Palaeont. afr., **14**. 87–92. 1972

A NEW SPECIES OF MACHAERODONT FROM MAKAPANSGAT

by

G. E. Collings

ABSTRACT

The skull and associated mandible belonging to a new species of machaerodont, *Megantereon problematicus* Collings is described. The specimen came from the lowermost horizon of banded and contaminated travertines at the Makapansgat Limeworks. An estimate of its relationship with other sabre tooth cats is given.

CLASSIFICATION

Class – Mammalia
Order – Carnivora
Sub-order – Fissipedia
Infra-order – Aeluroidea
Family – Felidae
Sub-family – Machaerodontinae
Genus – *Megantereon* Croizer and Jobert
Species – *Megantereon problematicus* nov.

DIAGNOSIS

A large *Megantereon*, whose carnassials are longer and narrower than any previously described species of this genus. The carnassial width to length ratio is 1 : 3, as opposed to all other described *Megantereon* species, which have a carnassial width to length ratio not exceeding 1 : 2.

INTRODUCTION

The Pliocene/Pleistocene sabre tooth cats are an assemblage of unrelated genera, which are assumed to have radiated from an earlier Oligocene felid stock, represented by *Dinictis* and *Hoplophoneus* (Matthew 1910). Both of these showed machaerodont tendencies, but it was probably the comparatively unspecialised *Dinictis* which led to the varied group of later sabre tooths, as well as the modern felids. The Pleistocene sabre tooths can be separated into a number of groups, each following slightly different lines of machaerodont modification. *Megantereon* and *Smilodon* are superficially very similar, and may be said to have been the most specialised of the Pleistocene sabre tooths. However, on closer analysis, they appear quite unrelated, and could be examples of parallel evolution. *Megantereon*, *Machaerodus* and *Therailurus* belonged to the Old World, and seem to have co-existed in the same habitats, while *Smilodon*, so far, has only been found in the New World.

DESCRIPTION

The specimen, No. M.8280 of the Bernard Price Institute for Palaeontological Research, is the incomplete skull and mandible of a large machaerodont belonging to the genus *Megantereon* (Figs. 1, 2, and 3). It was recovered by Mr. J. W. Kitching, in 1958, from the layer of banded and contaminated travertines at the site of the so-called "Ancient Entrance" at the Makapansgat Limeworks. These impure travertines are immediately overlain by the 'basal red breccia' (calcified red mud of Brain–1958) which is, in turn, succeeded by the relatively thin layer of exceedingly bone-rich grey breccia. The skull is considerably distorted, having been subject to lateral compression during fossilization, and a great deal of the cranium is missing. The teeth and mandible however are perfectly preserved, and enable an accurate diagnosis of the genus and species.

The preserved features of the skull, such as the small coronoid process and the specialisation of the teeth, are in agreement with those of the genus *Megantereon*. However, specimen M.8280 is defined as a new species of *Megantereon* on the basis of certain dental characters, which have not been observed in other machaerodonts previously described. The general proportions of the lower carnassials in all other species of *Megantereon* are about twice the width to the length, whilst in specimen M.8280, the length is approximately three times the width. A comparison of its teeth measurements with those of some other *Megantereon* species and the South African sabre tooth cats is given in Table 1.

A brief description of the dentition now follows (Figs. 1–7). The upper canines are much flattened laterally, crenulated, moderately long, but only slightly curved; P^3 is much reduced; P^4 has a vestigial protocone and a well developed parastyle; M^1 is small and rounded. The mandible has a deep symphysis, a mental crest and a mental process; the coronoid process is much reduced. The lower canines are comparatively small and raised above the level of the cheek teeth; P_3 is much reduced; P_4 has well developed accessory cusps; M_1 has a vestigial metaconid.

DISCUSSION

The inner surface of both upper and lower tooth rows had been worn extensively to form a continuous oblique shearing plane and the individual cusps had been obliterated to form one

longitudinal ridge. This indicates that the animal was old at the time of death. Observations on the teeth revealed that the animal also suffered from some dental defects. The right upper canine has a greater antero-posterior length than the left one and this seems to be the result of a genetic abnormality. This caused it to shear unnaturally against the lower canine in jaw closure and may have contributed to differential wear on both sides of the cheek teeth.

