A COLLECTION OF PHACOCHOERUS AETHIOPICUS TEETH FROM THE KALKBANK MIDDLE STONE AGE SITE, CENTRAL TRANSVAAL

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I. Introduction

A Middle Stone Age site at Kalkbank, near Pietersburg in the northern Transvaal, has recently been excavated for the Archaeological Survey[1] by R. Mason: a description of the site and the archaeological findings is shortly to be published (Mason, in press). In addition to the cultural material, animal remains are abundant; the present paper deals with the Suid material which has been found at Kalkbank. This consists of a large collection of teeth, almost all isolated, comprising (apart from much damaged fragments) 53 reasonably complete third, 29 second and 10 first molars, together with 29 upper and 25 lower canines and a single last milk molar.

As will be shown later, this material is all referable to the extinct *Phacochoerus aethiopicus* (Pallas). It constitutes the best collection of material of this species from a single locality that is at present available for study, and therefore adds something to our knowledge of the characteristics of the dentition of this species.

II. Description

The specimens all belong to an advanced species of *Phacochoerus,* clearly either the extant *P. africanus* (Gmelin) or the extinct *P. aethiopicus* (Pallas). Since the main difference between these two species lies in the later rooting of the third molars in the latter, it will be convenient to consider these teeth first.

(i) *Third molars*

The 53 reasonably complete specimens may be grouped, according to their state of wear, into 6 categories as follows:—

Stage 1: not yet fully erupted.

„ 2: just fully erupted, with wear on posterior columns very slight.

„ 3: posterior columns fully in wear, but no fusion of columns at the anterior end of the tooth has yet occurred.

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1 The Kalkbank excavation was made possible by the generous financial assistance of the Wenner Gren Foundation for Anthropological Research.

