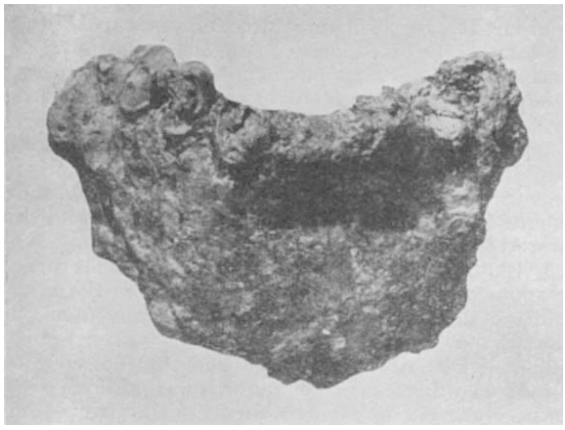

Fig. 1. The Kanam mandible. The fullness of the so-called chin is seen on the right, clearly demarcated by a highlight. The sockets and roots of the missing teeth are apparent; the surviving two right premolar teeth can be seen

Atlantic seaboard of Morocco[6]. On the other hand, the Ternifine mandibles of *Atlanthropus* show more archaic features than do those of Kanam, Rabat and Dire-Dawa; while the Kanam mandible has several morphological features comparable with those of Sidi Abderrahman, though the crucial evidence of the chin region and the retro-symphyseal surface is lacking[7]. As to the possibility of australopithecine affinities, the main resemblance is in the size proportions of the front and back teeth. A few ape-man specimens have, in addition, a degree of chin development faintly reminiscent of that of Kanam.

Thus, while we cannot entirely exclude the possibility that the Kanam jaw is related to a member of the Australopithecinae or of *Atlanthropus*, the balance of evidence supports the view that the Kanam mandible represents a third African fossil showing a cluster of features morphologically intermediate between those of *Atlanthropus* and those of modern man. Whether or not it is justifiable to describe these forms as neandertaloid, thereby relating them by implication to European forms, is a problem which must await more material and further analysis.

At least, it is no longer necessary or correct to build theories upon the alleged 'sapient' or 'modern' morphology of Kanam man; nor should the specimen be interpreted as providing evidence in favour of the

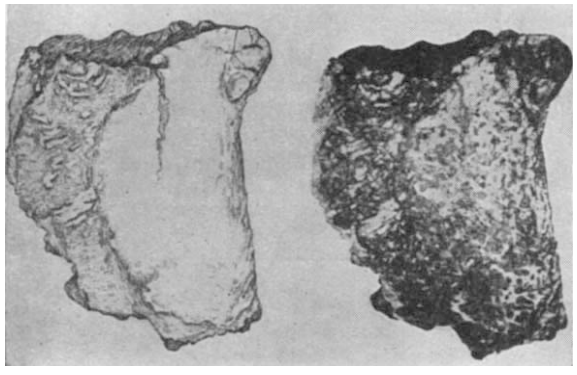

Fig. 2. Sketch and photograph of a section through the Kanam mandible, to show the large pathological mass on the retrosymphyseal surface. The section has passed through the right first incisor root

presapiens theory espoused by Vallois[8]. Perhaps most importantly of all, we are now in a position to consider the age of the Kanam specimen, free from any misconceptions that it is of sapient character.

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Fossilized Human Remains from Northern Kenya

DURING the summer of 1959, a party from the Durham Colleges visited the remote district of Turkana in northern Kenya to carry out a geological survey of the Lothidok and the Labur ranges of hills, which border the western shore of Lake Rudolf.

The rocks which compose the Lothidok range are probably Miocene; but a thick sequence of younger lacustrine sediments is developed against the eastern flank of the Lothidok range, immediately south of the Kalalokoil River (approximate position 35° 47′ E., 3° 26′ N.). C. Arambourg[1] has stated that their age is Upper Pleistocene. These lacustrine beds represent deposition in an ancient Lake Rudolf of far greater extent than the existing lake, since they stand between two hundred and three hundred feet above present lake-level. In places, the Miocene lavas and agglomerates of the Lothidok range must have formed a rocky shore-line to this ancient lake, during a part of Pleistocene times. From the western marginal facies of the lake beds, adjacent to their contact with the Miocene, the Durham Colleges party recovered portions of two fossilized human skulls which are the first remains of this kind to be found in the northern region of Kenya. One is represented by little more than the frontal bones and the upper margins of the orbits. The other skull, with which this communication is chiefly concerned, lacks only the face and the left side of the jaws. A few cervical vertebræ and ribs, and part of a humerus were intimately associated with the second skull.

