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THE LARGE MAMMAL FAUNA OF THE OLDOWAYAN SITES OF MELKA-KUNTURÉ, ETHIOPIA

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RESUME

La majeure partie des restes fauniques de Melka-Kunturé provient du site de Garba IV. Le site plus ancien de Gomboré I est moins riche, tandis que celui de Karré n'a livré que quelques fragments.

Les Carnivores renferment deux taxons: un *Megantereon*, félin à canines en sabre, et une nouvelle espèce de loutre, du genre *Enhydriodon*, également connue à l'Omo. De très rares restes attestent la présence du théropithèque et de l'éléphant. Bien qu'il soit surtout illustré par des dents isolées, *Equus* semble comprendre trois espèces, tandis qu'une symphyse mandibulaire et quelques autres restes témoignent de la survie tardive d'un *Hipparion*.

Un Hippopotame ne différant guère de l'actuel *H. amphibius* que par ses dents plus basses et ses canines plus robustes est la forme prédominante chez les Ongulés, au moins en termes de biomasse, et un Hippopotame nain était également présent à Gomboré IB. Les Suidés sont rares, mais il se peut que deux espèces de *Kolpochoerus* se succèdent à Gomboré I / Garba IV, et il existe aussi au moins deux espèces de *Metridiochoerus*. *Giraffa* et *Sivatherium* sont attestés par des restes rares mais caractéristiques.

La faune de Bovidés est largement dominée par les Alcelaphinae, avec une nouvelles sous-espèce de gnou, à cornes très longues et effilées, et une nouvelle espèce de Damalisque, à cornes torsadées. Un *Pelorovis* à cornes courtes et massives est aussi reconnu comme nouvelle sous-espèce. Parmi les Antilopini, *Gazella* et *Antidorcas* sont tous deux présents.

Cette faune de Bovidés atteste clairement, à l'écart de la rivière, un milieu ouvert et sec, mais les Equidés tempèrent quelque peu ces indications assez univoques.

Les corrélations biochronologiques avec les autres sites d'Afrique orientale sont délicates, parce que la plupart des taxons les mieux connus diffèrent au niveau spécifique ou sub-spécifique. Ces distinctions reflètent un certain isolement d'une partie au moins des hauts-plateaux éthiopiens pendant le Pléistocène inférieur, dont l'étude du peuplement humain doit tenir compte. Les sites oldowayens (auxquels il faut adjoindre, sur le plan faunique, celui de Simbirro III) constituent un ensemble assez homogène, bien distinct des sites plus récents. Il est peu probable qu'ils couvrent une tranche de temps très importante.

INTRODUCTION

The archaeological sites of Melka-Kunturé have been excavated, from 1965 onwards, under the leadership of Jean Chavaillon. Most of the large Mammal fauna collected until 1976 was studied by one of us (Geraads 1979).

The present paper is an updated version of the part dealing with the Oldowayan sites in the above-mentioned paper, now including Equids and Carnivores as well as the newly discovered material, and taking into account some important publications which have appeared since 1976, especially those on the Turkana basin. In terms of fauna, the site of Garba IV, excavated by M. Piperno, is the richest and most interesting of these sites. It is followed by the earlier site of Gombore IB, excavated by J. Chavaillon; the sites of Gombore Iγ and Karre have yielded only a few identifiable specimens.

The whole collection is deposited in the Authority for Research and Conservation of Cultural Heritage**,** Ministry of Culture, Addis Ababa, Ethiopia.

Abbreviations: L: length; W: width; AP: antero-posterior; Dist: distal; Prox.: proximal. Measurements are in mm. Upper teeth are in upper case (M3), lower teeth in lower case (m3). In descriptions, the skull is supposed to have the tooth-rows horizontal. The part dealing with Equidae is by V. Eisenmann (V.E.), that on Carnivora by G. Petter (G.P.), and others by D. Geraads (D.G.).

SYSTEMATIC STUDY

Carnivora (G.P.)

Family Mustelidae

Genus *Enhydriodon* FALCONER *in* Murchinson, 1868

Enhydriodon aethiopicus n. sp.

Holotype: GAR IVE-81-49, lower right m1, Garba IV, Melka-Kunturé, Ethiopia.

Derivatio nominis: from Ethiopia

Diagnosis: a species of *Enhydriodon* intermediate in size between *E. lluecai* from Spain and *E. africanus* from southern and northern Africa. Cingulum of m1 weak, and restricted to the anterior part of the tooth. Cuspids low and rounded, metaconid much smaller than other trigonid cuspids. Talonid long, with a central depression bordered by several rounded cuspids.

This genus is represented by a single lower right carnassial, GAR IVE-81-49 (Fig. 1a, b). Its measurements (following Willemsen 1999) are: maximum length = 18. 4; trigonid length = 10.7; trigonid width = 10.5; talonid length = 7.6; talonid width = 10.5

This carnassial is rather long and narrow. Even accounting for some slight wear, its trigonid has low rounded bulbous tubercles, protoconid and paraconid being of about the same height and size; the metaconid is much smaller. The protoconid is slightly longer, inflated labially, and followed by a minute tubercle. The paraconid bears a weak antero-lingual keel, and a vestigial antero-labial cingulum. The talonid is rectangular, with a depressed central area. The hypoconid is low but long, reaching mesially the minute posterior tubercle of the protoconid. The entoconid also reaches, by a serrated crest, the base of

the metaconid. Distally, small mesio-distal grooves indent the crest joining hypoconid and entoconid. The roots are long, the posterior one is stout and the tooth is unlikely to have been deciduous.

This long (L/W = 1.75) crushing carnassial, with low rounded tubercles, must be referred to the genus *Enhydriodon* FALCONER *in* Murchinson, 1868, a mollusc-eating otter known from the Upper Miocene until the Pleistocene of Eurasia, Africa, and North America (Repenning 1976; Willemsen 1992, 1999).

By its dimensions, it is closer to the *E. lluecai* VILLALTA & CRUSAFONT, 1945 from Los Algezares and other Upper Miocene localities in Spain. However, its lower and more rounded cusps, the weaker antero-labial cingulum, and the relatively shorter trigonid (ratio L trigonid / L talonid = 1.40 instead of 1.91 in *E. lluecai* according to Willemsen 1999) allow a clear distinction from the Spanish form, which has more conical cusps, sharper crests and a shorter talonid.

In the Siwaliks, the Pliocene specimen of *Sivaonyx bathygnathus* (LYDEKKER, 1884) is of approximately the same size, but its m1 similar to that of *Aonyx* (Willemsen 1999) makes it quite unlike our specimen. The m1 from Hasnot referred to *Enhydriodon falconeri* by Pilgrim (1931) also shows higher and more conical cusps, a wide valley between the paraconid and the metaconid, a more rounded and proportionally larger talonid, and a strong basal cingulum.

An African otter best known from Langebaanweg and Klein Zee (Stromer 1931; Hendey 1978), *Enhydriodon africanus*, shares the low rounded tubercles with that of Garba IV. However, *E. africanus* is larger (Fig. 2), the cingulum of m1 of is much stronger (Hendey 1978, Fig.9A) and, in contrast to GAR IVE-81-49, the metaconid is larger than the paraconid, as can clearly be seen on a photograph of the type specimen kindly provided by F. Clark Howell to G.P., and on the specimen from Lake Natron in Egypt figured by Stromer (1920).

