lion (sp. BPl/c 183) and leopard (sp. BPl/c 258), the ratio of skull height to width of palate was greater than that of the lion but less than that of the leopard. The jugal arch is distinctly thicker and more inflated than that of both extant cats. The latter feature allies this specimen with Dinofelis barlowi, and, superficially, the skull is strikingly similar. A comparison of measurements with those of two fossil cats and modern lion and leopard is given on table IV. The skull proportions are almost identical to those of D. barlowi. Although there could be no study made of the teeth, from the above observations, sp. M236 will be ascribed to the genus Dinofelis.

Specimens M607 and M259

These specimens were renamed Dinofelis barlowi by Ewer (1956a) after Toerien’s (1955) initial assignment to Machaerodus darti. A comparison with the then known Dinofelis material showed a considerable similarity with D. barlowi, mainly in the size and shape of the upper canines of sp. M259, and in the unspecialized nature of the mandible, sp. M607 (Ewer 1956a).

There have since been discovered a number of new specimens belonging to the genus Dinofelis, and which are comparable with M607 and M259. Table V gives the more important tooth measurements and proportions for M607 and M259. (Compare with table I). It is noted that the degree of lateral flattening of the lower pre-molars is about the same as for the type specimen of D. barlowi from Sterkfontein, and the diametral index for the upper canines (0.62) is identical.

Specimen M2136

Sp. M2136 is ascribed to the genus Dinofelis. The mandible is exceptionally thick under the pre-molars, and P3 and P4 are estimated to have had
about the same degree of lateral flattening as found in Dinofelis. From the few figures available from the specimen, it seems more comparable with *D. diastemata* from Langebaanweg. However, the amount of specialization within the genus seems highly variable and in view of the fragmentary nature of this specimen, it will remain *Dinofelis* sp.

**Specimen M8257**

This specimen is clearly part of a large felid mandible. It is too distorted to obtain much information, except that the coronoid is moderately reduced. $P_4$ and $M_1$ would have been moderately compressed before distortion, and the restored ramus would have been very thick. These are diagnostic features of *Dinofelis* and sp. M8257 will be referred to that genus.

**Specimens M8279 and M8356**

The upper canine (sp. M8279) and lower canine (sp. M8356) are typical of those for *Homotherium*. The upper canine has a very low diametral index and the lower canine is small, conical and recurved, and the crests are also serrated. Both teeth are therefore ascribed to *Homotherium* sp.

**The teeth from Sterkfontein**

Specimen S1, the upper canine, will be referred to *Dinofelis* sp. The lack of serrations on the crown are diagnostic for this genus and the tooth is relatively wide for the machaerodonts, so it is unlikely to belong to the genus *Megantereon*.

Specimen S2, the lower canine, appears very similar in shape to sp. M8356. However, the lack of serrations and the presence of a basal medial tubercle suggest that it belongs to *Megantereon*. It will
thus be referred to that genus.

Specimen M8358

The preserved teeth on this specimen bear an immediate resemblance to those of *Dinofelis*. The size and shape of the upper canine, the moderately reduced lower canine and the large P₃ and P₄ are diagnostic characters of this genus. Also typical is the large size of the incisors, indicated by I₃, the well developed talonid and accessory cusps on P₄ and the well developed P₃.

Of the known South African species of *Dinofelis*, *D. piveteaui*, *D. diastomata* and *D. barlowi*, sp. M8358 would come closest to the latter. The large size of the upper canines separates it from *D. piveteaui*, which had smaller canines than *D. barlowi* (although only one specimen of *D. piveteaui* is known), and *D. diastomata* is known only from Upper Pliocene deposits which are rather older than Makapan.

The measurements of the dentition seem to fit closely with those of *D. barlowi* from Bolts Farm (Cooke, pers. comm.). The upper canine is slightly larger, but the amount of reduction of the lower canine and P₃ is about the same. The type specimen from Sterkfontein shows a less reduced P₃. A heavy mandible is shown by the rami attached to the skull, and also by the fragments in the associated breccia block C. The skull is therefore ascribed to the species *Dinofelis barlowi*.

Measurements for this specimen are given in Table V.

