



Australopithecus africanus: discovered by accident

*It is almost 50 years to the day that Nature published a report by Dr Raymond Dart describing the face, jaw and the brain case of a child belonging to what Dart described as "an extinct race of apes, intermediate between anthropoids and man". Nowadays, though chance and perspicacity still count in the search for hominid fossils, the scene has shifted from South to East Africa. The size of the cast has increased and both the extent of backstage support and the scale of the budget reflect the fact that hominid research has changed a good deal in the past half century. Bernard Wood reports.*

THE child's skull which Dart called *Australopithecus africanus*, the southern ape, had been discovered by accident (*Nature*, 115, 195; 1925). It had been found in the rubble of a lime quarry at Taung, which is about 80 miles north of Kimberley in what was then Bechuanaland. It was fortunate that the remains of a fossil monkey had been recognised at the same quarry only a few months previously. The child's skull was in fact identified, and then passed on to Dart, by Professor Young, a geologist and one of those who had been alerted that the site was of potential interest.

The Taung child was not the first fossil hominid to be discovered; evidence had been found in the previous century at several sites in Europe and by Dubois in Indonesia. The Taung child was, however, much less 'man-like' than any of these other candidates for a relative or ancestor of man,

despite the fact that its young age tended to mask these non-human traits. Also it was the first specimen to be found in Africa, a continent that has since given up so much evidence to support Darwin's speculation that it was the cradle of mankind. In South Africa after Taung, Dart and Robert Broom, a noted palaeontologist, learnt of other cave sites in the dolomite of the Transvaal. Although no more hominid remains have been found at Taung, literally hundreds of specimens have been found at four other cave sites, and work has been resumed recently at three of these sites.

The other concentration of hominid fossil sites is in East Africa, and the circumstances could hardly be more different. The East African sites are all associated with the Rift Valley where hominid bones, and the evidence of hominid activity, are preserved in the silt of ancient lakes and streams, in-

stead of having been carried, washed or dropped into caves as in South Africa. The Rift Valley sites are only revealed to us now because earth movements have so distorted the landscape of several million years ago so that what were beds and shores of lakes are now thrust up and tilted so that they are exposed to erosion by water and wind.

An advantage of the location of these sites in sedimentary basins is that, with the help of palaeontologists and those skilled in palaeoenvironmental research, the life and landscape that the early hominids knew can be reconstructed. The intensity of diversification in contemporary animals and knowledge of the habitat are but two of the new dimensions that have been introduced into the interpretation of hominid remains. The stratigraphy of the sediments also enables the location of specific fossil finds within a large site to be placed in an order of occurrence. The tectonic activity that elevated and tilted the fossil sites was accompanied by volcanic eruptions, the products of which are suitable for isotope dating. These eruptions periodically covered the landscape and are now incorporated as layers of jam in the sedimentary sponge-cake. The dates of these strata provide bracketing ages for the fossils that lie in the intervening sediments. The history of the Earth's magnetic field can also be traced in the sediments which preserve the perturbations of the magnetic poles. When this information is combined with the results of the isotope dating techniques the East African sites can be fitted into an absolute time scale enabling them to be placed in a historical context, one with another, and also with dateable sites elsewhere.

The problems of organising the teams of research workers necessary for modern research into human origins, in inaccessible areas and often in a harsh climate, are probably no better illustrated than at East Rudolf in North Kenya.

This site, comprising sediments exposed in five main regions over an area of 2,000 square kilometres, was not found by accident. In July 1967 Richard Leakey was leading the Kenyan contingent of a multinational expedition that had been organised to explore the fossil potential of the Lower Omo Basin in southern Ethiopia. The area allotted to the Kenyan team turned out not to be as rich as that allocated to the French and US contingents who have since successfully jointly explored the exposed sediments known as the Shungura Formation on the west bank of the river. Leakey, however, realised that in flying from Nairobi up to the fossil sites in Ethiopia he had flown over similar looking exposures

some several hundred kilometres further south on the north-east shore of Lake Rudolf. So, following a short aerial reconnaissance in 1967, the first East Rudolf Expedition was mounted by Richard Leakey in 1968. It explored the area as far as it could and found enough vertebrate fossils, including four hominid specimens, to encourage the National Geographic Society (staunch supporters of Drs Louis and Mary Leakey in Olduvai Gorge) to support a more extensive field programme the following year. Their faith was rewarded by further hominid finds, among them a complete cranium, and stone artefacts that appeared to be eroding out of one of the volcanic layers. Dating evidence indicated that the fossils were being collected from sediments laid down between 1 and 4 million years ago, with the younger localities tending to be in the north of the area and the older ones to the south.

