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Future Prospects of Human Evolutionary Studies

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One of the most important features of evolutionary studies is that in spite of the enormous number of evidences of human evolution forthcoming we seem to be still not unanimous about the path and also the process of hominization. Changes had been both long term as also short term but we have no instrument of analysis to isolate one from the other in order to establish the cluster of taxonomic attributes that decide the phylogenetic status of a find. It may be quite revealing to compare what we think we know now with what we thought we knew at midcentury. We had at that time only one preoccupation - and that was to discover fossils. This was because we felt that fossil finds would provide enough links to the chain of hominization, as if, this would lead us to uncover the process of evolution. Although today this notion is vastly changed in academic circles, one can see it lingering quite tenaciously in such quarters as media and popular science magazines. No wonder terms like "earliest this" or the "ancestral" that are galore in our pop. science culture.

Human evolutionary studies have made spectacular progress in terms of adding a huge number of significant fossil finds for the entire period of hominizations. Yet if one observes the logic used by prominent scholars one cannot help but be shocked by the absence of rigour about how many and what specific morphological taxa are considered in announcing a new species. Further we seem to have no adequate explanation for a relative absence of change in these characters for an enormous period of time in one case as against the rapid and sudden changes observed in another. Probably these facts alone had influenced Eldredge to consider allopatric speciation (1971) first and then with stephen Gould propose the punctuated model of evolution (1972).

The olduvai remains were initially allocated to our genus because of their presumed stone tool making ability in addition to a very negligible increase in the cranial capacity when compared with the Australopithecus. But if one is to believe Tattersall (1995) this is more likely, "Because of Louis Leakey's desire to justify his long standing belief in the ancientness of *Homo*. In no other group of mammals would such considerations be accepted as justification for grouping species as unlike as *habilis* and *sapiens* in the same genus ..." (p.230). If we have to in this manner inflate our genus Homo we are still underestimating the actual species diversity of hominids over the past two to three million years. Furthermore, are we really clear about the post cranial features and hence life ways of these members of our genus?

The birth of any change which in a cumulative sense can in future lead to the formation of a new species is in reality very poorly understood even today. In fact the explanations given earlier have all been taking a repeated beating in the recent years. For instances, it was earlier argued that the cardinal turning point in human adaptational history came about 3 to 4 million years ago when the ancestors of the *Homo* were slowly moving to the savanna from the earlier woodland habitat and this provided the adaptational incentives for bipedalism. Having achieved this a chain of morphological changes like increase in brain size, releasing of the forelimbs etc., could gradually come about. The argument sounded logical but the scientific evidences could not support it. Now it has been specifically proved that both Ethiopias middle Awash region as also Makapansgat had maintained a woodland environment during 4 to 3 million years. Likewise the entire set of arguments given for cultural change caused by / or causing newer imperatives of adaptation as one of the pathways of speciation would also seem to be not supported by new evidences. Climatic changes in Holoscene, it was believed,

brought forth an altogether different kind of imperatives which led to the emergence of the microlith using Mesolithic culture. Yet such a change having taken place in Sri Lanka way back in 33,070±410 B.C. (at the site Batadomba Lena) could not create a new species in South Asia (Kennedy and Deraniyagala, 1989).

Between 400,000 to 200,000 we have several different types of populations usually clubbed together as *Homo heidelbergensis*. These have been discovered from such diverse areas as Kabwe in Zambia, Bodo in Ethiopia, arago in France, Patralona in Greece and probably also Dali in China. Could these forms be all actually derived from *Homo ergaster* of Africa? If all these types indeed represent progressive migration out of Africa then are we not accepting an unusually high number of regional populations as species. One would also like to know why Steinheim, Swanscombe and Saccapastore did not fit into these widely successful variety of *hydelbergensis*. In short, we still have to deliberate at length to decide who gets included in which group and why.

