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A new hominid fossil skull (L.H. 18) from the Ngaloba Beds, Laetoli, northern Tanzania

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In 1976, a fossil hominid skull was recovered from the Ngaloba Beds at Laetoli, Northern Tanzania; its morphology is discussed here. The discovery of this skull is of great interest and importance because of its very substantial presumed antiquity and its largely anatomically modern morphology. The discovery has considerable implications for the antiquity and origin of modern *Homo sapiens*, a subject of longstanding interest and one which has gained renewed attention recently.

The Ngaloba Beds[1], lying above the vogesite lavas which separate them from the underlying Ndolanya and Laetolil Beds[2–4], are stream deposits, principally sandstones and claystones, of which only patches are preserved. These patches consist chiefly of detritus eroded from the underlying Ndolanya and Laetolil Beds and they contain artefacts of Middle Stone Age affinity. The skull was recovered from a 2-m thickness of the Ngaloba Beds at Locality 2 that also yielded artefacts, some fossil reptilian and avian bones as well as fossil mammalian bones. This exposure is principally of sandy claystone and contains a water-worked vitric tuff. The tuff is trachytic and contains the pyroclastic minerals biotite and anorthoclase; it is tentatively correlated with the marker tuff in the lower unit of the Ndutu Beds at Olduvai Gorge[5]. This is the only trachytic tuff younger than Bed IV in Olduvai Gorge and its age is estimated at 120,000±30,000 yr BP (R. L. Hay, personal communication). The skull was found by E. Kandini *in situ* but eroding out of the deposits.

The skull is almost complete and includes the bones of the vault, much of the base, both temporal bones, part of the sphenoid and much of the face including the palate and part of the upper dentition. The bones are all heavily mineralised with no signs of pathology, but there are signs of post-mortem plastic deformation that has resulted in torsion to the right of the supraorbital region and some springing of the temporo-occipital suture on the left. As recovered, the skull was in 22 pieces and coated with greyish calcareous matrix. Cleaning produced fossil bone of an ivory colour and natural texture with the preservation of remarkable surface detail. It was possible to reassemble the vault and base into one structure and the paired maxillae into another. There is no point of contact between the facial skeleton and the calvaria although very little bone is missing. The relationship between these two main fragments of the skull remains speculative. The age at death seems to have been between 18 and 30 because the sutures of the vault are all open, but one third molar is present and fully in wear. The state of wear of this tooth suggests that the upper end of the age range is most likely.

Table 1 Skull dimensions

Greatest length (glabella/opisthocranion)	—	205 mm
Greatest breadth (biparietal)	—	140 mm
Cranial index	—	68.3
Vault thickness (right and left parietomastoid and bregma)	—	12 mm

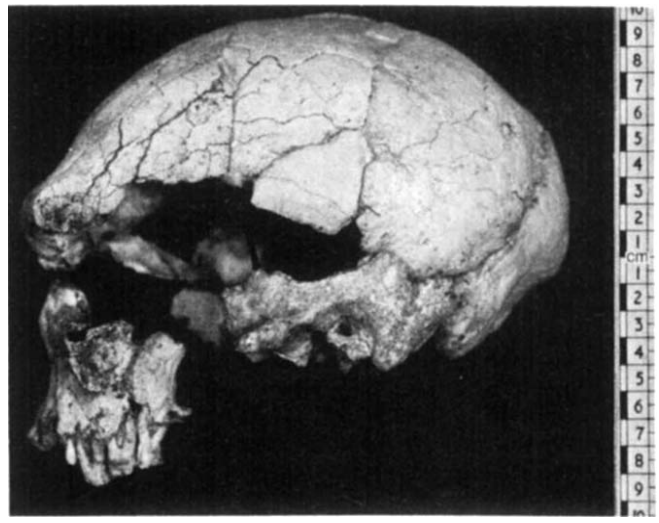

Fig. 1 Left lateral view.

Dimensions of the skull are given in Table 1. In lateral view (Fig. 1) the skull shows several striking features including marked recession of the forehead, a rounded occipital profile, an undercut central occipital torus and a small mastoid process. The frontal view (Fig. 2) shows a divided supraorbital torus, a relatively low vault and a mid-parietal swelling. The frontal bone is very slightly keeled in the sagittal plane but there are no

Fig. 2 Frontal view.

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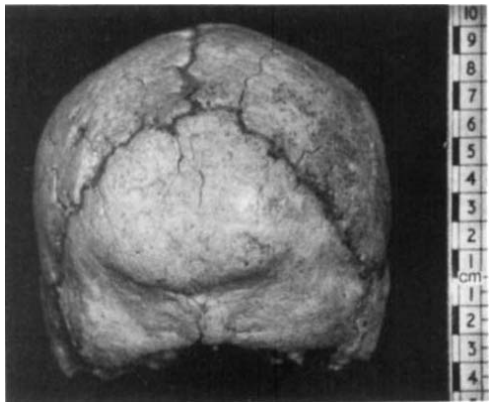

Fig. 3 Occipital view.

marked parasagittal flattenings. In occipital view (Fig. 3) the general frontal profile is confirmed but the parietal vault expansion is more clearly seen in the form of distinct parietal bossing or angulation.

