from three further wooden trackways that we determined.

Table 3. TRACKWAYS OUTSIDE SOMERSET

| | | Years B.P. |
|---|---|---|
| Q 310 | Fordy—Little Thetford, Cambs. | 2560 ± 110 |
| Q 77 | Brigg, Lincs.[5] | 2552 ± 120 |
| Q 68 | Kate's Pad, Pilling, Lancs. | 2760 ± 120 |

It was already known from associated prehistoric finds that the Brigg trackway clearly belonged to the Late Bronze Age to Early Iron Age transition. Pollen-analytic evidence and a single sherd from the Fordy trackway had already suggested a similar age for that structure. It is now strikingly evident that indeed all the trackways belong to the one archæological period.

Of course, prehistoric trackways were built at other periods than this, and the Groningen laboratory has dated an Irish example as follows :

*GRO* 272 Corlona, Co. Leitrim 3395 ± 170 years B.P.

None the less, the consistency of the English results is striking and strongly underlines the importance of carefully recording and dating these unregarded prehistoric monuments.

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[3] Godwin, H., and Willis, E. H., *Amer. J. Sci.*, Radiocarbon Supp., **1**, 63 (1959).
[4] Mitchell, G. F., *J. Roy. Soc. Antiq. Ireland*, **88**, 49 (1958).
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# A NEW FOSSIL SKULL FROM OLDUVAI

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ON July 17, at Olduvai Gorge in Tanganyika Territory, at Site *FLK*, my wife found a fossil hominid skull, at a depth of approximately 22 ft. below the upper limit of Bed I. The skull was in the process of being eroded out on the slopes, and it was only because this erosion had already exposed part of the specimen that the discovery was possible. Excavations were begun on the site the following day and continued until August 6. As a result, an almost complete skull of a hominid was discovered. This skull was found to be associated with a well-defined living floor of the Oldowan, pre-Chelles-Acheul, culture.

Upon the living floor, in addition to Oldowan tools and waste flakes, there were the fossilized broken and splintered bones of the animals that formed part of the diet of the makers of this most primitive stone-age culture. It has not yet been possible to study the fauna found on this living floor ; but it can be said that it includes birds, amphibians, reptiles such as snakes and lizards, many rodents and also immature examples of two genera of extinct pigs, as well as antelope bones, jaws and teeth.

It is of special importance to note that whereas the bones of the larger animals have all been broken and scattered, the hominid skull was found as a single unit within the space of approximately one square foot by about six inches deep. Even fragile bones like the nasals are preserved. The expansion and contraction of the bentonitic clay, upon which the skull rested and in which it was partly embedded, had resulted, over the years, in its breaking up into small fragments which have had to be pieced together. The bones, however, are not in any way warped or distorted. A large number of fragments still remain to be pieced together.

This very great difference between the condition of the hominid skull and that of the animal bones on the same living floor (all of which had been deliberately broken up) seems to indicate clearly that this skull represents one of the hominids who occupied the living site ; who made and used the tools and who ate the animals. There is no reason whatever, in this case, to believe that the skull represents the victim of a cannibalistic feast by some hypothetical more advanced type of man. Had we found only fragments of skull, or fragments of jaw, we should not have taken such a positive view of this.

It therefore seems that we have, in this skull, an actual representative of the type of 'man' who made the Oldowan pre-Chelles-Acheul culture.

This skull has a great many resemblances to the known members of the sub-family of Australopithecinae. Some scientists recognize only one genus, namely, *Australopithecus*, and treat Broom's *Paranthropus* as a synonym ; others consider that the demonstrable differences are of such a nature that both genera are valid. Personally, having recently re-examined all the material of the two genera, in Johannesburg and Pretoria, I accept both as valid.

The Olduvai skull is patently a member of the sub-family Australopithecinae, and in certain respects it recalls the genus *Paranthropus*. In particular, this is the case in respect of the presence of the sagittal crest, the great reduction in the size of the canines and the incisors, the relatively straight line of these teeth at the front of the palate, the position of the nasal spines and the flatness of the forehead. In certain other characters, the new skull resembles more closely the genus *Australopithecus*, for example in respect of the high cranial vault, the deeper palate and the reduction of the upper third molars to a size smaller than the second, all of which are features to be found in *Australopithecus* but not in *Paranthropus*.

The very close examination and direct comparisons which I have personally made in South Africa have convinced me that, on the basis of our present state of knowledge, the new skull from Olduvai, while clearly a member of the Australopithecinae, differs from both *Australopithecus* and *Paranthropus* much more than these two genera differ from each other.

