

by FRANCK BOURDIER☆

Paris, France. 6 XII 70

Quigley is right in calling attention to the exaggerated role as a factor in human evolution sometimes given to the defense of early man against carnivores; however, I think that specialists in human evolution working in Western Europe for the past century and more have rarely fallen into such exaggeration.

In accordance with the classic—perhaps too classic—view, the author seems to be thinking principally of an African evolution of man. For geological reasons, especially geotectonic ones, the eastern part of Africa is very rich in fossiliferous continental deposits of the early Quaternary, which later Quaternary erosion bared, facilitating paleontological discoveries. Arambourg (1969, and personal communication), however, considers African faunas, hominids included, to be native to Asia. Africa would appear to be a place of preservation, rather than transformation, of species, as the very recent age of *Tchadanthropus* Coppens seems to show.

If the hypothesis of a Euro-Asiatic human evolution is adopted, it is possible to give an important part to climatic changes, for they were very much more marked in Eurasia than in Africa and caused wide migrations of fauna and flora. The author well cites “the drastic climate changes of the Pleistocene,” but the four lines he devotes to them seem insufficient.

Quigley writes (p. 526), “It is now quite clear that early hominids lived on the ground, in grasslands,” and opposes two environments—grassland and forest; it may be recalled that apes, particularly the Tertiary ones, were able to live in a third environment, the rocky wall with holes offering shelter. Rarely considered by specialists in human evolution, this hypothesis has been accepted for *Pliopithecus vindobonensis*; we must remember that Gibraltar’s macaques, the only monkeys surviving in Europe from the primate fauna of the early Quaternary, live on rocks.

The author grants an important part in human evolution to possible changes in behavior; in this regard, he could invoke the neotenic hypothesis formulated by Buffon in the 18th century, according to which infantile characteristics tend to persist in the adult. This hypothesis felicitously explains some of the anatomical peculiarities of man; it can also account for some of his psychical peculiarities, as I have tried to point out elsewhere (Bourdier 1949, 1967).

Quigley’s own hypothesis seems to be a development of language favored by

the rearing of infants in an affective context. I would point out that this hypothesis was also advanced by Buffon. Many American investigators, it would appear, neglect earlier writers, whose profound insights are still profitable today.

by CLAUD A. BRAMBLETT☆

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Two observations are essential to the study of human evolution, either past or present. First, men are subject to the same natural laws as the rest of the animal kingdom. Second, the plentiful data available for understanding human evolution will never speak for themselves.

Our unwillingness to deal with *Homo* in this framework is one of the barriers to scientific treatment. Life may have been most often brief and frequently traumatic for preagricultural man. Although some demes have substantially lengthened life expectancy, modern man is still mortal. Evolutionary success implies survival beyond maturity and reproducing one’s own kind. Some phenotypes are more often successful than others in the same deme. The resulting differential reproduction is due to selection and sampling error. Where genetic variants contribute to a successful phenotype, their frequency may be affected by differential reproduction. In all vertebrates, behavior is a very important part of the phenotype.

Any statement about this process, either in the past or present, is a hypothesis. It is drawn from data, and is intended to be tested against future data. Quigley is hypothesizing (a) that man evolved in a world that was not violent and dangerous and (b) that early hominids did not have an effective *physical* defense against predators (or game?). Contrary to the impression he conveys, lions do eat people. Guggisberg (1961) describes the prey of the lion as virtually every species whose range is within the lion’s area at some time or another. The behavior of lions toward modern man is probably better characterized as the behavior of an intelligent carnivore toward a vulnerable but dangerous prey, rather than a prey that tastes bad. It seems appropriate to point out that even modern men who live in the bush do not depend upon *physical* defense as the major manner of avoiding predation, if *physical* means knives or rifles. Moreover, unarmed Old World monkeys have always relied on cooperative avoidance to escape predation, but all have large canine teeth except females of terrestrial forms in which the *role* of group defense is performed by males.

