news and views

Should fossil hominids be reclassified?

RICHARD LEAKEY'S report in this issue of *Nature* signifies the end of the sixth field season in the Lake Rudolf area. In those six seasons important new fossil material has appeared at a rate almost too fast for scientific interpretation if not intellectual assimilation. At present, it is possible to discern two important contributions of the East Rudolf work, although a greater time perspective may indeed add further dimensions and ramifications to present interpretations of the Rudolf material.

The first and most obvious contribution has been the enormous increase in the size of the fossil sample, not only of hominid material but also of other Primates and vertebrates. The work at Rudolf has so far yielded approximately 107 specimens of fossil hominid; by comparison, Olduvai Gorge, an area noted to be very productive of fossil material, has yielded only about 40 hominids in nearly as many years. A second important result of the Rudolf work has been a recognition of the necessity to examine closely some of the earlier concepts and interpretations of human evolution. Before the 1970s the widely accepted model of human evolution suggested a slow and orderly emergence of a more advanced evolutionary grade of man from a primitive basal stock. In this way, late Pliocene-early Pleistocene australopithecine populations were seen to develop slowly into middle Pleistocene populations, generally attributed to *Homo erectus*; in fact, the process may not have been so simple.

The fossil evidence of man at East Rudolf now demonstrates a very wide morphological variation. There is clearly a large, robust-type australopithecine as seen in the cranium KNM-ER 406, mandibles KNM-ER 729, 818, 1806 and other specimens. There is also evidence of a more lightly built and perhaps more advanced group seen in the crania KNM-ER 1470 and possibly 1590, mandibles KNM-ER 730, 820, femur KNM-ER 737 and others. Certain specimens, notably the cranium KNM-ER 1805 and the mandible KNM-ER 1482, have proved difficult to assign to any currently recognised group. An interesting aspect of the Rudolf material has been the apparent absence of the gracile form of australopithecine. This type is well known from sites in South Africa and from Olduvai Gorge and now Leakey suggests that a cranium recovered during the last field season, KNM-ER 1813, may indeed represent that group at Lake Rudolf.

The variety of morphology present in the Rudolf hominid sample poses a number of interesting questions and of these perhaps the most important concerns the relationship between the advanced primitive members of the gracile groups. Does the gracile group contain generically distinct *Australopithecus* and *Homo* or does it contain only one taxonomic group with wide variation due to temporal, behavioural, sexual or geographical factors? Robinson, in placing all of the more gracile types in the genus *Homo* (*Nature*, 205, 121; 1965), has favoured the second explanation. His classification, based largely on features associated with dental mechanisms, implied significant dietary differences between the robust and gracile groups. Leakey now suggests that there may be two gracile groups—one advanced and one with more primitive morphology, distinct at the generic

level—in addition to a large, robust group and perhaps one other. He thus suggests the existence of at least three separate hominid lineages, sympatric and contemporary, within the early Pleistocene. Such a classification imposes problems.

First, it is difficult to understand how the East African environment could provide adequate ecological space to support three or more separate hominid lineages which must have been in competition for territory and for some basic subsistence materials during a period of 2 million years or more. Leakey's interpretation of the evidence would seem to suggest an early adaptive radiation within the Hominidae but since all groups were living in presumably the same environment, it is difficult to visualise the adaptive pressures and isolating factors which are necessary to produce genetic separation in related groups. Finally, and most important, if one accepts that gracile australopithecines and *Homo* coexisted in the early Pleistocene, then one must also accept that the available sample of australopithecines does not, and indeed cannot, represent the ancestral hominid group. The gracile australopithecines are widely accepted as the basal hominid stock and yet Leakey's current classification of the early hominids implies that the known members of this group coexisted with the genus *Homo* and were in fact too late to provide the ancestral population.

The problems associated with interpretations of the Rudolf material demonstrate the urgency of the need to re-evaluate the taxonomic criteria for genera within the Hominidae. The definition of the genus *Homo*, proposed in 1964 by Louis Leakey, Tobias and Napier (*Nature*, 202, 7) is inadequate on several grounds and failed to demonstrate adequate morphological space between the gracile australopithecines and *H. habilis*, the most primitive member of the genus *Homo*. Robinson's classification separated the robust australopithecines ("*Paranthropus*" in his terminology) from all gracile hominids ("*Homo*") on the basis of dietary and behavioural factors. Still others have suggested that all of the australopithecines should be included within a single taxa. There is still, however, no widely accepted classificatory system. The present difficulty is due partly to the inevitable incompleteness of the fossil sample and partly to the inadequacy of Linnaean systematics in dealing with evolving populations; in the particular case of the Rudolf material, Leakey's typological approach to classification adds yet another dimension to the difficulties. Palaeontologists must be dealing with evidence of evolving lineages and yet by continuing to compartmentalise this evidence into discrete taxa based on typologically orientated criteria, they are losing sight of the continuity and cohesiveness of the fossil record. Typological classification emphasises the distinctiveness of the material and must, also, therefore, implicitly suggest discontinuity in the fossil record. A more appropriate approach might emphasise functionally-based similarities and expected variability in evolving populations and would emphasise the continuity of the evolutionary process.

Leakey suggests in this issue that in view of the large amount of fossil human material now available he intends to make a review of hominid systematics. Such a review is necessary, but before it can be of practical importance, the theoretical bases of hominid palaeotaxonomy must be re-evaluated and if necessary reformulated. Without a valid and widely acceptable theoretical framework for classification of the fossil Hominidae such a taxonomic review may be premature and will only add further controversy.

From our Palaeoanthropology Correspondent