I am not in favour of creating too many new generic names among the Hominidae ; but I believe that it is desirable to place the new find in a separate and distinct genus. I therefore propose to name the new skull *Zinjanthropus boisei*. This generic name derives from the word 'Zinj', which is the ancient name for East Africa as a whole, while the specific name is in honour of Mr. Charles Boise, whose constant encouragement and financial help ever since 1948 have made this and other important discoveries possible. I would also like to acknowledge the generous help received, from time to time, from the Wenner-Gren Foundation and the Wilkie Trust.

The following is the preliminary diagnosis of the new genus and the new species :

*Zinjanthropus* gen. nov. :

Genotype : a young male with third molars not yet in wear and sutures relatively open, from *FLK* I, Olduvai.

A new genus of the Hominidae, sub-family Australopithecinae, which exhibits the following major differences from the genera *Australopithecus* and *Paranthropus* :

(*a*) in males a nuchal crest is developed as a continuous ridge across the occipital bone ;

(*b*) the inion, despite the great evidence of muscularity, is set lower (when the skull is in the Frankfurt plane) than in the other two genera ;

(*c*) the posterior wall of the occipital bone rises more steeply to form, with the parietals, a very high-vaulted posterior region of the skull ;

(*d*) the foramen magnum is less elongate and has a more horizontal position than in *Australopithecus* (in the crushed skulls of *Paranthropus* it is not possible to be quite sure of the plane of the foramen magnum) ;

(*e*) the presence of a very massive horizontal ridge or torus above the mastoids. This is much more marked than the normal type of supra-mastoid crest ;

(*f*) the mastoids are more similar to those seen in present-day man, both in size and shape ;

(*g*) the presence of a strong wide shelf above the external auditory meatus, posterior to the jugal element of the temporal bone ;

(*h*) the shape and form of the tympanic plate, whether seen in *norma lateralis* or in *norma basalis*. In this character the new skull has similarities with the Far Eastern genus *Pithecanthropus* ;

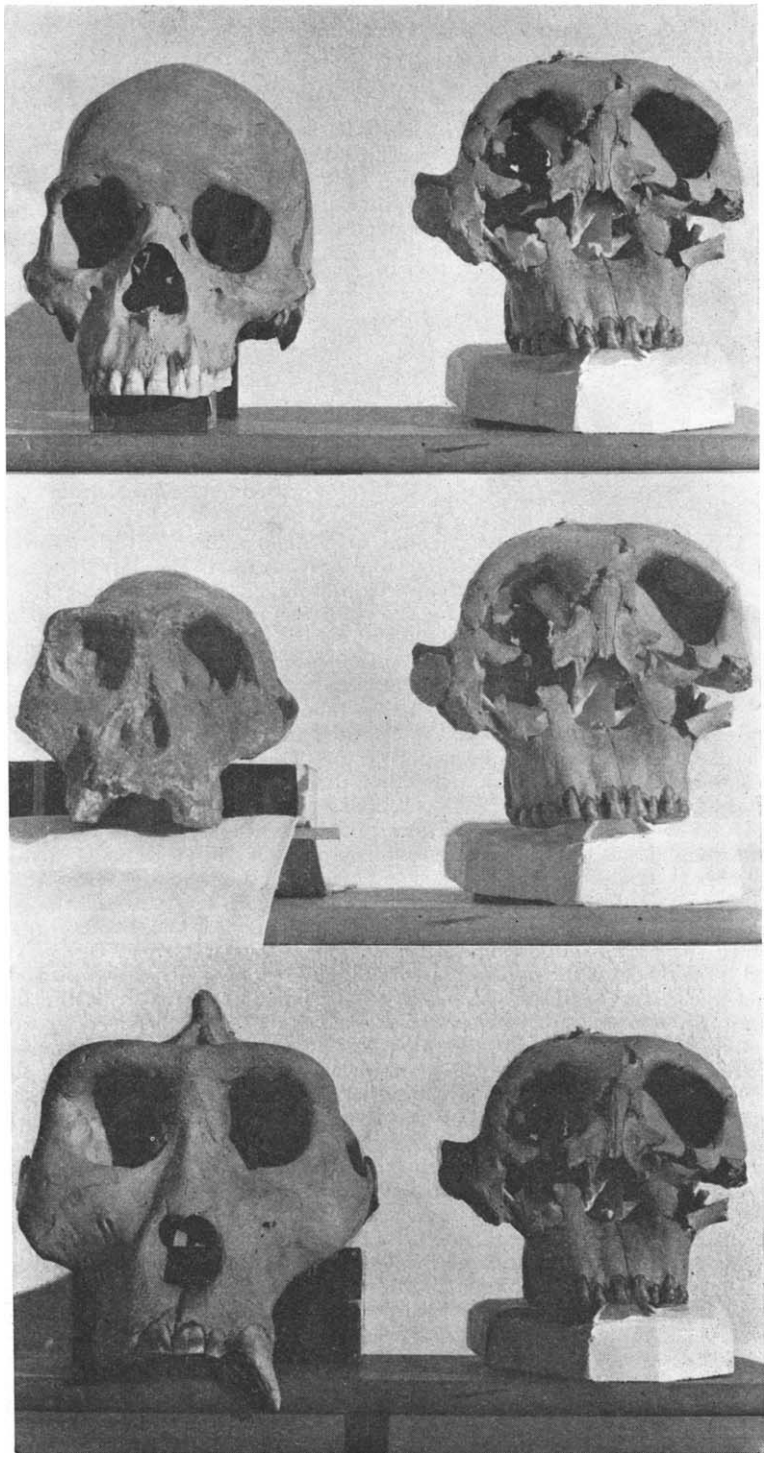
(*i*) the very great pneumatosis of the whole of the mastoid region of the temporal bones, which even invades the squamosal elements ;

