. The fourth Australian mtDNA genotype with the deletion could be part of a widespread Asia-Pacific clade, representing either later introgression or an early divergence from the main Asian-derived clade with the deletion [*with the source being Amerindians, see Cann and Lum 1996*] (ibed pg. 431).

It is being reported that the 9bp deletion is found with a backdrop of more ancient Australian lineages. This could be explained by male contribution to the aboriginal maternal phenotype. This would be due to genetic admixture with Polynesians whose male descendants may have underwent a severe founding effect in the initial colonization of remote Island Polynesia. Could male dominated admixture explain the widespread distributions of the 9bp deletion, as far as coastal Indians and rivertine Africans? It could if the backdrop of other regional populations were recombined after intermarriage with migrating Polynesians. Migration and admixture could account for this phenomenon. By example, the fourth group in Australia, the only aboriginal *containing the Polynesian motif*, may have been the initial source for the 9bp deletion observed in more common Australian mtDNA lineages.

The Polynesian "Motif" is not found in association with Continental Amerindian Populations indicating that it arose independently in later Polynesians following the bottleneck that must have occurred during their initial expansion into Polynesia. This motif's fixation followed subsequent Polynesian dispersals into Melanesia, coastal Southeast Asia, Taiwan, and Madagascar. The Region V 9bp mtDNA deletion does not appear to be a founding lineage for any Old World interior populations. I suggest that it is evidence of an Amerindian contribution to the founding population of Polynesia. There are many other genetic links (HLAs, HVS-1, and other nuclear DNA markers) that link the more recent coastal Melanesians with Polynesians, and them, with more ancient equatorial-based Amerindians.

Part 4

² David J. Betty, Amy N. Chin-Atkins, Lynn Croft, Michaela Sraml, and Simon Easteal *Am. J. Hum. Genet.* 58:428-433 Letter to the Editor Multiple Independent Origins of the COII/tRNA^{Lys} Intergenic 9-bp mtDNA Deletion in Aboriginal Australians

Part 5

5/5 Problems and Possibilities

The requirement that extant apes be found in primate-bearing locals justifies, for many, an exclusion of the American Indian as a source of modern humans, and the sudden dispersal of *Homo sapiens* into the Old World. The turn-of-the-Century proponents of an Amerindian ancestry of Old World modern humans were considered extremists while it should be remembered that human origin theories of the time were actively discounting an American Indian contribution in the building and maintenance of the civilizations attributed to the North American Mound Builders. Could prejudice have contributed to who were and who were not included as potential ancestors of fully modern humans? Perhaps it was a greater loss to humanity than to Wallace himself, that his work on New World primates was lost when the boat carrying him and his work back to England sank off Brazil in **1857**.

Further, the adoption of Piltdown Man, by British anthropologists, as the transitional link between modern humans and earlier archaic forms (the European Neandertals) left untested, alternatives, including a Western Hemisphere origin for modern man. The proponents of this long-dismissed theory were arguing that the relative stability of the human form had an antiquity that stretched beyond the periods associated with the first appearance of Cro-Magnon Man in Europe. Today anthropologists continue to find support for evidence of replacement with modern humans moving into and subsequently displacing the African descendants throughout the Eastern Hemisphere resulting from the much earlier radiation of *Homo erectus*.

What is demonstrated in the fossil discoveries of earlier *Homo* forms from the Ethiopian Highland is that, in Africa, there is paleontological support for the evolution of primates into hominids. The discoveries have been made through the diligent efforts and scientific funding that directs the search for hominid ancestors. Yet, funding of New World paleontological expeditions have, until the last decade, been difficult to obtain. Although mining operations have revealed the existence of hominids outside of the Ethiopian Highlands, a research strategy that would entertain a search for hominid ancestors in the African Congo have only recently been supported. In the same way, ideas suggesting that because there does not exist, at present, paleontological support for evidence of hominid evolution in the Americas, it has become a philosophical "given" that evidence does not exist. This, however, is not the case (see Bryan 1978; Whitney 1879; and Raemsch 1990).

Just as mining claims from Africa are used, there to draw conclusions regarding hominid evolution there, the New World evidence discovered in related mining activities remains unresolved. The significance of placing these finds from the New World in their proper time and place may be profound. Certainly, as Raemsch (1990) suggests these New World finds have the right to be placed in their proper geological context given the present advancements that have not been applied to the resolution affording their discovery which suggested a great antiquity for the modern human anatomy and/or the Ages of human occupations of the Americas.

