

External and Cranial Characters of some Rare Asiatic Mammals recently Exhibited by the Society.* By R. I. Pocock, F.R.S. (Zoological Dept., British Museum of Natural History).

[Received May, 1945.]

(With 1 figure in the text.)

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1 *An Adult* ♂ *Rhinoceros unicornis*.

This Rhinoceros was one of a pair presented by the Maharajah of Nepal to the late King George V and no doubt came from the Nepal Terai. It reached the Zoological Gardens in April 1933, when it was perhaps only about a year old, Dr. Veveris thinks, and was probably about 13 years old when it died at Whipsnade on March 24th, 1945. I took the following particulars of its external characters from the stripped skin.

The *ear* is 10.9 in. long from the intertragal notch to the tip and 6.4 inches wide in its upper half. I am not aware that the ear in a fresh state of this or any other Rhinoceros has been previously measured. As might be expected, it is a good deal bigger than the dried ear on mounted heads. For instance in a head of an adult ♀ from Assam (Vanderbyl), in the British Museum, the length and breadth of the ear are respectively 9.3 and 5.1 inches and these dimensions are a little bigger than those of a just adult ♂ from Kuch Behar (The Maharajah).

The *feet* are a little longer than broad, the total length of the fore foot being 14.4 in. and the total width 10.9 in., the same dimensions of the rather smaller hind foot being 12 and 10 in.† Otherwise the feet are very similar. In the fore foot the median hoof, seen from below, is nearly semicircular, its width being 5.4 in. and its median length 3 inches. The lateral hoofs, separated on each side from the median by a narrow space and capable of only slight divarication, are smaller, less regular in shape, with the free edge not so strongly and evenly convex, and not quite alike on the two sides. The area of their attachment to the sole is about as long as that of the median hoof and, as in the latter, their long diameter is about twice the length of the short diameter.

The three hoofs form a strongly convex curve round the anterior half of the sole which, owing to the oblique setting of the lateral hoofs, gradually expands posteriorly, its width just behind the median hoof being about half its width between the posterior ends of the lateral hoofs. The whole sole consists of an area of smooth, leathery skin and the lateral and posterior edges of its hinder half form a continuous, nearly semicircular curve.

* My thanks are due to Dr. G. M. Veveris, the Superintendent, and to Col. A. E. Hamerton, the Pathologist, for kindly allocating to the British Museum the specimens dealt with in this paper and for sending them to South Kensington for my examination. I am also indebted to Mr. W. Lawrence, the pathologist's assistant, for their careful preparation and for his help in various minor particulars.

† A possible source of small error in the width arises from the soles of the feet having been cut down the middle line.

The *horn* is very massive, its area of attachment to the skull being 9 in. long and 7 in. wide and its basal girth of 26 in. exceeds by $1\frac{1}{4}$ inches the largest entered in Rowland Ward's 'Records of Big Game,' 1928, p. 436. Its length over the anterior curve is 14 in. but it is greatly worn and truncated at the tip, which forms a flattened area 3.4 in. wide and 2.6 in. long. It must be remembered, however, that Rhinoceroses in menageries not infrequently reduce their horns to mere rounded stumps by rubbing them against the bars and walls of their enclosures and have no opportunity of using them in the same way as wild specimens in which the horns typically become gradually narrower distally and are pointed at the tip. That consideration, however, does not account for the exceptional girth of the unused base of the horn in this captive specimen.

