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SOUTHERN NAMIB**

**VOLUME 2:
PALAEOONTOLOGY OF THE ORANGE RIVER VALLEY,
NAMIBIA**

by

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Orangemeryx hendeyi

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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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Minute species of *Orycteropus* from the early Middle Miocene at Arrisdrift, Namibia

Martin Pickford

Chaire de Paléanthropologie et de Préhistoire, Collège de France, and Département Histoire de la Terre, UMR 8569 du CNRS, 8 rue Buffon, 75005, Paris

e-mail : pickford@mnhn.fr

Aardvarks from early Middle Miocene deposits at Arrisdrift, Southern Namibia are assigned to the species *Orycteropus minutus* Pickford, 1975. The body weight of the Arrisdrift specimens is calculated to be about 3.5 - 4 kg.

Résumé français

Le gisement d'Arrisdrift en Namibie vieux de 17 à 17,5 Ma a livré plusieurs restes d'un Tubulidenté de petite taille. Les mandibules et les dents ressemblent à celles d'*Orycteropus africanus*, bien connu dans le Miocène inférieur d'Afrique orientale, mais tous les fragments post-crâniens sont beaucoup plus petits que ceux de cette espèce et sont même plus petits que ceux d'*Orycteropus minutus* du Kenya (Pickford, 1975). Les comparaisons réalisées avec l'espèce actuelle *Orycteropus afer* permettent d'estimer un poids avoisinant 3,5 - 4 kgs.

Introduction

In a recent paper, Pickford (1996) described a few tubulidentate fossils from Miocene deposits at Arrisdrift and Rooilepel, southern Namibia. The Rooilepel fossils are similar in size to specimens of *Orycteropus minutus* from Early Miocene sites in Kenya (Songhor, Mfwanagno), but the Arrisdrift specimens are somewhat smaller, but probably belong to the same species.

Systematic description

Order Tubulidentata Huxley, 1872

Family Orycteropodidae Bonaparte, 1852

Genus *Orycteropus* Geoffroy, 1795

Species *Orycteropus minutus* Pickford, 1975

Type locality: Songhor, Kenya.

Material from Namibia: AD 94'00, left mandible with p/3-m/3; AD 342'98, rear portion of left mandible fragment with m/2-m/3; AD 640'00, right mandible with p/4-m/1 and alveoli of p/1-p/3; AD 330'94, maxilla fragment with M2/ and part of alveolus of M3/; PQAD 2575, isolated lower molar; AD 159'96, lower premolar; AD 408'86, distal end of metapodial; PQAD 2356, second phalanx; AD 160'96, second phalanx; AD 587'94, associated distal metapodial and proximal end of first phalanx.

Age: Basal Middle Miocene ca 17.5 Ma.

Description: Cranio-dental remains. AD 94'00 is a left mandible with the p/3-m/3 (Pl. 1, Fig. 1-2). The ascending ramus is steeply inclined and the body is shallow. The third lower premolar is a single lobed tooth with slight curvature such that the labial surface is convex. The p/4 is also comprised of a single lobe but it has two wear facets apically. It is not curved

buccally. The three molars are bilobed, with the anterior lobe being larger than the distal one, except in the first molar in which the two lobes are almost the same width. The m/2 is the largest tooth, the third molar having a reduced distal lobe. There is a distinct retromolar space behind the third molar. Dimensions of the body and its teeth accord closely with those of *Orycteropus africanus* from Rusinga Island, Kenya.

AD 640'00 (Pl. 1, Fig. 6-7) is a lower jaw fragment with the last premolar and the first molar and the complete alveoli of the second and third premolars and the distal part of the alveolus of the first premolar. It is close in morphology to the preceding specimen but the first molar is wider.

AD 342'98 (Pl. 1, Fig. 3-5) consists of the rear of the mandibular body containing m/2-m/3 and the ascending ramus lacking the articular condyle. The body is shallow below the molars and the roots of the teeth reach close to its ventral border. The ascending ramus is inclined at a shallow angle and there is a long retromolar space. The mandibular foramen is 12.3 mm behind and in line with the m/3. This specimen is similar to the mandible of *Orycteropus africanus* from the Early Miocene of East Africa (Pickford, 1975). The shallow inclination of the ascending ramus (about 45°) is a particular resemblance, the rami of most other species of *Orycteropus* being more vertically oriented (MacInnes, 1956; Pickford, 1975).