The arguments promoted by the advocates of an American genesis were (and are), that the relative stability of the modern human form could be traced back in time and that evidence from the Old World, suggesting a *sudden change* in Old World hominid species leading to the modern human form, is not sustainable. The idea of "punctuated equilibrium" or the paleontological evidence to support sudden shifts in speciation is, as Steven J. Gould reiterates, difficult to define from the paleontological record. Recently, students working under the tutelage of Gould and Eldridge were able to document a speciation event that led to a distinct change in morphology, this being evidenced in a 160,000 year speciation event that led to two separate forms of worms. Paleontological evidence supporting "punctuated equilibrium" is virtually absent in the record of species and species change in more advanced animals. We should, as a result of this evidence, or lack of, admonish the perspective that supports an evolution from *Homo erectus* to *Homo sapiens*, as a radical view, with few parallels in the animal kingdom. What is even more challenging is the idea that multi-continental speciation events led to a sudden onset of modern humans, likened to the rising of all boats on a common sea, as suggested by proponents of Multi-Regional Evolution (Wolproff 1989).

Nowhere in the Old World, does there exist adequate evidence for transitional forms that would link modern humans with earlier *Homo erectus* forms (Corrucinni 1992). This finding does not discount that the evolution of *Homo erectus* can be traced to Africa where earlier hominid forms either leading to *Homo erectus* or closely associated with the evolution of primates into hominids is supported by paleontological evidence several million years old. Today, the 3.4 million-year-old fossil find named Lucy now has a 4.2 million-year-old predecessor. Surprising, but not to those who question "punctuated equilibrium models," the 800,000 years separating these two fossil finds does not indicate any evidence of punctuated change, that is, these fossil hominids had remained relatively stable in their anatomical form between 4.2 and 3.4 million years. The relative stability of the earliest *Australopithecine* forms does not confirm that they can be traced to the lineages that gave rise to *Homo erectus* or that they were rapidly progressing into humanness. It could be argued that *Homo erectus* has remained relatively stable and that paleontological finds associated with other hominid forms do not require that they were direct descendents of Lucy, and/or Desi.

Looking elsewhere for the earliest remains of our primate ancestors

Since we have found in east Africa signs of a great antiquity for hominid forms, is it unwarranted to suppose that other continents could have spawned other hominid forms akin to *Homo sapiens*? Perhaps we have over-emphasized the African discoveries and, consequently, limited the search and interpretations of the paleontological evidence at hand. New World finds have not been properly interpreted, have most often been discovered by untrained researchers, and are not as abundantly preserved as the remains painstakingly found in east Africa. A lack of (fossil) evidence is not evidence of a lack of alternative support.

Certainly, it would not be considered productive to look for paleontological evidence in the African Congo. Yet, this and other tropical environments including those of southeast Asia and South America may provide viable alternatives even if there are not readily defined fossil bearing locals. While we can identify that hominid evolution transpired from earlier primate forms in East Africa it is not good

science to overlook alternative primate bearing locals, especially since scientific solutions supporting a definitive human origin continues to be unresolved. Certainly, alternative Higher Primate bearing locals should be considered in the search for the ancestral homeland of our kind. In this, we could eliminate Australia but not the Americas from analyses that confirm that Humans are derived from earlier Higher Primate bearing habitats.

The search for alternative human bearing primate niches, outside of Africa, have been suggested but rarely adequately investigated (Wallace 18 ; Ameghino 1889; Raemsch 1990). Fossil beds producing signs of primate/hominoid/hominid evolution in East Africa offer the best preserved paleontological evidence but this does not require that we interpret these fossil finds as our those of our ancestors. It does not verify that our modern ilk where there or that we must trace ourselves to these archaic hominid forms. Early interpretations of the paleontological evidence suggested to many that we have been, anatomically, relatively stable in our human form, unrelated to now extinct species of hominids, like *Homo erectus*.

Those suggesting a relative stability to the *Homo sapiens* species dismiss the explanation of a procustrian change or punctuated equilibrium (as it is known today) as the only model able to account for the replacement of Neandertals by Cro-Magnons. They suggests rather, that we have not yet discovered the place of our origin, only that we have been isolated from archaic forms, those verified by paleontological discoveries to be the first widespread hominids of the Old World but not, anatomically modern *Homo sapiens*. Moreover, any location that might produce preserved evidence of primitive hominid forms does not confirm that other less abundant fossil bearing locals (not presently offering preserved proof of ancestral modern human forms), should be automatically eliminated. As is often stated when scientific resolutions become difficult to establish, "a lack of evidence is not evidence of a lack of!"