Breccia block C

The mandibular fragments and parts of the occiput and jugal arch in this block of breccia were clearly part of the skull described above, and will be referred to the same genus and species. The metapodial and digital elements, because of their close association with the skull, will also
be referred to Dinofelis barlowi. The complete skull was obviously very large, and the manus seems to have been of a comparable size.

The specimens from breccia blocks A and B

This material bears much resemblance to the skeleton of Panthera. A comparison was made with a modern leopard, Panthera pardus, (sp. BPI/c 258) and two fossil machaerodonts, Smilodon californicus (Merriam and Stock 1932) and Homotherium crenatidens (Ballesio 1963). Due to their rather fragmentary nature and the lack of diagnostic material, such as complete fore and hind limbs, the identity of the bones will be limited to the genus. However, details of morphology and limb proportions, where available, were noted.

There is nothing unusual about the ribs and sternum, and they conform to the usual pattern in the Felidae. In the two machaerodonts, the sternebra are distinctly shorter and thicker, and in Smilodon the ribs are also shorter.

The cervical vertebrae resemble those of a leopard except in the shape of the inferior lamella of No. 3, and in the thickness of the transverse processes. On the sixth cervical vertebra of a leopard, the inferior lamella has a deep notch on the ventral border, dividing the flange almost into two. In No. 3 the ventral border is straight, and in this respect identical to Smilodon. The transverse process and inferior lamella is slightly more robust than in P. pardus. The shape of the posterior ends of the centra of Nos. 3 and 5 are circular, as they are for S. californicus and H. crenatidens, while in P. pardus they are a horizontal oval. The anterior end of the centrum is considerably more convex than in the leopard.

The centrum is very robust, as it is in S. californicus and H. crenatidens. Table VI gives the measurements for the sixth cervical
vertebra. The ratio of the average posterior diameter to the length of the centrum is a little less than that of *H. cronatidens* while it is much greater than in *P. pardus*. The proportions for *S. californicus* approach those for the leopard because as well as being strengthened the cervicals are lengthened, relative to the vertebral column as a whole.

In No. 5, the anterior and posterior flanges on the transverse processes are not present in the leopard, but they are present in *S. californicus*, to a lesser degree. The median ridge on the ventral surface of the centrum for the longus colli is slightly more developed in No. 5 than in *P. pardus*.

The thoracic vertebrae are morphologically identical to those of *P. pardus*. The neural spine of No. 68 is not shortened, unlike the thoracics of *S. californicus*. The positions of the capitular facets on the centrum are the same as for a leopard, while in *S. californicus* they face generally more anteriorly. A similarity with *S. californicus* is the stoutness of the transverse processes when compared with those of a leopard, while a similar shortening is seen in *S. californicus* in the more posterior vertebrae. *H. cronatidens*, like *S. californicus*, has shortened neural spines and robust transverse processes. A feature that Nos. 6 and 68 share with the sabre-tooths is their more sturdy centra.

A reconstruction of the sacrum (fig. 20c) was based upon the lengths and widths of the centra (No. 33/34) as observed from the ventral side. The widths of the centra diminish much more rapidly in the sabre-tooths than in the leopard, and No. 33/34 agree with the former. The average diameter of the posterior face of the third centrum, compared with the anterior face of the first centrum, is the same for No. 33/34 as it is for *H. cronatidens*. On the other hand, the sacrum of *H. cronatidens*, which was a much larger animal than the one being described, is only fractionally longer than No. 33/34. This means that
No. 33/34 has not undergone any corresponding reduction in length. A comparison of measurements is given on table VII. The decrease in width of centra, but not in length, indicates that the animal had a rather short tail, but not as short as that in the true sabre-tooths.

The first centrum of the leopards' sacrum is a flattened oval in section, while in both sabre-tooths it is noticeably more rounded. No. 33/34 is intermediate between the two.

In lateral aspect, the alae of No. 33/34 are relatively enormous, comparable to those of H. crenatidens and S. californicus, and differ considerably from those of P. pardus.

There is no indication of the size of the neural spines in No. 33/34, however, in S. californicus, and also Megantereon megantereon (Schaub 1925), the spines are all thick, terminating in a large tuberosity, in contrast to the small rather weak spine in P. pardus. In Schaub's opinion, the sacral spines of the sabre-tooths are well developed for the attachment of the sacro-spinalis system of back muscles, which would normally have inserted on the caudal vertebrae. If it is assumed that the tail of this animal was moderately short, it could be assumed also that the sacral spines were fairly large, or larger than in the normal Felinae.