The closest relative of the Garba IV otter is probably an unpublished *Enhydriodon* from Omo, represented by several m1 (e.g. Omo 33-69-354, Omo 75S-386), which are morphologically very similar. The Omo teeth display the same low rounded tubercles with gentle slopes, depressed talonid, and small metaconid. There is little doubt that they are closely related, if not co-specific. However, the Omo teeth are slightly larger (Fig. 2), although certainly earlier in age. This suggests that a decrease in size took place from Omo Shungura to Garba IV, and in this case the ancestry of this lineage might go back to Langebaanweg (where *E. africanus* is still larger). We are well aware that this is highly speculative, and that other factors (such as Bergmann's rule, or other ecological constrains) may also be responsible for the size differences. Details of this evolution may become available with the description of the material from Kanapoi and Lukeino, and more detailed comparisons remain to be conducted, but there is no doubt that the Garba IV otter is a new species.

Family Felidae

Megantereon sp.

GOM IB-80-8107, the distal part of a left humerus (Fig.1c, d), and an unnumbered proximal part of a left ulna (Fig. 1e) seem to fit together, and are probably of the same individual.

Humerus. Description and comparisons

This fragment of humerus is in a good state of preservation though the distal borders of the condyles are somewhat eroded. At the level of the break (approximately at mid-length of the bone) the shaft shows a pseudo-oval section with a flat medial border and a rounded lateral border. The lateral epicondyloid crest is pronounced, the epitrochlear foramen is elongated, and the medial rim of the trochlea is noticeably below (more distal than) the level of the lateral one, although this feature somewhat attenuated by erosion.

	Megantereon Gombore IB* 80-8107	*M. cultridens* Senèze Se 111	*Megantereon* Langebaanweg 6762
tr. diam. (near mid-shaft)	21		20.5
a.p. diam. (near mid-shaft)	35	36	
tr. diam. distal end	66,5	76	61.2
tr. diam. trochlea	47	50.3	
ap. diam. lat. condyle	36	39	
a.p. diam. mesial condyle	41.5	43	36.4

* measurements from a cast

The Gomboré IB specimen differs only from the humerus of *M. cultridens* from Senèze. (Se 111, *in* Schaub 1925) by its smaller size.

Ulna. Description and comparison

The olecranon is eroded on its upper face and the « beak » is broken. The shaft is flattened but the bone widens transversally from the level of the base of the sigmoid notch to the top of the olecranon. The dorsal border of the bone is straight and does not bend backwards in its upper part The ligament print of the small anconeus is large. The straight dorsal profile of the bone and its relatively small size preclude its attribution to *Homotherium* as it appears from the comparison with the ulna of *H. crenatidens* (Ballesio 1963). On the other hand, it does not seem to display morphological differences with the ulna of the *Megantereon* from Senèze described by Schaub (1925).

	*Megantereon** GOM IB	*M. cultridens* Senèze, Se 111
tr. diam. of olecranon	25	27
max. A.P. diameter	47	49

* Measurements from a cast

Remarks. These only two specimens of Gomboré do not allow of a specific attribution. According to Turner (1987, 1990), *Megantereon* is represented in Africa between the Middle Pliocene and the Lower Pleistocene by the Euro-Asiatic and North-American species *M. cultridens* Cuvier, of which the African taxa *M whitei*, *M. gracile* et *M. eurynodon* are junior synonyms. This opinion does not seem to be shared by Vrba (1988), who refers new material from Kromdraai to *Megantereon* cf *gracile* BROOM. The only two postcranial specimens from Gomboré IB do not help to solve this question.

Primates (D.G.)

Genus *Theropithecus* GEOFFROY SAINT-HILAIRE, 1843

Theropithecus cf *oswaldi* (ANDREWS, 1916)

The posterior two-thirds of right lower m3, GAR IVD-74-7596, belong to a fossil form of the gelada baboon of the Ethiopian highlands, of the genus *Theropithecus*. By its size (width = 14 mm), it could belong to *T. brumpti* or to *T. oswaldi*, but the former is known only from Omo, while the latter is widespread in the African Plio-Pleistocene. A definite specific identification is of course impossible. The only other remain of this genus from Melka-Kunturé is a fragment of maxilla from Garba XII.

Proboscidea (D.G.)

Elephantidae gen. et sp. indet., cf *Elephas recki recki* DIETRICH, 1915

In Addis-Ababa, only two specimens from Garba IV are of a Proboscidean. These are a pelvis fragment, GAR IV-79-10476, and a small piece of tooth-plate, GAR IV-78-4225. Of course, they cannot be identified beyond family level. We could not find the tooth figured by Piperno and Bulgarelli-Piperno 1975, Fig.17.5. It is probably a dp3, which looks similar to those of *E. recki recki* from Omo Shungura (Beden 1979, Fig.89C).

Perissodactyla (V.E.)

The material is poor (150 specimens) and often fragmentary. *Equus* is represented by 84 specimens, *Hipparion* by 13 specimens, and 53 specimens are uncertain as to their generic attribution (fragments of teeth and a few limb bones, see table 4).

Genus *Equus* (Plate 1.a-o)

E. cf. *capensis* (macrodont), *E*. cf. *stenonis* (medium sized), *Equus* sp. (microdont).

Upper cheek teeth

Biometrical data on the upper adult cheek teeth are in Table 1. They appear (Figure 3) to cluster into three groups: one premolar (GIVD-74-7150) and two molars (GIVD-73-2969 and GIVD-76-9319) seem large and have long protocones ; one premolar (GIVD-81-12305) and two molars (GIB-2153 and GIC-68-1988) are quite small. The rest is intermediate. All cheek teeth exhibit numerous plications on the fossettes (up to 22) and plis caballins (Plate 1).

Lower cheek teeth

Biometrical data on the lower adult teeth and one lacteal are in Table 2. One M3 (GIVD-75-7996) and possibly three P3 or P4 (GIA-72-67, GIVD-79-884, GIB-3495) seem larger than the others. All have stenonine double knots. The stem of the double knot may be very long (Plate 1.n). The ectoflexids of the molars are deep. There are no protostylids on the P2.

Limb bones

One MC III (GIVD-77-8274), perfectly preserved, is smaller than the others. It is robust, the proximal epiphysis is deep, and the distal articular width is larger than the supra-articular. Unfortunately the other MC III are fragmentary or badly preserved. The only specimen for which the distal epiphysis is good enough (GIVD-79-395) has also an articular width larger than the supra-articular. One well preserved metatarsal (GIB-72-1222) is very robust and flat, its distal supra-articular width is much larger than the articular one. Another, badly preserved (GIVD-74-7126), is also robust and flattened. One fragment of Tibia is rather large. One posterior third phalanx is narrow (Plate 1.o). Measurements are in Tables 3 and 4.

Discussion

Three upper cheek teeth fall completely outside the range of variation of the sample of Olduvai because of their longer protocones (Figure 3). These teeth, however, are little worn : the molars are 72mm high (the premolar is broken). It would be interesting to have them sectioned at mid-crown to see if the protocones remain long. If so, the teeth could be referred to *E*. cf *capensis*, although their real identification with a Middle Pleistocene species would be surprising (Eisenmann & Baylac 2000).

The metacarpals of Garba IV (Figure 4) are more robust and shorter than in *E. numidicus-E. tabeti*, and one at least is shorter than in *E. oldowayensis* (as represented by specimen 346 from BK II, Table 3). Moreover, and unlike *E. oldowayensis*, their distal articular width is larger than the supra-articular. The unique and very robust metatarsal (Figure 5) appears also too short for *E. oldowayensis* (as

represented by specimen 874-1277 from BK II, Table 3). The bones of Melka resemble more the small European *E. stenonis-E. stehlini* that are found at Casa Frata, Valdarno, and Senèze. Metacarpals of about the same size and proportions were also found in Swartkrans Member 2 and in the Post Member 5 Infill at Sterkfontein. Thus, while most of Garba IV teeth fall inside the range of variation observed at Olduvai (Figure 3), the metapodials do not agree with such an identification. We refer the medium group of teeth and most limb bones to a small *E*. cf. *stenonis*. The robustness of the metapodials does not suggest adaptation to dry conditions. Neither does the great degree of enamel plication on the cheek teeth. The third phalanx, however, is rather narrow, which could indicate a hard ground and/or a climbing adaptation like in the modern asses or mountain zebras.