Expanding the scope of primate/human relationships and with it, human origin models

In determining the processes of human evolution, it has been proposed that the development of *Homo* required stages. The design that is most parsimonious with this concept suggests that; (a) living primates evolved from earlier prosimian ancestors (< 65 million years ago); (b) that the earliest primates (similar to extant forms) primarily occupied an arboreal niche, comparable to those occupied by monkeys today; and (c) that apes (hominoids) and humans (hominids) share a similar line of descent, one line evolving independently into humans. By design this decadency theory implies that relationships leading to modern humans followed the evolution of ape-like forms including terrestrial quadrapedalism, i. e. knuckle-walking.

The question presented here is; has the presence of living apes limited the search for modern human primate ancestors to the areas presently supporting extant (living) definitions of hominoids? It is suggested here-in that anthropologists have, as a result of adopting this persuasion, overlooked the Western Hemisphere, illuminating it from human evolutionary concerns since there are no living apes for Amerindians to have descended from (Boas 1932; Hyerdahl 1978). The fact is, Platyrrhini maintain many of the distinctive characteristics found in Old World hominoids while the presence of his highly useful tail could be seen as the main reason many New World primates are not

classifiable as hominoid. Though we attribute the characteristics refined in the hominoids as resulting from some terrestrial habitation (leading to the loss of their tail), it is apparent that the specialization of a prehensile tail did not prevent anatomical hominoid-like characteristics from evolving in arboreal New World habitats. Anthropologists could redefine the significance of finding hominoid traits in many New World monkeys in lieu of the fact that the presence of their tail has removed all New World primates from human dependency theories. A comparison of related characteristics suggests ancestral links between Platyrrhini and humans and that these similarities are not the result of convergent evolution (see **Figures 4-7**).

The Higher Primate fossil record.

Fossil remains of hominoids extend back into the Oligocene, 35 million years ago and were abundant in Europe during the Miocene (10 - 22.5 million years ago). The fossil record suggests that Old World hominids progressed through the hominoid (ape-like) evolutionary stage. Fossil evidence to substantiate the relative stability of the African hominoids may be scant, yet, indicative, suggesting that the niche occupied by these semi-terrestrial primates did not preserve evidence of their arboreal habitations as it did for Savanna dwelling hominids like Lucy or Desi (primatologists are not sure of *Lucy's* gender).

The early hominid finds from the Ethiopian Highland may be representative of a Savannah environment while the Gorillas and Chimpanzee would not have occupied, only, a savanna habitat. There are several perspectives to be gleaned from this observation; 1) that fossil hominid forms living in the African Savannah do not represent the total diversity of the African hominoid family of the time; 2) that the evidence for the relative stability of the gorilla can be inferred from paleontological evidence (genetic findings suggest that Lowland and Highland Gorillas did not *recently* branch from a common ancestor, despite their anatomical similarities) and 3) that since fossil remains from East Africa are all that we have to base our interpretations of the early hominid record, that arboreal habitats outside of the Ethiopian Highlands are now known to have evolved other, now extinct, hominoid species (*Gigantropus*).

Paleontological discoveries from the Miocene of Europe support the existence of apes then, though they have long since become extinct to Europe. Evidence of an ancient presence of Orangutan from the beginning of the Miocene, dating somewhere between 19 million and 22 million years ago, demonstrates the relative stability -- in form -- of this extant member of Pongidae. The correlation that can be made here is that paleontological evidence does not support the idea that transitional forms continue to vary in their anatomy in order to adapt to stable environments. Interpretations of genetic evidence concerning the Mountain and Lowland Gorillas further suggests that both these species diverged from a common ancestor far longer than the proposed split humans are proposed to have made from a common ancestor with the Chimpanzee, estimated at 5 to 7 million years ago.

The continuance of two separate Gorilla species through time, though not verified from the fossil record, may support an alternative assessment; that the relative anatomical stability of the African Pan may span the same time as that of Pongidae (Orangutan), nearly 20 million years. Fossil finds continue to push back the timing of

proposed common ancestors of humans while the paleontological record continues to push back the age of specific species. The gorilla is now shown to have anatomical similar fossil ancestors dating to 9 million years ago. This, an implied state of "stasis" if you will, supports the tenant of "determined gradualism" and not the "punctuated equilibrium" model. Clearly, there is little fossil evidence for punctuated equilibrium except when new niches are first formed, as at the end of the reign of the Dinosaurs or during the 10 million year evolution of Asian wolf to into aquatic mammals, i. e. dolphin and whales.