The sacrum therefore shows a mixture of both machaerodont and felid features. It is not shortened, although the width decreased rapidly caudally; the transverse processes are as massive as those of the sabre-tooths, although the centrum is not so strong.

The scapula is too fragmentary to draw any conclusions from it. The proximal half of the humerus appears little different from that of a leopard (table VIII). The average diameter of the proximal extremity to that of the middle of the shaft is nearly equal to that of P. pardus.

In H. crenatidens it is a little less, and in S. californicus it is
even less so. The degree of convexity of the head is equal to that in
the leopard, but the sabre-tooths differ in that the head is less round-
ed and there is less overhang posteriorly.

The greater tuberosity is more developed than in the leopard but
not as much as in S. californicus or H. crenatidens. It would seem,
therefore, that the Makapan cat had a rather powerful forelimb, but not
as powerful as the sabre-tooths. The lesser tuberosity has the same
degree of development as the leopard, whilst in S. californicus it
appears not as large. This would imply that S. californicus had rather
less power to adduct the humerus than the leopard or the Makapan fossil
cat.

The remaining muscle insertion areas on No. 11 are the same as
for the leopard. H. crenatidens also compares with the living cats in
this respect.

The proportions of both femora, No. 62 and sp. 16196M, are compared
in table IX with those of F. pardus, H. crenatidens and S. californicus.
In the length of the femur compared to the width of the shaft, No. 62
compares with the leopard, while H. crenatidens and S. californicus have
a distinctly shorter, stouter shaft, particularly the latter. The size
of the head, relative to the length of the shaft is approximately the
same in No. 62 as for the leopard. In the sabre-tooths, particularly
S. californicus, it is much larger. The antero-posterior diameter of the
shaft at the middle is, like the leopard, greater than the transverse
diameter. In the sabre-tooths, the antero-posterior diameter is less
than the transverse diameter.

The distal femoral condyles in S. californicus are relatively less
extensive antero-posteriorly than those of F. pardus, showing a smaller
degree of flexion of the tibia. In table IX it is seen that
S. californicus has a greater transverse diameter than antero-posterior
diameter. In H. crenatidens both readings are equal, while No. 62 and sp. 16196M are like the leopard, with the antero-posterior diameter greater than the transverse diameter.

The general appearance of No. 62 and sp. 16196M are generally similar to a leopard's femur, that of H. crenatidens approaching the felid condition closely. In S. californicus, on the other hand, it is distinctly shorter and stouter.

Table X gives the dimensions of the proximal ends of the tibiae, and here there is a noticeable difference between No. 60 and P. pardus. No. 60 shows a more developed cnemial crest, and thus a greater antero-posterior measurement. This is the same for both H. crenatidens and S. californicus. The two oblique ridges on the posterior surface, where the deep digital flexors originate, are much less marked than in the leopard, and H. crenatidens and S. californicus show the same reduction. Like the sabre-tooths, the digital flexors must have had a rather small origin on the tibia.

The medial and lateral tuberosities of No. 60 are developed to the same extent as in P. pardus and there is a large area for the origin for the tibialis posterior. The posterior and lateral sides of No. 59 meet in a sharp crest, while in S. californicus they are gently rounded.

The three fragments attributed to one of the fibulae have a very different appearance from that of a leopard. No. 50, the middle portion of the shaft, is very robust and roughly triangular in section. The shaft of a leopard fibula is, on the other hand, slim flattened transversely and extended out into a thin wing anteriorly towards the proximal end.

The proximal head, No. 61, is also much more robust than that of P. pardus, and seems much more like that of S. californicus and H. crenatidens. The latter two have, like No. 61, a greatly expanded head, with
the proximal portions of the shaft deeply excavated. A comparison of measurements is on table X. The Makapan fossil therefore had a strong fibula upon which a large proportion of the muscles to the foot and digits originated. In the leopard, however, most of these muscles find their origins on the tibia.

Specimen 16202M

This specimen is assumed to belong to the same individual as the skeleton of breccia blocks A and B, and it will be considered here before identifying the individual as a whole.

