DURBAN MUSEUM NOVITATES

Issued by the Museum and Art Gallery, Durban.

Vol. IV ISSUED 30TH JUNE, 1953 Part V

SOME SYSTEMATIC NOTES ON THE LONG-FINGERED BATS OF THE GENUS MINIOPTERUS BONAPARTE OCCURRING IN SOUTH AFRICA AND MADAGASCAR

by

DR. DAVID L. HARRISON, B.A., M.B., B.CH., F.Z.S.
(Sevenoaks, Kent, England)

A revision of all the African members of this Genus is long overdue, but the material at present available from many parts of Africa is as yet too scanty to make this possible. The ensuing notes on the forms occurring in South Africa and Madagascar are based on a study of seventy-one specimens from these regions in the British Museum (Natural History) collection and twenty-six in my own possession. The most recent review of the South African forms is that of Roberts, "Mammals of South Africa," (1951). A previous review was made by Jameson (1909).

The *Type* of the Genus is *M. schrebersii* Kuhl, a southern European and Asiatic species which extends into North Africa. This is a well defined Genus in which the skull has a very high braincase and low rostrum with, as a result of this, a characteristically prominent frontal region. The dental formula is i $\frac{2}{3}$ c $\frac{1}{1}$ pm $\frac{2}{3}$ m $\frac{3}{3}$ = 36. In addition, the short ears, which are truncated to

a variable degree in the different species, are another feature. In these bats the second phalanx of the third finger is greatly elongated, nearly three times as long as the first. The fur is very soft and silky in all species.

It is clear that there are two valid species in South Africa, the characters of which are here compared with the Genotype and with each other.

1. Miniopterus natalensis natalensis (A. Smith)

Vespertilio natalensis A. Smith, "South African Quarterly Journal," vol. 2, 1834, p.59: Durban, Natal (*apud* Roberts, "Mammals of South Africa," 1951, p.73).

Synonyms: Miniopterus schrebersii (not of Kuhl), Tomes 1858: Lake Ngami; *Vespertilio dasythrix* Temminck, 1841: Caffraria; *Miniopterus scotinus* Sundevall, 1846: Caffraria; *Miniopterus breyeri* Jameson, 1909: Gatkoppies, Waterberg District, Transvaal.

This widespread species differs from *M. schrebersii* in only two features, namely in the shape of the ear and in colour. It is still possible that it will prove to be a geographical form of *M. schrebersii* but there is no evidence yet that the ranges of the two forms overlap at all or that they intermediate anywhere. In the absence of such evidence their characters are sufficiently distinct to allow their retention as distinct species. In *M. schrebersii* the ear is low and rounded off so that there is no distinguishable tip to the pinna, the general shape of which is square with rounded corners. In *M. schrebersii* the pinna rises to a more definite point and is more conspicuous (See Fig. 2). The very close correspondence in size between the two species is shown in the tables below. Careful comparison of the skull and dentition of the two species has not revealed any constant differences, nor is there any difference in cranial measurements (See Table 3).

The species extends from the Cape northwards at any rate to Angola, N.E. Belgian Congo, and Kenya Colony (See Map, Species 1). There are two distinct subspecies, including the present one, in South Africa. There is considerable variation in colour both individually and geographically. In typical *M. natalensis* the general colour is much darker than the light grey of *M. schrebersii*, varying from dark russet brown to smoky blackish brown. All individuals are paler below without any definite line of demarcation and there is often a creamy white or pale brown fringe of hairs along the

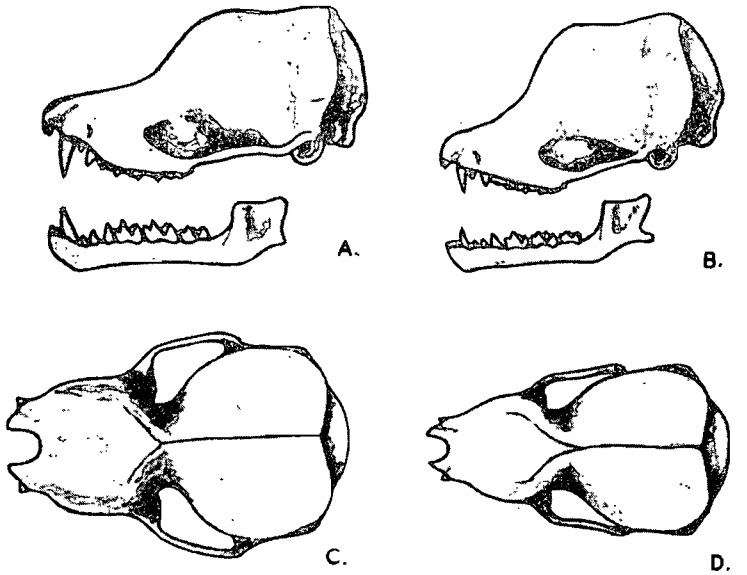

FIG. 1

Skull of *Miniopterus natalensis* (Smith). Based on a specimen from Pietermaritzburg, Natal. A. Side view. C. From above.