It is increasingly becoming clear - and I wish to emphasise this - that human evolutionary studies do not mean only searching for links in a chain. Yet nobody can deny that fossil records form the cornerstone of evolutionary studies. The enormity of fossil data recovered from Africa, Asia and Europe in the last five decades provides important components in a large and complex system of relations. That is, rather than providing end-points within a vertical chain these bear more potentialities in understanding horizontal ramifications in the path of hominization. Following the koobi Fora finds from Lake Turkana (Wood, 1991)it would now seem that even the earliest *Homo* i.e. *Homo habilis* would seem to constitute 2 different rather than one species. These are provisionally named as ER 1470 and ER 1813. Logically this can create a unique problem in contradicting our genetic explanation of speciation (kimura,1968), unless another common ancestor of these two forms is entertained, i.e. another archaic *Homo* existing beyond 2.5 million years is conjectured.

Another important feature revealed during the last few decades of fossil discoveries is that *Homo erectus* survived well within the period of colonization of *Homo sapiens*. Consequently one has to entertain the possibility of more than one species of the genus *Homo* surviving simultaneously in Europe and Africa through a major period of human evolution. Even this contradicts the initially held belief.

It has been largely believed that human culture taking up a pivotal role in adaptation progressively changed the speed and direction of evolution. This had combined with the selective advantage of larger brain case and narrowing down of the birth canal consequent to bipedal adaptation. This has resulted in the modern human child being delivered with only 30 percent of its potential cranial capacity. The brain being left to grow outside the mother's body. Thus, the child remains dependent on its mother for a longer stretch of time. This leads to lengthening mother child dependency period. It also prolong the time available for transferring cultural knowledge to the child. Thus, the adaptational repertoire of the child shifts from the urgency of perfecting the somatic attributes to acquiring cultural knowledge. This being a process unique for the genus *Homo* one can theoretically surmise that the velocity of preadult growth would possibly be much higher among the earliest members of our genus as compared to the later species. Juvenile specimens, therefore, could provide a wealth of information on the evolution of human ontogeny. Further, one needs to be also aware that such degrees of adaptation could not be possible without giving rise to a large number of sociobiological consequences. In an extended logic it would be also important to include these considerations before one attempts simple phyletic berth for discovered specimens. To address these issues comparative studies of human and ape growth have become the focus for many evolution experts. (Dean and Wood 1984; Smith 1989, 1994; Smith et al., 1994; Simpson et al., 1996; Braga, 1998; Reid et al., 1998 and Dainton and Macho, 1999).

Palaeodemography for the population metamorphosis during pleistocene, likewise, can yield significant information regarding genetic stresses active in one area as against another. Child mortality is known to be a reliable indicator of stress

operative in a population and many attempts are known to have been made to research this area (Herring et al., 1998; wall, 1991). Palaeopathological studies on pleistocene populations are not many but this does not mean that evolution studies cannot be benefited by informations regarding stresses created by pathologies in prehistoric societies. Apparently such studies were never included by; researchers in classic evolutionary studies. Today we are faced with more and more contradictions within the hard evidences of evolution and this should teach us to widen our field of enquiry into developmental patterns of growth either at micro or macro level within the framework of evolutionary forces. And to isolate one from the other can lead to the possibility of distorted interpretation.

Thus, in order to delineate the future prospect of evolutionary studies I strongly feel that we cannot limit our activities merely to discovering fossils and arranging phylogenetic trees to accommodate these finds. Further since fossils throwing light on our understanding of human evolution are not present in every country, evlutionists everywhere cannot occupy themselves with the same set of question. Logically such countries not yielding plio-pleistocene fossils carry enormous potentiality of addressing the issues normally not considered elsewhere. If we look at the palaeoanthropological records from South Asia, we find a very interesting situation which needs to be discsussed at length by human evolution experts here. The recovery of anatomically modern *Homo sapiens* at such an earlyl date as 33,000 B.C. may be taken to indicate that the process of sapienization probably occurred in Asia first and then moved into Europe. If we widen our view of evolution we can consider another important deviation of these finds when compared with our earlier Eurocentric views. For instance in the cave sites of Sri Lanka, these old populations, were using geometyric microliths. Since microlithic technology has long been accepted as a change brought about as a readaptation sought by man because of early Holocene climatic change these microlithic evidences cannot be explained with the existing explanative models. We do not have any alternative explanationforthis change either. *Homo sapiens* are known from Mumbwa in Zambia, Nazlet Khater in Egypt and Lake Mungo in Australia more or less around the same time but nowhere do we find a change over to microliths at such an early date. That is, when in western Europe *Homo sapein* sapiens were replacing the Neanderthals and establishing a proper upper Palaeolithich culture, in South Asia Homo sapiens are seen replacing a chopper-chopping culture with microliths! Such changes do not remain limited merely to socio-economic asctivities of a population but can have far-reaching consequences in providing fresh direction of bio-social changes. If we can concede this logic, we may also find it a strong case to accept that the process of hominization in the tropical regions cannot be compared with what have been recorded in western and central Europe.