Specimen 16202M has almost the same morphology and proportions as a leopard’s paw, but differing in some details. It will be compared with the same elements of Panthera pardus (sp. RPI/ c238) and Homotherium crenatidens (Zallesio 1963).

The distal end of the radius is considerably more robust than that of the leopard, and approaches more the condition in H. crenatidens. The large tuberosity on the posterior surface bordering the scapho-lunar facet is thicker than in P. pardus where it is only a thin ledge. The scapho-lunar facet is also wider antero-posteriorly. The ulna is considerably more robust, particularly where the shaft meets the epiphysis. This is similar to the ulna of H. crenatidens although it is not so accentuated.

The carpals have the same configuration as those of the leopard, except that they appear a little more sturdy. The scapho-lunar is deeper proximo-distally, and the facet receiving the unciform is larger. The ridge on the distal surface separating the magnum and trapezoid facets is flatter.

The cuneiform is wider transversely, with a larger facet for the pisiform. The pisiform is much more massive and similar to that of
H. crenatidens, in which appears almost cuboid, instead of the rectangular shape in P. pardus. In sp. 16202M the tubercle on its medial end is larger and the attachment areas for the extensor and flexor tendons on the distal surface are more marked than in the leopard.

The carpals and their articulation with the metacarpals are identical to those of the leopard, except that the magnum has perhaps a greater width and the trapezium is longer proximo-distally. In H. crenatidens, the disposition of the distal metacarpal facets is rather different, and it appears that the metacarpal articulation is distributed a little more medially. Smilodon californicus shows features of the carpals different from both P. pardus and H. crenatidens (Merriam and Stock 1932).

The metacarpals, except metacarpal I, show no appreciable difference from those of P. pardus. H. crenatidens on the other hand, has noticeably more massive metacarpals, the length as well as the width being increased. The first metacarpal of sp. 16202M has a greater distal width than in the leopard, and the prominent tubercle on the posterior side is only minutely represented in the latter.

The proportions of the first phalanges of sp. 16202M, and also of H. crenatidens are similar to those of P. pardus, except that in H. crenatidens they are generally larger. The second phalanx of sp. 16202M is relatively a little shorter than the same in the leopard. H. crenatidens shows an even greater shortening, and in S. californicus, the second phalanges are strikingly short and stout.

The two terminal phalanges are broader than in the leopard, and the ventral surface has a much steeper downward inclination towards the distal end. A comparison of measurements for the metacarpals and phalanges is given on table XI.

The partial skeleton from breccia blocks A and B obviously belonged
to a very lion-like animal. However, some of the features, such as the
strengthened cervical vertebrae and more robust transverse processes on
the thoracics; the heavy sacrum and short tail; the well developed
humerus; the rather heavy tibia and large fibula, are rather reminiscent
of the Machaerodontinae. The manus also shows this tendency in the
strengthening and thickening of the wrist, and in the shortening of the
second phalanges. Otherwise, its morphology is identical to that of
the leopard, and this animal was obviously much closer to the felid line
than was H. crenatidens or S. californicus.

The only known Plio/Pleistocene felid with slight machaerodont
tendencies is the genus Dinofelis. This skeleton will therefore be
ascribed to that genus. The species however, remains questionable,
since associated cranial remains are lacking, and the post-cranial
details of Dinofelis are not well known. The post-crania of D. barlowi
from Bolts Farm (Cooke, pers. comm.) are much like that of a tiger but,
unfortunately, a tiger skeleton was unavailable for this study. At
any rate, D. barlowi seems to have had a build very similar to the
living Panthera.

D. diastemata from Langebaanweg (Hendey, in press) has a leopard-
like build, but with relatively shorter hind legs and perhaps stouter
limbs, and a short tail. The measurements for the distal end of the
fibula imply a much stouter element than in the leopard, and this would
seem to ally the Makapan Dinofelis with D. diastemata.

Specimen 16201M

The appearance of this ankle joint is almost exactly similar to that of
the leopard. The dimensions are compared in Table XII with P. pardus,
D. diastemata (Hendey, in press) and H. crenatidens (Ballesio 1963).

The distal portion of the tibia has the same proportions as in