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SOUTHERN NAMIB**

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PALAEOONTOLOGY OF THE ORANGE RIVER VALLEY,
NAMIBIA**

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Orangemeryx hendeyi

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by

Dr Martin Pickford⁽¹⁾ & Dr Brigitte Senut⁽²⁾

⁽¹⁾Chaire de Paléanthropologie et de Préhistoire, Collège de France, and Laboratoire de Paléontologie,
UMR 8569 du CNRS. 8, rue Buffon, F-75005 Paris, France

⁽²⁾Département Histoire de la Terre du Muséum national d'Histoire naturelle et UMR 8569 CNRS,
8, rue Buffon 75005, Paris.

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Early and Middle Miocene Anthracotheriidae (Mammalia, Artiodactyla) from the Sperrgebiet, Namibia

Martin Pickford

Collège de France, 11, Place Marcellin Berthelot, 75005, Paris, France et UMR 8569 du CNRS 8, rue Buffon, 75005, Paris, France
e-mail: pickford@mnhn.fr

Postcranial fossils belonging to a large species of anthracothere have been recovered from two localities in the Sperrgebiet, southwestern Namibia. There can be little doubt that the material belongs to the genus *Brachyodus*, which is widespread in African Early Miocene and basal Middle Miocene localities (22 - 16 Ma). The Namibian material represents a large species within the genus, and probably belongs to *B. Depéreti* (Fourtau). There is evidence of a smaller suiform at Arrisdrift which may represent an anthracothere, but the material is too scanty for confident identification.

Résumé français

Les Anthracothères sont des mammifères amphibies de grande taille fréquents dans les dépôts lacustres et fluviaux du Miocène inférieur et moyen de l'Afrique du Nord et de l'Est. Leur habitat amphibie augmente considérablement leur potentiel de fossilisation et c'est pourquoi ils sont relativement communs dans le registre fossile.

Le gisement d'Auchas (environ 19 Ma) a livré un fémur presque complet et un métapode distal qui présentent une morphologie typique d'anthracothère. Aucune dent n'a été trouvée, mais la grande taille des spécimens postcrâniens et leur morphologie suggère que ces derniers appartiennent probablement à *Brachyodus Depéreti*. En revanche, le gisement d'Arrisdrift a livré un seul ulna proximal à morphologie de suiforme qui pourrait appartenir à un anthracothère de taille moyenne. La robustesse de la diaphyse suggère qu'il n'appartient pas à un Suidae, mais plus probablement à un anthracothère. Il y a donc deux anthracothères dans les dépôts de la Proto-Orange, mais la famille n'était à l'évidence pas commune dans le sud de la Namibie alors qu'à la même époque, ils étaient largement diversifiés en Afrique du Nord et de l'Est.

Introduction

Anthracotheres are poorly represented in the early Miocene and basal Middle Miocene localities in Southern Africa. A previous record from the Sperrgebiet (Hamilton & Van Couvering, 1977) was based on two fragments of a broken and wind eroded talus now known to belong to a sub-fossil giraffe (specimens with Hamilton's identification are housed in the South African Museum, Cape Town).

The Namibia Palaeontology Expedition has been collecting fossils in the Sperrgebiet since 1993, and out of the many thousands of specimens collected there are only three anthracothere specimens. The material is from Auchas (AM 93/02, femur; AM 1'97, distal lateral metapodial) and Arrisdrift (AD 248'95, proximal ulna possibly of an anthracothere). In addition there

is a large talus from Grillental, collected by G. Corvinus in 1978, which evidently represents the genus *Brachyodus* on the basis of its size and morphology. This specimen is curated in the South African Museum.