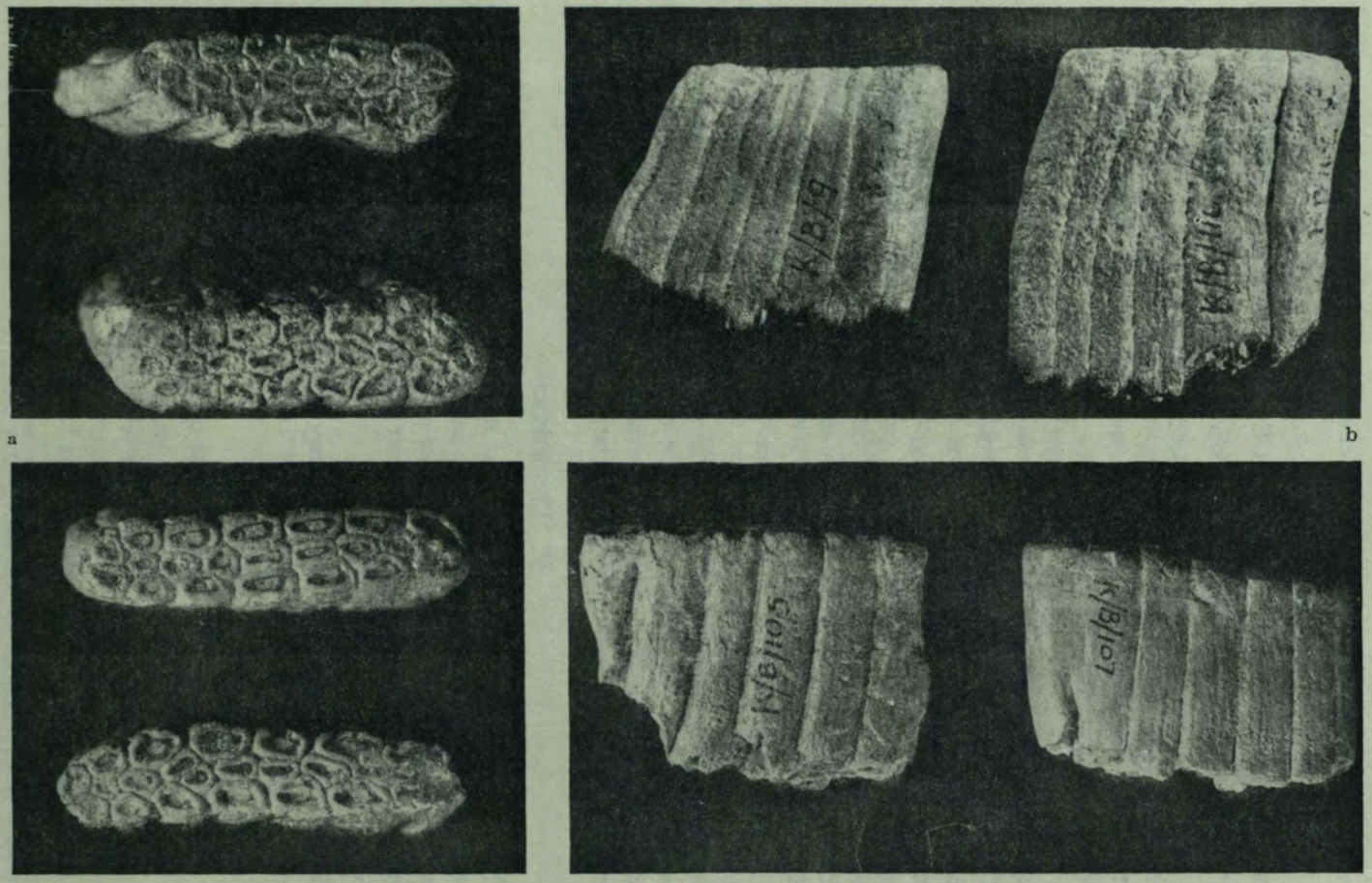

Figure 1—(a) & (b) occlusal and side views of third molar teeth in wear stage 3. The crowns are fully in wear, but root formation has not yet started.
(c) & (d) occlusal and side views of third molar teeth in wear stage 5. Fusion of cusps at the anterior end involves lateral columns of both sides: root formation is taking place.

Stage 4: wear sufficient for traces of fusion of cusps to be evident at the anterior end of the tooth, but the process of fusion as yet involves lateral columns of one side only.

„ 5: wear sufficient for the anterior columns of both sides of the tooth to be involved in fusion.

„ 6: heavily worn.

The teeth were first sorted into these categories, and then the state of root formation in each specimen was noted, with the following results:—

Stage no.	*No. of specimens*	*No. with roots*
1	13	0
2	3	0
3	11	0
4	18	3 distinct, 3 incipient.
5	6	6
6	2	2

Root formation starts during stage 4, well after the whole tooth is erupted and by stage 5 roots are clear in all specimens (Figure 1). There is no evidence of any heterogeneity in the material, and no reason to do otherwise than refer all the specimens to the late-rooting *P. aethiopicus*.

There is considerable variation in the number of cusps composing the marginal and median rows. Shaw (1939) notes that the same is true of *P. africanus* and gives the following values for that species.

	$M^{\frac{3}{2}}$		$M_{\overline{3}}$	
	marginal	median	marginal	median
Mode	7	7	7	8
Range	6-10	7-13	6-9	7-13

For the Kalkbank material the corresponding figures are:—

	$M^{\frac{3}{2}}$		$M_{\overline{3}}$	
	marginal	median	marginal	median
Mode	7	7	7	10
Range	5-8	5-12	6-8	8-13

The figures are very similar, and such differences as there are can hardly be taken as sufficient evidence of a specific difference in cusp numbers. There may, however, be some difference in the frequency with which extra cusps occur in the median row. In the Kalkbank specimens 8 out of 32 complete and fully erupted specimens show extra medians, whereas Shaw (1939) reports only 6 cases out of what appears to have been a larger collection of teeth of the extant species. The extra cusps are of the same type as those described by Shaw — the majority confined to the posterior part of the tooth, and lacking the regularity of arrangement characteristic of *P. compactus* (van Hoepen & van Hoepen).

Table 1

Dimensions of third molar teeth — fully erupted but not heavily worn. All measurements in this and the succeeding tables are given in millimeters.

$M\frac{3}{3}$

Specimen no.	Stage of wear (see text)	Occlusal length	Maximum length	Occlusal breadth (at 2nd cols.)	Maximum breadth	Maximum height preserved
K/B/108	3	47·9	52·2	11·3	11·7	42·5
K/B/101	„	ca. 47	ca. 49	11·5	12·2	46·8
K/B/104	„	56·0	63·8	12·8	13·1	45·2
K/B/87	4	57·3	57·3	13·7	15·3	47·8
K/B/55	„	47·3	48·4	12·2	12·3	49·6
K/B/102	„	ca. 48	ca. 48	ca. 11	13·7	45·9
K/B/92	„	56·5	56·9	11·0	13·7	43·2
K/B/98	„	54·1	56·2	11·1	14·3	43·1
K/B/72	„	53·0	54·0	12·0	12·2	44·3
Mean & standard error		51.90±1·44	53·98±1·88	11·84±0·31	13·17±0·39	
Standard deviation		4·32	5·65	0·93	1·18	
Coefficient of variation		8·3	10·5	7·8	9·0	
Range		ca. 47—57·3	ca. 48—63·8	ca. 11—13·7	11·7—15·3	
Range for *P. africanus* (given by Cooke 1949)		45—50	50—60	11—14		