One upper premolar and two molars suggest the occurrence of a smaller species, possibly present also at Olduvai (Churcher 1982) and/or East Turkana (Eisenmann 1983). Such teeth are rare in the samples of similar ages I have studied. The teeth from Olduvai (Tanzania) and Ubeidiyeh (Israel) are bigger (Eisenmann 1987). The teeth of *E. tabeti* (Aïn Hanech, Algeria) have smaller protocones (Eisenmann 1980) as do the small teeth of East Turkana (sub KF unit) referred to *E*. cf. *tabeti* (Eisenmann 1983). In South Africa, however, at Sterkfontein 5, and in the member 2 of Swartkrans, several upper cheek teeth match in size and protocone length the small teeth of Melka Kunturé. The smallest third metacarpal of Garba IVD (77-8274) could belong to the same species. It is not very different from a specimen of Sterkfontein (Post member 5 infill, where was found also a very small third phalanx) and from another of the member 2 of Swartkrans. At Swartkrans (member 2) was also found a fragment of a small third metatarsal (Table 3). All other metapodials of similar age are larger and/or slenderer.

Thus, there were possibly three species of *Equus* at Garba IV, one with large and plicated teeth and probably long protocones which is very tentatively referred to *E*. cf. *capensis* ; one of medium size referred to a smallish and robust *E*. cf. *stenonis* ; and one microdont *Equus* sp. In all cases, the less different *Equus* specimens are not East African, but either European or South African. The robustness of bones and the plications of teeth point to rather humid conditions.

Genus *Hipparion* (Plate 1.p-1.u)

Stylohipparion sp. (not *Eurygnatohippus cornelianus*).

The mandibular symphysis (GIVD-74-6767) was discussed and illustrated previously (Eisenmann, 1998). Its proportions indicate a grass-eater. The incisors are crenulated as often in Hipparions. Their occlusal surface is nearly orthogonal to the crown. A lower left incisor (GIVD-75-134) shows also the characteristic crenulation but it is clearly proclive (Plate 1.r), and its occlusal surface is bevelled, oblique to the crown. It is difficult to tell if these differences result from different eating adaptations in two different species, or merely from individual intraspecific variation.

Data on upper cheek teeth are in Table 5. They are all middle-sized with rather long protocones (Plate 1.s-u).

The lower cheek teeth (Table 6) have caballine double knots and ectostylids. The vestibular groove is deep on one moderately worn molar (Plate 1.p), shallow on another – little worn – molar (Plate 1.q).

From Gomboré I γ, there is a fragmentary third metatarsal (78-1604) about 32mm wide in the diaphysis, 44mm at the supra-articular tuberosities, and 43mm at the distal articulation. The depth of the keel is 34.5mm, the depths of the medial condyle are 28.5mm (minimum) and 31.7mm (maximum). A fragment of lateral metapodial (GIV-73-870) has a distal articular antero-posterior diameter of 17mm.

Discussion

Hipparions remains of this age are rare. In the Shungura Formation (member L9) there are 6 upper cheek teeth, 4 of which are fragmentary (Eisenmann 1985). In East Turkana, there is one upper premolar and one upper molar from the sub Chari levels; from the slightly older sub KF levels, there are 4 molars (Eisenmann 1983). At Olduvai, Hooijer (1975) described a few upper cheek teeth, some of them associated in series. It seems that the Garba IV upper premolar is slightly smaller than the teeth from Olduvai and East Turkana. It is difficult to assign these specimens to any specific taxon but it is certain that the symphysis of Garba IV cannot belong to the same *Hipparion* as the symphysis of Olduvai Bed II referred to *H*. cf. *cornelianum* (Eisenmann 1998, figure 5).

Not a single remain from Melka Kunturé can be referred to the Rhinocerotidae.

Artiodactyla (D.G.)

Family Hippopotamidae

Genus *Hippopotamus* L.

Hippopotamus cf. *amphibius* L.

The Hippo is probably the most common large Mammal of Melka-Kunturé, and certainly the dominant one in terms of biomass. As for most other animals, however, its remains are largely fragmentary; they consist mostly of bone and teeth fragments. The bulk of the material can be referred to a single species of large size. It is strongly dimorphic, like the Recent *H. amphibius*; the largest males reach the size of the largest Recent specimens, but not that of the gigantic ones from Djibouti (Bonis & al. 1988). Since there does not seem to exist any difference between the various sites, they will be described together.

The canines are noticeably large in males, but not morphologically different from those of the Recent species. It is impossible to tell the relative proportions of the lower incisors, which play an important role in Hippo systematics, because no symphysis has been recovered in the Oldowayan of Melka-Kunturé. It is unlikely, however, that these proportions were much different from those of the

Recent species, as suggested by incisors from others sites at Melka-Kunturé. The premolars display the usual variability found in the Recent species; the main tubercle of a P4 from Gombore I (GOM IB-70-2710) is a 5-branches star, while a specimen from Garba IV (GAR IV-75-218: Plate 2.g) has two intra-cingular cusps, as sometimes found today. The molars provide the only definite evidence of a morphological difference from other large tetraprotodont Hippos. While those of *H. amphibius*, like those of the Pleistocene *H. gorgops* and *H. sirensis*, are rather high-crowned, with their lingual and labial walls almost parallel, those of Garba IV and Gombore I are more brachyodont, with the lateral walls converging towards the apex, and the anterior and posterior cingula are lower. Taken alone, this difference would perhaps not demand taxonomic distinction, but in conjunction with the large size and large canines, we believe that it points to a somewhat different way of life. We might surmise that it fed on softer grasses than other large Pleistocene and recent Hippos, although isotopic analysis (Bocherens & al. 1996) shows that it fed mainly on C4 grasses.

We should also mention that we do not believe that the morphology of the single lower molar, GAR IVD-2104, referred to *Hexaprotodon* by Gèze (1980: 74) is distinct enough to establish the occurrence of another species of large Hippo in this site.

The diversity of Plio-Pleistocene Hippos has been stressed more than once; it is certainly due, in part, to geographic isolation (contrasting with today's wide range of *H. amphibius*), and it may be that the upper Awash basin was, at that time, not fully connected with the rest of the Ethiopian hydrogeographic system.