Systematic Descriptions

Family Anthracotheriidae Gill, 1872

Genus *Brachyodus* Depéret, 1895

Species *B. depéreti* Fourtau, 1918 (1920)

Material: AM 1'97, distal end of lateral metacarpal from Auchas housed in the Geological Survey of Namibia Museum, Windhoek; 93/28, right femur from Auchas housed in the Sperrgebiet Museum, Oranjemund; Unnumbered right talus from Grillental housed in the South African Museum, Cape Town

Descriptions: Distal lateral metacarpal: AM 1'97 from Auchas (Pit AM 02) is the distal end of a lateral metapodial. The articular facet is ball-like superiorly but is subdivided by a rounded crest on the volar side. The lateral part of the articular facet extends further towards the volar aspect than the medial side and the crest. The lateral *fossa* for tendinal insertions is shallow. The shaft is obliquely oval in section. This is a typical suiform lateral metapodial, but it is not possible to determine whether it was pedal or manual, nor from which side it comes. The distal articular facet measures 28mm in the dorsovolar direction x 13.8 mm medio-laterally. The size of the specimen suggests that it belongs to *Brachyodus*.

Femur: The left femur (93/28) housed in the Sperrgebiet Museum, Oranjemund, is from Auchas (AM 02). It is virtually complete, lacking only the head and neck (Plate 1). The shaft is slightly bowed laterally and antero-posteriorly and is almost circular in section (midshaft diameters are anteroposterior - 47.8 mm x mediolateral - 48.6 mm). The greater trochanter is robust and its distal root extends laterally as a large process on a level with the base of the neck. There is no sign

Table 1: Measurements of 93/28, femur of *Brachyodus depéreti* from Auchas, Namibia.

Length from tip of greater trochanter to distal extremity of the lateral tibial condyle -----	430 mm
Distal anteroposterior height on lateral side -----	134 mm
Breadth of the patellar articulation -----	60.6 mm
Breadth of the tibial articulation -----	119.1 mm
Midshaft diameter, mediolateral -----	48.6 mm
Midshaft diameter, anteroposterior -----	47.8 mm

of a third trochanter. The distal end is typically suiform, with a depression in the anterior surface of the shaft just proximal to the patellar articulation. Posteriorly there is a deep laterally positioned depression in the shaft which merges with the lateral tibial condyle. The two tibial condyles are robust and are separated by short gaps from the patellar articulation. The two anterior buttresses of the patellar articulation are almost the same height.

Femora of East African *Brachyodus* were not described by MacInnes (1951) but specimens from Europe described by Dineur (1981) are morphologically similar to the Auchas specimen. Femora of *Brachyodus Depéreti* from Wadi Moghara, Egypt, (Fourtau, 1918 (1920)) are similar morphologically and metrically to the Auchas specimen. On the basis of its morphology and size the Auchas femur is attributed to *Brachyodus Depéreti*.

Talus: A large anthracothere talus was found by G. Corvinus in 1978 at ‘Greenman’s’ Site in the Grillental (probably site GT 6 of Pickford & Senut, 2000), Northern Sperrgebiet. The specimen is currently housed in the South African Museum, but has no registration number. It is from the right side and was recovered in several pieces which have been glued

together. It has suffered some sand blasting, but is otherwise in good condition (Plate 2). It is 136.4 mm long externally which is greater than any of the specimens from East Africa identified as *Brachyodus aequatorialis* MacInnes (1951) (range from 108 to 125 mm) but its proximal breadth (73.2 mm) falls within the range of variation of the equatorial sample (range 70 to 75 mm). It is marginally larger than the biggest of three specimens from Gebel Zelten from deposits that may be about the same age as the Namibian fossils, as the measurements in table 2 show.

The Grillental specimen is longer than any of the specimens from the early Miocene of Western Kenya (MacInnes, 1951 and personal observation) as shown in table 3.

The closest match in terms of size is to the largest anthracothere specimens from Wadi Moghara, Egypt, assigned to *Brachyodus Depéreti*, as revealed in table 4 (Fig. 1).

Hamilton & Van Couvering (1973) included the genus *Brachyodus* in a faunal list for the Sperrgebiet on the basis of an eroded talus in two fragments. Examination of the specimens, now housed in the South African Museum in Cape Town, reveal that both fragments belong to a single individual of a subfossil giraffe (Plate 2).

Table 2: Measurements (in mm) of tali of large anthracotheres from Grillental, Namibia, and Gebel Zelten, Libya.