The second lower molar of AD 342'98 comprises two similar sized oval pillars fused together to yield an 8-shaped occlusal outline. The mesial pillar has two wear facets, one sloping mesially, the other distally. The latter wear surface continues uninterrupted onto the distal pillar of the tooth. The m/3 also consists of two pillars fused together, but the distal pillar is appreciably smaller than the mesial one and it narrows distally. As in the m/2, the mesial pillar of m/3 has two wear facets, the distal one continuing onto the distal pillar.

The fragmentary maxilla, AD 330'94, contains the M2/ and part of the alveolus of the M3/. The root of the zygomatic arch is preserved and there is a small sliver of palatine attached to it. The occlusal outline of the molar is 8-shaped, the distal pillar or lobe being slightly smaller than the mesial one. The distal lobe has two wear facets, the mesial one of which passes onto the mesial lobe.

An isolated upper premolar from Arrisdrift (AD 159'96) consists of a compressed oval pillar which is slightly laterally recurved from the root to its occlusal tip. The occlusal surface is divided into two by a curved wear facet. The tip of the root shows tubulidentate microstructure.

An isolated lower molar (PQAD 2575) is 8-shaped in occlusal outline, with the distal lobe slightly larger than the anterior one. The mesial and distal lobes each possess two wear facets. Tubulidentate microstructure is visible on the roots.

Postcranial skeleton. AD 587'94 consists of the distal end of a metapodial and the proximal end of a first phalanx, probably of the same individual. The symmetrical outline of the distal articulation of the metapodial suggest that it is from the second or third digit. It is similar to those that occur in other fossil and extant species of *Orycteropus*. The central ridge is well developed and extends onto the ventral and dorsal aspects of the articulation. It is a salient and sharp ridge that divides the articular surface into two subequal halves. The medial and lateral borders of the articular surface are sharp-edged. The lateral and medial fossae for tendinal attachments are strongly developed. The shaft is a dorsoventrally compressed oval. The proximal end of the first phalanx has a deep gutter dividing its articular surface into two halves. The dorsal and ventral margins of the articulation have notches for the central ridge of the metapodial. The shaft is higher than it is wide and has a flattened volar surface to its otherwise oval outline.

AD 408'96 is the distal end of a metapodial, probably from the fourth digit judging from the slightly asymmetrical distal articulation. Apart from this slight asymmetry, it is similar to AD 587'94.

There are two second phalanges in the sample (PQAD 2356 and AD 160'96). Apart from their diminutive size they are comparable to those of other fossil and extant aardvarks. The proximal articular surface is regularly curved from dorsal to ventral and is not marked by any grooves. The shaft is robustly constructed with a flattened volar surface edged by low ridges. The dorsal surface of the shaft is rounded. The distal articular surface reaches from the volar surface well onto the dorsal surface and it too is smooth and not marked by any grooves. The lateral and medial fossae for ligamentary attachments are well developed.

Discussion

The small aardvark from Arrisdrift is so similar morphologically to other fossil and extant species of *Orycteropus* that there can be little doubt about its generic affinities. The mandible and teeth are not very different in size from those of *Orycteropus africanus*, but the postcranial remains are appreciably smaller, being even smaller than those from Kenya assigned to *Orycteropus minutus*. Judging from the metapodials and phalanges, the Arrisdrift specimens would have been about 20% smaller than the Kenyan ones. Scaling down from the extant species *O. afer*, the body weight of the Arrisdrift specimens is estimated to have been between 3.5 and 4 kg. Adult modern aardvarks range in weight from 40 to 65 kg with barely any sexual dimorphism (females are on average slightly lighter than males but there is a great deal of overlap in the ranges of variation of the two sexes) (Skinner & Smithers, 1990).

Conclusions

Arrisdrift has yielded several fossils of a small aardvark. The dentognathic remains are closest in size and morphology to those of *O. africanus* from the Early Miocene of Kenya,

but the postcranial bones are considerably smaller, being even smaller than those of *O. minutus* from East Africa.