If phylogenetic aides like taxa are essentially achieved by identifying discrete characters in bones, one would naturally like to ask if such factors are shaped universally because of evolutionary forces. Lieberman (1997) has shown how such characters can be differentially shaped under different adaptational loads. The tropical adaptationargued earlier, therefore, becomes very significant because a trait viewed as archaic in Africa may not be archaic at alll in southern or central European adaptation or vice versa.

Lieberman summarises this dichotomy very aptly in the following manner: "The proximate cause for these variable, hence inconclusive, results in the phenomenon of *character-conflict* in which two characters support alternative phylogenies. Typically, only about 60-70% of these osseous characters in hominid phylogenetic analyses support the most parsimonious cladogram. Consequently, a given set of characters yields many cladograms of approximately equal length, rendering the results highly subject to error and therefore inconclusive." (p.203).

In India studies pertaining to Human Evolution started comparatively late and this too remained basically circumspect to the Siwalik region only. The majority of such finds of Miocene hominoids as Ramapithecus etc., would now seem to be more appropriately relevent to the evolution of Organs and hence outside the perview of human evolution. This can also

explain why inspite of our repeated attempts a 5 to 4 million yr. ancestor of early hominid from this zone has still not been found. Skeletal material from 10,000 B.P. and extending upto iron age have been found from numerous cultural and ecological zones of India but our tools of analysis being entirely geared to identify evolutionary status we have not been able to pay much attention to them. Issues of adaptational physiology operative during this important phase which marks pre-village economy in a majority of regions in India can throw significant light in our understanding of forces of change at a micro level. Recently Lukacs and Walimbe (1998) hae demonstrated a classic late Jorwe phase of scultural transformation as having been caused by progressive aridity in central Maharashtra during 1100-700 B.C. The result ing nutyrition stress in the population could be demonstrated by the presensce of hypoplasia of the teeth. A similar kind of study to elucidate population density and possible pathological problems giving rise to growth stresses might lead us to understand distribution and variation in our earliest colonising populations in Holocene.

Finally, let me suggest that bio-archaeology and palaeoanthropologyare included within the ambit of human evolution studies. This widened branch could be named Evolutionary Anthropology. Let me elaborate it as follows.

For their holistic understanding, the issues of human evolution require not only different types of data (such as archaeological, data, or the data of contemporary foraging societies etc., but also a collaboration of the expertise of different dissciplines which in their own specialized ways have been concerned with evolutionary questions. It is well known that since the mid-nineteenth century, the theoretical concept of evolution, of all aspects of theuniverse, have cut across, and have also brought together, different specializations known by different terms. Difficulties in studying it notwithstanding, the idea of evolution is pivotal to all domains of knowledge.

It is high time that these specializtions within and without bring different and newer data and a battery of concepts and methodologies but addressing the same issue of human origin and evolution come togther to share the same platform to yield a holistic evolutionary knowledge. the more the compartmentalization, the more are the chance of dilution of the issues resulting in segmentary knowledge. Keeping this in view a discipline which brings bio-archaeology, palaeoanthropology, and socio-cultural anthroplogy of foragers and agro-pastorals to stand face to face in the same forum and cross-fertilize their knowledge to arrive at an overall picture could be termed 'Evolutionry Anthropology'.

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