Measurement : Site	Grillental	Zelten B2	Zelten No N ^a	Zelten BC 1
External length	136.4	120.4	133.5	--
Internal length	--	102.5	109	--
Proximal width	73.2	69.0	68.4	74.5
Distal width	--	84.7	86	76e

Table 3: Measurements (in mm) of the tali of *Brachyodus aequatorialis* from Kenya.

Measurement : Site	Rusinga A	Rusinga B	Rusinga C	Rusinga D	M 32834 (Kulu)
External length	115	125	108	126	121.8
Internal length	103	115	98	--	106.8
Proximal breadth	70	75	60	--	67.4
Distal breadth	70	80	75	85	73.8

Table 4: Measurements (in mm) of tali of large anthracotheres from Wadi Moghara, Egypt housed in the Cairo Geological Museum (CGM).

Measurement : Wadi Moghara	CGM 82978 <i>Afromeryx africanus</i>	CGM 30822 <i>Brachyodus depereti</i>	CGM 30822 <i>Brachyodus depereti</i>	CGM 30822 <i>Brachyodus mogharensis</i>	CGM 30822 <i>Afromeryx africanus</i>	CGM 30822 <i>Brachyodus depereti</i>
External length	117	140.5	142	124.3	116	133
Internal length	109.5	123.5	115.5	109	108.8	--
Proximal breadth	67.3	72.2	73.5	65.4	66.3	--
Distal breadth	68	89	70.2	74.5	69.8	73

Genus and species inc. sed.

Material: AD 248'95, proximal end of right ulna from Arris-drift.

Description: *Proximal ulna.* AD 248'95 is part of the proximal end of a right ulna lacking the superior part of the olecranon. It is a solidly constructed bone of broadly triangular cross section. Anteriorly the distal part of the sigmoid notch is preserved. It consists of two curved articular facets that end abruptly where they would have been confluent with the proximal radial facets. The radius was not fused to the ulna at the time of death suggesting that the individual was young when it died. The anteroposterior thickness of the bone at the level of the base of the sigmoid notch is 51 mm and its width at the same level is approximately 40 mm. The interosseous pit is large and deep, and would have closely confined any mediolateral movements of the radius.

Discussion

Five species of *Brachyodus* are known from Early and basal Middle Miocene deposits of Africa and Europe. European material is identified as *Brachyodus onoideus* (Gervais, 1859) (Roman, 1907) and *B. intermedius* Mayet, 1908 (Dineur, 1981; Dineur & Ginsburg, 1986). African *Brachyodus* material has been assigned to three species which differ in size and morphology. The largest of the species is *B. depereti* (Fourtau, 1918) based on material from Wadi Moghara, and also known at Siwa Oasis, Egypt (Hamilton, 1973) and Gebel Zelten, Libya (personal observation). The two species *B. mogharensis*

Pickford, 1991, and *B. aequatorialis* MacInnes, 1951 are slightly smaller (Arambourg, 1933a, b; Black, 1978; Hooijer, 1966, 1968; Madden 1972, Madden *et al.*, 1978). The only other large anthracotheres known in the Early Miocene of Africa are *Afromeryx africanus* (Andrews, 1899) and an undescribed genus known from scanty dental remains from Mfwangano and Koru (Kenya) and Moroto (Uganda).

All other anthracotheres from the early Neogene of Africa are small to medium sized species (*Afromeryx zelteni*, *Sivameryx africanus*, *Sivameryx moneyi*, *Libycosaurus anisae*, *Libycosaurus algeriensis*) (Andrews, 1914; Black, 1972; Fourtau, 1918; Pickford, 1991; Ducrocq *et al.*, 2001) while the only known late Neogene representative of the family, *Libycosaurus petrocchii* Bonarelli, 1947, was a very large species.

Considering the restricted nature of the Namibian anthracothere remains, it is not possible to be dogmatic about an identification, but because much of the material plots out at the large end of the size variation within the family, it is probable that it represents *Brachyodus Depereti*.