The *skull* and *teeth* show some features worth recording, particularly as the approximate age, within a year or two, of the animal is known. All the sutures of the skull are obliterated and it has the roughened areas, *e. g.*, on the zygomatic arches and nasals, that are developed in old skulls. It has a condylobasal length of 26.2 in., and in this and its other dimensions closely agrees with the averages for *Rh. unicornis* recorded in a previous paper (Proc. Zool. Soc. Lond. 1944, p. 443), but the nasals, in conformity with the basal girth of the horn, are 5.9 in. wide, as wide as in the largest skull in the British Museum, that of a larger and much older ♂ (No. 15.11.10.2) with a condylobasal length of 27.5 inches. One or two points in the skull may be mentioned. The premaxillae are completely welded to the maxillae, without trace of the suture remaining, and meet in the middle line in front, without, however, fusing as they may do in old skulls as I recently recorded (Ann. Mag. Nat. Hist. (11) xi. p. 834, 1944). The vomer ends posteriorly in an emarginate tip, as in the skulls described in my first paper quoted; the upper end of the pterygoid forms an elongated subcylindrical thickening which projects backwards and outwards beyond the pointed outer half of the angle of the mesopterygoid fossa; the outer wall of the fossa between the angle and the alveolus of m^3 is nearly straight, as it usually is in this species; and, finally, there is no posterior projection on the edge of the palate. These features connected with the mesopterygoid fossa confirm previous observations on other skulls of *Rh. unicornis*.

The *Teeth*. In the front teeth the tusk-armature is normal; and close behind the enlarged upper incisor of the left premaxilla there is an open socket of a recently shed second incisor, but no trace of a corresponding socket is visible on the right premaxilla, and two lower incisors are retained between the tusks of the mandible, although quite loose. Of the upper cheek-teeth the full complement is in use, and it is noticeable that in all of them, except pm^1 , the antero-lateral angle, representing the parastyle, is prominently developed, more so than in many skulls of *Rh. unicornis*. In pm^2 , which is considerably worn, the accessory fossa is completely isolated, the posterior fossa is closed behind, but the anterior fossa is open in front, although the median fossa, confluent with it, is shut off from the exterior by an enamel-edged bridge joining the protocone and hypocone. The accessory fossa is also developed on pm^3 , pm^4 , m^1 and m^2 , but in m^2 the "crochet" and "crista" are incompletely fused superficially and do not form a continuous enamel-edged ridge. In all these teeth the three main fossae are closed to the exterior by the worn condition of the teeth, the protoloph and ectoloph being confluent and forming enamel-edged areas. But m^3 , which is fully erupted, is only a little worn, not sufficiently for complete union of the protoloph and ectoloph, which are superficially separated by a very narrow cleft on the inner side of the parastyle.

These data may be of some interest in determining roughly the age of the skulls of rhinoceroses by the condition of the teeth; but only approximately, because the condition of the teeth depends upon the nature of the food which, consisting largely of dried hay and clover in captive specimens, may perhaps be harder on the average than the fresh foliage and grass masticated by wild animals.

2. *A Lioness (Panthera leo persica) from Kathiawar.*

This lioness, fully adult, was presented to the Society by H. H. The Nawab of Junagadh and died January 1st, 1945.

In the 'Fauna of British India,' Mammalia, i. 213, 1939, I stated that the general colour of Indian lions is very variable individually, ranging above from ruddy tawny, heavily speckled with black, to sandy or buffish grey, sometimes with a silvery sheen under reflected light, with the black speckling much less in evidence, and below from buff to nearly white. It is significant that the variation within the confined limits of the Gir Forest covers that of the lions of the whole of Central Africa which have been assigned to several subspecies largely on differences of colour.

The lioness under notice is intermediate in colour on the upper parts described, being rather rich buffy tawny, the paler hue of the hairs dominating the black, but showing no trace of a grey cast; the lower side is creamy white, with a few buff spots.

The measurements of the dressed skin are :—Head and body 6 ft., tail 2 ft. 8 inches. The tail is the same length as in a lioness from the same locality recorded in my volume above cited, but the head and body are 8 inches longer.