The basal view (Fig. 4) of the skull shows plastic deformation which has affected the left frontal bone and to some extent the position of the left temporal bone. There are well marked frontal sinuses exposed by the loss of the ethmoids; the sinuses extend laterally into the orbital roof and posteriorly between the tables of the skull. The sphenoid is preserved in part and includes part of the body, greater wing and lesser wing of the right side and part of the body on the left. Both temporal bones are present and the right one is virtually complete. Both styloid processes are broken off but both the fossae for articulation of the mandible are present. The foramen magnum and its associated structures are entirely missing.

Both mastoid processes are limited by deeply incised mastoid notches (digastric grooves), and on the right there is a prominent occipitomastoid crest. The cranial capacity has been estimated by the water displacement of a cavity cast and the mean value of six estimates is 1,200 cm^3 with a small range of observational error.

The facial fragment consists of the paired maxillary bones including the hard palate, the alveolar processes bearing some teeth as well as both zygomatic processes and the frontal process on the left. The dental arcade is U-shaped and the palate is deep and broad. The teeth that are present include P^3, P^4 and M^1 on the right, and the stump of P^4 as well as M^1, M^3 and M^3 on the left. The dimensions of the teeth are given in Table 2. All the teeth are heavily worn, with no trace of the cusp and fissure pattern on any tooth. Dentinal exposure is present on all the molars and all the teeth have suffered from post-mortem damage. The nasal aperture is pear-shaped and there is evidence of the presence of a nasal spine.

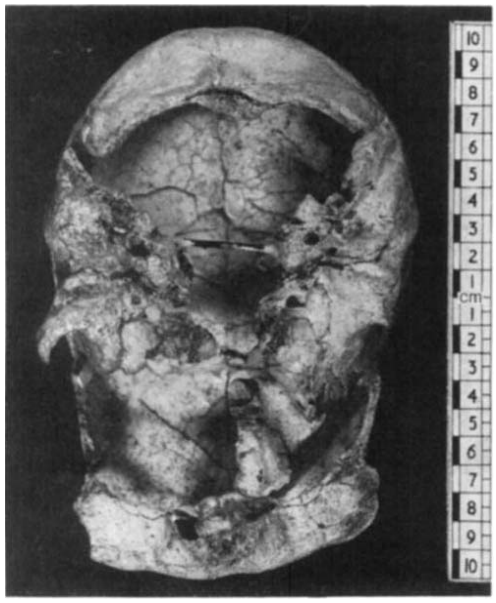

Fig. 4 Basal view.

Table 2 Dimensions of the teeth*

		1^1	1^2	C	P^3	P^4	M^1	M^2	M^3
Left	B/L breadth	—	—	—	—	Roots only	11.5	—	10.5
	M/D length	—	—	—	—	—	10.0	—	10.0
Right	B/L breadth	—	—	—	9.5	9.8	12.5	—	—
	M/D length	—	—	—	7.0	7.0	10.8	—	—

*All the teeth are heavily worn and damaged.

In frontal view the zygomatic processes both take off laterally well above the alveolar margin and angle sharply laterally, giving breadth to the face. In lateral view the face shows a marked degree of subnasal prognathism so that the anterior dentition would have projected to a considerable degree. The frontal process of the maxilla on the left is broken, preventing articulation of the face with the cranial vault. The distortion of the frontal bone has also made correct positioning of the two major fragments impossible for all views of the skull.

The final assessment of the affinities of the Laetoli Hominid 18 skull must await a full study including anatomical comparisons and metrical analysis. From a preliminary examination, however, there is little doubt that it should be regarded as an early East African example of sub-Saharan *H. sapiens*, of particular interest because of its good state of preservation including the presence of its facial structure. The skull shows a number of points of resemblance with the African skulls known as Omo I, Omo II (ref. 6), Broken Hill (Kabwe), Saldanha, Bodo[7] and Ndutu[8,9]; its anatomical features are mixed in that it has some modern characters and some that are archaic. The general expansion of the vault, the rounded form of the occiput and the low position of the inion are modern features whereas the frontal flattening, the supraorbital torus, the small mastoids, the occipitomastoid crest and its general thickness are archaic features.

The dating of the skull also adds considerably to its importance as it places the fossil near to the root of the evolution of *H. sapiens* in East Africa out of the early *H. erectus* stock represented by Olduvai Hominid 9 and KNM-ER 3733. The *H. erectus*/*H. sapiens* transition is still poorly documented despite the recent finds from East Africa, notably the Bodo skull and the skull from Ndutu. The recovery of Laetoli Hominid 18 adds to this growing sample and makes an important contribution to our understanding of the evolution of *H. sapiens* in sub-Saharan Africa.

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