P_3 and P_4 on the left side had been broken in life, and the left P^3, which opposes P_3, is also broken (compare Figs. 5 and 6). This may have influenced the animal to use the right side more while masticating, as the right teeth appear more worn than the left.

The geological age of specimen M.8280 is estimated as Lower Pleistocene. The fossil fauna of Makapansgat shows a similarity with the oldest horizon of the Omo beds in East Africa. These have been dated by the Potassium–Argon method as 4,1 million years old, with the youngest horizon being 1,4 million years old (Cooke 1970, pers. comm.). This makes the Omo beds older than the European Villafranchian with which it was previously thought they corresponded. However, in view of the extremely specialised dentition of *Megantereon problematicus* it is more likely that the Makapansgat fossil fauna accumulated somewhat later, at an age that corresponds to the accepted Lower Pleistocene. Although the European species of *Megantereon* are regarded as Lower Pleistocene (Stirton 1951), there are descriptions of other species from the Upper Pliocene of India (Pilgrim 1932, Colbert 1935), and from the Lower Pliocene of China (Young 1935, Teilhard de Chardin 1939, Chang 1957) which gives this genus a long range in time. It is quite possible that an African species could have evolved independently from a Pliocene group and reached a high degree of specialisation by Lower Pleistocene times.

SUMMARY

1. The skull of a machaerodont from the Makapansgat Limeworks is described.
2. It is ascribed to a new species, *Megantereon problematicus* Collings, on the basis of its unique dental pattern.
3. A determination of the age of the deposit is estimated as probably Lower Pleistocene.

ACKNOWLEDGEMENTS

This work was completed as part of the honours course in Palaeontology at the University of the Witwatersrand, and I am extremely grateful to all those who gave their advice and encouragement in its production; Mr. J. W. Kitching, who did most of the preparation on the skull; Dr. A. R. I. Cruickshank, who read the manuscript; Mr. B. Maguire and Miss J. Roets for discussion, and Dr. C. K. Brain, who kindly lent me sabre tooth specimens from the Transvaal Museum collections.

Explanations to text figures

Fig. 1 Right lateral view of skull M.8280.
Fig. 2 Palatal view of skull M.8280.
Fig. 3 Outer view of right mandible M.8280.
Fig. 4 Inner view of left mandible M.8280.
Fig. 5 Inner view of right cheek teeth M.8280.
Fig. 6 Outer view of left cheek teeth M.8280.
Fig. 7 Dorsal view of lower jaw. Distortion corrected. M.8280.

Key to Abbreviations

al.	alveolus
ant. acc. csp.	anterior accesory cusp
cor. proc.	coronoid process
con.	condyle
eam.	external auditory meatus
fr.	frontal
g.	glenoid
iof.	infra-orbital foramen
j.	jugal
m.	maxilla
man. for.	mandibular foramen
man. sym.	mandibular symphysis
men. cr.	mental crest
men. for.	mental foramen
men. proc.	mental process
meta.	metacone
o.	orbit
p.	parietal
pal.	palatine
para.	paracone
parad.	paraconid
parast.	parastyle
proto.	protocone
protod.	protoconid
pt. lac. for.	posterior lacerate foramen
pt. pal. for.	posterior palatal foramen
s.	squamosal
tb.	typanic bulla

REFERENCES

BRAIN, C. K., (1958). The Transvaal Ape-Man bearing cave deposits. *Transv. Mus. Mem.* No. 11.

CHANG, H. C., (1957). On new material of some machaerodonts of Pontian age from Shansi. *Vertebr. Palasiat.*, 1, No. 3, 193–198.

COLBERT, E. H., (1935). Siwalik mammals in the American Museum of Natural History. *Trans. Am. Phil. Soc.*, 26, 1–401.

MATTHEW, W. D., (1910). The Phylogeny of the Felidae. *Bull. Am. Mus. nat. Hist.*, 28, 289–316.

PILGRIM, G. E., (1932). The fossil Carnivora of India. *Palaeont. Indica.*, 18, 1–232.