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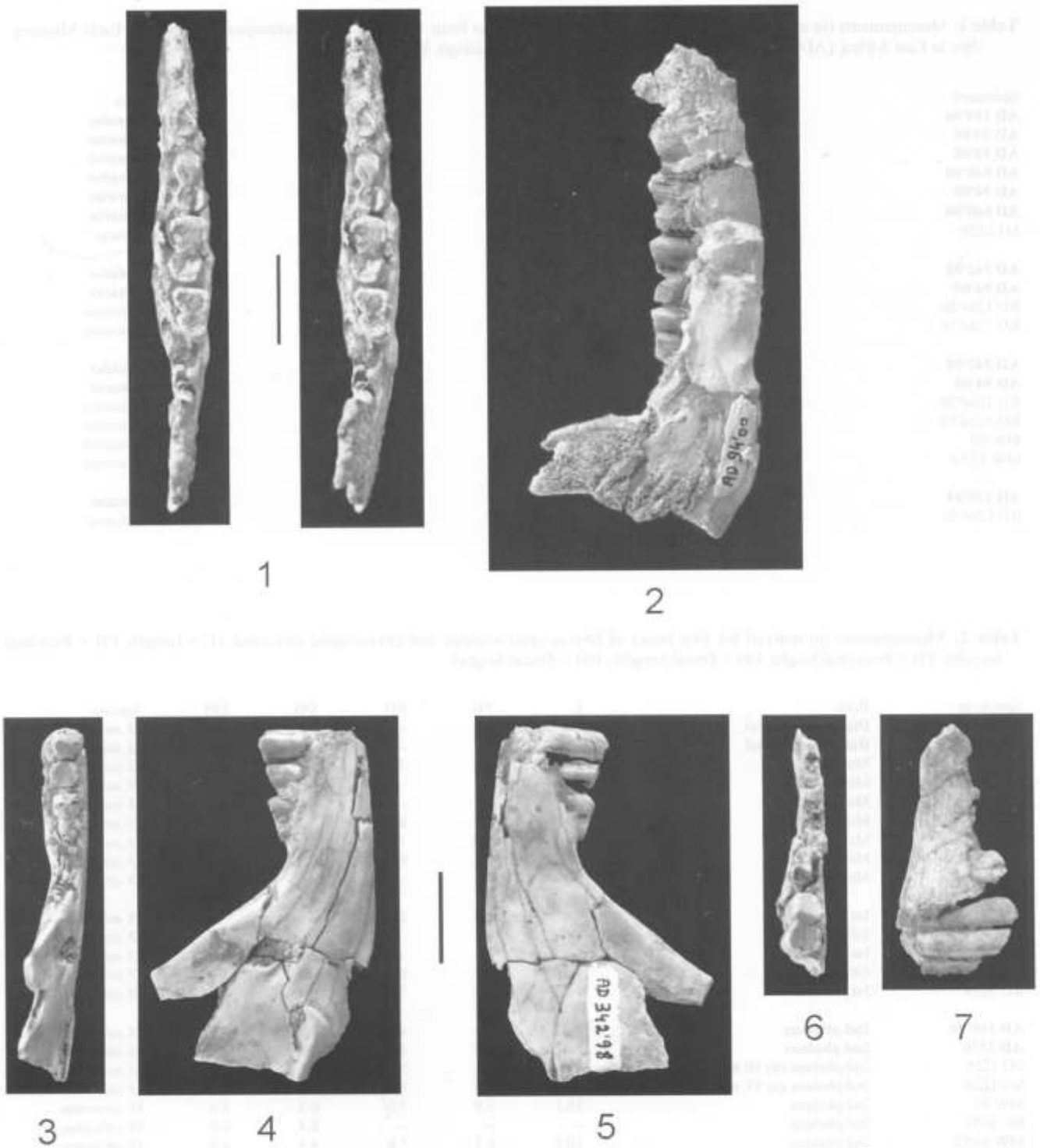


Plate 1: *Orycteropus minutus* from Arrisdrift, Namibia (Scale bars = 1 cm).
 1. AD 94'00, left mandible with P₃-M₃, stereo occlusal and lingual views.
 3-5. AD 342'98, left mandible with M₂-M₃, occlusal, lingual and buccal views.
 6-7. AD 640'00, left mandible with P₄-M₁, occlusal and buccal views.

