NEWS AND VIEWS

More Questions than Answers at East Rudolf

RESULTS of field work in the East Rudolf area of Kenya continue to expand knowledge of the evolutionary development of man, but as Richard Leakey has pointed out in a recent issue of *Nature* (242, 170; 1973), more questions are now arising than are finding answers.

Because of Leakey's insistence on the representation of a wide variety of geological, palaeontological and anatomical specialities East Rudolf continues to be one of the best known early man locales. Even the continuing difficulty in obtaining further reliable radiometric dates has not been a severe handicap because other methods of dating the sites are now available. Maglio's attempt (*Nature*, 239, 379; 1972) to correlate the East Rudolf fauna with that from other radiometrically-dated sites in East Africa seems a particularly good application of a dating method which, in other circumstances, has been justly criticized.

Leakey's report in this issue (see page 447) brings abundant affirmation of the lower Pleistocene (if not Pliocene) existence of the genus *Homo*. The large, and now reasonably complete calvarium, KNM-ER 1470, reiterates what more fragmentary and less dramatic material from the East Rudolf area has been suggesting for some time. The postcranial material, including two nearly complete femora, also re-emphasizes and clarifies the early hominid dichotomy. The comparatively large size of this skull, the lack of strongly developed or continuous brow ridges, the vertical parietals and other morphological features of the cranium quite clearly place the specimen outside the australopithecine grade of evolutionary development. In view of other evidence from past seasons, especially the KNM-ER 730 and 820 jaws and the KNM-ER 737 femur, the early existence of *Homo* at East Rudolf is no surprise. Although no dental measurements accompany this preliminary report it is interesting that the recently discovered "*Pithecanthropus* VIII" skull in Java shows apparently similar mesiodistal compression of the cheek teeth and a short, broad palate as are seen in the new Rudolf skull. The zygomatic process of the maxilla also appears to show a similar conformation in the two specimens.

One of the big bonuses of the East Rudolf material is the collection of associated material—associated in the sense of two or more bones having come from a single individual. Although definitely associated cranial and postcranial material has not yet been discovered at any lower Pleistocene hominid site, several related limb bones are now known from the Rudolf area. The body of evidence now available indicates that australopithecine locomotion, although clearly bipedal, did not necessarily conform to a hypothetical transitional model between apes and man. It now seems possible that the locomotive behaviour of these early hominids may have been different from any known pattern. The suggestion that the forelimb may have been long in relation to the hindlimb is interesting and may stimulate work which will eventually clarify one of the most elusive aspects of studies of early man.

The question which the new material really poses is what should now be done, in a taxonomic sense, with the gracile australopithecine and "*Homo habilis*". "*H. habilis*" has been suggested as a direct ancestor of modern man, yet, more than a million years later than KNM-ER 1470, the habilines from Bed I at Olduvai Gorge have a smaller endocranial capacity and a cranial morphology perhaps more primitive in some respects than the Rudolf skull. Although it is dangerous to put too much emphasis on brain size alone (living *H. sapiens* has a range of more than 1,000 cm³) the quite advanced morphological pattern of the new skull clearly suggests that it is not australopithecine.

It may well be, as Leakey has suggested elsewhere, that the East African material presently suggested to be from gracile australopithecines should be re-allocated. The very wide diversity found in this group would mean that some specimens would be placed with the robust australopithecines and some specimens would be placed with *Homo*. This would clarify and simplify the situation seemingly revealed by the postcranial bones. In the lower limb there is clear evidence of two types of erect and efficient bipedality. But if two types of australopithecines are recognized in East Africa then the mounting evidence of contemporary *Homo* could demand three types of lower limb morphology; this is not indicated in the East Rudolf material.

There is a further and perhaps sometimes overlooked implication of the East Rudolf material. It can no longer be doubted that two types of hominids co-existed in East Africa; if the Chesowanja skull (Carney *et al.*, *Nature*, 230, 509; 1971) is accepted as the latest (and last) evidence of that co-existence then the period of sympatry was at least 2 million years. This firmly and unequivocally indicates that the australopithecines were not incompletely evolved or inefficiently adapted hominids, as some workers have suggested; it is indicative of a very high level of adaptation and development that two closely related hominids were able to co-exist successfully for such a period.

From our Palaeoanthropology Correspondent

"Gating Currents" in Axons

It is generally accepted that the action potential of nerve cells and muscle fibres arises from a transient increase in the ionic permeability of the surface membrane which in turn leads to a transient inward movement of positive ions. Since the pioneer work of Hodgkin and Huxley (1952) the ionic currents have been measured in a variety of experimental conditions; ionic permeabilities and their dependence on voltage and time have been extensively studied. The ultimate aim has been to obtain information