STIRTON, R. A., (1951). Principles in correlation and their application to later Cenozoic Holarctic continental mammalian fauna. *Rept. 18th Internat. Geol. Congr. London.*, 11, 74-83.

TEILHARD DE CHARDIN, P., (1939). On two skulls of *Machairodus* from the lower Pleistocene beds of Choukoutein. *Bull. Geol. Soc. China*, 19, 235–256.

TABLE I*

A comparison of dentitions of some *Megantereon* spp. from Asia and Europe with South African machaerodonts

		Therailurus barlowi (Ewer)	*Therailurus piveteaui* Ewer	*Machaerodus transvaalensis* Broom	*Megantereon whitei* Broom	*Megantereon gracilis* Broom	*Megantereon problematicus* Collings	*Megantereon eurynodon* Ewer	*Megantereon falconeri* Pommel	*Megantereon palaeindicus* (Bose)	*Megantereon praecox* Pilgrim	*Megantereon inexpectatus* Teilhard	*Megantereon nihowanensis* Teilhard & Piveteau	Isolated canine associated with *M. nihowanensis*	*Megantereon megantereon* Croizet & Jobert
Upper Canines	crown height	57,0	±43,0	60,0	–	–	55,8	74,0	–	–	–	–	–	50,0	80,0
	ant. post.	24,3	20,0	23,9	–	–	34,3	25,5	–	–	–	25,0	–	31,0	22,2
	trans.	15,0	12,0	12,7	–	–	14,0	12,8	–	–	–	10,0	–	13,0	–
p^3	ant. post.	18,4	19,4	–	–	–	10,8	12,0	12,5	–	–	16,0	18,0	–	–
	trans.	8,8	8,9	–	–	–	5,7	5,4	6,3	–	–	7,0	–	–	–
p^4	ant. post.	36,9	40,0	–	–	–	53,2	30,2	33,0	–	13,0	35,0	25,0	–	29,5
	trans.	14,5	12,0	–	–	–	8,9	10,6	12,3	–	13,5	13,0	11,0	–	13,5
M^1	ant. post.	5,9	4,0	–	–	–	5,7	4,2	4,5	–	–	5,0	–	–	–
	trans.	?	?	–	–	–	–	7,8	8,0	–	–	10,0	–	–	–
Diastema length		9,8	5,5	–	–	–	12,8	–	15,5	–	–	–	–	–	?
Lower Canines	crown height	26,5	–	–	–	–	21,6	12,1	–	–	–	–	24,0	–	–
	ant. post.	6,7	–	–	–	–	14,9	8,2	–	–	–	–	11,0	–	–
	trans.	12,5	–	–	–	–	10,7	–	–	–	–	–	6,5	–	–
P_3	ant. post.	12,9	–	–	–	–	13,0	6,3	8,0	–	–	–	8,7	–	–
	trans.	6,7	–	–	–	–	7,0	–	6,3	–	–	–	–	–	–
P_4	ant. post.	12,8	–	–	–	12,4	22,6	17,0	21,0	23,5	–	–	21,5	–	–
	trans.	10,3	–	–	–	6,8	9,9	–	12,5	11,0	–	–	–	–	–
M_1	ant. post.	25,9	–	–	19,6	19,2	34,0	19,8	26,0	20,0	–	–	–	–	22,0
	trans.	13,5	–	–	9,4	8,5	12,0	9,2	13,0	10,0	–	–	–	–	–
Diastema length		30,4	–	–	–	–	45,5	–	–	34,5	–	–	–	–	–

*Data from various authors.