The skull has all the characteristics of the Indian race I previously described. The preorbital foramen of the left side is divided by a broad bridge; the bullae are low behind, projecting only a little below the condyles and their anterior portion has a long, shallow slope; the temporal ridges are strong, meeting on the frontals about 30 mm. in front of the fronto-parietal suture; the sagittal crest is about 11 mm. high in the middle of the parietals but only about 10 mm. on the occiput; the maxillae overlap the nasals by 8 mm. It is the largest female skull of this race hitherto recorded. Its dimensions in mm. compared with those of a female skull from the Gir Forest (No. 31.4.13.2), which I recorded in 1939, the measurements of the latter being put in brackets, are as follows :—Condylbasal length 287 (272); zygomatic width 208 (204); postorbital width 56 (51); interorbital width 65 (63); maxillary width 91 (85); mandibular length 213 (208); pm^4 35 (34); m_1 $24\frac{1}{2}$ (23). The smaller skull also differs from it in one or two structural points. The preorbital foramen is bridged on both sides; the maxillae overlap the nasals by only 2 mm. and the occipital portion of the sagittal crest is much better developed, being 20 mm. high. This last, however, is probably an age-character.

3. *The Skull of a Hunting Leopard (Acinonyx jubata venatica) from Iraq.*

Since little is known of the cranial characters of Asiatic Cheetahs, or Hunting Leopards, the skull of an adult ♂ from Iraq, which was presented to the Society by Dr. N. L. Corkhill, on March 12, 1930, and died on June 5th, 1932, is of interest, especially as the species is almost certainly verging on extinction, if not already extinct, in S.W. Asia, and India. The skull, it may be noted, shows no signs of deterioration from captivity. In the account of the Indian Hunting Leopard (The Fauna of Brit. India, Mammalia, i. 326, 1939), I stated that Persian and Mesopotamian specimens probably belong to the same race. Adopting this suggestion the skull in question may be assigned to *Acinonyx jubata venatica* Griffith (Vert. Anim., Carnivora, p. 93, 1821).

The only race of *Acinonyx jubata* of which a good series of skulls has been measured is the one inhabiting Kenya Colony for which I adopt for the time being the name *velox* given to it by Heller (Smith's Misc. Coll. lxi. 7-9, 1913), who described two races from different areas of Kenya, *velox* from the Loita Plains and *raineyi* from the Kapiti Plains. But Hollister, who revised Heller's work, was very doubtful about the distinctness of the two. At all events their skulls appear to be quite alike, and this is sufficient for my present purpose. It is to Hollister that we owe the skull measurements (Bull. U.S. Nat. Mus. xcix.

153, 1918). The measurements show that ♂ skulls are decidedly larger than ♀ skulls. In 7 alleged ♂ skulls the condylobasal length ranges from 170 mm. to 155 mm., but the skull with the latter dimension has the basioccipital suture open and is exceptionally small, no doubt not nearly full grown, if a ♂; but I suspect it is in reality a ♀ skull. The average condylobasal length in the remaining 6 male skulls is 166 mm.; and the average length of the upper cheek-teeth in the same specimens is 56.4 mm. In 8 adult female skulls the condylobasal length ranges from 157 to 146 mm., its average being 152.5 mm. The cheek-teeth in the same specimens range from 53 to 50.5 mm., the average being 51.6. In the small alleged male, above referred to, the cheek-teeth are 52.5, a little smaller than in two of the female skulls.

The skull of the adult male of *venatica* from Iraq, with a condylobasal length of 156 mm. and the upper cheek-teeth 52 mm. long, is considerably smaller than the male skulls of *velox* from Kenya above described, but agrees closely with female skulls of the latter race, although differing in its exceptionally narrow zygomatic width which is only 113 mm., whereas in the adult female skulls of *velox* measured by Hollister that dimension varies from 122 to 119 mm., the average in 7 skulls being 120.5. In 3 adult male skulls of *velox* with the basioccipital suture closed, it varies from 129 to 136 mm., the average being 133 mm. It is known that the zygomatic width increases with age after the skull has attained its full length. It is nevertheless unusually small in the skull from Iraq which has the basioccipital suture closed and is obviously fully adult, although not old.