Skull of *Miniopterus fraterculus* Thomas and Schwann. Based on a specimen from Pietermaritzburg, Natal. B. Side view. D. From above.

(Drawn by D. L. Harrison) (Twice natural size)

ventral edge of the tail membrane. This form extends northwards through the Transvaal at least to Southern Rhodesia. In East Africa the form *M. n. arenarius* Heller has been described from Kenya Colony (Guaso Nyuki, N. Guaso Nyeri). The limits of distribution of the two forms are not yet defined.

Although the populations resident in the extreme south of the Union of South Africa (localities from which I have seen specimens are Knysna, King Williams Town and Plettenberg Bay) do tend to be rather darker than those from Natal this is not sufficiently constant in the material before me to warrant the retention of the race *M. n. dasythrix* (Temminck). It is here treated as synonymous with the nominotypical form, which may be considered to extend south to the Cape of Good Hope. Roberts (1951) likewise does not recognise *M. n. dasythrix* as a maintainable geographical race.

Miniopterus natalensis smitianus Thomas

Miniopterus smitianus Thomas, "Proceedings of the Zoological Society of London," July 1927, p.373: Witvlei (Witvley). 40 miles west of Gobabis, East Damaraland, South West Africa.

I have examined sixteen specimens of this subspecies from the following localities in South West Africa in the British Museum (Natural History) collection: Berg Aukas, 12 miles east north east of Grootfontein; Numkaub, Grootfontein District; Klein Windhoek; Namutoni, north-eastern Etosha Pan. Also one in my own collection from Anenous. The series in the British Museum has previously been examined by St. Leger (see Shortridge, 1934), who considered them to be quite distinct in colour from *M. n. natalensis*. I have also compared this series with material from all other parts of southern Africa, and I can identify any example of *M. n. smitianus* when mixed with series from elsewhere. It is very much paler both on the dorsal and ventral aspects, the general colour being a light fawn-brown, often sandy. The race is very constant in the seventeen examples examined by me, and there is no difference in size when compared with the nominotypical race. The exact limits of its distribution are not as yet definable. Four specimens in the British Museum collection from Otjitundua, Kaokoveld, South West Africa, all males, collected by the late G. C. Shortridge on 20th May, 1927, are of considerable interest (Nos. 28. 9. 11. 56-59). In these examples the proximal three-quarters of the dorsal hair is as dark as in *M. n. natalensis*, while the tips are pale sandy as in *M. n. smitianus*. It seems that in northern South West Africa this form intergrades either with the typical or with some other form. Two examples from Golungo Alto, Angola, in the British Museum collection (Nos. 4. 4. 9. 25-26) are indistinguishable from the typical form. A series from southern Angola would be of great interest. Roberts (1951), strangely enough, does not recognise the validity of this pallid subspecies.

2. Miniopterus fraterculus Thomas and Schwann

Miniopterus fraterculus Thomas and Schwann, "Proceedings of the Zoological Society of London," June 1906, 1, p.162: Knysna, Cape Province, South Africa.

This rare bat is quite clearly a distinct species. I have a series of seven examples in my collection and I have also examined the paratypical material in the British Museum (Natural History) collection. Although this is a small series it is evidently the largest available as yet for comparative study and by means of it I am able to place on record some interesting characters of this species, which were not evident in the small series available to Thomas and Schwann (two males and one female).

In their original description Thomas and Schwann state that it is "clearly similar to *M. dasythrix*, agreeing with that species absolutely in colour even to the peculiarity in the respective colouration of the two sexes. Thus the back of the male is smoky blackish, the head and the whole of the under surface dark brown (darker than Prout's Brown in Ridgway, 'Color Standards and Color Nomenclature,' 1912, pl. XV); the female is dark brown above and below, rimmed with black along the hinder part of the back." *M. dasythrix* is here regarded as a synonym of *M. n. natalensis*.