$M\frac{3}{3}$

Specimen no.	Stage of wear (see text)	Occlusal length	Maximum length	Occlusal breadth (at 2nd cols.)	Maximum breadth	Maximum height preserved
K/B/16*	3	44·4	51·7	13·4	14·4	51.8
K/B/74*	„	42·3	50·0	13·5	14·6	50·5
K/B/116	„	47·7	54·0	15·9	16·5	59·5
K/B/69	„	46·8	50·5	12·6	13·8	42·4
K/B/5	„	52·4	62·1	15·6	16·4	68·4
K/B/2	„	58·5	58·5	14·2	15·6	46·0
K/B/9	„	44·5	53·7	14·6	15·3	45·9
K/B/110	„	44·8	49·7	14·7	15·0	57·0
K/B/6	4	52·1	54·6	14·6	16·2	50·5
K/B/53	„	54·0	56·3	14·8	16·0	51·0
K/B/17	„	ca. 53	53·3	16·2	17·0	52·6
K/B/8	„	48·2	50·5	13·9	15·0	42·1
K/B/54	„	50·2	55·2	14·9	15·5	59·7
K/B/18	„	50·2	56·8	15·5	16·1	50·3
K/B/48	„	53·6	54·9	16·2	16·5	51·0
K/B/1	„	ca. 58	59·5	16·0	16·8	51·2
K/B/125	„	ca. 51·5	53·9	13·3	14·0	42·8
K/B/11	„	47·8	48·7	14·2	15·4	48·7
K/B/7	„	62·1	62·1	15·5	16·0	49·7
K/B/12	„	62·1	64·8	15·6	16·1	53·1
Mean & standard error		51·08±1·25	55·04±0·98	14·76±0·23	15·61±0·20	
Standard deviation		5·57	4·39	1·03	0·89	
Coefficient of variation		10·9	8·0	7.0	5·7	
Range		42·3—62·1	48·7—64·8	12·6—16·2	13·8—17·0	
Range for *P. africanus* (given by Cooke 1949)		45—55	55—65	12—15		

* Probably left and right teeth of a single individual.

Measurements of the third molars are given in table 1. Since the tooth dimensions change considerably during growth and attrition, the measurements have been restricted to teeth in stages 3 and 4, i.e. they refer to fully erupted teeth which are not yet heavily worn and they are thus comparable with the estimates given by Cooke (1949) for teeth of *P. africanus* which are "fully erupted but at an early stage of root formation". Cooke's figures for what he describes as a reasonable range of variation for certain dimensions of the third molars in the living species are given for comparison in table 1. Specimens as much as 5 mm. in excess of the limits given, Cooke considers to be "extremely rare", but Leakey (1942) is of the opinion that the range is greater than this and gives 33-75 mm. as the range for the length of 10 specimens of M_3 in his collection. He does not, however, specify the stages of wear represented, and, of course, younger and older teeth will be expected to cover a greater size range than Cooke's selected material.

In the Kalkbank material three specimens of M^3 (numbers K/B/ 5, 7 & 12) are rather larger than the others, but do not exceed Cooke's limits, while one M_3 (K/B/ 104) exceeds his limits, but by less than 5 mm. In other respects these three teeth resemble the rest of the material and there seems to be no justification for concluding that they do not belong to the same species. It is, of course, quite possible that large individuals may have been commoner in *P. aethiopicus* than they are in extant *P. africanus*.

(ii) *Anterior cheek teeth.*

The second and third molars do not show any characters which differentiate them from those of *P. africanus*. Unfortunately, no complete jaws are known, so that it is not possible to see whether the anterior cheek teeth are shed any earlier than in the extant species. Measurements of the second and first molars and the single dm_4 are given in tables 2 and 3.

(iii) *Lower canines.*

Nineteen lower canine specimens from Kalkbank are available. They appear to differ from those of the extant species in three respects (see figures 2 and 3). Firstly, the curvature appears to be rather less. To make certain that this difference is real would require for comparison a much larger collection of tusks of *P. africanus* at different ages than is at my disposal, so that at present this remains purely as a subjective "impression".