Conclusions

Anthracothere fossils are rare in Namibia, being known from only three or four specimens. Three of the specimens from Grillental and Auchas can be identified with some confidence as *Brachyodus*, probably *B. depereti*. The fourth specimen is from a smaller species, and is unidentifiable at the generic level. The presence of

Brachyodus in Namibian Early Miocene sediments extends the record of the family Anthracotheriidae to the southern portions of the continent and accords with their fossil record else-

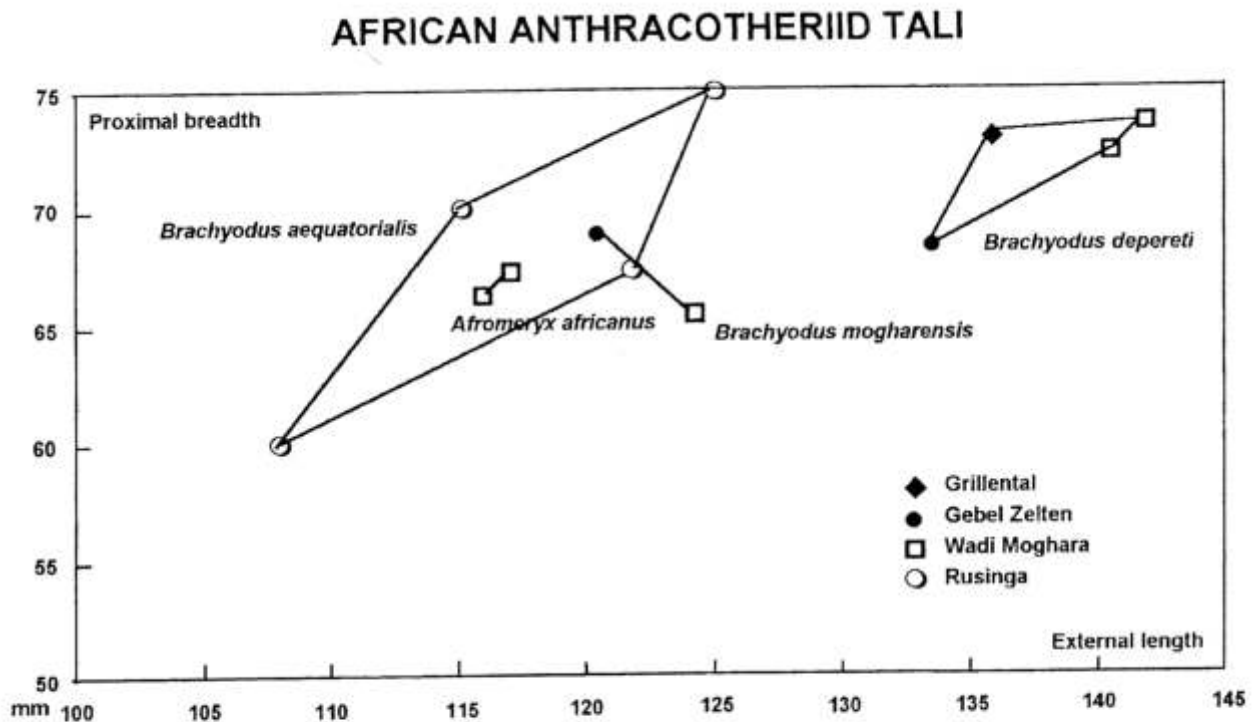


Figure 1: Length-Breadth plot of large African anthracotheriid tali from Grillental (Namibia), Gebel Zelten (Libya), Wadi Moghara (Egypt) and Rusinga (Kenya). The Grillental specimen is closest in size to *Brachyodus depereti* from Egypt and Libya and is significantly larger than the East African species *Brachyodus aequatorialis*.

where in East Africa (Faunal Sets PO to PIIIa), North Africa (MN 3 and MN 4) and Southern Europe (MN 3).