The only specific or subspecific name in the genus older than *venatica* is *jubata* Schreber (Säugethiere, 3, pp. 392 and 586, pl. 105, 1776) of which the type locality, settled by Hollister, is the Cape of Good Hope. The British Museum has two adult skulls certainly assignable to this race, one, unsexed, labelled Cape of Good Hope (Burchell, 135 a), the other, the type of *lanea* Sclater (83.4.14.1), a male skull from Beaufort West in the Cape Province. It is nearly the same age and has the same condylobasal length as the skull of *venatica*, but shows many differences largely due to stronger muscular moulding. It is longer in its total length, owing to the more prominent occipital crest; the sagittal crest is better developed; the postorbital processes are much longer, owing to the pronounced constriction of the postorbital area; and the zygomata are wider. These differences expressed in mm., those of the type of *lanea* being set in brackets, are as follows:—Total length 169 (173); height of sagittal crest on occiput 4 (8); distance between the temporal ridges at the suture 12 (7); width of postorbital area or "waist" 58 (53); width just behind postorbital processes 66 (58); width across zygomatic arches 113 (120).

The differences above pointed out being due to weaker muscular moulding in the case of the skull of *venatica* and stronger in the case of the skull of *jubata* (= *lanea*) may have no systematic significance; but, in addition, the skull from Iraq has noticeably more inflated tympanic bullae. The bullae are very nearly the same length and width and the same distance apart in the two, but they are higher in the skull of *venatica*. Their dimensions expressed in mm. with those of *jubata* in brackets are as follows:—Length 27 (29); width 20 (20); distance between 15 (15); height on inner side 16 (13); on outer side from lower rim of orifice 18 (15).

Burchell's unsexed skull from the Cape of Good Hope, with a condylobasal length of 150 mm., is shorter than the skull of *venatica*, but I believe it to be a male on account of its strong muscular moulding in which it closely resembles the skull of *lanea*. Its total length is 168 mm., the occipital crest being prominent. It is not so constricted behind the postorbital processes, which consequently are not so salient, but its zygomata are wider, 123 mm., and its bullae distinctly smaller, 25 mm. long, 19 wide, separated by 20 mm., with the height on the inner side only 11.

4. *The Skull of a Wolf (Canis lupus pallipes) from Iraq.*

This wolf, a ♂ from Basra on the Persian Gulf, was presented to the Society on July 10th, 1929, and died on March 7th, 1944.

The interest of the skull lies in its affording an additional item of evidence of the racial identity of the wolf of the Mesopotamian area with the smaller wolf of India (*Canis lupus pallipes*).

In a paper on the races of *Canis lupus* (Proc. Zool. Soc. Lond. 1935, 670) I referred to the skull of an adult male wolf from Tarooma in Iraq and stated that it agrees very closely in most of its measurements with *pallipes*, although longer in its condylobasal length, and added that on the scanty evidence, its exact identity was doubtful. Its condylobasal length of 217 mm. exceeds by 5 mm. that dimension in the largest skull of the Indian form I have seen, namely an adult male from Bikanir*. But this skull from Basra agrees tolerably closely in its measurements with two adult male skulls from Bikanir. With those of the Basra skull put in brackets, their dimensions are as follows:—Total length, — and 229 (227); condylobasal length, 212 and 209 (210); zygomatic width 131 and 126 (132); postorbital width 40 and 37 (42); interorbital width 40 and 41 (44); maxillary width 41 and 41 (41); mandibular length 175 and 166 (167). The zygomatic and interorbital areas are wide in the Basra skull, probably owing to its age, but it is clearly not racially distinguishable from the skulls from Bikanir.

5. *A Ratel (Mellivora capensis), representing a new subspecies, from S. Arabia.*

This Ratel, an adult ♀ from the Hadramaut, was presented to the Society by Squadron Leader A. R. M. Richards on July 28th, 1933, and died January 26th, 1945. It seems to represent a new local race which may be named and described as follows:—

MELLIVORA CAPENSIS PUMILIO, subsp. nov.