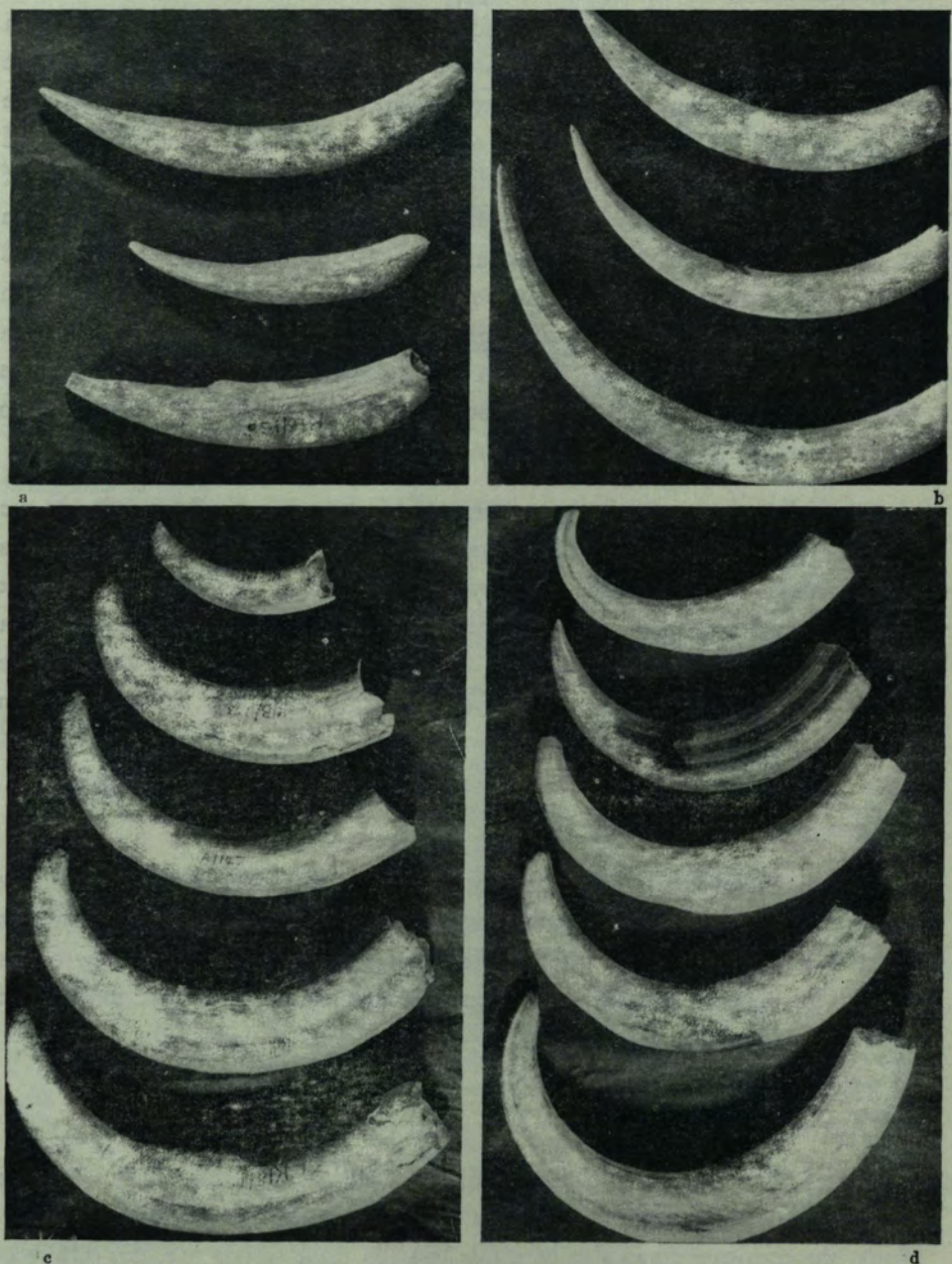

Figure 2—(a) & (c) lower and upper canines of *P. aethiopicus* from Kalkbank.
(b) & (d) lower and upper canines of extant *P. africanus*.

