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## HOMO HABILIS AND HOMO ERECTUS: FROM THE OLDOWAN MEN TO THE ACHEULIAN PRACTITIONERS

### THE EARLIEST DISCOVERY OF EARLY HOMO IN AFRICA

Not long before Dr Robert Broom died in 1951, his assistant, J. T. Robinson, made in 1949 an historical find at Swartkrans near Krugersdorp in the Transvaal. He showed that, along with *Australopithecus robustus*, that cave held remains of a more advanced kind of hominid to which Broom and Robinson (1949) gave the name of *Telanthropus*. Some of the bones assigned to this group were found in the same layer as *A. robustus*. Today this advanced hominid is classified in the genus *Homo*. Detailed studies by my research student, R. J. Clarke, have shown that this Swartkrans hominid has features that may lie somewhere between those of *H. habilis* and *H. erectus*.

Such was one of the many surprises that the southern end of the African continent had yielded to palaeo-anthropology. What of East Africa? Here we come to the role of the late Louis Seymour Bazett Leakey, his wife Mary and his son Richard, in revealing yet more of Africa's "golden joys" (*Henry IV*, Part II — Shakespeare).

The late L.S.B. Leakey was without doubt one of the most colourful and controversial figures in a field of science that does not lack for mavericks, prima donnas and a certain outsize species of genius. With his equally remarkable and unusual wife Mary by his side, he was a pioneer in several areas — such as palaeoecology and primatology, and a creative contributor to general palaeontology, palaeo-anthropology, archaeology, ethnology, linguistics, geology and zoology. Like Broom and Dart he was cast in the mould of an 18th or 19th Century polymath, of which few examples have been pro-

duced in the 20th Century. Time and context forbid my expatiating on Leakey: but for our present story one must stress two aspects of the Leakey saga. These are the revelation of two kinds of early hominid, namely *Australopithecus boisei* and *Homo habilis*, and their implications for the human story.

### AUSTRALOPITHECUS BOISEI

Broom (1938) had already made us accustomed to the idea that there had been a robust kind of *Australopithecus* on the African scene, through his discoveries at Kromdraai and Swartkrans. Thus, it was a reasonable expectation that similar kinds of ape-men would be found in East Africa. Nothing, however, could have prepared our minds for the extravagantly large-toothed and powerfully-muscled australopithecine which Mary Leakey found in the Olduvai Gorge in July 1959 (L. S. B. Leakey 1959). It was the cranium of a still more robust ape-man, that made the Transvaal specimens from Swartkrans pale into relatively puny insignificance. Leakey recognised it as another kind of small-brained australopithecine which he called *Zinjanthropus boisei* (1959); later, in my detailed study of it, I lumped it into *Australopithecus*, though as a distinct species, *A. boisei* (Tobias 1967). Although its closest resemblance lies with *A. robustus*, there are a number of respects in which it is closer to *A. africanus*, and still others in which it differs from both of the Transvaal species. Thus, it would be an over-simplification to lump the Olduvai fossil into the species *A. robustus* as some rather facetiously have suggested. For the moment, it would seem more correct to retain the Transvaal