My series reveals that there are, in fact, very striking colour differences between *M. fraterculus* and *M. natalensis*. At any rate in Natal there are two colour phases of *M. fraterculus*, one red-brown, the other dark brown, while several individuals show variable admixtures of the two. In about eighty examples of *M. natalensis* examined from most parts of its range no trace of a red-brown phase has been found in that species. The existence of this red-brown phase has already been briefly commented upon (Harrison and Clancey, 1952). The dark phase of *M. fraterculus* is, in my opinion, a shade darker and more rufous than the darkest examples of *M. natalensis*, so that the two species can be distinguished apart by colouration. It would seem useful to describe the colouring of my series in some detail. The seven examples in my possession were all obtained in the Town Bush Valley Cave, near Pietermaritzburg, Natal. Of these, one is a pure example of the red-brown phase, one is similar but with a small dark patch in the interscapular region and an admixture of dark hairs in the lower back, while the remaining five specimens are of the dark phase. This dimorphism is clearly not a sex difference, because the two red-brown individuals included one male and one female, while the five dark examples included two females and three males. It is equally clearly not seasonal, because red-brown and dark phase animals were obtained on the same day (27 January, 1951). All the examples obtained are fully adult so that the colour phases are independent of age, and one can reasonably conclude that this is an instance of genetic dimorphism.

In the red-brown phase, as represented by an adult female (No. 1. 1174), obtained on 27 January, 1951, the colour is a uniform reddish brown (very close to the Burnt Umber of Ridgway, *loc. cit.*, pl. XXVIII), distinctly paler on the under surface especially towards the tail. In this example there is absolutely no trace of the more usual dark colouration. When the hairs are parted they are seen to be very slightly darker red-brown for the basal three-quarters

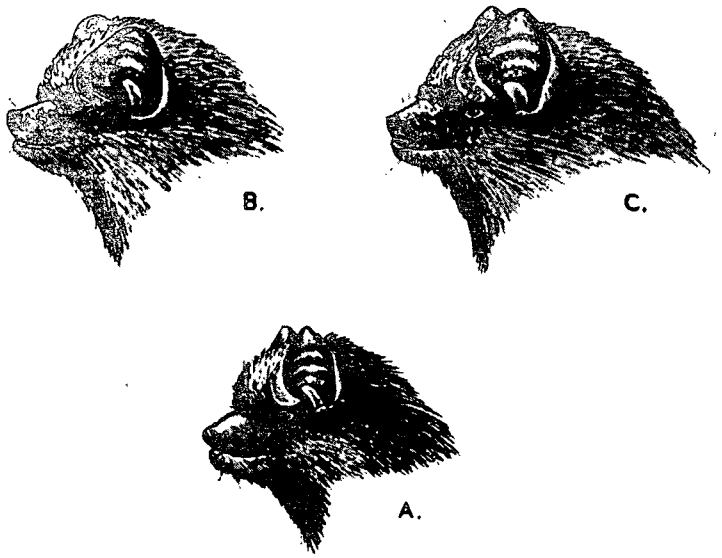

FIG. 2

(A) Head of *Miniopterus natalensis* (Smith). Based on a specimen from Pietermaritzburg, Natal, in coll. D. L. Harrison. ♀ ad.

(B) Head of *Miniopterus schrebersii* Kuhl. Based on a spirit specimen from Syria in the British Museum (Natural History) collection. ♀ ad.

(C) Head of *Miniopterus majori* Thomas. Based on a spirit specimen from Madagascar in the British Museum (Natural History) collection. ♀ ad.

(Drawn by D. L. Harrison) (About natural size)

of their length. In the dark phase I am unable to detect any sexual difference in colouration as claimed by Thomas and Schwann. In this phase the general colouration is a dark chocolate brown (closest to the Seal Brown of Ridgway, *loc. cit.*, pl. XXXIX), which is, by comparison with *M. natalensis*, slightly more rufous, unlike the tendency to grey-brown in that species. The cream-buff tipping of the hairs of the back, so often present in *M. natalensis*, is not apparent in any of my examples of *M. fraterculus*. Furthermore, in the dark phase of *M. fraterculus* there is a narrow band of black hairs running from behind the humerus along the edge of the mesopatagium to the femur and round to the tail, where it attains its greatest width. This black band is constant but variably developed in all the dark phase examples of both sexes that I possess, and there is no trace of it in any of the examples of *M. natalensis* seen by me. On the ventral surface the dark phase of *M. fraterculus* is much darker and more rufous than *M. natalensis*, while the tendency to a cream buff fringe of hairs

along the ventral border of the tail membrane, which is often marked in *M. natalensis*, is only just apparent in two of my examples of *M. fraterculus*. In the dark phase also the hairs are darker in their basal three-quarters.