Locality of the type.—The Hadramaut, South Arabia.

Distribution.—South Arabia.

Distinguished from the majority of the races of *M. capensis*† by its smaller size and from those that approximately equal it in dimensions by other characters as described below.

The type, an adult ♀, has the winter coat thick and longish, but entirely without underwool; the contour hairs gradually lengthen towards the hinder end of the body, being about 20 mm. behind the shoulders, 35 mm. on the flanks and 45 mm. on the rump. The mantle is not uniformly tinted; on the head the forehead is white as far back as the ears, the crown being grey like the greater part of the nape and shoulders; the back between the shoulders and rump is much darker than the shoulders, being blackish, speckled with white, but the rump is paler, nearly the same grey tint as the shoulders; on the sides of the nape and above the fore legs the edges of the mantle are nearly white and this paler tint is traceable along the flanks as far as the thighs; the tail has some whitish hairs on its basal half above, but the rest of it is black, although the hairs of the extreme tip are missing.

No other specimens from South Arabia are available for comparison with the type, but no doubt the colour of the mantle will prove to be individually variable as I pointed out was the case in the Indian ratel, *M. c. indica*, and as Cheesman showed in the Persian and Iraq ratel he named *M. wilsoni* (J. Bomb. Nat. Hist. Soc. xxvii. 1920 and, 'Survey of the Fauna of Iraq,' p. 13, 1925), which I suspect is the same as *indica*. But the South Arabian

* See 'Fauna of British India,' Mammalia, ii. p. 93, 1941.

† A considerable number of different kinds of *Mellivora* have been described and granted specific status, although their distinguishing features are admittedly trivial. For this reason I recently assigned them, without exception, to a single species, *M. capensis*, regarding them merely as geographical races (Fauna Brit. India, Mammalia, ii. p. 456, 1941).

form is smaller than either of these as shown by the table of flesh-measurements. It is also smaller than all the African races of which the measurements have been recorded, with one exception, namely *M. c. buchanani* described by Thomas from Asben (Ann. Mag. Nat. Hist. (9) xvi. p. 190, 1925), an old ♀ which has the same total length, but the head and body shorter and the tail longer, differences perhaps due to the tail being differently estimated in the two. But according to Thomas's description *buchanani* has the crown and anterior part of the mantle absolutely white; and the skull is smaller than in *pumilio*. Another small race, *M. c. concisa* from Lake Chad, described by Thomas (Ann. Mag. Nat. Hist. (7) xix. p. 376, 1907), was based upon an adult ♂ which is only a little larger than the Arabian ♀; but according to Thomas, in this ratel the white of the mantle begins to die out in the middle line on the hind back and is entirely absent from the rump and tail. A third small race, based on an old ♀ from the Lorian Swamp, Kenya, was described by Thomas as *maxwelli* (Ann. Mag. Nat. Hist. (9) xii. p. 340, 1923). No flesh-measurements were taken and the colour of the mantle is hardly different from that of *pumilio*, although said to be uniformly grey all down the back; but the skull is very different from that of *pumilio* (see below).

The following table gives the measurements in English inches of the races of *Mellivora capensis* above referred to. To these have been added those of *cottoni*, recorded by J. A. Allen, as representing the larger African races exemplified by the typical form *capensis* from South Africa.