# DISTRIBUTION OF HOMINID TAXA IN TIME (1979)

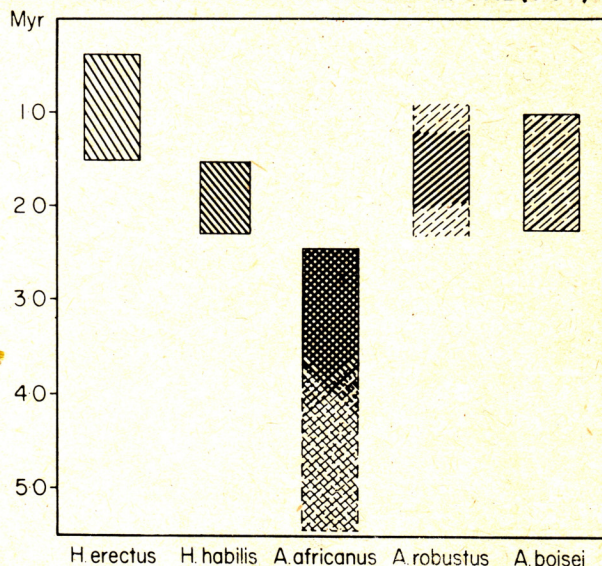


FIG. 1. The approximate placement in time of *Homo habilis* and *Homo erectus*

and the East African robust australopithecines as separate species.

The Leakeys' discovery showed that the evolutionary radiation of the australopithecines had been more striking even than the Transvaal fossil finds had demonstrated. The splitting of the hominid lineage may have been a tripartite rather than a bipartite one. The Olduvai type specimen of *A. boisei* has proved the forerunner of a number of East African finds of that kind: it is known now from Peninj of Tanzania, Chesowanja, Koobi Fora and Ileret in Kenya, and the Omo Valley in southern Ethiopia.

## HOMO HABILIS FROM EAST AFRICA

The next dramatic contribution came with another series of Olduvai discoveries made by the Leakey family: these were the lightly built fossils to which the name *Homo habilis* was given. Actually, the first of these came to light before the discovery of *A. boisei* in 1959; but the most important ones appeared in 1960, 1963 and 1968. These are totally different from their contemporary *A. boisei*; but they are also different in a number of traits from the earlier Transvaal *A. africanus* fossils. They have brain-sizes almost 50 per cent greater than the average for *A. africanus* (Tobias 1971, 1975; Holloway 1973); the teeth are on the average somewhat smaller; the premolars and first molars are more elongated, whilst all of the cheek-teeth are narrow — and characteristically lack that great thickening which I have called the "australopithecine bulge". There are numerous differences in the region of the brow-ridges, face, jaws, brain-case and base of the cranium (Tobias 1979). All of these features suggest very much what one would expect from later, more hominized members of the same

lineage as that to which *A. africanus* had earlier belonged. Its brain was more developed, its teeth more human, its pattern of tooth wear curiously human, its structure in many other respects very close to that of *Homo*. On top of that it was identified as the probable fabricator of the Oldowan stone industry. All of this evidence decided L. S. B. Leakey, J. R. Napier and myself in 1964 to place these specimens in the genus *Homo*. We adopted a name suggested to me by R. A. Dart and called it *Homo habilis*, the first proficient "handy-man".

What was surprising about the *H. habilis* discoveries from Olduvai was first their age and secondly that they should exist at all as a separate population. To take the latter point first, up to the sixties and for some scholars even later, it had been generally and often mindlessly assumed, by those who accepted that *A. africanus* was the likely ancestor of man, that the population limits of the species *A. africanus* must have overlapped markedly with those of the species *H. erectus*. There is not room, they cried, for another species between these two ancestral species. Yet, as soon as one started to analyse the biological distance between them, it emerged that in such crucial features as cranial capacity and tooth size, there were significant shifts. We were able to demonstrate that there was indeed enough room for a species to be accommodated on the lineage between them. Also, there was a time-lapse of at least threequarters of a million years between the latest of the Transvaal *A. africanus* specimens and the earliest of the *H. erectus* specimens. George Gaylord Simpson (1944) has stated that the minimum time-span for a new species is about 0.5 million years. So there would seem to have been not only enough biological distance but enough time for *Homo habilis* to be accommodated as a critical incipient species along the *Homo* part of our lineage.