The only direct evidence for behavior

in ancient men is the archeological record. Analogies inferred from comparative anatomy are valuable, but they are not in themselves direct evidences of behavior. It should not be surprising that artifacts occupy so much attention among scientists. In the study of the archeological record, there is a tendency to underestimate the sophistication or the behavioral value of ancient industries. A professor who is sitting before an electric typewriter may feel that a dart tipped with a chip of stone is not what one would use for elephants. But the archeological record indicates that it will suffice, if one knows how. Even the powerful African apes use objects to enhance their displays. Whether or not the branches, leaves, and stones are called tools, their use increases the effectiveness of the behavior.

It is possible that some rare events that dramatically affect behaviors may play a greater role in changing the phenotype than frequent events that are disregarded. Thus automobile-pedestrian accidents in school zones, even though they are relatively few, may have more effect on changing the phenotype (operating a vehicle at sensible speeds) than comparable accidents elsewhere. Absence of traffic deaths in front of your local elementary school implies that hominids have a behavioral solution to the problem, not that the problem does not exist, or that it does not affect behavior. One might argue that if a phenotype is successful, the frequencies of its truly critical problems (food, predation, etc.) are gross underestimates of their importance. Predation upon humans by carnivores may be this type of phenomenon.

by M. H. CRAWFORD☆

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Quigley’s article is an interesting and lucid attempt of a nonspecialist to examine human evolution and origins without some of the prevalent and so-called unconscious assumptions. I am basically in agreement with the idea that a scholar from a closely related discipline, possibly less biased by current trends and assumptions, should examine the “dirty laundry” of anthropology. However, unless the specialist is a biologist or well-versed in evolutionary theory, there is danger that he will present alternative hypotheses strictly on the basis of logic and ignore the precepts of formal evolutionary theory, supported primarily by empirical evidence from nonhuman animal and plant experiments. Not all of the alternative hypotheses, although they may be equally sound logically, are as likely biologically. All of the hypo-

theses generated to explain the fossilized hominid skeletal remains must agree with the massive corpus of mathematical formulations explaining the processes of evolution.

This article places in proper perspective the evolutionary role of predation upon early man in the grasslands of Africa. Quigley's discussion suggests that large incisors and tools (1) would be of little use in fighting off large feline predators, (2) were not necessary for man's survival in the grasslands, and (3) have, therefore, played a lesser role in the evolution of early man. Man probably survived in the grasslands of Africa as a result of "cooperative avoidance," and was probably unaffected by predation.

Quigley states (p. 520):

Man did become extinct *in nature*, and survives today as a living form only because he was extruded from nature into culture.

Both *culture* and *nature* are constructs, based upon certain observable and recurrent phenomena. These constructs are heuristic aids designed for a more efficient handling of certain behavioral and biological phenomena. To state that man was extruded from one construct into another is utter nonsense. Biologically, what has happened is that man, with developing technology, has altered some of the environmental and evolutionary stresses. He has modified the biosphere surrounding him. The selective forces resulting from this modification are at present unknown, but may yet result in the extinction of the species. Quigley raises man above his environment into mystical and superorganic concepts of nature and culture. These poetic references to man's extrusion from nature to culture do not help us either to understand the biological evolution of man or to eliminate some of the conflicting hypotheses of man's origin, but instead provide us with an additional, untestable hypothesis.

Another area of ambiguity in this paper is the characterization of the evolution of man as a shift from a creature whose activities were largely genetic to a creature whose activities are largely learned. Again, Quigley opposes two extremes, learned versus genetic, recalling the nature versus nurture arguments so popular a few years ago. Do these two concepts provide any additional information as to the evolution of early man? I doubt it. There is as yet little information as to the genetic basis of behavior in man or any of the living primates. The only mammal for which some data in behavioral genetics is available is the common house mouse, *Mus musculus* (Lindzey and Thiessen 1970). In anthropology, there has been

a swing away from the "tabula rasa" interpretation of behavior in man, explaining all behavior as learned, to a more sophisticated view, of genetic capacities overlain by experiences. Behavior is interpreted in terms of an interaction between learning and biological factors such as inheritance, hormonal levels, neural pathways, and brain chemistry. A model of the evolution of behavior of early man going from genetic to learned is simplistic and not based on evidence.