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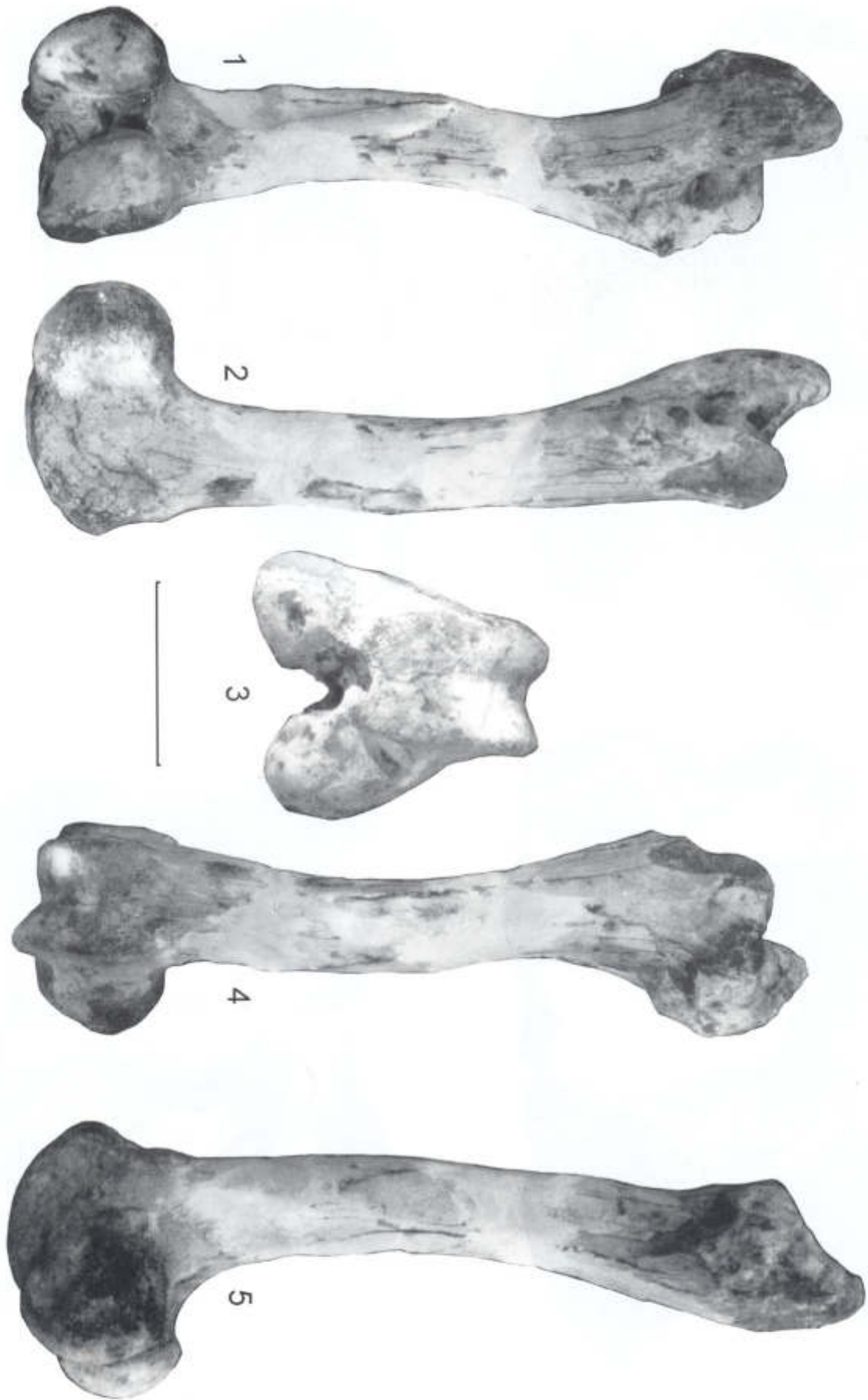


Plate 1: Left femur (93/28) *Brachyodus depereti* housed in the Sperrgebiet Museum, Oranjemund. (1 = posterior, 2 - medial, 3 - distal, 4 - anterior, 5 - lateral view). (Scale bar 10 cm).