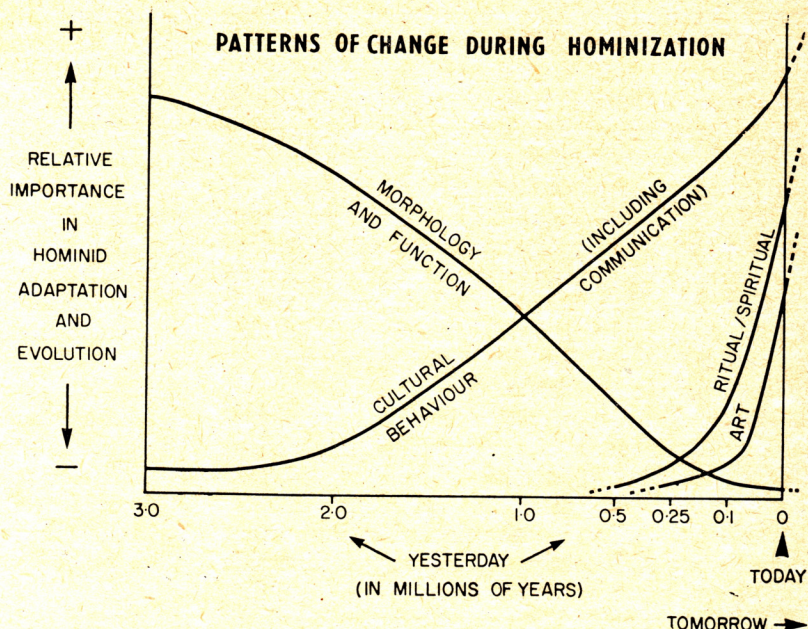
The other breathtaking aspect of the Leakeys' finds was that specimens assignable to *Homo* should have existed as long as 2 million years, for that is the approximate age of the earliest fossils of *H. habilis* at Omo, East Turkana, Olduvai and Sterkfontein. This revelation of the high antiquity of the genus *Homo* is one of the greatest contributions the Leakey family has given us. Add to that the fact that *Homo* did not begin with the big-brained *H. erectus* but with a more modest antecedent — *Homo habilis* — who held his own in the face of competition from his robust australopithecine contemporaries.

## HOMO HABILIS AND CULTURE

In 1971, Dr. Mary Leakey produced a volume on the archaeological remains in Beds I and II of Olduvai Gorge. This remarkable work has been dubbed by Professor Desmond Clark of Berkeley "an unsurpassed record of humanity's beginnings". She provided critical evidence showing that the stone implements of the lowest two layers were made by *Homo habilis* rather than by his contem-



FIG. 2.  
Graphical representation of the patterns of biological and cultural change in the evolving hominids over the past 3 million years. Note that it seems that, during the era of the Acheulean practitioners (predominantly *Homo erectus*), cultural processes became for the first time relatively more important in hominid evolution and adaptation than the essentially genetic processes of morphological and functional change.



porary *Australopithecus boisei*. These implements have been classified as belonging to the Oldowan Culture. They show a sustained record of cultural activity by *Homo habilis* over a couple of hundreds of thousands of years, during which the culture moved from simpler to more elaborate stages.

With the emergence of *H. habilis* from its presumed ancestor, *A. africanus*, we see the emergence of a new phase of hominization. The idea of culture is adopted by man and made the very basis of his survival. It is a major turning-point in the emergence of man and forever thereafter the human line is culture-bound and culture-dependent. It is this dramatic swing-over that made man the cultural animal par excellence. It marked a revolution in the evolution of man: for it heralded a new set of evolutionary techniques. Thenceforth, man's behaviour, his adjustments, his survival, came to be determined more and more by what he could do with his hands under the gaze of his watchful eyes and under the control of his planning, foreseeing, anticipating and agile brain.

The great evolutionist, Theodosius Dobzhansky, recognised in his posthumous Raymond Dart Lecture (Dobzhansky and Ayala 1977) two great steps forward in the development of life. The First Transcendence was the Origin of Life itself; the Second Transcendence was the coming of Man with his futuristic survival kit. *Homo habilis*, the small meek hominid, announced the Second Transcendence to the world: and neither the hominids nor the world would ever be the same again.