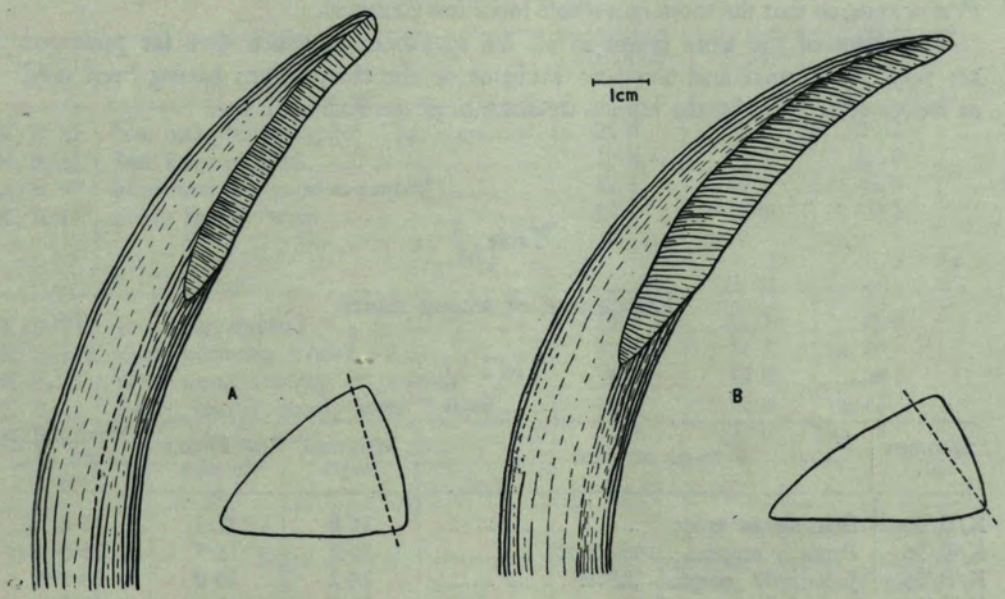

Figure 3—Lower canines of (A) *P. aethiopicus* (specimen K/B/157) and (B) extant *P. africanus* in side view and transverse section. The broken lines through the sections represent the direction of the plane of the wear facets. The scale refers to the side views; in the transverse sections the magnification has been doubled.

Secondly, the angle of the wear facet is slightly different. In *P. africanus* the wear facet usually makes an angle with the posterior face of the tooth, so that the dorsal corner (i.e. the junction of posterior and antero-dorsal faces) is sliced off and considerably more of the antero-dorsal than of the antero-ventral face is removed by wear. In most of the fossil teeth the wear is more nearly parallel to the posterior face and consequently antero-dorsal and antero-ventral faces are almost equally reduced by wear. There is considerable individual variation both in the fossil and in the extant species and not every tusk could be assigned to its correct species on this character, but parallel wear does seem to be distinctly commoner in the former than in the latter — presumably reflecting a slight difference in the orientation of the teeth in the jaw.

Thirdly, the teeth are less flattened in the fossil than in the extant species. This can be expressed numerically in terms of the ratios of the widths of the antero-dorsal and antero-ventral faces to the width of the posterior face. In the extant species these ratios remain reasonably constant over a wide size range and there is no evidence of any consistent change with increasing size. The lengths of the

three faces and the ratios are given in table 4. Although the ranges overlap slightly, the differences between the means for *P. africanus* and *P. aethiopicus* are statistically significant: for both ratios $P < 0.01$. We may therefore conclude that in *P. aethiopicus* the posterior face of the lower canine is relatively wider than in *P. africanus*, so that the tooth as a whole looks less flattened.

The edges of the wear facets in all the specimens in which they are preserved are perfectly normal and show no evidence of the sharp edges having been used as knives or scrapers by the human inhabitants of the Kalkbank site.

Table 2

Dimensions of second molars

$M\frac{2}{2}$

Specimen no.	Stage of wear	Maximum length	Maximum breadth	Maximum height of crown
K/B/68	Starting to erupt	24·8	11·1	25·8
K/B/56	Partially erupted	26·1	11·3	33·5
K/B/66	Just fully erupted	24·2	10·0	30·2
K/B/112	Just fully erupted	25·5	12·6	42·2
K/B/61	Fully erupted, not yet rooted	24·1	10·7	37·0
K/B/75	Moderately worn, not yet rooted	21·0	10·7	35·8
K/B/89	Moderately worn, root formation starting	22·2	11·7	ca. 35
K/B/109	(Incomplete) Moderately worn	—	11·3	30·6
K/B/32	Roots formed	20·0	12·3	23·0
K/B/88	Roots formed	21·9	12·3	ca. 24
K/B/121	Well worn	20·0	10·9	20·0
K/B/57	Heavily worn	ca. 19	12·5	ca. 12
K/B/31	Very heavily worn	18·8	13·2	ca. 7
K/B/36	Very heavily worn	—	12·4	—

$M\frac{2}{2}$

K/B/81	Partially erupted	26·5	13·5	—
K/B/118	Partially erupted	24·2	13·1	—
K/B/24	Just fully erupted, not yet rooted	22·9	13·5	39·0
K/B/27	(Incomplete) Fully erupted	20·5	13·5	—
K/B/29	Root formation started	20·8	16·6	36·9
K/B/28	Well worn — roots present	19·1	15·5	24·8
K/B/34	Well worn — roots present	18·8	14·9	23·3
K/B/30	Very heavily worn	19·4	15·9	ca. 8

Table 3

Dimensions of first molars and milk molar.