Locality, name and sex.	Head and body	Tail	Hind foot.
S. India (<i>indica</i> , ex Jerdon)..... ? ad. ♀	26	6	
Central India (<i>indica</i> , ex Brander)..... ad. ♀	25	7	4 to 5
Ram Hormuz, S.W. Persia (<i>wilsoni</i> , type) ad. ♀	23·8	7	4
Tyb River, Iraq (<i>wilsoni</i>)..... ad. ♀	29·6	7·6	4+
Hadramaut (<i>pumilio</i> , type)..... ad. ♀	21	5·5	3·5
Asben, S.W. Soudan (<i>buchanani</i>)..... ad. ♀	19·8	6·6	3·4
Lake Chad (<i>concisa</i> , type)..... ad. ♂	23·2	6·5	3·8
Belgian Congo (<i>cottoni</i> , ex J. A. Allen).... ad. ♀	26·8	8	4·8

The skull of the type of *pumilio* is normal in shape and proportions; but as the table of measurements (p. 316) shows it is shorter in its condylobasal length than those of the other races considered above, apart from *buchanani*.

The two female skulls of *indica* entered above are the largest and smallest recorded by me in 1941, the condylobasal length of the first being estimated. In the case of *concisa*, Thomas gave the total length of the skull as 135 mm., but in *Mellivora* the total and condylobasal lengths are approximately the same.

The skull of *maxwelli* is only a trifle longer than that of *pumilio*; but they differ otherwise in many respects. The latter is broader across the zygomata and the postorbital and interorbital areas, but much narrower in its mastoid width, which in *maxwelli* exceeds the zygomatic, as it does in *cottoni*. As Thomas pointed out, *maxwelli* has a very low skull, with its height from the bullae only 45 mm., whereas in *pumilio* that height is 50 mm.

Some External Characters of the ♀ of M. capensis pumilio.

In a paper on *Mellivora* and *Gulo* (Proc. Zool. Soc. Lond. 1920, pp. 179-187) I described some of the external characters of an adult ♂ of an African Ratel (*M. c. capensis*) that died in the Zoological Gardens. Since the Arabian specimen above described, apart from being a ♀, shows some variations from the African specimen, a few notes on this subject seem worth publication*.

* For the characters of the ♂ I have to rely on my description and figures taken from a fresh specimen, which was not preserved.

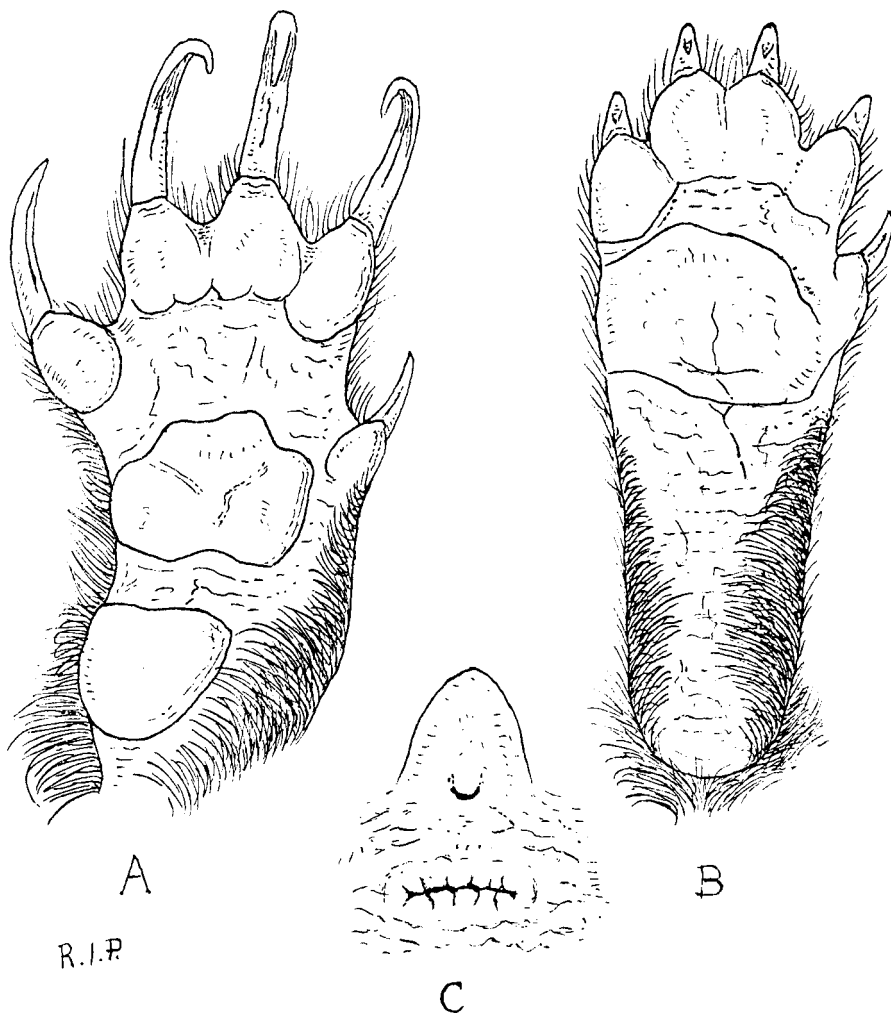
SKULL MEASUREMENTS OF RACES OF *MELLIVORA CAPENSIS*.