Signs of *Homo habilis* have not been restricted to Olduvai Gorge. They have come also from Sterkfontein in the Transvaal (Hughes & Tobias 1977), East Turkana in Kenya (R. E. F. Leakey 1973), Omo in Ethiopia (Boaz and Howell 1977). Their first appearance is dated to about 2.3 million years ago. In those millennia of transition, the early hominid made a remarkable leap: instead

of remaining, like *Australopithecus*, the most man-like of animals, he became of a sudden a man. It was surely the evolution of his culture and his culture-dependence that turned a primitive hominid into a man.

*Homo habilis* had many kinds of stone tools; he collected red earth; and as far back as 1.8 Myr B.P. he could erect a stone shelter at Olduvai. Perhaps we should recognise in that stone walling the first architectural awakening and in those red earth fragments in Olduvai Bed II the first glimmering of man's artistic interests and inclinations.

We know nothing of language, ritual, ideology among the meso-encephalic (medium-brained) little people, *Homo habilis*; but we do know that they were an alert and culturally alive population. They paved the way for the next great step forward, from *Homo habilis* to the macrencephalic *Homo erectus*, about 1.6 Myr B.P.

#### HOMO ERECTUS

Unlike *Homo habilis* who seems to have been confined to Africa, we see *Homo erectus* as a venturesome species, breaking its geographical bounds and spreading into Europe and eastwards to Java and China. For a million or more years, *H. erectus* developed culturally and expanded his hunting areas. We find the first convincing evidence that man had become a cave-dweller; for not only his bones occur in caves, but also associated remains of stone and charred animal bones, collections of seeds, and what could be ancient hearths and charcoal. Thus we find his remains in the cave of Choukoutien near Peking. Elsewhere, he seems to have lived in open encampments along the banks of streams or on the shores of lakes: proximity to water was essential to the survival of man. Not only Choukoutien but also Vértesszőllős in Hungary have shown signs of his fireplaces. Controlled mas-



tery of fire seems to have made it possible for man to dwell in caves, and also to move into colder climates. Indeed this factor may have speeded the migrations of ancient men into the chilly, often glaciated regions of prehistoric Europe. Sooner or later, too, *Homo erectus* started cooking his food, thus reducing the work demanded of his teeth. This in turn may have played an important part in minimizing the evolutionary advantage of big teeth — for cooked food needs far less cutting, tearing and grinding than does raw food. This may have led directly to the diminution in the size of the teeth, one of the features that distinguish the later *Homo sapiens* from *Homo erectus*.

Culturally, *Homo erectus* has been found associated in some parts of the world with a chopper tool tradition and in other places with an Acheulean hand-axe industry. Thus, this kind of man had considerable versatility in manufacturing implements. Even during this early phase, a well-diversified suite of tool-types is recognisable.

Numerous animal bones have been found with *H. erectus* remains; sometimes they seem to have been cooked, deliberately broken and even fashioned. From this evidence it seems that *H. erectus* was a hunter. *Australopithecus*, it seems, and perhaps *H. habilis* too, had been more of a scavenger than a hunter, possibly at best an opportunistic hunter who seized his chance when a weak, young, sick or aged animal crossed his path. *H. erectus*, on the other hand, seems to have been a confirmed hunter, a habitual eater of fresh meat; and his prey included animals of all age groups.

It is reasonable to suppose that, as with present-day hunters, such as the Kalahari San (Bushmen), meat from the hunt formed only a part of the diet of *Homo erectus*. Other juicy morsels may have been furnished by snakes, birds and their eggs, locusts, scorpions, centipedes, tortoises, mice and other rodents, hedgehogs, fish, crustaceans, and a myriad other edible forms of life. Many of these even children could have caught — as they do in the Kalahari today, before they are allowed to accompany the older men on the hunt. Vegetable foods too must have played a big part in the diet of *H. erectus*, in the form of fleshy leaves, fruits, nuts and roots. Accumulations of hackberry seeds, for example, were found in the Choukoutien cave deposit.