Measurements:

Upper canine	transverse diameter	AP diameter
GAR IV-72-2247	65	46
GAR IV-76-5248	40	33
GAR IV-77-5746	41.5	34
GAR IV-81-12501	45	33
GOM IB-67-365	42	35
GOM IB-76-7063	50	35
Lower canine		
GAR IV-71-1985	62	102
GAR IV-72-2120	29	48
GAR IV-72-2269	55	90
GAR IV-75-395	54	101
GAR IV-73-709	42	79
GAR IV-73-723	31	56
GAR IV-80-10914	25.5	47
GAR IV-80-11414	28	45
GAR IV-81-12495	40.5	67.5

GOM IB-70-2708	47	82
GOM IB-71-870	43	80
GOM IB-73-1353	59	99

Dimensions of the teeth on two fragments of maxillae

	P3	dP4-P4	M1	M2	M3
GAR IV-75-496 (juvenile)		39 x 35.5	51 x 39.5	59 x 59	
GAR IV-75-218	38 x 28	26 x 32	43.5 x 44	55 x 58	53.5 x 53.5

The dimensions of some unworn upper molars are:

GAR IV-74-660	L = 54	W = 48	H = 45
GOM IB-74-5056	60	50	44
GOM IB-74-3902	52	48	46
GOM Iγ-74-170	49	46	43

Humerus	L (articular)	distal artic. W	max.dist.AP	min.dist.artic.diam.
GAR IV-75-776	-	110	105	70
GAR IV-74-1000	470	-	-	-
GOM IB-72-2927	-	118	117	75

McIII

GAR IV-72-598	Max. L = 184	Prox.transverse W= 66	Min.W of shaft = 49

Tibia	Max.L	Prox.W	Dist.artic.W	Min.W shaft
GAR IV-75-412	378	180	100	65
GAR IV-75-406	-	-	108	-
GAR IV-75-665	-	-	105	-
GAR IVE-81-33	400	153+	-	71

Astragalus

GAR IV-72-2265	medial height = 116	
GOM IB-73-5332	113	
GOM Iγ-74-20	107	

Calcaneus	Length	Max.height	Max. W
GAR IV-75-631	-	-	82
GAR IV-75-679	-	-	84
GAR IV-77-8583	230	100	-

Hippopotamus cf *aethiopicus* CORYNDON & COPPENS, 1975

A single P4, GOM IB-73-1213 (Plate 2.h), belongs to a dwarf Hippo. It is almost circular and very small (diameter 20-21 mm). It consists of a single star-shaped tubercle, almost completely surrounded by a cingular bur, from which small bud-like tubercles arise on the lingual side.

Hippo premolars are rather variable in shape, and no definite identification can be reached with a single tooth. It compares favourably with a P4 from Kazinga described by Cooke & Coryndon (1970: 185), which was included by Gèze (1980) in his *Hippopotamus shungurensis*, or with a P4 from Omo (Coryndon & Coppens 1973, Pl.3, Fig.C) referred by these authors to their *H. aethiopicus*. The latter species lasts until member L at Omo, while *H. shungurensis* does not survive after member G, and is therefore a less likely identification at Gomboré I.

There is no doubt, in any case, that two Hippo species co-existed at Gomboré I.

Family Suidae

Genus *Kolpochoerus* VAN HOEPEN & VAN HOEPEN, 1932

Kolpochoerus majus (HOPWOOD, 1934)

A brachyodont Suid is illustrated by a few incomplete tooth remains. The best one (or rather the least incomplete one) is the posterior part of an M3, GAR IV-78-3152 (Plate 2.f). It consists of the posterior part of one pair of tubercles, a single median pillar, a second pair of tubercles, narrower than the preceding one, plus a talon made up of a median pillar and of an accessory buccal one. It is, almost certainly, the posterior part of a left M3 of *Kolpochoerus*. The very short talon recalls the earliest representatives of this genus, such as *K. afarensis*, but its large size and its geological age rule out such identification. It is well distinct from the contemporary *K. olduvaiensis* (= evolved morph of *K. limnetes*) by its short, simple talon.

Its features, on the contrary, recall the species *K. majus*, present in a number of East African Pleistocene sites but still poorly known (or at least, seldom described). According to Pickford (1994), it ranges from 1.8 to 0.4 Ma. It is found in the Nyabusosi Fm of Uganda (lowermost Pleistocene), but also at Olduvai, Konso Gardula (Asfaw & al. 1992) and Asbole region of Hadar (Alemseged & Geraads 2000).

A few other fragments (GAR IVE-81-0011, probably a fragment of anterior part of lower molar; GAR IV-74-634 and GAR IV-74-1374, fragments of teeth) should probably be referred to the same species.

Kolpochoerus cf *limnetes* (HOPWOOD, 1926)

GOM IB-81-9400 is a P4 of *Kolpochoerus* whose measurements (basal length 16; maximum width 16.5) would fit either *K. limnetes* or *K. majus*. According to (Harris and White 1979) Harris & White (1978), both species can be distinguished by the smaller size of the metacone in the latter species, but the tooth from GOM I does not differ significantly in this respect from the sample of *K. limnetes* to which we have compared it.

GOM IB-80-8273 is the talon of an M3 similar to those of *K. limnetes* from Omo – Shungura around member G.

Thus, it might be that two time-successive species of *Kolpochoerus* are present in the Oldowayan sites of Melka-Kunturé, but this rests upon very scanty evidence, since no complete molar has been found.

Genus *Metridiochoerus* HOPWOOD, 1926

Metridiochoerus cf. *andrewsi* HOPWOOD, 1926

GOM Iγ-74-200 is an M2 of very large size, whose basal part is missing. Its maximum measurements are: L = 39 ; W = 18.5+ ; H = 45+. Its hypsodonty index can be estimated at 2.5. The occlusal pattern was similar to that illustrated by Leakey (1958, Pl.8, Fig.3; Pl.16, Fig.1-2) for

M. andrewsi. This tooth has the characteristic lateral profile of the M2 of *M. compactus* (van Hoepen & van Hoepen, 1932, Fig.53), with its posteriorly bulging talon, but is much larger, i.e. more primitive, since the size of the anterior molars decreases in this lineage. Arambourg (1947) had also mentioned such a large M2 from Omo. They should probably be referred to *M. andrewsi*.

GAR IV-79-0100 and GOM IB-81-9339 are fragments of teeth that could belong to the same species, because of their rather T-shaped pillars, rather than to the following one.

Metridiochoerus modestus (VAN HOEPEN & VAN HOEPEN, 1932)

We refer to this species, known from Olduvai bed I onwards, a couple of talons : GOM IB-73-1487 (M3; Plate 3.f, g) and GAR IV-79-4662 (m3). They have numerous columnar pillars, similar to those of recent *Phacochoerus* in their most posterior part, but slightly more complicated more anteriorly.

A few fragments from Gombore IB cannot be identified to species. These are three m3 fragments, GOM IB-73-1487, GOM IB-74-3637. They could also belong to *M. modestus*.

Family Giraffidae

Genus *Giraffa* BRISSON, 1762

Giraffa cf. *jumae* LEAKEY, 1967

The best Giraffid specimen from Garba IV is a proximal metatarsal of large size, GAR IV-72-2268 (max.width 93; max. AP diameter ± 77). The proximal epiphysis bears 4 articular facets for the tarsus: this is a characteristic feature of *Giraffa*. The large buffalo-like *Sivatherium* has lost the posterior cuboid facet, so that it has only 3 facets, and can therefore be excluded from comparison.

In the Plio-Pleistocene of Africa, the Recent Giraffe, *G. camelopardalis*, has not been recognised with certainty, but a species of similar size, *G. jumae*, is not uncommon. We refer the specimen from Garba IV to this species, although definite identification is certainly impossible without a skull.

An atlas from Gombore I (GOM IB-72-2706) is also similar in size and morphology to that of the Giraffe, and probably belongs to the same taxon as at Garba IV.

Genus *Sivatherium* FALCONER & CAUTLEY, 1836

Sivatherium maurusium (POMEL, 1893)

The most characteristic specimen is a p3, GOM Iγ-78-1545. Its large size (L = 37 ; W = 25.5), hypsodonty, and primitive stage of molarization leave no doubt as to its belonging to this large buffalo-like Giraffid. A fragment of upper molar from the same site, GOM Iγ-7438, is of the same species.

These two specimens definitely establish the occurrence of *Sivatherium* at Melka-Kunturé, and allow referral of a fragment of lower molar, GAR IV-78-3175 (which is too large and too hypsodont to belong to *Giraffa*) to the same taxon. A tooth fragment, GAR IV-78-669, is also Giraffid. *Sivatherium* can therefore be confidently added to the faunal list of Garba IV.