This species does not differ from *M. natalensis* in the form of the ear, wing, legs or tail membrane. It averages much smaller in size (See Tables 2 and 3). The head of *M. fraterculus* is proportionately much smaller than that of *M. natalensis*, a difference which is clearly apparent in spirit specimens. The very small skull and teeth of this species form its most distinctive character (*vide* Thomas and Schwann, *loc. cit.*). The difference in size between the skulls and teeth of the two species is much greater than would be expected from the slight difference in body size, as Thomas and Schwann remarked (See Fig. 1).

Apart from the absolute difference in size of the skulls of these bats, there is also an evident difference between the relative breadths of the rostrum and braincase in the two species, a character which has not previously been described. The rostral part of the skull is much narrower in *M. fraterculus*. To demonstrate this I have applied some simple cranial indices to the skull measurements of the two species. The first of these, which I have called the maxillo-parietal index, is obtained by dividing the maximum breadth of the braincase by the rostral breadth of the skull at the level of m^2. The maxillo-condylobasal index is obtained by dividing the condylobasal length by the rostral breadth at the level of m^2. The interparieto-condylobasal index is obtained by dividing the condylobasal length by the maximal breadth of the braincase. The figure obtained in this way for series of *M. schrebersii*, *M. natalensis* and *M. fraterculus* are given in the Table below (Table 1).

TABLE 1

Cranial Indices. Averages and Extremes in mm.

	Maxillo-parietal	*Maxillo-condylobasal*	*Interparieto-condylobasal*
M. schrebersii (20 examples)	1.33 (1.29–1.39)	2.47 (2.39–2.65)	1.84 (1.81–1.91)
M. natalensis (32 examples)	1.31 (1.20–1.39)	2.47 (2.28–2.57)	1.88 (1.79–1.99)
M. fraterculus (8 examples)	1.42 (1.38–1.47)	2.62 (2.57–2.69)	1.84 (1.79–1.87)

It will be seen from this that the figures for the maxillo-parietal and maxillo-condylobasal indices of *M. fraterculus* are consistently higher, while the interparieto-condylobasal index is not significantly different in the three species. This clearly demonstrates the narrower rotrum in *M. fraterculus*, and show how cranial indices may be of great value when difference in gross bulk in two skulls makes it difficult to appreciate differences of proportion.

TABLE 2

External Measurements. Averages and extremes in mm.

	M. schrebersii (40 examples)	*M. natalensis* (51 examples)	*M. fraterculus* (8 examples)
Length . . .	111 (99–121)	110.7 (89–123)	101.7 (95.2–110)
Tail	55.7 (44–61)	52.9 (36–61)	50.6 (48–53)
Hind Foot . .	9.2 (8–11)	9.8 (8–12)	8.6 (8.1–8.9)
Forearm. . .	44.8 (42.4–47.2)	45.4 (42.5–49.6)	42.9 (41.9–43.8)
Ear	10.5 (8–13.5)	11 (7.4–13)	8.7 (7.7–12)
Wing Span . .	316 (300–333)	304 (269–330)	291 (280–308)

Table 3

Cranial Measurements. Averages and extremes in mm.

	Condylobasal length	*Zygomatic breadth*	*Interorbital constriction*	*Breadth of brain case*
M.schrebersii (18 examples)	14.4 (13.9–14.9)	8.2 (8–8.7)	3.7 (3.6–3.8)	7.8 (7.4–8.1)
M.natalensis (45 examples)	14.8 (14–15.9)	8.4 (7.9–9.1)	3.7 (3.3–4.1)	7.8 (7.5–8.2)
M.fraterculus (8 examples)	13.7 (13.6–13.8)	7.7 (7.6–7.8)	3.4 (3.2–3.7)	7.4 (7.3–7.6)
	Mandible	*Maxillary toothrow*	*Mandibular toothrow*	*Rostral breadth at m²*
M.schrebersii	10.6 (10.2–10.8)	5.6 (5.3–5.8)	6 (5.9–6.3)	5.8 (5.7–6.1)
M.natalensis	10.7 (10.1–11.7)	5.6 (5.2–6.1)	6 (5.5–6.6)	5.9 (5.5–6.7)
M.fraterculus	9.8 (9.5–10)	5 (5–5.2)	5.5 (5.5–5.7)	5.2 (5.1–5.3)

There is still very little known about the distribution of this bat. The *Type* and Paratypes were obtained at Knysna, Cape Province, in a sea coast cave (Thomas and Schwann, *loc. cit*). It has also been recorded from Great Buffalo and Cinnabar Mines in the Barberton district of the eastern Transvaal (Roberts, 1951), and it has recently been obtained in the Town Bush Valley Cave, near Pietermaritzburg, Natal (Harrison and Clancey, 1952).

