

HUMAN EVOLUTION: AN ALTERNATE MODEL OF
HOMINID SOCIAL DEVELOPMENT

by

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Man has long speculated about the evolutionary pathway taken by our hominid ancestors. The search for human origins has led many people to the farthest reaches of the world in an effort to determine what our early ancestors looked like and how they lived. The discoveries of human paleontologists have provided us with a fairly accurate idea as to what these early hominids looked like. Rather than solving problems, however, these discoveries have seemed to create a plethora of theoretical speculation and totally confuse the picture.

Speculations on the evolution of hominid social structure have become quite popular in recent years. The primary concern of these theorists has been the development of a model which would accurately depict the adaptive strategy of early man. This paper is a response to the models which have been proposed. I will concern myself with one model in particular: the baboon analogy.

The primary problem when dealing with hominid social development is to build a model which would enable the animal in discussion, to move from an arboreal to a terrestrial environment with enough flexibility to account for the further evolution of the species. These models are no more than mental exercises in that any conclusions reached are non-verifiable and usually serve only to justify or criticize the speculators views on modern human society. Nevertheless, these speculations have shaped the course of further investigations and should be examined very carefully before they are

accepted for theoretical generalization.

The baboon analogy has come into great favor in anthropological circles; so much so that it seems to have been accepted as a close approximation of the truth. This paper is an attempt to show that there are other, equally viable, models which can account for the fossil record and the idiosyncrasies of modern human society. An analogy accepted as explanation can be very damaging to future theoretical orientations. It is dangerous to put too much weight on such tenuous speculation. I will attempt to show that the adaptive strategy of the patas monkey can be used to explain hominid social evolution at least as well as the baboon analogy.

Baboon adaptation to a savannah environment has been studied in great detail for its possible implications to the study of human evolution. Irven DeVore and Sherwood Washburn were probably the first major figures to propose this analogy. Their paper "Baboon Ecology and Human Evolution" (DeVore and Washburn 1967) describes baboon ecology, demography and behavior and the implications which this study has for paleo-anthropology. The authors feel that "the problems faced by the baboon troop may be very similar to those confronted by our ancestors" (DeVore and Washburn 1967: 159). The study of the baboon, therefore, could give us an idea of the adaptive choices available to the early hominids. This assumption is very reasonable and, in this sense, the study of the baboon does provide some interesting insights. It is only when this assumption is extended into a developmental model for Homo

sapiens that it runs into problems.

Clifford Jolly (1970) develops the baboon analogy on the basis of morphological and dental similarities between Theropithecus and the early australopithecines. His construct is a two-phase model based on the small-object feeding pattern of the Gelada baboon. In this model, Jolly feels that Australopithecus robustus (or Paranthropus) is the more primitive form and that the changes evident in A. africanus and Homo habilis are the result of cultural and technological developments and their corresponding changes in dietary preference and feeding behavior (Jolly 1970: 23-24). The author does a very good job in pointing out the weak points of other theories on hominid social development. The work of Johanson and White (1979), however, has placed a big question mark over Jolly's evolutionary sequence and, as a result, on his social evolutionary model as well. Johanson and White have discovered a hominid for which is morphologically closer to A. africanus than to A. robustus, yet it is dated circa 2.9 to 3.8 million years ago (Johanson and White 1979: 327). If the implications of these findings are followed through, then the A. robustus form is seen as a later specialization of the generalized A. africanus stock. If this is the case, the small object feeding pattern would be a secondary development of the hominid line and the Theropithecus analogy would not explain the morphological and dental adaptations of the early form.

The rigidly structured baboon analogy has been developed at the expense of other, less structured, adaptive solutions.

Most theories of hominid social development have described all biological and cultural evolution in terms of variation and selective retention. Christopher Boehm (1978) illustrates (once again using the baboon analogy) that rational preselection is a very important factor in all primates (including Homo sapiens) and that this factor, when applied over long periods of time, could significantly alter the course of evolution. I think that this factor has been ignored because it is a very difficult one to handle in the rigid structure provided by most models of social development. I will attempt to integrate this factor into my new model which will illustrate that alternate adaptive strategies must be considered when attempting to analyze the socio-cultural evolution of Man.