Family Bovidae

Bovids make up, together with Hippos, the bulk of the large Mammal fauna of Melka Kunturé, being far more common than Equids, Suids and Giraffids. Most of them belong to the tribe Alcelaphini, and only a few specimens are referable to buffaloes (tribe Bovini), kobs (tribe Reduncini) and gazelles (tribe Antilopini).

Tribe Bovini

Genus *Pelorovis* RECK, 1928

This genus is best known from Olduvai, with the type-species *P. oldowayensis* RECK, 1928, which is also known from Koobi Fora, and from Simbirro at Melka-Kunturé. Other species with straighter horn-cores are known from the late Pleistocene of North Africa [*Pelorovis antiquus* (DUVERNOY, 1851)] and from the Plio-Pleistocene of Uganda (*Pelorovis kaisensis* GERAADS & THOMAS, 1994). From Koobi Fora and West Turkana, Harris (1991) described a short-horned variety, *Pelorovis turkanensis*, the horn-cores of which are shorter and more upwardly curved than those of the type-species. He also referred to this species the short-horned *Pelorovis* that Geraads (1979) had described from Melka-Kunturé as *Pelorovis* sp. While we acknowledge the overall similarities between the Melka-Kunturé and Koobi Fora *Pelorovis*, we believe that the consistent differences between them warrant taxonomic distinction.

Pelorovis turkanensis HARRIS, 1991

Pelorovis turkanensis brachyceras n.ssp.

Holotype: GAR IV-72-2272, a left horn-core with a fragment of the frontal bone (Plate 2.a, b).

Type-locality: Garba IV, Melka-Kunturé, Ethiopia.

Derivatio nominis: Greek brachy-, thick, and -ceras, horn.

Diagnosis: a sub-species of *Pelorovis turkanensis* with semi-circular horn-cores, shorter than in most other species, with a thick base tapering to a strongly upwardly turned tip.

Although the holotype includes little more than the horn-core proper, there is no doubt as to its orientation, as shown by what remains of the temporal fossa and of the supra-occipital area. As in *P. oldowayensis* and *P. turkanensis turkanensis*, the horn-core was first directed backwards and outwards, then outwards, then forwards and upwards, the tips being probably almost vertically oriented (the skull being horizontal). The main difference from *P. turkanensis turkanensis* is that instead of being of rather regular thickness, the holotype and other horn-cores from Garba IV are very thick at the base, but quickly taper. It seems better to emphasise this distinctiveness, keeping in mind the similarities, because it is constant on all specimens. *P. turkanensis brachyceras* is also present at Simbirro, together with *P. oldowayensis*. "*Bos*" *praeafricanus* ARAMBOURG, 1979 (= "*Bos*" *bubaloides* ARAMBOURG, 1979), from Aïn Hanech in Algeria, has similar horn-cores, but they are inserted less posteriorly, the occiput is higher, and the North-African species is perhaps unrelated to *Pelorovis*.

Measurements:

	GAR IV-72-2272	GAR IV-75-782	GAR IV-75-814
AP x vertic. diameters at base	99 x 74	101 x 67+	102 x 77
Length along post.curve	550	555	570

Other specimens, too damaged to be measured, are: GAR IV-74-7134, GAR IV-78-4493, GAR IV-79-10491.

Only three teeth from Garba IV are Bovine. The p4 GAR IV-79-0919 (19.5 x 12.7) has a strong metaconid, but no complete lingual wall, in contrast to that of *P. oldowayensis*. The m1 GAR IV-74-7181 has a rather small ectostylid, no goat fold, and the labial lobes are pinched as in modern *Syncerus*. The incomplete upper molar GAR IV-79-10047 has a rather simple occlusal pattern.

There are a few post-cranials of the appropriate size for *Pelorovis turkanensis brachyceras*:

GAR IV-77-8398	scaphoid	max.H = 31	
GAR IV-75-7751	pyramidal	mini.H = 29	
GAR IV-73-3617	metacarpal	L = 234	mini.W of shaft = 35
GAR IV-73-3622	distal tibia	artic. W = 60	
GAR IV-76-5267	cubo-navicular	max.W = 60	
GAR IV-72-4121	metatarsal	prox.W = 51	mini.W of shaft = 33
GAR IV-79-10461	metatarsal	dist.W = 61	mini.W of shaft = 37 L = 250

Gen. et sp. indet., cf *Pelorovis*

No Bovine horn-core is known from Gomboré I, but a few other remains belong to the Bovinae. These are an m3 (GOM IB-74-3755, a distal tibia GOM I-70-2666, and an astragalus GOM IB-81-9216 (medial height = 77.3; distal width = 57).

A Bovine mandible from Karre (KAR IK-80-207) has a p4 looking more molarized than that of Garba IV, but it is also more heavily worn, and it is impossible to tell whether the medial valley was closed higher up. KAR IM-80-128, a fragment of lower molar, as well as a scaphoid, KAR IM-80-123, are probably of the same species,.

None of these specimens can be identified, even to generic level, but they could all belong to *P. turkanensis.*

Tribe Hippotragini

Hippotragini gen. et sp. indet.

The only definite record of this tribe at Melka-Kunturé is a lower molar, GOM Iγ-76-943. Its large size would suggest a Bovine, but its goat fold rules out this identification. GOM Iγ-76-783 is the base of a horn-core with a large sinus, which could be Alcelaphine or Hippotragine.

Tribe Reduncini

Gen. et sp. indet.

From Garba IV, a single tooth, GAR IV-75-7627, belongs to this tribe (and not to the Cephalophini, as was written in 1979). It is the size of a small kob. GOM Iγ-74-223 is a very similar tooth.

Tribe Alcelaphini

Genus *Connochaetes* LICHTENSTEIN, 1814

This genus includes today the gnu of South Africa, *C. gnou*, and the blue wildebeest of East Africa, *C. taurinus*. The latter species is known from the late lower Pleistocene onwards in East and North Africa. From the late Pliocene and early Pleistocene of Kenya and Tanzania, Gentry & Gentry (1978), Harris & al (1988) and Harris (1991) have described a more primitive species, *C. gentryi*, that they believed to be ancestral to *C. taurinus*. We think that the Oldowayan wildebeest from Melka-Kunturé can be included in the same species, although the peculiar shape of its horn-cores implies taxonomic distinction.

Connochaetes gentryi HARRIS, 1991

Diagnosis: A species of *Connochaetes* in which the horn-cores are inserted less posteriorly than in either living species and very widely apart; they pass less backward than in *C. africanus* and less downward than in *C. taurinus*; the face is long and narrow but with laterally expanded premaxillae; the frontals are domed in the midline between the orbits and horn-cores; the braincase is angled steeply downward; the supra-occipital has a median vertical ridge (Harris 1991: 192).

Connochaetes gentryi leptoceras n.ssp.

Holotype: GAR IV-72-2311, left horn-core (Plate 3.e).

Type-locality: Garba IV, Melka-Kunturé

Diagnosis: a subspecies distinguished by its long slender horn-cores, with a long straight distal portion.

Derivatio nominis: from Greek lepto-: slender, and -ceras, horn.

Connochaetes is mostly represented by horn-cores, many of them being complete or almost complete, but there are no other cranial remains (except teeth) at Garba IV.

The horn-cores are very slender, especially if compared with those of living *C. taurinus*, or with the *C. taurinus* of Gomboré II. They are less twisted than those of this species and than those of the *C. gentryi* from Olduvai, West and East Turkana (Harris & al. 1988, fig.51-53; Harris 1991, fig.5.49). Many specimens bear a keel on the posterior side of the proximal portion, and are more or less dorso-ventrally compressed. Others have an almost rounded or oval cross-section, but the difference does not appear to be correlated with size, as might have been expected if it were a sexual difference. However, among the measurable specimens, the larger two (Fig.) are slightly more compressed than the others.