M^1

Specimen no.	Stage of wear	Maximum length	Maximum breadth	Maximum height of crown
K/B/82	Not quite fully erupted	21·6	9·7	29·2
K/B/85	Just fully erupted	22·8	9·8	27·8
K/B/97	Moderately worn, roots formed	19·6	10·4	12·5
K/B/117	Fairly heavily worn	17·3	10·0	9·5

M_1

K/B/73	Just fully erupted	22·9	11·5	31·9
K/B/124	Root formation started	17·4	11·7	ca. 20
K/B/33	Well worn; rooting in progress	18·7	12·8	20·3
K/B/63	Fairly heavily worn; roots formed	18·0	12·0	ca. 12
K/B/26	Fairly heavily worn	15·4	12·0	ca. 7

dm_4

Specimen no.	Stage of wear	Maximum length	Maximum breadth		
			anterior pillars	middle pillars	posterior pillars
K/B/65	Crown just fully in wear	18·7	6·1	7·8	9·1

(iv) *Upper canines*

The 29 upper canine specimens include tusks belonging to animals of all ages. They range from small immature specimens, with a maximum diameter near the base of ca. 25 mm. to tusks of mature animals with a maximum diameter of ca. 45 mm. which would be regarded as large, but by no means abnormal, for the extant species.

As in the case of the lower tusks, the uppers give the impression of being slightly less curved than those of *P. africanus* (see Figure 2). It would, however, be even more difficult than in the case of the lower tusks to establish the reality of this difference, for the range of variation shown in the living species is very great, including marked sexual dimorphism (Ewer, in press). Moreover, since the curvature is greatest near the tip, a slightly incomplete tooth may give a misleading impression.

A number of the upper tusks have been gnawed by rodents. In most cases the tooth marks are so large that the only reasonable suggestion as to their authorship is that they have been made by porcupines. This suggests that the K'lkbank tool-makers did not attach particular value to the tusks, but left them lying about where they were easily accessible to porcupines.

Table 4

Dimensions of lower canines

Specimen no.	Widths measured between wear facet & gum line			Ratios	
	(1) Posterior face	(2) Antero-ventral face	(3) Antero-dorsal face	(2): (1)	(3): (1)
K/B/158	8·7	12·1	12·0	1·39	1·38
K/B/162	9·0	14·0	13·4	1·55	1·49
K/B/167	9·1	11·5	12·4	1·27	1·36
K/B/168	9·4	12·5	13·1	1·33	1·40
K/B/166	9·5	13·2	13·5	1·39	1·42
K/B/176	9·7	13·3	13·2	1·37	1·36
K/B/177	9·7	12·3	12·0	1·27	1·24
K/B/180	9·7	12·4	13·2	1·28	1·32
K/B/164	9·8	12·9	11·0	1·32	1·12
K/B/178	9·8	13·5	13·7	1·38	1·40
K/B/172	9·9	15·7	14·4	1·59	1·46
K/B/161	10·0	13·4	13·4	1·34	1·34
K/B/173	10·3	13·4	13·6	1·30	1·32
K/B/165	10·5	14·9	14·7	1·42	1·40
K/B/160	10·6	15·6	15·5	1·47	1·46
K/B/159	11·0	14·4	13·4	1·31	1·22
K/B/171	11·0	17·0	16·2	1·55	1·47
K/B/181	11·1	16·8	16·1	1·51	1·45
K/B/156	11·4	14·6	15·3	1·28	1·34
K/B/174	11·8	18·9	16·3	1·60	1·38
K/B/182	11·8	15·4	15·4	1·31	1·31
K/B/157	12·5	17·5	17·0	1·40	1·36
K/B/163	13·1	16·8	16·6	1·28	1·27
K/B/175	14·8	20·6	18·7	1·39	1·27
K/B/155	15·1	24·3	19·8	1·61	1·31
Mean & standard error				1·396±0.0220	1·354±0·0171
Standard deviation				0·1099	0·0854
Coefficient of variation				7·9	6·3
Range				1·27—1·61	1·12—1·49

Table 4 (continued)