ALLIED MADAGASCAN FORMS

Recently, I examined material in the British Museum (Natural History) of the bats of the Genus *Miniopterus* which occur on Madagascar. Two species are resident on the island, both of which appear to me to be distinct on morphological grounds. There is a large dark species, *M. majori* Thomas, and a smaller one, *M. manavi* Thomas. In the latter species red-brown and dark phases occur just as in *M. fraterculus*, and it seems very likely that *M. manavi* belongs to the same species group as *M. fraterculus* and might well have evolved from it. These two Madagascan species are considered briefly below.

1. **Miniopterus majori** Thomas

Miniopterus majori Thomas, "Annals and Magazine of Natural History," series 7, vol. 17, February, 1906, p.175: Imasindrary, N.E. Betsileo, Madagascar.

This bat is uniformly much darker in colour than *M. natalensis* both on the back and belly, and, furthermore, the texture of the fur is quite different, being silkier, with a marked shiny gloss on the back—a character by which it can be picked out from series of *M. natalensis* at once.

The tragus is broader than in *M. natalensis*, a character not previously noted (See Fig. 2). Only a small series is available (4 specimens in the British Museum (Natural History) collection), and these do not seem to differ in size from *M. natalensis*. Forearms of two specimens measured 46.8 and 47.4 mm. The measurements of the two skulls available also fall within the range of size of *M. natalensis*, so that it is not larger as claimed by Thomas (*loc. cit.*). It is known only from Madagascar and is clearly a member of the *M. natalensis* species group from which it has been evolved by long isolation, and its characters are sufficiently distinct as to justify its retention as a species.

2. Miniopterus manavi Thomas

Miniopterus manavi Thomas, "Annals and Magazine of Natural History," series 7, vol. 17, February, 1906, p. 176: Imasindrary, N.E. Betsileo, Madagascar.

I have examined twelve specimens of this species in the British Museum (Natural History) collection. It is obviously a distinct species. As noted above this little bat possesses red-brown and dark phases, like *M. fraterculus*. The red-brown examples come from Manavimenu, with two dark ones. The dark phase of this species is darker than *M. natalensis* and matches quite closely the dark phase of *M. fraterculus*. Several dark examples approach the red-brown phase in the redder colouration of the fur towards the tail.

The small size of this species is its chief distinguishing feature. Forearm 37.3—39.1 mm. Condylo-basal lengths of four skulls, 12.4, 12.6, 12.8, 12.9 mm.

Map of the southern half of Africa and Madagascar showing the distribution of the bats of the Genus *Miniopterus* Bonaparte dealt with in the present paper.

1. *Miniopterus natalensis* (Smith).
2. *Miniopterus fraterculus* Thomas and Schwann.
3. *Miniopterus manavi* Thomas.
4. *Miniopterus majori* Thomas.

SUMMARY AND CONCLUSIONS

1. Two species of the Genus *Miniopterus* are considered to exist in southern Africa and two on the island of Madagascar, these being *M. natalensis*, *M. fraterculus*, and *M. majori*, *M. manavi* respectively.

2. The original description of *M. fraterculus* Thomas and Schwann is amended with regard to colouration and cranial characters, and some cranial indices are employed for comparision of this species with *M. natalensis* and *M. schrebersii*.

3. The subspecies *M. n. smitianus* Thomas is considered valid, but the race *M. n. dasythrix* is not believed to be separable and is sunk into the synonymy of *M. n. natalensis*.

ACKNOWLEDGEMENTS

I am most grateful to Mr. P. A. Clancey, Director of the Durban Museum, Durban, South Africa, who has provided me with a great deal of material of this Genus to study, and also to Mr. R. W. Hayman of the British Museum (Natural History), who has made the material in the National Collection available to me.

BIBLIOGRAPHY

1909, Jameson, H. Lyster 'On a Collection of South African Mammals,' "Annals and Magazine of Natural History," series 8, Vol. 4, p.471.

1952, Harrison, D. L. and Clancey, P. A. in 'Notes on the Bats (Microchiroptera) from a Cave the Pietermaritzburg District of Natal,' "Annals of the Natal Museum," Vol. 12, pt. 2, p.177.

1951, Roberts, A. "The Mammals of South Africa," p.74.

1934, Shortridge, G. C. "The Mammals of South West Africa," Vol. 1, p.69.