Most of the specimens curve almost in one plane. The general course is the same as in *C. gentryi*, but the lowermost part is less curved upwards and backwards, as shown by the fragments of frontal bone preserved on a few specimens, allowing their orientation to be ascertained. The terminal half, instead of being hook-shaped and somewhat curved inwards, is long and straight, with a circular cross-section. A few specimens show that the basal sinus, usually unique in Alcelaphines, is subdivided into several chambers.

Measurements

	AP x vertical at base	AP x vertical at mid-length	L along upper curve
GAR IV-72-2311	56 x 53	37 x 34	485
GAR IV-72-2261		36 x 33	480 ?
GAR IV-72-2262		37 x 31	480
GAR IV-72-2271	50 x 50	31 x 33.5	± 450
GAR IV-73-2730	48 x 43	35 x 29.5	
GAR IV-73-2818		37 x 27	
GAR IV-74-6268	- x 43	43.5 x 34.5	
GAR IV-74-6954	58 x 48	40 x 39	
GAR IV-74-7493	70 x 60	44 x 40	
GAR IV-75-139	66 x 57	45 x 40	
GAR IV-75-140	55 x 40	38 x 31	
GAR IV-75-161			500
GAR IV-75-396	53 x 44.5		
GAR IV-75-398		33.5 x 30.5	500 ?
GAR IV-75-502	47.5 x 45	29.5 x 27.5	480 ?
GAR IV-75-641		39 x 30	
GAR IV-75-723		34 x 27.5	440 ?
GAR IV-75-1410	55 x 41	38 x 32	
GAR IV-76-5251		36 x 32	
GAR IV-76-9239	45 x 33	33 x 30	± 400
GAR IV-77-5602	53 x 50	32 x 30	
GAR IV-78-3820		29 x 27.5	
GAR IV-78-4427		29 x 28	440 ?
GAR IV-78-4494		41 x 39	500 ?
GAR IV-78-8667		28 x 26.5	440 ?
GAR IV-79-10460		32 x 29	440
GAR IV-80-11790	52 x 35		
GAR IV-80-11921	45 x 35		

Most of the dental remains from Garba IV belong to Alcelaphines, but the majority of them are isolated teeth, which cannot easily be sorted into *Connochaetes* or *Damaliscus*. The best specimen of *Connochaetes* is a mandible illustrated by Piperno & Bulgarelli-Piperno (1975, fig. 17.2), GAR IV-74-1114. There is no p2, as in *C. taurinus*, and p3 is very small. Dimensions are: length p3-p4 = 22.5; length m1-m3 = 70.

The differences between the *Connochaetes* of Garba IV and the *C. gentryi* from Olduvai and the Turkana basin are not greater than those usually found between two living subspecies of antelopes; therefore, we can refer it to this species. It should be noticed, however, that the Turkana basin *C. gentryi* is more similar to that of Olduvai than either is to that of Melka-Kunturé.

There is also a rare wildebeest with slender horns in Gombore IB, but no distal portion is preserved, so that its subspecific identity is unknown. The best specimen is GOM IB-70-2894, whose measurements, taken as above, are : 65.5 x – and 40 x 34.

Genus *Damaliscus* SCLATER & THOMAS, 1894

Damaliscus strepsiceras n.sp.

Holotype: GAR IV-74-6354, a left horn-core with fragment of frontal and orbit (Plate 3.a, b).

Type-locality: Garba IV, Melka-Kunturé.

Diagnosis: a species of *Damaliscus* with horn-cores larger than in *D. agelaius* GENTRY & GENTRY, 1978, from Olduvai, but with a shorter tooth-series. Horn-cores similar to those of *D. agelaius*, with little compressed cross-section, no flattening, but rather stronger spiralisation. Premolar row rather long, p2 not shed before advanced age.

Description: At Garba IV, horn-cores of *D. strepsiceras* are less common than those of *Connochaetes*. Only one of them, the holotype, can be definitely oriented. It shows that the horns arise not very far from the orbit and that they have a moderate basal divergence. Well-preserved specimens display transverse ridges, and their compression is weak, with no flattening of the medial or lateral surface. However, their main characteristic is their rather strong spiralling, probably stronger than in *D. agelaius* (Gentry & Gentry 1978, pl.29), and certainly still stronger than in any Recent species of the genus.

There are also some mandibular remains. They are smaller than those of *Connochaetes*, so that their generic identification is easy. Only two specimens have the area anterior to p3 preserved. One (GAR IV 74-6772) is adult, but it still has an alveolus for a p2, while the other (GAR IV 74-1347) no longer has a p2, because of its advanced age. By contrast, all mandibles of *D. agelaius* lack p2 (Gentry & Gentry 1978).

Comparative measurements:

	GAR IV 74-6354	GAR IV 72-2258	GAR IV 74-1397	GAR IV 75-143	GAR IV 75-812	GAR IV 79-10048	*D. agelaius* Olduvai
AP at base	44	40	-	47	45	-	29.2-39.2
TR at base	40	38	-	40	-	-	23.6-36.9
L (ant.curve)	-	270	320	-	-	230	220-266

GAR IV 74-6772	length p2-p4	22.5	length m1-m3	53
D. agelaius	length p3-p4	21.5-23.4	length m1-m3	58.1-65.1

The horn-cores of *D. strepsiceras* are much like those of *D. agelaius*, mainly known from Olduvai beds III-IV, and the main problem is whether both species should be considered as distinct. The horn-cores of *D. strepsiceras* are larger than those of *D. agelaius* (basal diameters are greater) and more strongly twisted, so that in these characters they are more derived. However, the molar series are shorter,

and p2 is still present, both characters that are less advanced. Thus, although both species are certainly closely related, they cannot be ancestor / descendant, and they must belong to different lineages.

A few incomplete specimens from Gomboré I differ from those of Garba IV by being longer (their diameters decrease slowly upwards) and perhaps slightly thicker. These differences could reflect different evolutionary stages. The only measurable one are :

GOM IB-76-7279	AP x TR at base	57.5 x 40.5 +	anterior L	340
GOM IB-81-9303		46 x 41.5		± 320

Other fragments are: GOM IB-68-1248; GOM IB-68-1532; GOM IB-69-1275; GOM IB-70-2884; GOM IB-71-1017; GOM IB-72-2928.

Damaliscus cf *lunatus* (BURCHELL, 1823)

A single horn-core, the base of which is missing, GAR IV-74-1544, is perhaps too small to belong to the common *Damaliscus* of the Pleistocene of Africa, *D. niro*, but is more like the living *D. dorcas* or *D. lunatus*. A poorly preserved horn-core of what appears to be the same species is also present at Simbirro III.

Genus *Parmularius* HOPWOOD, 1934

Parmularius cf *angusticornis* SCHWARZ, 1937

Parmularius is a common and widespread genus in the Plio-Pleistocene of Africa, but it is quite rare at Melka-Kunturé. Only two specimens from Garba IV can be referred to it.

GAR IV-78-4470 (Plate 3.c, d) is a piece of left frontal bone with the horn-core base. It differs from *Damaliscus* in that the frontal profile is sharply bent in the sagittal plane, the horn-cores are very close to each other, with almost no divergence between them, they curve slightly outwards (but not appreciably backwards), and there is an incipient basal external thickening.

There is little doubt that these fragments (together with GAR IV-75-812, another poorly preserved specimen) belong to *Parmularius*, but the specific identification is risky.