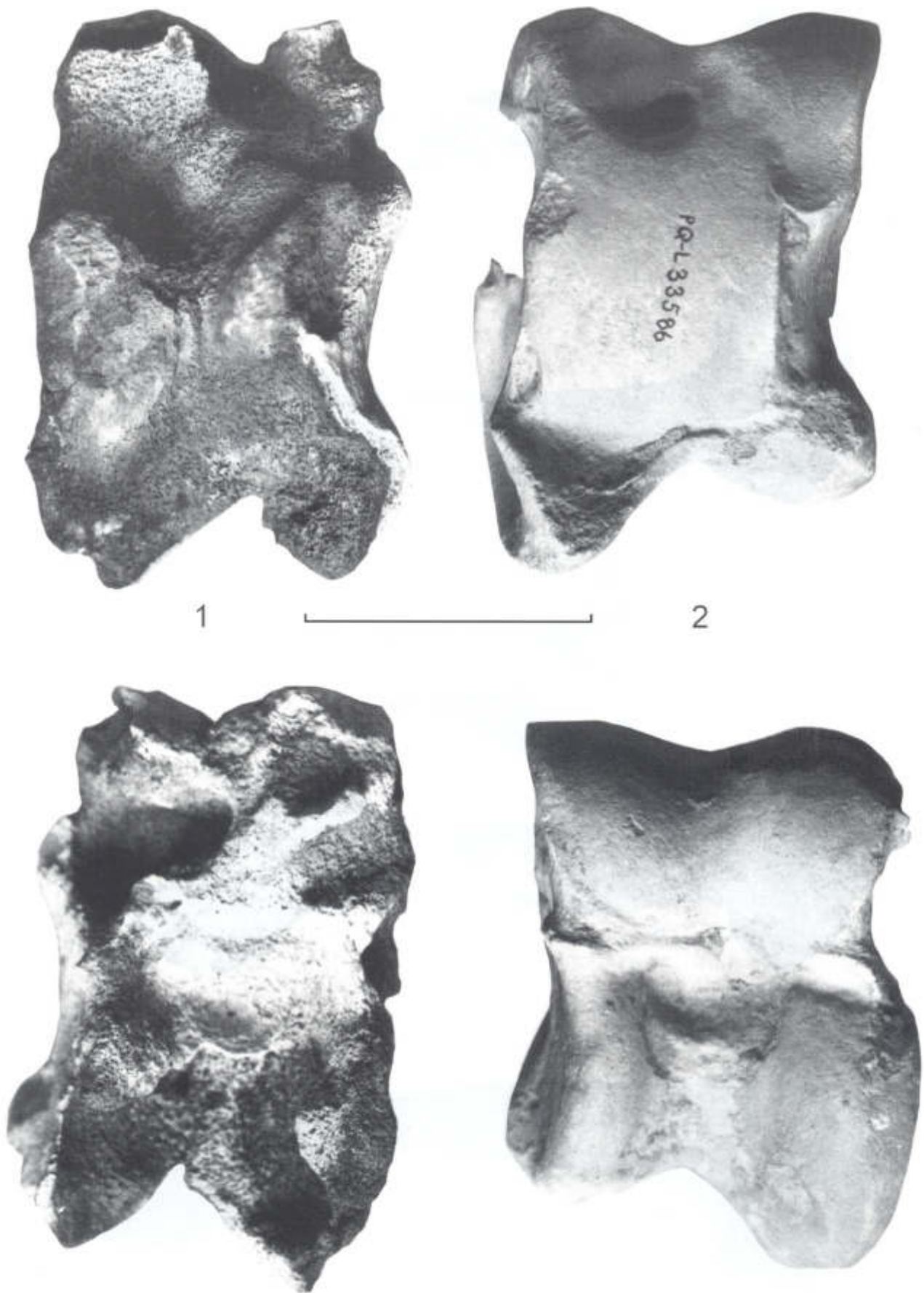


Plate 2: 1. Wind eroded right talus of *Giraffa camelopardalis* from the Sperrgebiet, Namibia, previously assigned to *Brachyodus* sp., housed in the South African Museum, Cape Town, compared with 2. SAM PQL 33586, right talus of a giraffid from Langebaanweg, (Early Pliocene) South Africa. (Scale bar 5 cm).