The baboon analogy provides one possible avenue of explanation for this socio-cultural evolution, but there is a number of problems which this analogy faces when confronted with the fossil record. Baboon society is built around the power of the adult males and the size of their canines. While this may be an oversimplification of the truth, it is at least a dominant factor in baboon society. The group has a distinct power ranking and is preserved by an active defense both internally, through attempts to maintain or change the status quo, and externally, against predatory attacks. Baboons are well equipped for this active aggression with a large set of canines. None of Man's known or hypothesized ancestors are known to have had such canines. If the baboon analogy is accepted, the weapon(s) for this inter- and intra-group aggression

must be extra-somatic. This leads to the question of how the early hominids survived while they were developing these defense mechanisms.

Ramapithecus is held by some as the earliest known hominid based on similarities in dental morphology with the australopithecines. Tattersall feels that "Ramapithecus constitutes the most convincing present evidence of the ancestry of Australopithecus and subsequent hominids..." (Tattersall 1975: 28). Ramapithecus does not have large canines adequate for defensive action of the type postulated by the baboon analogy. Even though Ramapithecus is considered to have been semi-terrestrial, one would expect some indication of an increase in the size of the canines between this form and the australopithecines. If Ramapithecus were to develop the adaptive strategy of the Savannah baboon with its known physical and dental limitations, it probably would not have made it very far from the trees. This, in my opinion, is one of the major flaws in the baboon analogy. The baboon analogy takes a highly specialized social organization and applies it to a very generalized form. Man's greatest evolutionary asset has always been his generalization. If we are to formulate a model of social and biological evolution based on the ethology of living forms, then we must attempt to find a system which is adaptable to a number of environments and applicable under the physical and morphological restrictions which we can deduce to have existed for the ancestral hominid stock.

If we accept Ramapithecus as the basal hominid, it must

be done on the basis of very limited evidence. Nevertheless, it seems to be a general agreement that the first hominid would be very similar to this form. It has been suggested that Ramapithecus was an arboreal or semi-terrestrial form (Tattersall 1975:29). This assumption would correspond to the commonly held assumption that our ancestors originated in the trees. The analogy chosen, therefore, must provide some indication as to the social system which existed in the trees as well as on the ground. It must also provide an explanation of the continuity in, or evolutionary changes of, the social traits which the analogy seeks to explain.

In this sense, the baboon analogy is found to be lacking. It may explain a possible adaptive strategy for life on the savannah, but it does not explain how this system arose and how it evolved into our present system of social organization and behavior. An analogy which begins its explanation at the midpoint of the problem is useless.

The social organization of the patas monkey (Erythrocebus patas) and the closely related Cercopithecus monkeys provides an analogy which avoids most of the problems mentioned above and yet it can still provide some interesting explanations for some problems which are not addressed by the baboon analogy.

Patas monkeys are large bodied, quadrupedal, terrestrial animals which have long limbs and slender torsos. There is marked sexual dimorphism with adult males being nearly twice as heavy as females (Bramolett 1976: 132). Some sexual dimorphism is also evident (although not always to the same

degree) among the arboreal guenons (Struhsaker 1969: 98). The patas monkey is so close to the guenons that it has been argued that Erythrocebus patas be sunk into the genus Cercopithecus as a sub-genera (Rosen 1974: 94). The patas lives in the open savannahs of the northern Sudan and East Africa. It relies on speed and diversionary tactics for protection rather than the large canines and aggressive behavior of the baboons whose range they overlap (Simonds 1974: 57). They live in small groups with large ranges which they roam in search of food. In terms of dietary preference, they are primarily omnivores (Rosen 1974: 96). One group has been reported to have occupied 5180 hectares and when food is scarce they may travel as much as 12 km (Bramblett 1976: 134). The primary patas groups are heterosexual with several adult females and young grouping with one adult male. Secondary groups of isolated males and all-male groups are also reported (ibid). This one-male group organization is used by all the guenons and will form the basis for my analogy. In the heterosexual group, the females form a strong ranking system among themselves. The females follow the male by choice with all group continuity occurring through the female. The mother lineage plays a prominent role in the patas group (Simonds 1974: 164-165).