Anthropologists, and those who accept the tenants of an Earthly origin for all life, embrace the concept that humans must trace their ancestors to Higher Primate species. This paper attempts to dispute however, that stages of the evolutionary processes that led to humans must have incorporated *semi-terrestrial habits* associated with *knuckle-walking* found in extant Pongidae. In this regard, the distinctive anatomical characteristics separating monkeys and hominoids in the Old World should be cautiously applied when deriving Homo sapiens from New World Platyrrhini. It is accepted that hominoid characteristics have evolved with-in arboreal habitats, most specifically, by many New World primate species. It is suggested that arboreal bidelalism may have foreshadowed the need to adapt knuckle-walking into this New World hominoid evolutionary scenario.

The autochthons Amerindian hypothesis counters the hypothesis that knuckle-walking, associated with Pongidae, was a precursor to terrestrial habitation in all hominoids. Unfortunately, we have little evidence to confirm an evolutionary transition to a terrestrial environment by New World primates, however, this may be due to a lack of interest in furthering implications surrounding the existence of New World fossil hominoid finds that remain scientific anomalies (see Bryan 1978; Whitney 1879; Ameghino 1889).

It can be implied from anatomical inferences drawn from living Platyrrhini that they might not have needed to pass through an ape-like stage (one that included knuckle-walking), if they were to ever adapt into a terrestrial niche. The added dexterity provided by the prehensile tail in Platyrrhini may have preempted any need to adapt knuckle-walking to the terrestrial environment. Specifically, arboreal locomotion and the transition to a terrestrial habitat may have been simpler for the Platyrrhini since they already possess the capacity to use both hands freely for foraging, feeding, resting, and traveling in arboreal niches.

As C. Loring Brace cites, the existence of a (prehensile) tail is the only anatomical characteristic separating certain members of the Platyrrhini from apes and hominoid-like adaptation. Why would Platyrrhini not have secured a permanent terrestrial environment if they already possessed adaptive advantages not found in Old World monkeys? It has been hypothesized that humans began evolving from New World monkeys into hominoid primates as early as when Old World apes began evolving from monkeys (Ameghino 1889). The relative stability of the modern human anatomy -- as suggested by turn-of-the-Century anthropologists -- led the more progressive New World hominoid-like primates into their prospective niches as far back as the fossil record suggests there were Orangutans, 19 million years ago. We must remember that a lack of evidence is not evidence of a lack of, while, a lack of resolve in seeking scientific

alternatives will surely delay resolutions that require determining and then investigating the existence of alternatives.

Comparing apples and oranges; "New" and "Old" Worlds

In Madagascar there exists a separate line of primates, Strepsirhines, who are not members of the Higher Primate Family, Haplorrhine. Found in this Lesser Primate family are the sometimes tiny Lemurids and Indriids. Yet, the fossil evidence shows that, before and immediately following the arrival of the Polynesians, semi-terrestrial Strepsirhine forms existed including the now extinct *Megaladapis* weighing approximately 150 kg. and *Paleopropithecus* weighing 200 kg. These ape-like species were equivalent in size to today's gorilla and orangutan. If these lesser Primates were able to secure a semi-terrestrial niche, how can we judiciously deny the capacity of New World Primates to also adapt Hominoid behaviors and/or the capacity to reach into their own terrestrial habitations?

The fossil evidence of the ape-like Strepsirhines is found in archaeological deposits associated with immediate post-Polynesians arrival (dating less than 2,000 years ago). It is believed that the earliest human occupants of Madagascar hunted the large semi-terrestrial Lemur forms into sudden extinction. Several points need to be alluded to here. First, fossil support for these semi-terrestrial Lemurids does not date beyond the arrival of Polynesians; second, human hunting may have contributed to extinctions of other apes, either in the New World and Old; and finally, if lesser primates could evolve into semi-terrestrial niche in Madagascar we should be skeptical of views that illuminate this adaptation from possibly being secured by New World Higher Primates. An explanation could be forwarded in the persuasion that American Indians may have, themselves, both evolved from Higher Primates in the New World and, after adopting Old World hunting strategies <12,000 years ago, (developed by their Cro-Magnon relatives who left the new World for the old 40,000 years ago), contributed to the extinction of semi-terrestrial New World hominoids themselves.