Fig. 1

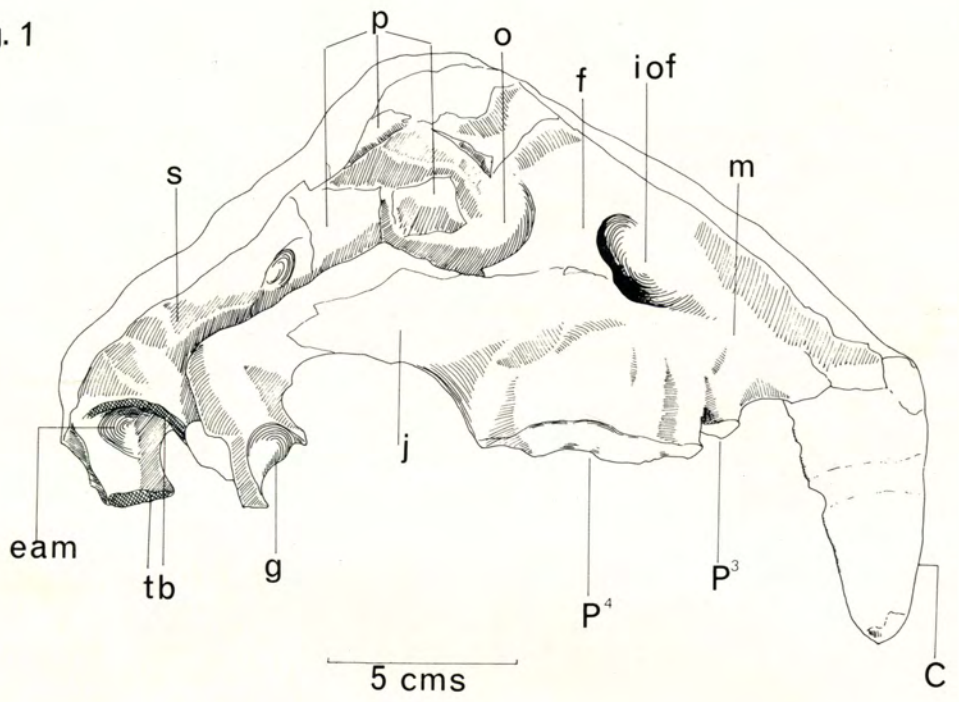

p
o
f
iof
s
m
j
eam
tb
g
P4
P3
C
5 cms

Fig. 2

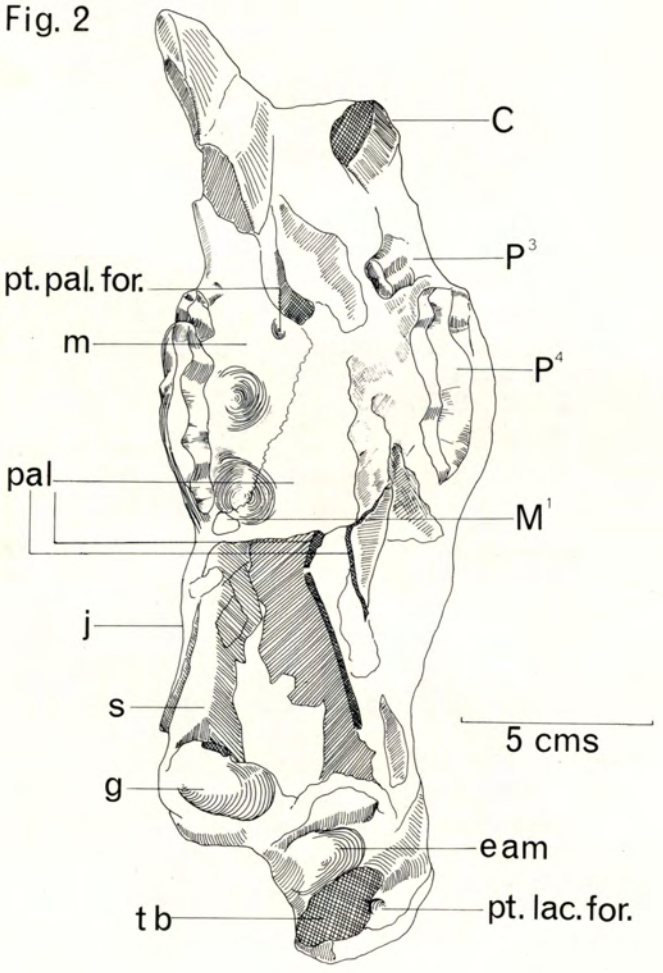

C
P3
pt. pal. for.
m
P4
pal
M1
j
s
5 cms
g
eam
tb
pt. lac. for.