The adult male acts as a scout or vanguard for the group. He is often found at the periphery of the group scanning the surrounding areas for any signs of predators. The patas habitually employ the bipedal posture to augment their range of vision in order to peer over the tall savannah grass (Napier

1970: 175). A much more complete description of the patas can be found in Hall (1965) and Struhsaker and Gartlan (1970) which, to conserve space, will not be given here. The one-male group can be seen as a continuum of lifestyles from the arboreal guenons to the terrestrial patas in a hypothetical evolutionary construct. The particular adaptive response chosen by the patas monkey will be applied to the hominid fossil record in an attempt to provide a logical construct which could explain some etiological factors of biological and social change. While running through the chronological sequence of human evolution, I will continually return to the patas example when describing particular aspects of development.

The dental evidence points to the conclusion that Ramapithecus was an omnivor and it has been hypothesized that it was a somewhat arboreal creature. The question of whether or not this form ate meat and used tools is still rather doubtful but some evidence to support these speculations does exist (Leaky 1977: 74). I believe this evidence to be very tenuous and will work with the assumption that Ramapithecus did not use tools and occasionally ate meat much in the manner of modern chimpanzees.

The change in habitat from forest to savannah was probably influenced by some change in the environment. The shrinking of the forest during the Miocene could have provided the prime mover for such an exodus (Volpe 1975: 591). The physical characteristics of Ramapithecus combined with the Cercopithecus one-male group pattern would have provided

enough flexibility to accomplish such a gradual transition without placing too much stress on the population. While the actual extent of the shrinking of the forests is impossible to determine, it is probable that this environmental change did have some effect similar to that hypothesized for early man (Leakey 1977: 67). This move from the trees took place over a long period of time and by a fairly large number of groups. Some of these groups would have gone on to develop the patas form of social organization and defense which, considering their physical limitations of small canines and relatively small body size, would have given them a better chance for coexistence with other savannah and forest border forms. Increased sexual dimorphism would be selected for as a large male would provide a better diversion and small females would have an easier time concealing themselves in the tall grasses. Although the fossil record is too incomplete to ascertain whether or not this increase in sexual dimorphism actually occurred, others have argued for the selective advantage of large males to human evolution in other contexts (Brace 1973¹). The patas males spend a great deal of time scanning the surrounding areas in a bipedal stance within their home range. In a group which is traveling and has no definite home range, selection would favor males which could spend more time in an

¹This article is a clarification of C. Loring Brace's position on sexual dimorphism within individual species of early hominids.

erect stance. The first tool may very well have been a walking stick which was occasionally used as a digging stick rather than a weapon.

Meat eating, which was being opportunistically pursued, could very well have become the preferred food for some of the groups which would then have developed some of the rudimentary hunting techniques. This meat eating preference would then become an additional selective advantage at a time of changing environmental conditions. It would enable a group to move into an area with differing floral and faunal assemblages without having to drastically alter their subsistence pattern.

During this period of territorial expansion and experimentation, the Ramapithecus form has gradually severed its connection to the trees, to a greater or lesser extent, and evolved into a completely terrestrial form; Australopithecus afarensis. This new form can also be divided into two groups based on dietary preference; the first, a group of opportunistic omnivores with rudimentary hunting techniques and, second, a group which has the basic omnivorous dietary pattern with a relatively greater dependence on local floral assemblages. This second group has also opted to remain close to the trees as much as possible while living a completely territorial existence.