Several points can be drawn from the evidence in Madagascar; 1) that the Strepsirhine order of prosimian primates were able to evolve ape-like anatomies (the extant members of this family range in size from incredibly small primates like the brown mouse lemur and other Cheirogaleidae, weighing 60 g. to 440 g., to the Lemuridae ranging from 1,200 g. to 3,800, and the Indriidae ranging from 920 to 200,000 grams); 2) that the isolation affording a separate development of a lesser form of primates dictates that before the Island of Madagascar separated from Africa, there were not higher primates akin to the Haplorhini in southern Africa, (Haplorhini include only the order of Higher Primates that includes descendants living in both New and Old Worlds; 3) the likelihood that the present members of the order Haplorhini shared a common Miocene origin with early prosimians found in the Northern Hemisphere, Laurasia; and 4) that the common origin shared by New and Old World Higher Primates might have been outside of Africa since they later displaced in Africa the same Strepsirhine forms that remained isolated in Madagascar due the early isolation of that island. If a lesser form of primate were able to evolve into ape-like forms shouldn't we be more cautious in excluding the capacity of this niche to have once been filled by Platyrrhini forms who are Haplorhini that is, members of the Higher Primate family. Finally morphological traits commonly found in living Platyrrhini date back in Egypt to the Fayum 45 million years ago.

The adaptive radiation in South America of the Higher Primate family, the New World monkeys of the Haplorhini family or Order, Platyrrhini, can also be supposed to have had a Northern Hemispheric origin, this in North America not Eurasia. Simply, the common origins of both the New and the Old World Higher Primate families can be traced to the Northern Hemisphere and that certain characteristics may have been lost or gained during separate Southern Hemispheric radiation's. The earliest primate ancestors of both Africa and South America came from the north. These regions today contain similar higher primate forms, called Haplorrhine. In Africa Strepsirhine forms were clearly displaced by these more highly evolved Haplorhini groups. From this, we can surmise that the Haplorhini families were not present in the southern Hemisphere before the separation of Madagascar at the end of the Cretaceous period - approximately 80 million years ago.

In South America, the radiation of the Haplorhini descendants, the Platyrrhine, did not occur until the end of the Eocene, 35-45 million years ago. Morphological differences that separate Platyrrhini and Catherine are less distinct than the morphological characteristics that separate Haplorhini from Strepsirhine. Yet there are distinct traits that are found in the New World members of the higher primate family and it is proposed that these traits were physiologically important in the distinction that may have precluded terrestrial adaptation to a non-ape-like behavioral posture. The most profound difference separating Platyrrhini and Catherine and their arboreal habits is the adaptation and maintenance of a prehensile tail by New World monkeys. An argument can be made that the Old World members of the Haplorhini family may have lost this arboreal characteristic while it is certainly not evident in any African monkeys living today.

To propose that the selective qualities contained in the advantages such a fifth appendage offers and/or that it was lost by one Haplorhini group and not another can be argued. At any rate, the advantage in freeing both hands in the arboreal niche has allowed hominoid-like characteristics to become even more pronounced in the monkeys of the New World. As Lauren Brace has pointed out, the morphological characteristics shared between hominoid members of Pan and Pongo are also shared with many New World primates. These characteristics include brachiation, an open hip and shoulders, and a tendency, especially in New World primates, for arboreal bipedalism. In fact, as Brace points out, the only distinctive morphological characteristic that would or does exclude Platyrrhini as an ape is the existence of the prehensile tail as a highly useful appendage.

The word platyrrhini means extended nose and this is the primary difference (along with the prehensile tail) that separates the Old and New World members of the Haplorhini family. Moreover, the distinctive presence of an extended nose is a unique trait shared by both modern humans and New World primates. Also characterized by the platyrrhine nose is the existence of nasal hair while Old World members do not retain this distinct similarity. Other morphological characteristics that are perhaps shared by humans and Platyrrhine are a more gracile brow ridges, the location of the **medulla**, and a distinguishable chin.

Jeffrey Goodman's 1979 book, "*American Genesis*" represents an Old World twist with Homo *sapien* origins an isolated New World event resulting from Homo

erectus migration into the Americas.³ Dr. Goodman championed a unique perspective of his own, that the Neandertals, having found the Americas in very ancient times, evolved into *Homo sapiens* here and later populated Europe as the ancestors of Cro-Magnon Man. Here, as in other measurements regarding the ancestry of mankind, the idea of a human link to earlier primate forebear's can be seen to eliminate any possible connection humans might share with the higher primate family of the New World. By investigating the idea that mankind's wellspring lies in the New World it must be assumed that he originated from earlier primate ancestors who also hold evolutionary ties to the Americas. Dr. Goodman was unwilling to anticipate this alternative.