Table 1: Measurements (in mm) of the dentition of *Orycteropus minutus* from Arrisdrift and *Orycteropus* species from Early Miocene sites in East Africa. (AD = Arrisdrift, MW = Mfwangano, RU = Rusinga, SO = Songhor)

Specimen	Tooth	Length	Breadth	Species
AD 159'96	lower premolar	4.1	2.7	<i>O. minutus</i>
AD 94'00	left P ₃	3.7	2.3	<i>O. minutus</i>
AD 94'00	left P ₄	4.8	2.6	<i>O. minutus</i>
AD 640'00	right P ₄	4.4	2.5	<i>O. minutus</i>
AD 94'00	left M ₁	6.7	4.1	<i>O. minutus</i>
AD 640'00	right M ₁	7.0	4.3	<i>O. minutus</i>
SO 1228	lower molar	7.1	3.9	<i>O. minutus</i>
AD 342'98	left M ₂	7.0	3.8	<i>O. minutus</i>
AD 94'00	left M ₂	7.7	4.6	<i>O. minutus</i>
RU 1264'50	M ₂	8.0	4.7	<i>O. africanus</i>
RU 1264'50	M ₂	7.9	4.7	<i>O. africanus</i>
AD 342'98	left M ₃	5.6	3.6	<i>O. minutus</i>
AD 94'00	left M ₃	5.6	4.3	<i>O. minutus</i>
RU 1264'50	left M ₃	6.3	4.5	<i>O. africanus</i>
RU 1264'50	right M ₃	6.5	4.7	<i>O. africanus</i>
MW'50	right M ₃	6.1	5.6	<i>O. africanus</i>
MW 61'52	left M ₃	6.7	5.5	<i>O. africanus</i>
AD 330'94	right M ²	6.4	4.6	<i>O. minutus</i>
RU 1264'50	left M ²	6.2	5.1	<i>O. africanus</i>

Table 2: Measurements (in mm) of the foot bones of *Orycteropus minutus* and *Orycteropus africanus*. (L = Length, PB = Proximal breadth, PH = Proximal height, DB = Distal breadth, DH = Distal height)

Specimen	Bone	L	PB	PH	DB	DH	Species
AD 587'94	Distal metapodial	--	--	--	3.6	5.0	<i>O. minutus</i>
AD 408'96	Distal metapodial	--	--	--	4.1	5.0	<i>O. minutus</i>
SO 1231	Metacarpal II	29.7	6.0	7.5	5.4	6.2	<i>O. minutus</i>
SO 1227	Metacarpal II	--	--	--	5.3	6.9	<i>O. minutus</i>
MW 86	Metacarpal II	--	--	--	5.9	6.8	<i>O. minutus</i>
SO 1231	Metacarpal III	29.3	6.5	8.5	5.2	7.0	<i>O. minutus</i>
SO 1230	Metatarsal III	32.5	7.0	10.1	6.9	4.9	<i>O. minutus</i>
RU 1264'50	Metacarpal II	37.3	8.1	9.9	7.2	9.0	<i>O. africanus</i>
MW 89	Metatarsal	--	--	--	8.2	6.6	<i>O. africanus</i>
AD 587'94	1st phalanx	--	4.2	5.1	--	--	<i>O. minutus</i>
MW 88	1st phalanx	--	--	--	5.6	4.9	<i>O. minutus</i>
RU 3055	1st phalanx	--	--	--	5.1	3.7	<i>O. minutus</i>
RU 3056	1st phalanx	12.3	6.5	6.0	4.5	4.3	<i>O. minutus</i>
RU 3059	1st phalanx	15.6	8.3	7.9	5.4	4.5	<i>O. africanus</i>
AD 160'96	2nd phalanx	7.9	4.6	4.3	3.7	4.1	<i>O. minutus</i>
AD 2356	2nd phalanx	8.4	4.9	4.2	3.9	3.7	<i>O. minutus</i>
SO 1225	2nd phalanx ray III manus	10.9	6.1	5.6	5.0	3.3	<i>O. minutus</i>
SO 1226	2nd phalanx ray IV manus	11.5	7.7	7.7	5.1	5.1	<i>O. minutus</i>
MW 85	2nd phalanx	15.1	7.8	7.0	6.3	4.4	<i>O. africanus</i>
RU 3051	2nd phalanx	--	--	--	8.4	6.6	<i>O. africanus</i>
MW 64'52	2nd phalanx	10.4	6.1	7.6	4.4	4.6	<i>O. africanus</i>
RU 3048	2nd phalanx ray II manus	14.3	8.5	9.4	5.2	6.3	<i>O. africanus</i>
RU 3061	2nd phalanx ray III manus	14.0	9.2	9.2	6.8	6.0	<i>O. africanus</i>
RU 1264'50	2nd phalanx ray IV manus	20.2	8.1	11.0	8.9	7.0	<i>O. africanus</i>