(*j*) the massiveness of the jugal element of the temporal bone relative to the total size of the temporal bone ;

(*k*) the way in which the parietals rise almost vertically behind the squamous elements of the temporal before bending over to become a dome ;

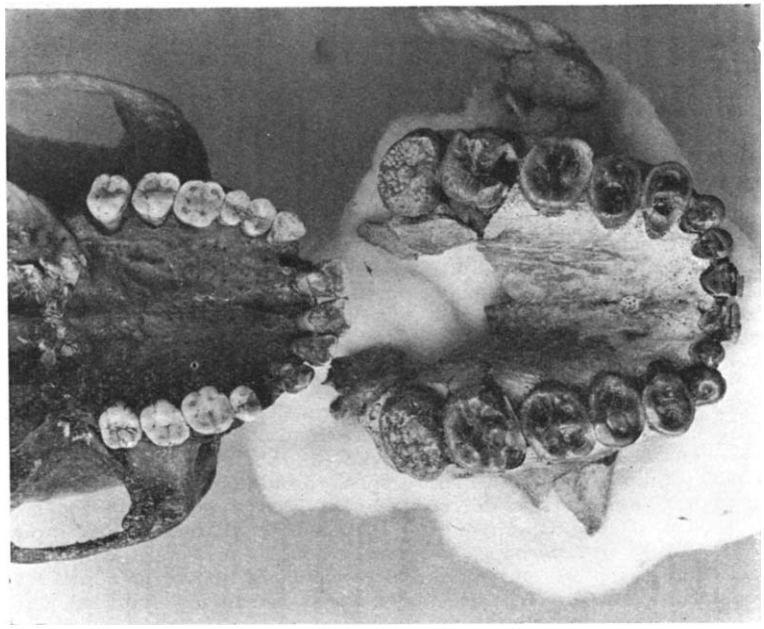
(*l*) the relative thinness of the parietals in comparison with the occipitals and the temporals ;

(*m*) the very prominent and keeled anterior margin of the crests on the frontal bone for the anterior segment of the temporal muscles in the region of the post-orbital constriction (even the most



*Des Bartlett–Armand Denis Production*

Fig. 1. *Above* : The new skull compared with the skull of an Australian aboriginal. Note the very long face, the architecture of the malar region, the unusual nasal bones, the torus above the mastoid, the sagittal and nuchal crests. *Middle* : The new skull compared with a cast of the most complete adult of *Australopithecus*. Note the difference in the size and shape of the face, the shape of the tympanic plate, the low position of the inion, the huge mastoid, as well as the difference in the shape of the malar region and the supra-orbital area. *Below* : The new skull seen next to that of a gorilla



*Des Bartlett–Armand Denis Productions*

Fig. 2. The palate of the new skull compared with that of an East African native

muscular male *Paranthropus* exhibits nothing comparable) ;

(*n*) the very unusual position of the nasion, which is on the most anterior part of the skull, instead of being behind and below the glabella region ;

(*p*) the very great absolute and also relative width of the inter-orbital area, with which may be associated the shape of the nasal bones, which are much wider at the top than at their inferior margin ;