It is widely accepted that the descendants of *Homo erectus* can be traced back into Africa. Paleontological evidence confirms an Africa origin for *Homo erectus*, a relationship that led to Neandertals in Europe, Java Man in Indonesia, and Peking Man in China. This I will not dispute, as there are no missing links with this evidence! In fact, paleontological data that scientists draw on to conclude that *Homo erectus* evolved from African primates is profoundly relevant in discussing evolutionary convergence on a planet that maintains separate hemispheres with isolated primate bearing locals. The fact remains, however, that a "missing link" is at the center of an ongoing debate regarding true anatomically modern human *Homo sapiens* relationship to *Homo erectus* or any of their migratory descendants. The "philosophical givens" that have led the science of human origins on a 140 years investigation might be at the heart of our anthropological quandary. From the time of their discovery, it has been a predisposed conclusion that the first Americans migrated here from some part of the Old World. The unresolved nature of the origins of *Homo sapiens* should lead scientists to investigate alternatives including the possibility of an American wellspring for modern humans.

"Missing links" are an inherent part of the paradigm defining scientific understanding of human evolution. The existence of chaos, for example the theory of human origins with "missing links", should lead anthropologists to question the tenants of their basic assumptions. The alternatives presented in this book counter many anthropological givens by going back far enough in time to allow for a separate primate source for our forbears. The model outlined in this book renders a consistent understanding of the fossil record with no need for connecting missing links between one species of hominid and another. Rather, isolation and divergence from separate primate bearing locals is seen to correspond with anatomical affinities shared between *Homo erectus* and African primates while *Homo sapiens* affinities are aligned with South American primates (see **Figure 1**).

5/5 an example supporting the relative stability of ancestral primates can be found in the 19 million-year-old fossil ancestor of today's Orangutan. The ability of an early primate from Asia to 'punctually' evolve into the same distinctive, niche presently occupied by the Orangutan, favors a perspective that once the habitat is adapted to the adapting species becomes specialized to that niche. The movement or transition from a preceding niche to a niche that is presently unoccupied is a major step in the evolution of form and common referred to as "punctuated equilibrium (Gould and Eldridge 19). In this the preceding species does not abandon morphological characteristics, but rather, due to adaptive forces, becomes more specialized in order to secure previously un-secureable food sources. The Orangutan, in specializing his anatomy to the niche they presently

³ 1979 advocate of an early man presence of the Americas.

occupy, has remained relatively stable for perhaps 19 million years. Changes in the size of his anatomy correspond with an anatomical affinity to earlier morphologic characteristics once present in the pre-Orangutan ancestor.

In contrast, New World monkeys are relatively small in comparison to Old World apes even the smallest of the Old World Apes, the Asian Gibbon. The niche secured by New World Platyrrhines has come to promote its own specialization. What has been discovered in the recent advancements anthropologists have made in understanding primates in the New World is that there are many species today that are morphologically similar to larger specimens from the fossil record. The ability of New World primates to secure a semi-arboreal, semi-terrestrial niche should not forestall that a permanent terrestrial residence could not have been achieved by the Higher Primate families of the New World millions of years ago themselves. The lack of fossil evidence to support and/or define this transition from arboreal to terrestrial niche does not have to be evidenced by fossil finds. Fossil finds only verify what we might choose to suppose, but a lack of fossil evidence today should not predetermine that evidence must first guide are observations when explanations might better serve are research strategies.

Genetic evidence also has unique perspectives that champion the relative stability of Lowland and Highland gorilla. The recent finding suggests that neither share a recent common ancestor, that both species although very similar anatomically, have been occupying those separate niches for perhaps as long as the Orangutan has occupied theirs in Asia. The common affinities that are associated with these two separate Gorilla species and the subtle differences that have accompanied them into separate niches suggest supports an earlier affinity. Here as in the New World, the relative stability and anatomical affinities associated with the radiation of primates into specific niches may preclude our discovery of fossil evidence of a common origin. The open savanna that was believed to be occupied by Lucy and her earlier ancestors may have also provided for the preservation of their anatomical forms. *Fossil evidence for a common ancestor between Gorilla and/or Chimpanzee and/or them and humans, is not a prerequisite to accepting genetic similarities as evidence of common origins.* Even so, if fossil remains linking African members of the great apes could be hypothesized it would have to suggest that common ancestor groups were less diverse then today. This is not likely!