Fig. 3

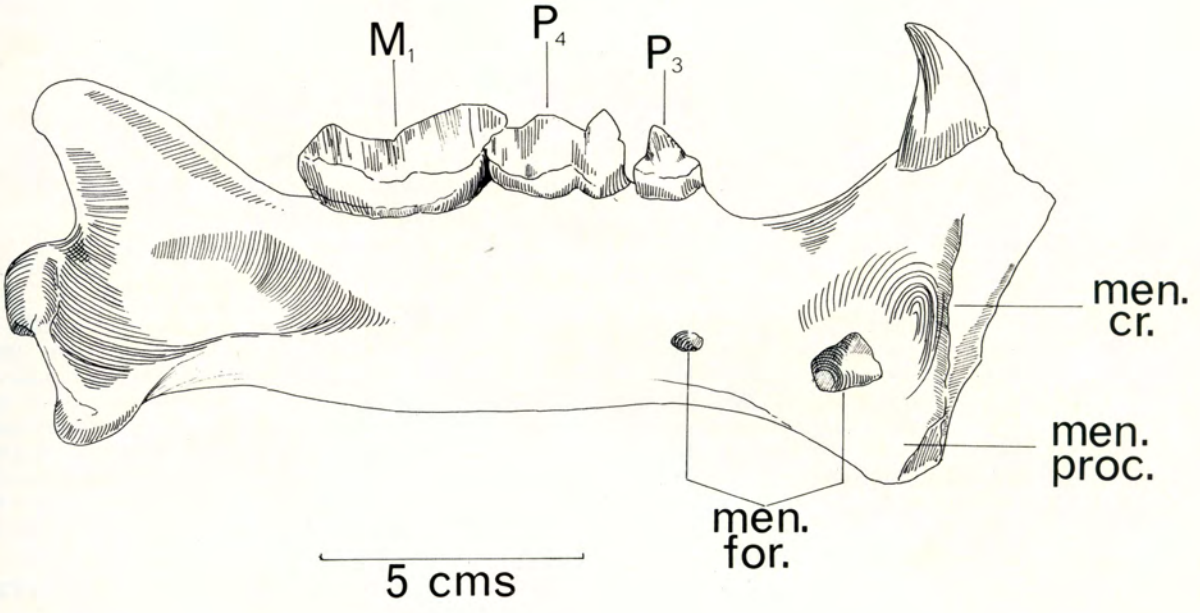

M1
P4
P3
men.
cr.
men.
proc.
men.
for.
5 cms

Fig. 4

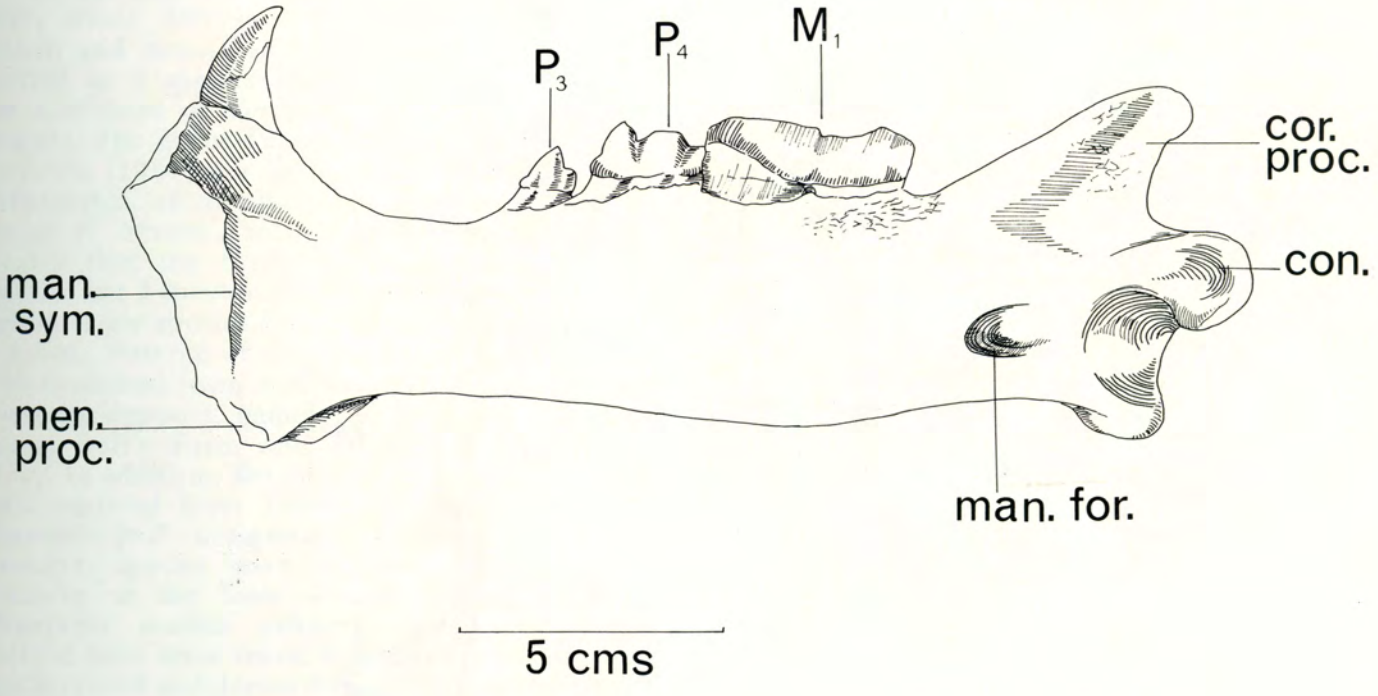

P3
P4
M1
cor.
proc.
con.
man.
sym.
men.
proc.
man. for.