From the size (basal diameters 40 x 34.3 for GAR IV-78-4470; 44.5 x 35 for GAR IV-75-812), they match *P. altidens*, but this species is known only from Bed I at Olduvai, member G at Omo, and perhaps Aïn Boucherit in Algeria; all these strata are certainly older than Garba IV. The succeeding *P. angusticornis* is larger, but this is a more likely identification, assuming that both specimens from Garba IV are juveniles.

This species is not definitely known from Gomboré I.

From GOM Iγ, two horn-core bases are probably of the same species, although they are slightly larger (adults ?). Only the first one is curved outwards.

GOM Iγ-74-31	DAP x DT base	55 x 40.5
GOM Iγ-XX-783		52.5 x 46

Alcelaphine limb-bones

There are some post-cranial remains which are likely to be Alcelaphine, but tribal characteristics are usually hard to see on this fragmentary and eroded material, and generic identification is impossible. The measurements of the most complete ones are as follows:

Humerus

GAR IV-79-10249 Distal W = 31

Radius

GAR IV-75-682 Min.W of shaft = 24 Length = 212

GAR IV-78-3764 Min.W of shaft = 21 Length = ±217

Metacarpus (all of *Damaliscus* ?)

GAR IV-77-5311 Min.W of shaft = 17.7 Length = 195 ?

GAR IV-77-5464 Min.W of shaft = 19 Length = 195

GAR IV-79-10534 Min.W of shaft = 16.5 Length = ±200 Distal W = 28.7

GAR IV-81-12429 Min.W of shaft = 16.6 Length = 201 Distal W = 31.4

GAR IV-81-12431 Min.W of shaft = 16.3 Length = 204

Metatarsus (*Connochaetes* ?)

GAR IV-79-10497 Min.W of shaft = 21 Length = 230 Distal W = 36.5

Tribe Antilopini

Genus *Gazella* BLAINVILLE, 1816

Gazella cf *janenschi* DIETRICH, 1950

GAR IV-75-7728 (Plate 2.c, d) is a left gazelle male horn-core. It is small and rather short, regularly curved backwards, but its insertion angle cannot be estimated. It is slightly compressed transversely, with strong anterior and posterior grooves, and a anterior face tending to be flattened rather than strongly convex as usual in gazelles, and with an incipient postero-lateral keel.

There is no Antilopini at GOM IB, but a horn-core from GOM Iγ probably belongs to the same species as at Garba IV. Their dimensions are:

GAR IV-75-7728	DAP x DT base	25 x 20	Length 144
GOM Iγ-78-1753		29 x 22	130

These characters link this gazelle with *G. pomeli* ARAMBOURG, 1979 from Aïn Hanech in Algeria and *G. janenschi* DIETRICH from Laetoli and other Plio-Pleistocene sites in East Africa, and with the *Gazella* sp. from Olduvai. Unfortunately, it is unlikely that the few features available on the horn-cores are sufficient to establish phylogenetic relationships. It is more likely that the Garba IV and GOM Iγ gazelle is related to the East African fossil gazelles, but we do not know whether they belong to the same group as *G. pomeli*.

Genus *Antidorcas* SUNDEVALL, 1847

Antidorcas cf *recki* (SCHWARZ, 1932)

A few mandibular remains and one upper molar are also Antilopine, but definitely do not belong to *Gazella*, as erroneously surmised by Geraads (1979). The labial wall of the paracone is concave, and the third lobe of m3 is long (Plate 2.e), as in *Antidorca*s. The lower premolars are shortened, more so than in any Gazelle, but less than in the Recent springbok, *A. marsupialis*, and about as much as in *A. recki*, from the Plio-Pleistocene of East Africa. The lingual walls of the lower molars are more flattened than in *Gazella*. Their dimensions are:

	p3	p4	m1	m2	m3	m1-m3
GAR IV-74-1505	6 x 3.5	7 x 4.5	10 x 6	11 x 6	17 x 6	37.8
GAR IV-74-6462			9.5 x -	11.5 x 6	17.5 x 5.5	39.4
GAR IV-74-6360			9.5 x 6	10.5 x 6	18? x -	38.8
GAR IV-74-6794	5 x 3.5	7.5 x 5	10 x 6	11 x 6		

There are also a few post-cranials, the dimensions of which match those of a small Gazelle or *Antidorcas*.

Humerus

GAR IV-74-1946	dist.W	23	L	± 110			
GAR IV-74-6553		22		120			
GAR IV-78-3095		21.5		105 ?			

Radius

GAR IV-74-1868	prox. 23 x 115	dist. 20 x 13.5	L	136	Min.W. shaft	14.5

Metatarsus

GAR IV-77-8557	prox. 17 x -		L	145	Min.W. shaft	10.2

CONCLUSIONS

Biochronology

The relative ages of the Oldowayan sites of Melka-Kunturé are already known through their stratigraphic relationships and lithic technology, but it is interesting to see how far the biochronological data are in accordance with them. The lists of their large Mammals, together with that of Simbirro III, is given below.

	GOM I	GOM Iγ	KARRE	GAR IV	SIM III
Enhydriodon aethiopicus				+	
Theropithecus cf *oswaldi*				+	
Elephas recki recki				cf	
Hipparion		+		+	
Equus cf *capensis*				+	
Equus cf *stenonis*	+			+	

Equus sp	+			+	
Hippopotamus cf *amphibius*	+	+	+	+	+
Hippopotamus cf *aethiopicus*	+				
Kolpochoerus majus				+	
Kolpochoerus cf *limnetes*	+				
Metridiochoerus cf *andrewsi*	?	+		?	
Metridiochoerus modestus	+			+	
Giraffa cf *jumae*	+			+	
Sivatherium maurusium		+		+	
Pelorovis turkanensis brachyceras	sp		sp	+	+
Hippotragini		+			
Reduncini		+		+	
Connochaetes gentryi leptoceras	cf			+	cf
Damaliscus strepsiceras	cf			+	
Damaliscus cf *lunatus*				+	+
Gazella cf *janenschi*		+		+	
Antidorcas cf *recki*				+	

Some of these taxa do not have much biochronological significance, because they are rare and their absence in some sites may be merely due to chance. Such are the Suids, *Theropithecus*, *Giraffa* (and also *Gazella* and *Parmularius*). Bovids are the most informative group. Material from Gomboré I and Simbirro III is more fragmentary than that of Garba IV, but some of the characteristic taxa of this latter site also seem to be present in the former ones. Gomboré I has probably *Metridiochoerus modestus*, *Pelorovis turkanensis brachyceras*, *Connochaetes gentryi leptoceras* and certainly *Damaliscus strepsiceras* (albeit a slightly different variety), while Simbirro has certainly *Pelorovis turkanensis brachyceras*, and probably *Connochaetes gentryi leptoceras*, but not *Damaliscus strepsiceras*. Gomboré Iγ has yielded only a fragmentary fauna, but it shares several taxa with Garba IV, and these localities are certainly close in time. These four localities at least belong to the same faunal set, well distinct from some other localities of Melka-Kunturé, such as Garba XII or Gomboré II. How close in time they are is hard to tell. We would estimate the difference between the earlier and later sites to between 0.1 and 0.5 Ma., but this is little more than a very rough guess.

Another question is that of the relative placement of these sites. On archaeological grounds, Gomboré I is the oldest, and there is no reason to believe that this is incorrect. The position of Simbirro III is less clear. The occurrence of both species of *Pelorovis*, and of a *Connochaetes* which is almost certainly the same as at Garba IV (and definitely not *C .taurinus*) tends, in our opinion, to push the site back in time, perhaps deep into the lower Pleistocene, at more than 1 Ma. On faunal grounds, there is even no reason to believe that it is later than Garba IV.