These general assumptions are made to cast light on the perspective that a lack of evidence does not support evidence of a lack of. What is needed in order to determine more thoroughly the antiquity of the American Indian, is the location and open-hearted evaluation of paleontological evidence that would support of the relative stability of the modern human form that is *Homo sapiens sapiens*. The formation of research strategies suggesting that because paleontological support for the evolution of hominids is found in the Ethiopian Highland does not, nor should not, fore-ordain that more tropical environments (where paleontological support is [thought to be] virtually absent), could not have spawned the extant members of the Higher Primate family of Modern Humans. Though paleontological evidence in Africa is rarely overlooked or not afforded funding for investigation, similar New World finds remain outside the present paradigms sustaining paleontological research strategies. Outlines defining human evolution drawn from the limited evidence in the Old World has left the implications from the New World warranting investigations.

The argument that mankind evolved from New World primate family argues for the relative stability of the modern human form. The relative stability of other primate forms whether supported by fossil finds or genetic restriction mapping suggests that the acquisition and perfection of certain niches leads ultimately to the stability of the evolved forms that occupy them. Certainly, the closest living predecessors to humans must have shared ancestral forms that led to today's world-wide members of the Higher Primate Family. It is suggested that the ability to maintain a terrestrial niche accompanied by a subsequent abandonment of the arboreal habitat be precluded by a transition that ultimately evolved into semi-terrestrial locomotion. The morphological characteristics associated with knuckle walking in Old World apes in terrestrial habitats may be foreshadowed by their inability to adapt hominoid tendencies to the arboreal canopy. The relationship bound by Old World origin theories suggests that even evolved hominids like Lucy were occasional knuckle-walkers.

The alternative suggested here; an evolution of Modern Man from New World primates contends that the existence of the prehensile tail foreshadowed the need to adopt knuckle-walking into the terrestrial habitat. The capacity to use the tail as a fifth appendage in arboreal habitats allowed hominoid characteristics to evolve from earlier ancestors of terrestrial primates found in the New World. Certainly, this perspective has morphological and behavioral support in extant platyrrhine with their tendency to walk upright in both arboreal and terrestrial habitats. The scientific supposition that they did not evolve into a terrestrial niche predisposes that the American Indian does not have an autochthonous origin in the Americas. Because scientists have found this idea unwarranted they have cast doubt on this niche ever being secured by New World primates. By example, even the lesser primates of Madagascar were able to secure a semi-terrestrial niche and an apelike form. To conclude that the higher primate family of the Americas could never have secured a niche similar to those occupied by African hominids is not a fair portrayal of the potentially strong affinities that the prehensile tail have afforded our own evolution into the terrestrial niche.

Part 6

Carbon-14 dating of their first appearance of modern man in the Old World demonstrates a rapid migration and colonization of our kind beginning 45,000 years ago. A prolonged period of glacial expansion, following the beginning of the Wisconsin-Wurm interglacial epoch, would have isolated Old World colonists beyond their American homeland. The first Old World *Homo sapiens*, when viewed as the decedents of Aboriginal Americans, may have, though glacial adaptation and survival, refined hunting into Paleolithic technologies as they explored and colonized the Eastern Hemisphere. Adaptations, spurred by migration into unknown worlds, would have taken these *Amerindian* explorers beyond Alaska and Beringia into interior northeast Asia and eventually, Europe. Others would have spread by sea along the coastal corridors of a new Old World through beyond Indonesia into Australia and west to the African shores and Klaisies River Mouth. In studies detailing the immediate condition of post Wisconsinian II Glaciation 18,000 years ago, J.B. Griffon, 1979, finds that:

"Coastal occupation was possible only along the low lying south shore of the land bridge, in areas that are now part of the submerged continental shelf in the Bering Sea. Certain

areas, notably the river mouths and cliffed headlands of the present day Priboloff Islands, are thought to have offered considerable potential food resources to human bands equipped with appropriate technology."