5 cms

Fig. 5

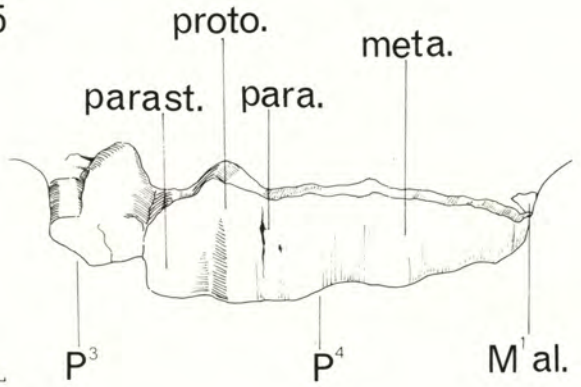
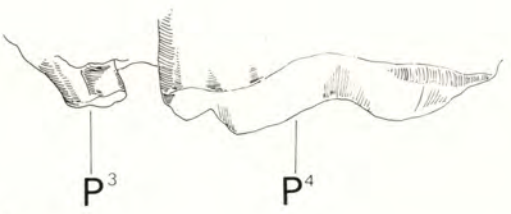
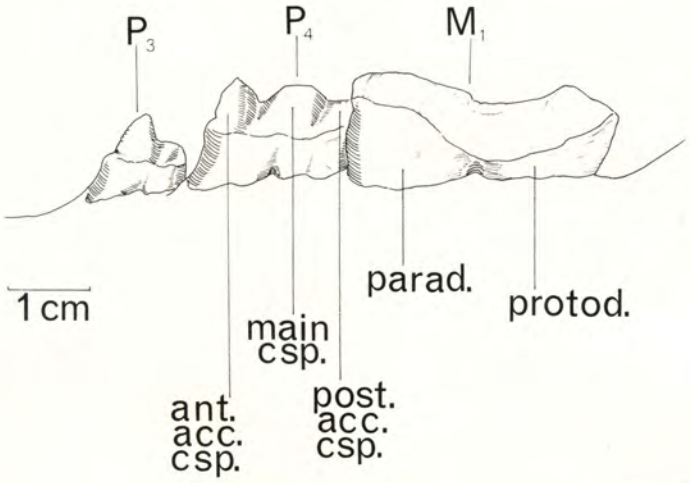


Fig. 6





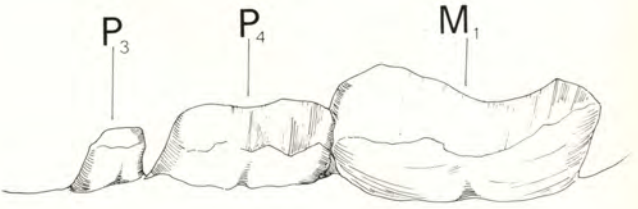


Fig. 7