(*q*) the whole shape and position of the external orbital angle elements of the frontal bone ;

(*r*) the very deep palate which is even more markedly like that of *Homo* than in *Australopithecus*, and is quite unlike the form seen in *Paranthropus*, except in respect of the more or less straight canine-incisor line which has already been commented on, as a character recalling *Paranthropus* ;

(*s*) the conformation of the malar-maxillary area of the cheek. In all known members of the genera *Australopithecus* and *Paranthropus* there is a buttress of bone which runs down from the malar towards the alveolar margin of the maxilla in about the region of the fourth premolar ; in *Zinjanthropus* this buttress is wholly absent and the form of architecture of this region is that which is found in *Homo* ;

(*t*) the very great area of muscle attachment on the inferior margin of the malars ;

(*u*) the relatively greater reduction of the canines in comparison with the molar–premolar series than is seen even in *Paranthropus* ; where it is a marked character.

*Zinjanthropus boisei* sp. nov.

A species of *Zinjanthropus* in which the males are far more massive than the most massive male *Paranthropus*. The face is also excessively long. Males have a sagittal crest, at least posteriorly. Upper third molars smaller than the second.

The above is only a preliminary diagnosis of the genus *Zinjanthropus* species *boisei*. It is recognized that, if and when further material is found, the diagnosis will need both enlarging and possibly modifying.

The whole question of generic value is one which is relative. There are some who maintain that *Australopithecus* and *Paranthropus* are not generically distinct, and who will wish to treat *Zinjanthropus* as a third, but less specialized, species of a single genus ; but the differences seem to be too great for this.

I must now turn to the absolute and relative geological age of the new skull. As stated earlier, *Zinjanthropus* comes from Olduvai Gorge, about 22 ft. below the upper limit of Bed I. It was found in association with tools of the Oldowan culture, on a living floor and with associated fauna.

In the past it has been customary to regard Olduvai Bed I as a part of the Middle Pleistocene, not differentiating it from Bed II. During the last few years, however, detailed excavations at sites *BK* II, *SHK* II and *HWK* II have shown that there is a constant and well-marked break between the top of Bed I and the base of Bed II. It is incidentally on this clearly defined land surface that Chellean Stage I living sites are found.

There has also been found a great deal of new faunal evidence, and it is now clear that the fauna of Olduvai Bed I is the same as that of Omo, and that both are generally of the same age as that of Taungs. In other words, it is now necessary to regard Olduvai Bed I as representing the upper half of the Villafranchian and not the lower part of the Middle Pleistocene. So far as relative dating is concerned, it now seems clear that in the Far East the Djetis beds belong to the Middle, rather than to the Lower, Pleistocene, so that the new Olduvai skull would be older than the oldest *Pithecanthropus*.

In South Africa, the deposits at Taungs and Sterkfontein are now regarded as belonging to the upper part of the Lower Pleistocene ; they must therefore be regarded as generally contemporary with Olduvai Bed I. The Makapan beds are a little younger, in all probability, while Swartkrans is of Middle Pleistocene age, as are the upper beds at Sterkfontein which are now yielding stone tools.

With the Taungs child, therefore, and the *Australopithecus* fossils from the lower beds at Sterkfontein, the new find represents one of the earliest Hominidae, with the Olduvai skull as the oldest yet discovered maker of stone tools.

The following approximate measurements will indicate the size of the new specimen.

| | |
|---|---|
| Length from inion to glabella | about 174 mm. |
| Greatest breadth at supra-mastoid torus | ,, 138 mm. |
| Greatest breadth of brain case on squamosal element of the temporal bones | ,, 118 mm. |
| Height (in Frankfurt plane) from basion to a point vertically above it in the sagittal plane | ,, 98 mm. |
| External orbital angle width | ,, 122 mm. |
| Inter-orbital width | ,, 32·5 mm. |
| Post-orbital width | ,, 88 mm. |
| Palate-length from front of incisors to a line joining back of third molars | ,, 84 mm. |
| Palate-width at second molars | ,, 82 mm. |
| Palate-width at third premolars | ,, 62 mm. |
| Length of molar–premolar series | ,, 72 mm. |

Teeth measurements :

*M*3 : 21×16 mm. ; *M*2 : 21×17 mm. ; *M*1 : 18×15·5 mm. ; *PM*4 : 18×12 mm. ; *PM*3 : 17×11·5 mm. ; *C* : 9·5×9 mm. ; *C*2 : 7×7 mm. ; *C*1 (both damaged but about 10×8 mm.).