The patas model depends on the speed of the individual males and the concealment capabilities of the females for it to work. Based on the fossil record, we can infer that the

australopithecines walked and stood almost as well as modern man (Le Gros Clark 1970: 74). Australopithecus africanus was probably capable of running quite fast (Robinson 1972: 245). A. africanus would develop from the first group; their smaller size and greater cranial capacity resulting from the continued dependence on speed and stealth for survival. Their constantly changing environment would force those groups which are on the move to remain flexible in their choice of adaptive strategy while continually providing new problems to be solved as a group.

The second group developed into Australopithecus robustus (or Paranthropus). This group was moving in the direction of greater dependence on the floral assemblage, possibly as a result of competition from A. africanus. It developed into a herbivorous form with incomplete development of erect posture which was never completely emancipated from the trees (Robinson 1972: 252). Its larger size probably results from its fairly sedentary lifestyle and moving into a gorilla type ecological niche. It is with the A. africanus form that I will primarily concern myself with from here on out as this is the form that I see developing into the genus Homo.

A. africanus developed the rudimentary beginnings of culture and language as an adaptation to a constantly changing environment. Culture has been called Man's major adaptive characteristic (Alland 1973: 270). In this sense, biological evolution is now augmented by cultural evolution. A rapidly changing environment would also increase the amount of genetic

variation and occurrence (Alland 1973: 69). Add to this a developing cultural system and the chances for genetic change surviving in a population are greatly increased because the population has two systems working for the survival of the group: biological and cultural.

Applying the patas analogy to A. africanus, the society is divided into a primary heterosexual group and a secondary group of all-male composition. When the females come into estrous, the adult male becomes even more intolerant of the juvenile males and it is, presumably, at this time that the juvenile males are ejected from the group (Bramblett 1976: 136). This group is similar in structure to the group structure hypothesized by Freud and which he called a Primal Horde, as the young males are forcibly ejected from the group and prevented from gaining access to the females. The stress of separation for the young males could very well produce something similar to the Oedipus Complex in a protocultural animal. At this point, it becomes important to remember that the patas male rules by consent of the females. If the females refuse to go along with the male, he has no recourse but to accept the fact or lose the group. If the combined factors of the beginning of culture, increase in brain size, increase in sexual receptivity of the females and the lengthening period of child dependence on the mother made some high ranking females want to keep their young, the male would have to accept or be driven out. The choice to keep young in the group would probably not come about in the herbivorous groups because this

decision would have a minimal, or negative effect on the group. Brain size and the corresponding increase in the period of child dependency did not increase significantly in A. robustus. In an actively hunting society, however, the benefits of increased male participation in the hunt could easily help to influence the male's decision. Increasing female receptivity would make it harder for one male to service a large number of females and to prevent access to them at all times by outside males. The increase in group size would also ease the burden on the females as primary providers.

If this adaptive alternative were chosen by a few groups, their social structure would rapidly evolve into a family type of social organization as more and more males service fewer and fewer females. At this time, the incest taboo would become a formalized social institution as a holdover from the earlier form and as a way to maintain the new system with a minimum of internal stress. It is interesting to note that in our society, father-daughter incest is most prevalent, followed by sibling incest with mother-son incest by far the rarest form (Leaky 1977: 225). This pattern is similar to what would be expected to result from the gradual integration of males into the group. And whether the males realize it or not, they still rule the household only by female consent.

Some of these newly organized groups developed their meat-eating preference into the organized hunting of large animals. These groups have reached the stage of Homo habilis. At the time that this preference, and the corresponding hunting

techniques, were being refined, another major change had begun to take place in the environment. The climate was getting cooler and the flora and fauna had begun to change.

The Australopithecus robustus form, which most closely fits Clifford Jolly's Seed-Eater model, having specialized in a gorilla type ecological niche has developed a dependency on the local floral assemblage. Their dental and physical specialization has severely limited their capability for further adaptation. This limitation was further reinforced by the relative lack of cranial development. The assumption here is that the cranial development could have provided an additional adaptive outlet which could have allowed adaptation despite specialization. As the floral assemblage change radically, these groups gradually die out.