Dimensions of lower canines of extant *Phacochoerus africanus*

Specimen no.	Widths measured between wear facet & gum line			Ratios	
	(1) Posterior face	(2) Antero-ventral face	(3) Antero-dorsal face	(2): (1)	(3): (1)
A.M. 1644	7·6	12·2	12·0	1·61	1·58
R.U. 2	9·5	16·5	16·1	1·74	1·70
R.F.E. 2	9·5	16·2	15·5	1·71	1·63
A.M. N875	10·2	15·5	14·4	1·52	1·41
R.U. 1	10·5	19·2	18·8	1·83	1·79
R.F.E. 3	10·8	19·1	18·2	1·77	1·69
A.M. Ohl.	10·8	15·2	14·6	1·41	1·35
R.F.E. 4	11·0	20·2	19·7	1·84	1·79
R.F.E. 1	12·0	20·0	19·1	1·67	1·59
A.M./G.C.	12·3	20·7	19·8	1·68	1·62
A.M.5829	12·8	19·2	20·0	1·50	1·56
		Mean and standard error		1·662±0·0418	1·610±0·0417
		Standard deviation		0·1389	0·1383
		Coefficient of variation		8·4	8·6
		Range		1·41—1·84	1·35—1·79

Dimensions of lower canines of Cape Warthog

N.M. A 1411 right	ca. 14·0	19·6	17·5	ca. 1·40	ca. 1·25
N.M. A 1411 left	ca. 14·0	ca. 19·5	17·5	ca. 1·39	ca. 1·25
S.A.M. 21370	12·0	16·6	14·9	1·38	1·24
S.A.M. 21371	13·1	17·8	16·4	1·36	1·25

III. Discussion

The name *Phacochoerus aethiopicus* is normally used by palaeontologists to denote an advanced phacochoere which differs from the extant *P. africanus* in the later rooting of the third molar teeth. In practice this means that third molars which root early are identified as *P. africanus,* while later rooting specimens are referred to *P. aethiopicus.* A neontologist might be inclined to question the legitimacy of this procedure and feel tempted to suggest that a difference of this type may have a very simple genetic basis and be no more indicative of specific distinction than are blood group differences in man. It is therefore necessary to consider whether there is indeed sufficient evidence to warrant the specific distinction.

A second question concerns the relationship of the fossil *P. aethiopicus* to the recently extinct Cape Warthog, to which the same name is normally applied: they agree in the single character of late-rooting molars, but is it certain that the two are in fact the same species?

Lönnberg (1908), on the basis of differences in skull proportions attempted to characterise what he called "races" of Warthog — but since he referred to them by the normal binomial nomenclature used to designate species, it is not clear exactly what he meant by the term. His "races" include *P. aethiopicus,* of which vestigial incisors shed earlier than in other "races" is given as one diagnostic character. Lönnberg's differences in skull proportion have subsequently been shown by Shaw (1939) to be useless as taxonomic characters, but the van Hoepens (1932), in a study based largely on a single skull thought to belong to the Cape Warthog, pointed out the delayed rooting of the molar teeth and confirmed the great reduction of the incisors. This skull, number 1411 in the National Museum collection, is the only known Cape Warthog skull to be found in any South African museum collection, and even its origin is not certain. It is therefore necessary firstly to consider all the characteristics now known for fossil *P. aethiopicus* and decide whether these warrant separation from *P. africanus;* secondly, to see whether all of the characters are also shown by the van Hoepen's Cape Warthog skull.

The characters of fossil *P. aethiopicus* distinguishing it from *P. africanus* are as follows:—

1. Rooting of the third molars does not start until well after the tooth is fully erupted and the whole length of the crown in wear.

2. The lower incisors are vestigial. This character is not visible in the Kalkbank material, but is shown by a mandible from Florisbad described in a previous paper (Ewer 1957).

3. The anterior cheek teeth are probably shed a trifle earlier. This character is also shown in the Florisbad material.

4. The lower canines are less flattened, the wear facet tends to be less sloping and the curvature of both upper and lower tusks appears to be a trifle less.

Thus, although the single character of early or late rooting of the third molars is alone normally used to distinguish *P. africanus* and *P. aethiopicus* the two do in

fact differ not in one but in a number of characters affecting the whole of the dentition. It seems difficult to believe that such a constellation of characters could exist unless it did reflect a specific difference, and it therefore seems justifiable to regard *P. aethiopicus* as a valid species, distinct from *P. africanus*.

The van Hoepen's Cape Warthog skull is described as showing two of the *aethiopicus* characters listed above — late rooting molars and vestigial incisors. Examination of the specimen shows that in fact the others are also present (see figure 4). Although the third molars are not much worn the other cheek teeth have been lost, the second molars not long before the death of the animal, for partially filled alveoli are still present. At a comparable stage of third molar wear, *P. africanus* normally possesses at least last premolars and second molars, while the first molars may either be present but much worn or have been recently shed. The characters of the lower canines of specimen N.M. 1411 agree perfectly with those of fossil *P. aethiopicus*: they are not much curved, have a wear facet which is very little slanted and are less flattened than is usual in *P. africanus*. Measurements of the lower canines are included in table 4. This specimen therefore agrees in all particulars with the fossil *P. aethiopicus,* and there thus seems to be no doubt of the specific identity of the latter with the Cape Warthog.