Leakey had now moved to the National Museum in Nairobi. The museum authorities recognised the scientific importance of the work and since then the field expeditions have been organised from the museum, which has provided vital technical assistance and considerable logistic support. Despite the fact that many of the scientists involved are from Europe and the USA, the essentially Kenyan identity and basis of the expedition has never been in doubt.

For the 1970 season Leakey sought the assistance of Professor Glynn Isaac from the University of California. With Leakey leading the field team and the two acting jointly as scientific coordinators, they recruited geologists and palaeontologists and, with the continued backing of the National Geographic Society and a generous grant from the National Science Foundation (NSF), they began a planned programme of prospecting, excavations and earth sciences field work. Specialists were recruited to examine the fossils, both hominid and non-hominid, and by this time the scale of work necessitated the establishment of a permanent field camp at East Rudolf at Koobi Fora.

Like the creatures it set out to study, the expedition underwent its own evolution. As the involvement of the participating teams became deeper, and the importance of the laboratory and experimental support that was necessary for the field work was recognised, the East Rudolf Research Project was formed. This consolidated the close relationship of the research with the National Museum, and by means of a research council provided the museum with a panel of scientists which could advise not only on how best the current research could be prosecuted, but which

would also help to formulate future research policy for the area.

Research teams now come from both the USA and Europe to participate alongside the scientific staff of the National Museum. Each team is grant aided to a greater or lesser degree. The NSF in America and the Royal Society, the University of London and the National Environmental Research Council (NERC) in the UK have all provided support for research workers from many disciplines.

The maintenance of research teams many hundreds of difficult miles from the nearest town calls, however, for considerable basic logistic support in addition to that provided for by the research grants. Drinking water is several hours drive away from the main camp and a lorry is used solely to fetch water and firewood. Another lorry plies the barely passable tracks and roads to and from Nairobi with petrol and supplies. The buildings in the permanent camp have to be provided and maintained in an almost constant gale. To supply and maintain contact with small camps spread out over an area of thousands of square kilometres an aeroplane has been purchased which has since proved itself invaluable. To keep the twelve vehicles and two boats that are used in the field in good order a small garage has been built and for the field season a mechanic is resident at the main camp at Koobi Fora.

The responsibility for finding the funds for all these basic facilities has been accepted since the outset by Richard Leakey. Much of this money has been raised in the USA, a good deal of it from proceeds of lectures which serve the dual function of informing people of the research work

and raising the necessary funds. Paradoxically it is this willingness of a scientist to ask the public directly for money, instead of receiving it anonymously from the people through government and research grants, that seems, to earn the displeasure of some fellow scientists.

It is now a fact that the discovery of a possible ancestor of man several million years old is newsworthy. It is apparently also vexing that Richard Leakey, like his father before him, has a knack of exploiting this news to the advantage of his fund raising, and moreover doing it with a style and self assurance that is normally only associated with unravellers of double helices.

A more pertinent criticism of research programmes into human origins is that the very publicity surrounding the finds tends to concentrate judgement solely on results in terms of specimens recovered. There is an increasing tendency to judge sites according to their position in a hominid league table, with 'oldest' on one axis and 'greatest number' on the other. One would hope that, when scientific judgement is passed on these programmes, it will be on the basis of the quality of the scientific research and on the ability of the research workers to see beyond the immediate problems of the age and nature of the specimens. There is every sign that those bodies that support the research at East Rudolf appreciate the importance of the wider aspects of the research, while at the same time encouraging work on the fossils themselves.

Perhaps it is an encouraging sign of the maturity of hominid research that although research into the geological and palaeoenvironmental context of the material will be maintained at East Rudolf, and in some areas intensified, prospecting for hominid fossils has been temporarily suspended. This to give time for the sample of more than 120 hominids that have been collected to be assessed and analysed.

Only when the hominids are considered as just one faunal component, albeit an important one, of an evolving sedimentary basin, as is beginning to be the case at East Rudolf and at other East African sites, will hominid research this decade in Africa have shown itself to be a worthy descendant of Dart's pioneering efforts. That so much progress has been made, both in terms of available fossil material and in the manner in which its context is being studied, is to a large degree because of the scientific and organisational skills of two generations of the Leakey family.

A new centre for prehistory at Nairobi is to be called the Louis Leakey Memorial Institute. □

*Fossil site, showing areas of exposed sediment*