The more complete skull has been slightly distorted during its enclosure in the lake sediments, but it is possible, without further preparation, to distinguish certain salient features of the skull. The cranial bones, which, incidentally, are fully lithified, are unusually thick (12 mm. or more). The skull is long and conspicuously narrow, although the latter character is exaggerated by crushing; and the face appears to have been small. There is no more than a suggestion of a supra-orbital torus, but the brow is remarkably low. The lower jaw (Fig. 1) is very robustly constructed, with a deep horizontal ramus 22 mm. thick below the third molar; and the mandible seems to have possessed a chin. The molar teeth are very badly worn, being planed down almost to the level of the inferior margin of the enamel. They

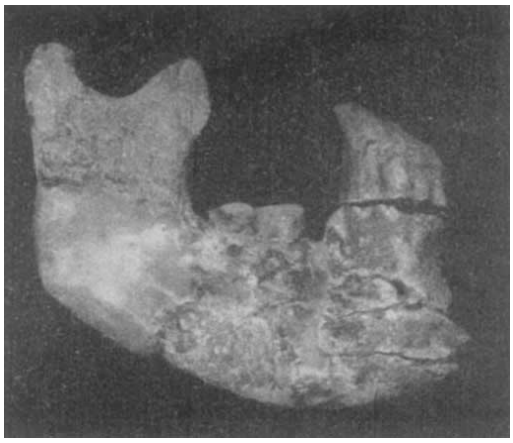

Fig. 1. Lateral aspect of the right branch of a fossilized human mandible, together with a fragment of the upper jaw; from Turkana, northern Kenya (half natural size)

are probably a trifle larger than is the average in Recent individuals of *Homo sapiens*.

Numerous artefacts were found afterwards on sites adjacent to this fossilized human skull, but all were surface finds. None was found *in situ*. The implements include Middle Sangoan hand-axes and Levallois-type flake tools fashioned in chert, small stone points of Solutrean aspect, and barbed harpoon heads and spatulæ of bone. Neighbouring sites also yielded rather poorly preserved remains of various fossilized mammals, including hippos, antelopes and pigs, as yet not properly identified.

It is too early to speculate upon the nature or status of the skull, but there seem to be some clear physical resemblances to the most complete of the Kanjera skulls, which were recovered by L. S. B. Leakey nearly thirty years ago from Pleistocene lake beds developed on the flank of Homa Mountain in western Kenya. Dr. Leakey has suggested a Middle Pleistocene date for the Kanjera skulls. So far, it has not been possible to establish with certainty the precise stratigraphical position of the human fossils from Turkana. Attempts to obtain an absolute dating by chemical methods have also proved inconclusive. The uranium content is the same in both the human bones and in fossilized animal bones from neighbouring sites, which are believed to be undoubtedly contemporaneous with the formation of the lake beds, but the actual figure for all this material is abnormally low.

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PSYCHOLOGY

Age Differences in Movement Pattern

The literature which describes studies of detailed hand movement patterns contains few references to changes in acceleration during these movements. Such references as do occur are mainly to be found in books on motion study and suggest that a movement occurs in three phases: an acceleration phase to a steady speed, followed by deceleration. For example, Lowry *et al.*[1] give a curve purporting to show this pattern without quoting any evidence support it. Experimental work carried out here[2] and at Cambridge by Singleton[3] suggested that movement patterns of older people might differ from those of young and, since no relevant evidence could be found in the literature, an ultra high-speed chrono-cyclographic technique was developed in order to make a detailed study of movement patterns.

Our subjects were required to make simple movements in response to a four-choice stimulus and these were photographed with a light on the hand flashing at 100 flashes per second. Three conditions of response were used which differed only in the manipulation demanded after the initial movement was completed. Matched groups of 12 younger subjects (20–25 yr.) and 12 older subjects (60–65 yr.) were used. It was found that under the conditions of this experiment the movement, far from showing a simple acceleration : constant speed : deceleration pattern, showed marked variations in acceleration throughout. Typically, instead of the smooth acceleration which might have been expected, the movement pattern showed very rapid acceleration at the outset, followed by an equally rapid decrease in acceleration to a minimum at approximately 0·1 sec. from the commencement of the movement, which was in turn followed by a second acceleration to a 'peak' of approximately half the value of the first. This whole phase occupied approximately a third of the total movement time. While the characteristic pattern at the outset of the movement was found in both young and old subjects, the old subjects accelerated less rapidly than the young and the 'dip' passed below the zero acceleration line showing that the older men had a short negative acceleration phase. Fig. 1 shows a typical velocity curve for an older subject with the acceleration curve derived from it. There were, within the young and old groups, no statistically significant differences between the three response conditions tested, but between groups there were significant differences in response initiation time in

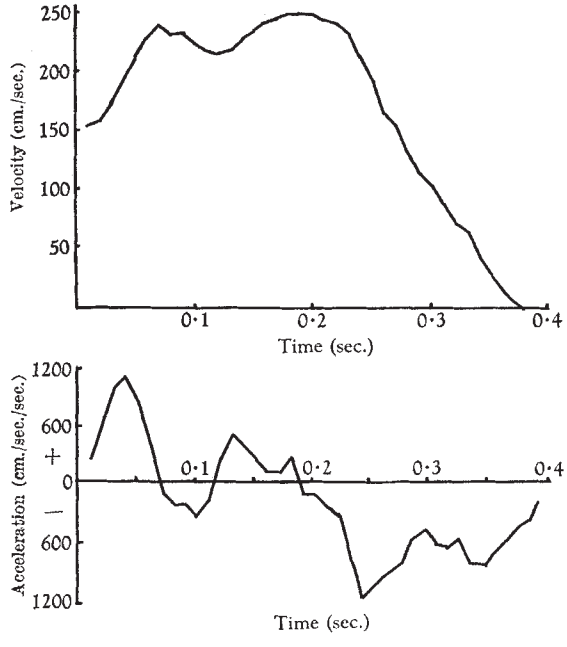

Fig. 1