This article also states that man must be considered as a failure in nature and that the function of culture is to provide an environment in which man can survive when he can no longer survive in nature. But Pliocene early man was found distributed throughout Africa, part of Asia, and possibly Indonesia, and by the mid-Pleistocene, hominids had spread throughout most of Asia and Europe; and such a geographical distribution suggests an adaptive radiation. In other words, man was so well adapted to his ec niche that fertility drastically outweighed mortality and resulted in his spread throughout the world. This adaptive radiation of man must be viewed as a successful episode in the history of the species, not as a failure. Culture must have played a role in helping man invade his ec niche and aided his adaption to the environment, but the role of culture in this adaption does not alter the success of the species as measured biologically and evolutionarily.

Quigley further states (p. 525):

It may well be that man, as a semiscavenger in the Pliocene, developed his excellent heat-regulating system by being active in the middle of the day. This would explain three other changes: his loss of body hair, his darkened skin in his early and recent tropical forms, and his increase in size.

I am not convinced that scavenging at high noon explains anything. Man shares a basic homiothermic regulatory mechanism with most of the other mammals. The uniqueness of man has been thought to be the high-capacity sweating mechanism of cooling and heat dissipation (Newman 1970a). Recent tests (Newman 1970b) indicate, however, that peripheral heat loss in the extremities of the macaque is equal to that of man, suggesting that early man was endowed with the cooling apparatus when he moved into the grasslands rather than acquiring it by exposure to the noonday sun. Newman (1970a) also points out that there is no evidence to support the contention that hair interferes with heat loss; on the contrary, data he presents suggest that hair makes no difference in heat dissipation. Considering the added heat load to which man in the open grassland is subjected, it is likely

that early man was heavily pigmented prior to the reduction of the forest and his emergence as a grassland inhabitant (Newman 1970a). Lastly, the "size" of man would not necessarily be increased as a result of exposure to the heat stress associated with noonday scavenging. If the Bergmann and Allen rules are applicable to man—and there is some doubt of this because of the possible effects of clothing and shelter—then selection would operate on the surface area exposed rather than on stature.

by R. C. DAILEY☆

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Quigley has put together what appears to be a very perceptive appraisal of some of the central issues in the problem of human origins. Unfortunately, the provocativeness of his arguments seems to stem more from his tendency to overstate the positions of the "experts," "authorities," and "students" he cites than from his own perspicacity. Indeed, at times one gets the impression that Quigley is fighting the vested interests of paleo-anthropology. Several parts of the paper are not only repetitive but also appear to be contradictory—for instance, his discussion of tool use. Quigley's analysis of predation is good and brings together ideas that are certainly worth further exploration. At the same time, his thoughts on the "human revolution" and "man the unsuccessful animal" are in my opinion specious.

by HELMUTH FUCHS☆

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In a recent editorial entitled "Fact-Crazy, Theory-Shy?", Etzioni (1970) points to an imbalance in our information system arising from overemphasis on data collection and analysis and neglect of interpretation and synthesis. Quigley's contribution attempts to establish a balance regarding the question of human origins. His article achieves a high degree of plausibility. The general sequence of processes he outlines could be supported by subjectively descriptive data contained in mythology. If mythology were acceptable without reservation as documentation, assumptions and inferences on the origin of many human and human-made phenomena would be conclusive (Fuchs 1964a, b, 1965). Archaeological evidence would be irrelevant in this context because it documents not the processes but rather their accomplishment. (The inversion of the traditional value-system as to documentary evidence here is obvious, and a "pater peccavi" well in order.) However, this type of study will always have a strong scent of sophisticated speculation.

Regarding the evolution of language,