There seems little doubt that *H. erectus* must have been omnivorous (as *Homo sapiens* is today). Such a diet is the most opportunistic, and modern man is the most opportunistic of all living primates. Liberated from too narrow an environmental dependence, from too restricted a dietary regimen, man has come to thrive off many diets, in many surroundings. He is par excellence the creature that lives with an eye for the main chance. *H. erectus* was probably one of the earliest of the great opportunists; and it is likely that his very opportunism endowed him with evolutionary flexibility, with adaptability, with a very plastic survival kit.

To this adventurous and ambitious go-getter there came a new dimension of evolution: the expe-

rience of symbolising, the ideological, the ritualistic. There is no sign yet that *H. erectus* buried his dead; no complete burials have been found, no graves, no grave goods, no red ochre on or around the bones. That cannibalism was practised seems most probable. The human bones of Choukoutien are in the same broken and splintered state (perhaps for the eating of the marrow) as are those of other animals. The preponderance of human skulls in that deposit may be evidence that *H. erectus* went in for head-hunting. The site has yielded thousands of pieces of non-hominid animal remains pertaining to every part of the skeleton; but, although more than 40 human individuals are represented by the bones of *H. erectus*, the overwhelming majority are represented by parts of skulls, there being only very few fragments of human limb-bones. Human heads would seem to have been selected, much as one finds them in the lairs of later head-hunters.

Evidence of skull-collecting is not the only sign of ritual observances. With scarcely an exception, the skulls of *H. erectus* (whether from China, Java or Africa) show damage to the region around the foramen magnum (the opening in the base of the skull through which the brain-stem passes to become the spinal cord). The damage appears to have been deliberately inflicted. Some have argued that because this part of the skull is very thin, the damage must be accidental; but that is an unconvincing argument, for even in the much thinner-walled crania of *Australopithecus* and *H. habilis* no single specimen shows this pattern of damage and the region is typically found intact. On the other hand, very similar signs of intentional mutilation are found on the crania of early and later Neanderthal men, as well as on those of the Bronze Age of Germany. Present-day head-hunters of Borneo and New Guinea inflict very similar cranial mutilations on special ritual occasions; they extract the brain through the aperture thus made and after cooking it with sago, eat it ceremonially (Blanc 1961). Only in this way, they believe, may they give the name of the deceased victim to the son of the ritual cannibal. Although it is improbable that *H. erectus* pursued so elaborate a ritual, it is very likely that the damage to the base of the crania of *H. erectus* was not only deliberate, but also an indication of ritual mutilation and of ritual (rather than nutritional) cannibalism. If this interpretation is correct, perhaps head-hunting, ritual mutilation of the skull-base, and, possibly, ritual cannibalism were the earliest signs of ideology in the life of *Homo erectus*.

It may well have been *Homo erectus* who carried culture to a new dimension with the first glimmerings of ritual.

By the last aeons of *H. erectus*, we see a troglodytic, hunting and gathering, fire-using, tool-making, ritual-observing man as a dominant species of mammal all over the Old World from Africa, through Europe, to China and Java.

With such complex lifeways as he possessed, we should find it most difficult to deny him speech, articulate speech, words about fire, about hackber-



ries, about heads and hunters, about brains and about holes in the skullbase, about caves, about water, about choppers and about hand-axes, and words about the concepts behind head-collecting, ritual cannibalism and other elements of his world of ideas. For this adventurer and opportunist was also the world's first theorist and ideologue. Biologically, he was poised nervously on the brink of one more great step forward — the emergence of *Homo sapiens*. Culturally, he stood upon the threshold of a great discovery that some of his sapient successors made: the art of the hunter, which was to prove one of mankind's sublimest inventions.

The era of ritual evolution that he had pioneered was soon to give way to the epoch of artistic, linguistic and spiritual evolution that has been the hallmark of modern man.

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