On a recent visit to the South African Museum two of the Warthog skulls in the collection were found to agree in all particulars with *P. aethiopicus*. Unfortunately no details as to their dates and localities are known, but there is no doubt of their being Cape Warthog and they are easily distinguishable from specimens of the extant *P. africanus,* as shown by the following particulars:—

Specimen no. S.A.M. 21370

Third molars at wear stage 5, but only the merest indications of root formation starting at the anterior end of the teeth: lower incisors worn off level with the bone: no cheek teeth other than third molars present, but small alveoli of a recently used upper premolar are present: lower canines broad, rather forwardly directed and worn off abruptly.

Specimen no. S.A.M. 21371

Third molars at wear stage 3, with no sign of root formation: lower incisors only represented by minute vestiges: anterior cheek teeth comprise much worn M^2 and small premolar alveolus in the maxilla and in the mandible alveoli for two teeth anterior to M_3: of the lower canines only a small stump remains on one side, but this suffices to give the relative lengths of the three faces. Measurements of the lower canines of these two specimens are given in table 4, and it can be seen that both agree with those of fossil *P. aethiopicus*.

Another characteristic of these skulls is that the sinuses in the zygoma below the orbit are extensive, so that the bone has a more inflated appearance than is usual in the extant species. This character is highly variable and is affected by the age and sex of the individual and its importance could therefore be assessed only by a comparison of extensive series of skulls. It is, however, of some interest to note that Lydekker (1894) distinguishes two types of Warthog — one "distributed

Figure 4—**Mandibles of, on left, Cape Warthog, N.M. 1411 and, on** right, extant *P. africanus* with third molars at similar stages of wear.

over a large part of the eastern side of Africa, ranging as far north as Abyssinia", the other "confined to south eastern Africa". In the latter the sub-orbital warts are described and figured as long and pendulous. My own observations on living Warthog have been confined to Zululand, but I have not seen an animal with warts resembling those figured by Lydekker. It seems possible that Lydekker's southern type was the now extinct *P. aethiopicus* and that in this species the sub-orbital warts differed from those of *P. africanus* — a difference which might well be accompanied by a difference in the structure of the bone underlying and supporting the wart.

I have not been able to find any accurate records of the distribution of the Cape Warthog within historic times but, from the writings of the early naturalists, it is clear that the animal was found as far south as the Cape Province, although it was not abundant. At some time towards the end of the nineteenth century the Cape Warthog was shot out. This suggests that northward from the Cape its range cannot have been very extensive — possibly it did not occur north of the Vaal river — for Warthog were not eliminated from Zululand and the Transvaal, but the survivors in these areas are *P. africanus*. In the past the range of *P. aethiopicus* must have been wider, since at Kalkbank it was clearly abundant in Middle Stone Age times. What caused the restriction in range between the Middle Stone Age and historic times remains unclear. Competition with *P. africanus* appears to have been involved, with climatic and associated vegetational change possibly playing a part. It seems clear that *P. aethiopicus,* once abundant and widespread, as shown by its fossil remains, had become rare and restricted in range by the time European colonisation of the Cape took place, and that fire arms only accounted for the remnants of a species already well on the way to extinction. It is therefore very important that careful specific identification should be made of all fossil and sub-fossil Warthog remains from South Africa, so that more detailed information about the southward spread of *P. africanus* and disappearance of *P. aethiopicus* may be obtained. Such information may be of value in determining the relative ages of archaeological sites in southern Africa.

IV. Summary

Fossil suid remains from Kalkbank are identified as belonging to *Phacochoerus aethiopicus* (Pallas). Measurements of the teeth are given and a new specific character, namely that the lower canines are less flattened than in *P. africanus,* is noted.

The validity of the specific distinction between *P. aethiopicus* and *P. africanus* is considered and it is concluded that the two are distinct species.

The Cape Warthog skull described by van Hoepen & van Hoepen (1932) is found to show all the diagnostic characteristics of fossil *P. aethiopicus* and it is concluded that the identification of the recently extinct Cape Warthog with the fossil *P. aethiopicus* is correct. Two skulls in the South African Museum collection are identified as belonging to *P. aethiopicus.*

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