Paleoecology

The relative proportions of the various groups of Ungulates present in the occupation floors reflect, of course, a biased picture of the living guild of Ungulates. That this bias might be quite important is suggested, for instance, by the unequal representation of horns and teeth of Alcelaphines at Garba IV. Although few teeth can be identified to species, it is clear that horn-cores of *Connochaetes* are over-

represented in respect to those of *Damaliscus*, while teeth and perhaps limb-bones of the latter genus are more common.

Still, the ecological implications of the Bovid assemblage are quite clear. The complete lack of Tragelaphines, the almost complete lack of Reduncines, and the striking dominance of Alcelaphines and Antilopines strongly suggest that the environment of Garba IV was dry and open. Even the *Pelorovis* was probably mainly a grazer, and we must assume that bushes and thickets were rare in this savannah, even though the Giraffe implies the presence of some trees. However, although a terminal phalanx probably reflects a hard ground, the robustness of the *Equus* metapodials and the extreme plication of their teeth point to an environment that was perhaps not so dry as the Bovids suggest.

Despite its fragmentary nature, which often precludes precise identification, the oldowayan fauna from Melka-Kunturé is quite interesting. This is because all large Mammals that can be identified at least to specific level show the same pattern of specific or sub-specific distinction from contemporary forms in the Turkana basin or Olduvai. Since Gomboré I - Garba IV, whatever their precise ages are, must fall within the time-range of these Kenyan and Tanzanian sites, those distinctions are clearly of geographical / ecological origin. They point towards an isolation of some part of present-day Ethiopia. Whether this part includes only a small area (say, central Shoa) or most of the Ethiopian highlands is not known, because no other fauna has been described from these highlands, but it is clear that this geographic isolation must be taken into account when dealing with Hominid evolution and cultural diffusion in the Paleolithic of East Africa.

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Captions to Plates

Plate 1. Equidae

a. Garba IV D-76-9319. *E*. cf. *capensis*. Upper right M2.
b. Garba IV D-72-2088. *Equus* sp. Upper right P.
c. Garba IV D-74-7150. *E*. cf. *capensis*. Upper right P.
d. Garba IV D-76-9159. *E*. cf. *stenonis*. Upper right P2.
e. Garba IV D-72-3958. *E*. cf. *stenonis*. Upper left P.
f. Garba IV D-78-3010. *E*. cf. *stenonis*. Upper right M.
g. Gomboré IB-73-2153. *Equus* sp. microdont. Upper right M.
h. Garba IV D-72-2054. *E*. cf. *stenonis*. Upper left M.
i. Garba IV D-75-7996. *E*. cf. *capensis* ? Lower right M3.
j. Gomboré Iγ-76-476. *E*. cf. stenonis. Lower right M.
k. Garba IV D-78-3776. *E*. cf. *stenonis*. Lower right P.
l. Gomboré Iγ-74-245. *E*. cf. *stenonis*. Lower right P2.
m. Garba IV-73-690. *E*. cf. *stenonis*. Lower left P2.
n. Gomboré IA-72-67. *E*. cf. *capensis* ? Lower left P.
o. Gomboré Iγ-78-1751. *Equus* sp. Posterior third phalanx.
p. Garba IVD-74-1349. *Hipparion* sp. Lower right M.
q. Gomboré Iγ -74-220. *Hipparion* sp. Lower left M.
r. Garba IV D-75-134. *Hipparion* sp. Lower left Incisor.
s. Garba IV-73-2922. *Hipparion* sp. Upper right P.
t. Gomboré IB-69-1201. *Hipparion* sp. Upper left P ?
u. Gomboré IB-73-2338. *Hipparion* sp. Upper left M.

Plate 2.

a. *Pelorovis turkanensis brachyceras*. Holotype, left horn-core, GARIV-72-2272, upper view. x 1/3
b. same specimen, posterior view. x 1/3
c. *Gazella* cf *janenschi*. Left horn-core, GAR IV-75-7728, medial view. x 1
d. Same specimen, anterior view. x 1
e. *Antidorcas recki*. Right mandible, GAR IV-74-6462. x 1.
f. *Kolpochoerus majus*. Incomplete M3. GAR IV-78-3152. x 2
g. *Hippopotamus* cf *amphibius*. Maxilla. GAR IV 75-218. x ½

Plate 3

a. *Damaliscus strepsiceras*. Holotype, left horn-core, GAR IV-74-6354, anterior view. x 2/3
b. Same specimen, lateral view. x 2/3

c. *Parmularius* cf *angusticornis*. Base of left horn-core, GAR IV-78-4470, lateral view. x 1

d. Same specimen, anterior view. x 1

e. *Connochaetes gentryi leptoceras*. Holotype, left horn-core, GAR IV-72-2311, anterior view, x 1/3

f. *Metridiochoerus modestus*. Incomplete M3. GAR IV-73-1487.

CAPTIONS TO FIGURES

Figure 1.

a, b. *Enhydriodon aethiopicus*. Holotype, m1 GAR IVE-81-49, occlusal and labial views. x 2

c, d *Megantereon* sp. Distal humerus, GOM IB-80-8107, anterior and lateral views. x 1/2

e. *Megantereon* sp. Proximal ulna, GOM IB no N°. x 1/2

Figure 2. Length x width scatterplot of *Enhydriodon* m1.

Figure 3. *Equus* upper P3-P4 and M1-M2. Scatter diagram of the protocone length versus the mean occlusal diameter ((occlusal length+width)/2) in millimeters. Comparison with the range of variation observed at Olduvai.

Figure 4. Scatter diagram of distal articular widths versus maximal lengths of *Equus* third metacarpals. One specimen of Melka Kunturé is compared to metacarpals of Olduvai, East Turkana, Omo, and South Africa and to the ranges of variation of modern Plains zebras, *E. mauritanicus* of Tighenif (Algeria), and *E. numidicus* and *E. tabeti* of Aïn Boucherit and Aïn Hanech (Algeria).

Figure 5. Scatter diagram of distal articular widths versus maximal lengths of African *Equus* third metatarsals. See captions of Figure 3.

CAPTIONS TO TABLES

Table 1. *Equus* upper cheek teeth of Garba IV and Gomboré I. Measurements in millimeters. OL = occlusal length ; PL = protocone length ; OW = occlusal width ; Ht = height. Measurements marked with asterisks are approximate.

Table 2. *Equus* lower cheek teeth of Garba IV and Gomboré I. Measurements in millimeters. OL = occlusal length, L = length, OW = occlusal breadth, Ht = height. Measurements marked with asterisks are approximate.

Table 3. Third metacarpals (MC) and metatarsals (MT) of African Equus. Measurements in millimeters. 1 = maximal length; 3 = breadth at mid-diaphysis; 4 = antero-posterior diameter (APD) at mid-diaphysis; 5 = proximal breadth; 6 = proximal APD; 10 = distal breadth at the supra-articular tuberosities; 11 = distal articular breadth; 12 = maximal APD of the keel; 13 = minimal APD of the medial condyle; 14 = maximal APD of the medial condyle; 7 = diameter of the articular facet for the magnum (MC) or the large cuneiform (MT); 8 = diameter of the anterior articular facet for the unciform (MC) or for the cuboid (MT). Measurements marked with asterisks are approximate.

Table 4. Limb bones of Garba IVD and Gomboré I gamma. Measurements in millimeters. Max. = maximum. DAP = antero-posterior diameter. DT = transverse diameter. Measurements marked with asterisks are approximate.

Table 5. *Hipparion* upper cheek teeth of Garba IV and Gomboré I. Measurements in millimeters. L = length ; PL = protocone length ; W = width.

Table 6. *Hipparion* lower cheek teeth of Garba IV and Gomboré I. Measurements in millimeters.