The Australopithecus africanus form has continued its omnivorous feeding pattern. The change in the flora and fauna would force this group to depend more on its sporadic hunting attempts than on the increasingly uncertain floral food supply. This increasing dependence on the meat supply would force this form into direct competition with Homo habilis which has developed the emphasis on organized hunting and the corresponding techniques and technology. Ecological theory predicts that when two forms are forced into competition for the same niche, the weaker form will either be eliminated or forced into a smaller portion of the niche (Smith 1976: 40). In either case, with a radical change in the environment taking place, the result would be disastrous to the weaker form; which, in this case,

is A. africanus.

The form which has developed into an advanced australo-pithecine and which, for sake of convenience, I have followed Leakey in designating Homo habilis, would be able to survive a major change in the environment due to its megafaunal hunting emphasis. These groups, by following the herds, have learned to utilize the differing floral assemblages. The social organization of these groups at this time is similar to that described by Julian Steward as a composite band (Steward 1949: 23). The question of group composition must be addressed in terms of the patas model. There is some evidence that the patas are capable of intergroup cooperation. An account provided by Struhsaker and Gartlan of one all-male and three heterosexual groups at the Bodelaram waterhole will serve to exemplify this assertion:

Suddenly many patas began giving the chattering vocalization. A jackal ran off with a young juvenile patas in its mouth. It was about one-fourth the jackals size and was held by the nape. Three adult males gave chase. After 50m the jackal dropped the young patas, but the three patas continued chasing him for another 30-45 seconds. An adult female patas soon retrieved the young patas who was apparently unharmed. Another jackal was nearby but was not involved in the encounter. Although it could not specifically be determined which males chased the jackal, it is obvious and significant that at least two of them did not belong to the same group as the youngster who was attacked and yet participated in defending him (Struhsaker and Gartlan cited in Bramblett 1976: 157).

Evidence of such cooperation in such a purportedly inter-group-aggressive society indicates the degree of cooperation which is possible in a society in which the level of inter-group aggression is much lower and the survival value is directed towards cooperation. In such an instance, group consolidation and the intermingling of sexes in a family type social organization is possible. Selection would also favor inter-group cooperation in a case such as this where groups follow herds as their primary source of food. As the herds disperse throughout the expanding grassland at the beginning of the Pleistocene (Asimov 1975: 303), the hominid groups would become isolated from other groups of the species with particular groups is bound to occur.

By the time the groups had moved out of Africa, they had evolved into Homo erectus and had begun to use fire (Smith 1976: 62). At this point, a true family type of social organization had evolved through the continued interaction of the groups which followed individual herds. As the megafaunal herds began to disappear, the composite bands began to divide into patrilineal bands which began to exploit small localized environments. In this way, the hunter-gatherer societies similar to those we study today were formed.

The evolutionary scheme presented here is basically multi-lineal. As the groups moved further from the Ramapithecus stock, they began to utilize different adaptive strategies. I have followed one of these strategies here; a strategy which, I feel, could have resulted in modern human society. Not all

groups would have chosen the same solutions at any particular level of evolution. It is only important that some groups at each stage develop new solutions to the old, and new, problems which would then start them off on an evolutionary pathway of their own.

The patas analogy is an example of one method of survival on the savannah which seems most in harmony with the fossil record. The development of hominid ancestry can be traced from a Ramapithecus-like form through the australopithecines and on into the genus Homo with very little loss of continuity. This analogy also provides an explanation for the extinction of the australopithecine forms.

In conclusion, the patas analogy is better than the currently accepted baboon analogy. It is an alternate model for hominid social development which could provide a better model for describing evolutionary process. It is probably one of many which were actually utilized by Man's ancestors. The emphasis here, though, is that it is just another way of looking at the same information and that there are other possible ways of describing the social development of Man based on the fossil record.

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