Length, name and sex.	Condylo- basal length.	Zygomatic width.	Mastoid width.	Post- orbital width.	Inter- orbital width.	Maxillary width.
Hoshangabad (<i>indica</i>) ad. ♀	(132)	76	—	29	33	30
Rajputana (<i>indica</i>) ad. ♀	121	—	—	32	32.5	34
Ram Hormuz (<i>wilsoni</i> , type) ad. ♀	122	—	—	—	—	—
Hadramaut (<i>pumilio</i> , type) ad. ♀	115	68	63	33	31	27
Asben (<i>buchanani</i> , type) old ♀	109	62.5	60.6	29	29	—
Kenya (<i>maxwelli</i> , type) old ♀	117.5	65	69.7	25	27	—
Lake Chad (<i>concia</i> , type) ad. ♂	(135)	—	—	—	33	—
Belgian Congo (<i>cottoni</i>) old ♀	133.5	73.1	76.2	30.5	34.5	—

In the head and its organs there are no reliable differences, although I failed to find the interramal tuft of vibrissae which was present in the ♂.

The general structure of the feet is similar in the two specimens, but those of the type of *pumilio* appear to be narrower, more compact, longer in comparison with their width and have the pads a little smoother, at most very finely coriaceous. In the fore foot (fig. 1, A) the pads of the 2nd, 3rd, and 4th

Figure 1.



A. Lower view of the right fore foot of *Mellivora capensis pumilio*.

B. Lower view of the right hind foot of the same.

C. Anal and genital area of the same showing the transverse slit of the closed anus, the small crescentic vulva in front of it and at the base of the linguiform, flap-like clitoris.

(All figures natural size.)

digits are more closely united, their curved fossorial claws measuring 30 mm. in a straight line. The plantar pad is not so wide and its component elements are less well defined. The external carpal pad is cordate, about as wide as long, instead of much wider than long, and there is no trace of the internal pad that was present in the ♂.

In the hind foot (fig. 1, B), the claws of which are only 10 mm. long, the digits are similarly more closely united, the plantar pad has its component elements less well defined and there is no definite trace of a distinct metatarsal pad such as was figured in the ♂; the sole is naked to the heel, but overlapped at the sides by the overcurving, lateral hairs.

The anal and genital area (fig. 1, C) is naked as in the ♂. The anus is a transverse slit, when closed, but when opened shows none of the radial corrugations figured and described in the ♂. The stink-glands are well developed, measuring 30 by 20 mm. and filled with a yellow secretion looking like liquid mustard.

The vulva is a small, crescentically curved orifice about 12 mm. in advance of the anus and situated at the posterior base of a prominent, linguiform flap, apparently representing the clitoris, which is capable of being folded back over the vulva perhaps to protect it from the secretion of the anal glands when in action. I am not acquainted with a similar structural development of the clitoris in any other Carnivore.