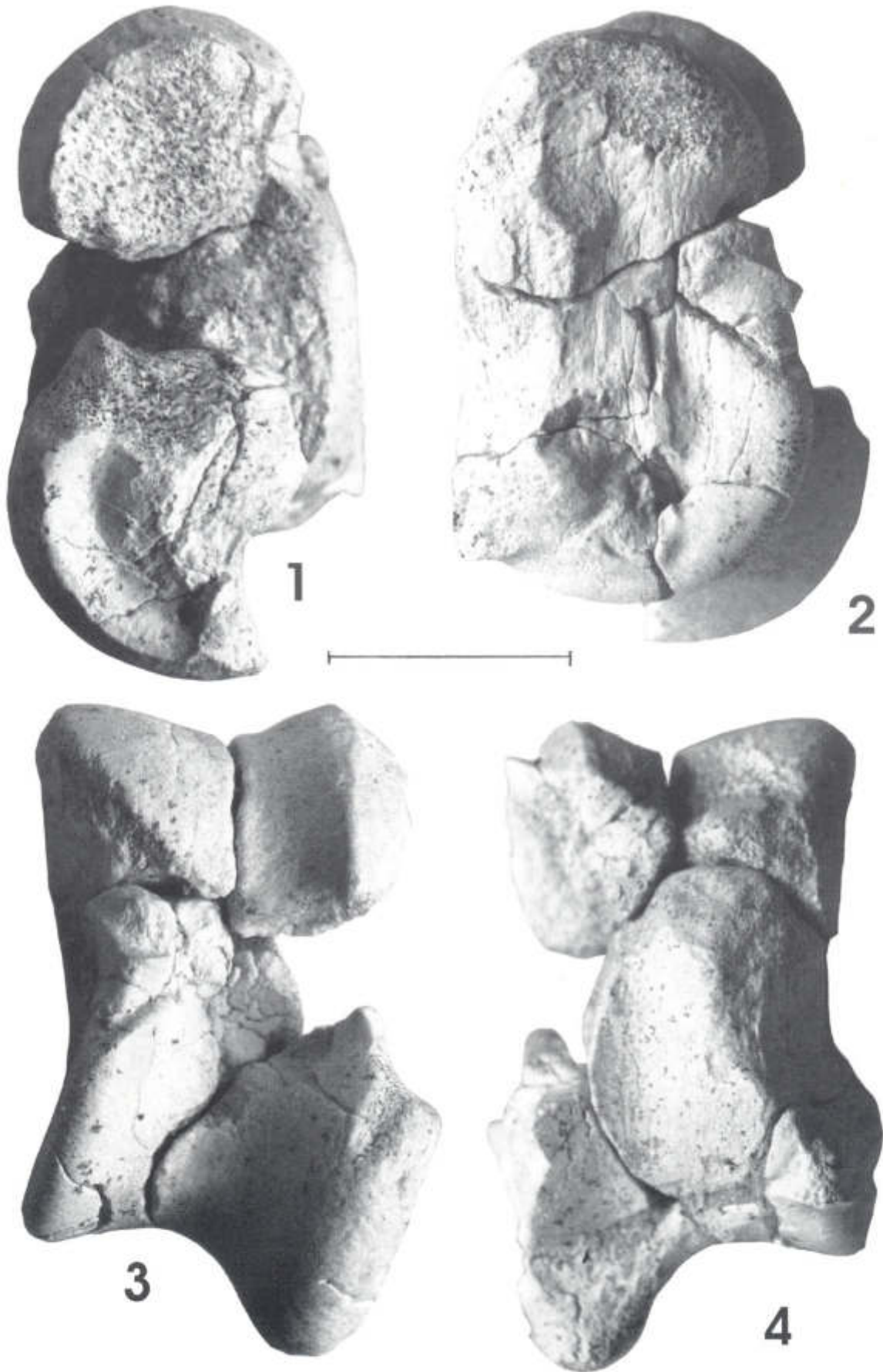


Plate 3: *Brachyodus depereti* un-numbered right talus from "Greenman's site" Grillental, Early Miocene, Namibia, housed in the South African Museum, Cape Town. (1 - lateral, 2 - medial, 3 - tibial and 4 - calcaneal view). (Scale bar 5 cm).