Perhaps it was in the opposite direction that the first modern Paleolithic cultures emerged to explore beyond the Backdoor of the Americas. We can trace these first migrations from southern Siberia 43,500 b.p. by land into Europe. They went by sea into southeast Asia and Niah Cave crossing into Australia 39,500 years ago. Less than 2,500 years later we find the earliest dates from Southern Africa at Klaisies River Mouth (36,180 b.p. \pm 230) marked by the appearance of the Howieson Poort Industry. These *Amerindian* explorers, with their evolving Paleolithic tool kits, found in this *new* Old World a bountiful harvest of many previously unknown animal forms. The messages left by Upper Paleolithic Ice Age hunters demonstrate a deep understanding and reverence for the natural world about them. They danced to show homage to these great creatures that they came to hold a lasting kinship too, in that they gave themselves freely so that the people would not go hungry. The Shaman not only cared for the people of his clan but also for the animals they came to rely upon, depicting them in paintings and carvings as heavy with young. The first Americans and their *Duyktai*, *Cro-Magnon*, and *Howieson Poort* "Homo sapien" descendants held a similar kinship, comparable to traditions found in the immediate and later generations of post Colombian American Indians and Traditional Native People throughout the World. They sought the "Great Spirit" to give new offspring to the animal relations, to replace the lives they had taken. Ice Age Man left images portraying animals as personal guardian spirits. The totem depictions found in Lascaux, France remain one of the most famous and articulate representations of Ice Age man's belief in the Great Spirit, a belief that continues in hunter/gatherer societies as we move into the 21st century.

The Native American and other Aboriginal Societies, though once considered primitive and culturally inferior by conquest oriented societies, continue to live in balance with nature. It might do the world well to respect their commitment to humanities "original instructions", and honor the great antiquity of these beliefs as they remain the wellspring of today's modern "civilized" societies. Have we, as scientists, given up all hope to a solution for the source of our initial humanness? If so, we will be left to believe that our *Duyktai*, *Cro-Magnon*, and *Howieson Poort* ancestors, in all their wondrous accomplishments, appeared spontaneously, devoid of their own prehistoric evolutionary foundations.

Part 7

Changing Perspectives

In arguing for an inclusion of the higher primate families of the Western Hemisphere and a New World source for the evolution of fully modern *Homo sapiens*, I am illuminating a world beyond the shores of the Eastern Hemisphere. An analogy might help us contemplate the impact of unknown worlds and our relationship, in deed and thought, with them. If I were arguing that man originated from another star system and later, in his highly evolved state, populated this new world, I would be misinterpreting perhaps the most important indigenous believe, a reverent concept that; the "Earth is our mother." I have taken to heart, parenthetically, this "other worldly origin" with advocates who

promote the interpretation that UFO's are somehow directly, or indirectly involved in the evolution of life on planet Earth. This idea could be a secondary result of man's successful 20th Century exploration of space, aerial interpretation of the Nasca Lines, an aberrant mistrust of governments that have no true power to prevent contact if aliens wanted us to know they were here, or the inference that Stone monoliths and astronomical observation of our place in the universe. These are *in-situ* concepts generated by those who constructed them, not knowledge given to them from extra-terrestrial galactic explorers. Astronomical observation posts were born of independent connection constituent of beliefs in a universal force. The quest to place symbolic references of our creativeness is born in the minds of the Temples Builders. They are human accomplishments.

Many advocates linking an extra-terrestrial derivation for Higher Civilization(s) identify early attempts by primitive and civilized societies to communicate with unknown worlds as evidence of said contact or ancestry. By choosing another world *as this source* we would eliminate our own Earth's potential to conceive higher life. Perhaps, stretching the boundless reaches of constellations illuminated in the night's sky with an observation that we are not alone is what connects humanity with obeisance of the stars. If we are ever to be visited, I am quite sure that they would have the power to reveal themselves, if they chose to do so. Certainly, no government could keep this visitation a secret if alien beings, after traveling light years to get here, wanted to make themselves visible. The evolution of bone and stone tools into the Neolithic, Copper, Bronze, Iron, and Industrial Ages is transcendent with today's "Age of Technology". All are the result of mankind's own achievements. We are the first Earthly live-form to have explored the heavens and we should not beguile our triumphs as anything less than the product of Free Will.

The earth itself represents the culmination of earlier worlds, the product of star formation, heat, energy, light and ash, with the dust rekindling itself into the S'LO Star System with the Earth it's finest jewel. Certainly, Life existed elsewhere in the universe before the Earth itself was able to act as host. As I stated earlier, the inception of life on this Earth followed the formation of compatible primordial conditions hastened the unification of essential ingredients that sustain life. This is the essence of "niche formation" of the first degree. The slow progressive march has at its core a heterogeneous complex of symbiotic relationships. From the simplest embryonic forms the building blocks of more advanced organisms arose. Time and occasional cataclysmic events that occurred during its passage contributed to the formation of numerous ecosystems. To argue that life, as we know it, is unrelated to this process of planetary evolution is to deny our place in the cosmos as but another joyous example of the consummation of sun and earth, male and female, niche formation and evolution, birth and renewal.