

BATS FROM ETHIOPIA COLLECTED BY THE GREAT ABBAI EXPEDITION, 1968

By J. E. HILL & P. MORRIS

INTRODUCTION

THERE has been hitherto no great concentration on the bat fauna of Ethiopia by collectors and many records are of one or two specimens sporadically obtained. For this reason the present collection is of particular interest, and is of especial value for the wide representation of the bats of western Ethiopia, hitherto largely unrecorded. This paper is an account of the bats collected by the Great Abbai Expedition including taxonomic notes, and revisions where appropriate, together with what little ecological information is available.

The principal aim of the Expedition was to carry out a survey of the Blue Nile (= Great Abbai) Gorge. The organization of the Expedition and its main activities are described by Blashford Snell (1970). The bat collections were made mainly in the Gorge itself at river level at various "Forward Bases" west of Shafartak Bridge, or in the Awash National Park, with some additional specimens being obtained elsewhere, notably in the highlands at Ghimbi.

The Nile Gorge is a unique habitat, mostly uninhabited with dense scrub covering the steep rocky hillsides. There is a spectacular seasonal change here; during the dry season the river almost ceases to flow and the Gorge becomes exceedingly arid with only a narrow fringe of tall trees beside the river retaining their leaves. At this time survival must be a serious problem for many animals, Megachiroptera especially being unlikely to find any succulent fruits and presumably migrating elsewhere. By contrast insects appear to be especially abundant in the dry season, according to previous explorers, so that the Microchiroptera may well remain throughout the year, though the fierce heat and lack of shelter must cause problems. The Expedition's visit to the Nile Gorge came towards the end of the wet season, when the atmosphere was warm and humid; the lush green vegetation seemed to provide an ideal habitat for a wide range of animals and gave no indication of just how inhospitable the habitat is during at least one third of the year.

The Awash National Park is chiefly an open dusty area of grassland, thorn scrub and volcanic rubble. An important geological feature, so far as bats are concerned, is the occurrence of "lava blister caves". These are evidently formed by gas bubbles in flowing lava and appear on the ground as low, rounded hillocks standing up prominently in an otherwise flat area. These mounds are hollow inside and some have perforated so allowing access to the interior. They represent the only cool, shady retreats in an otherwise open, arid landscape and consequently house many bats. Two of the blisters had openings only at their highest points. These had functioned as pitfall traps and also perhaps as carnivore dens, and the floors of both were littered with mammal bones which included the remains of five bat species.

Live bats were collected either by shooting (with .22 or .410 guns loaded with dust shot) or with mist nets. Fixed nets, supported on poles, trees or convenient rocks were avoided by flying bats, and only proved useful when set at a roost entrance whence the bats could be driven into the net. For catching bats as they flew low hawking for food a hand held net was employed. A small net (about 1 m × 1.5 m), supported between two fibreglass rods was held close to the ground and flicked sharply upwards to catch the bat as it flew past. The method requires both patience and a certain amount of practice and was used with particular success by Dr. D. W. Yalden to catch most of the free-flying bats obtained. Specimens taken this way come in ones and twos and contrast with sizeable batches of bats taken at roosts. Because roosting bats are easier to get in quantity, they figure prominently in this collection, though their numbers here are not necessarily a reflection of true abundance in the field. Netted bats are often of greater interest purely because they are difficult to catch, particularly if they do not form communal roosts; they are therefore poorly represented in collections.

The specimens obtained were either preserved whole in formalin, supported on card so as to keep the wings well displayed or they were prepared as a skull and dry card-mounted skin. The collections of the British Museum (Natural History) contain also a small number of specimens representing species previously not recorded from Ethiopia and notes on these are included in this report. Such specimens are denoted by their registration numbers, as is a single specimen from French Somaliland (Territory Afars and Issas) which constitutes a new record for that country and is included in this paper.

The majority of bat specimens collected by the Great Abbai Expedition are now in the collections of the British Museum (Natural History), but where numbers have permitted this to be done, duplicate examples have been sent to the Museum at Haile Selassie I University, Addis Ababa.

In the present paper, the altitudes and co-ordinates used have been taken from the best available maps, the 1 = 1,000,000 series. For convenience, clarity and ease of future reference these have been adhered to, even though investigations in the field showed the maps to be inaccurate in places. Part of the Nile forms the boundary between the provinces of Gojjam and Wollega; specimens obtained at the riverside have not been specifically assigned to either. Times given are 'local time', and as a rough rule the period 19.00 hrs–06.00 hrs is passed in darkness. Linear measurements of specimens are in millimetres: the minimum, maximum and mean (in parentheses) are given for series.

It is hoped that a future paper will give detailed background information on the ecology of the areas visited by the Expedition, meanwhile the brief survey above and the "collection and field notes" for the various species below have been prepared by one of us (P.M.) from actual field data; determinations and taxonomic investigations are the work of J.E.H. We would like to express our thanks to various members of the Great Abbai Expedition for the hard work and long hours spent in pursuit of bats under trying conditions. The efforts in the field of Drs. D. W. Yalden, M. J. Largen and Mr. H. King are particularly acknowledged.

SYSTEMATIC SECTION

Epomophorus anurus (Heuglin, 1864)

SPECIMENS. 2 young adult females. Temporary base, Mouth of Azir River, Blue Nile Gorge, 10° 29' N, 36° 25' E, alt. 1,000 m. 21 August 1968.

TAXONOMIC NOTES. These young adult specimens agree closely in palatal proportions with those given by Anderson (1912 : 533) for females of *E. anurus*. Kock (1969 : 18) considers *anurus* a subspecies of *E. labiatus*.

COLLECTION AND FIELD NOTES. A small group of fruit bats was located, flying about under the big trees lining the river; the bats were particularly concentrated around some large fig trees which bore plenty of ripe fruit. The remains of many chewed figs littered the ground below. The bats were seen at about 21.30 hours, and were immediately recognized as Megachiroptera by the distinctive way in which their eyes appeared large and red as they reflected the light from torch beams. Three specimens were obtained using dust shot. It was interesting to note a form of communal behaviour; the bats had been following each other in threes and fours through gaps in the foliage, and when each specimen was shot, the others changed course and flew low and close to investigate the victim. The bats showed particular concern in response to the cries of a wounded individual. No other instances of group behaviour of this nature were observed with any of the other bats obtained. This communal response is all the more remarkable if the group really did include two species (see below). All three specimens of *Epomophorus* were females, so it may be that the group was part of a nursing colony whose individuals would perhaps have a stronger attachment to others of their species than normal.

Epomophorus sp.

SPECIMEN. 1 young adult female. Temporary Base, mouth of Azir River, Blue Nile Gorge, 10° 29' N, 36° 25' E, alt. 1,000 m. 21 August 1968.

TAXONOMIC NOTES. It seems likely that this young adult specimen is referable to *E. gambianus*, a species recorded from southern Ethiopia by Andersen (1912 : 540). Although from the proportions of the palate it could be referred to *E. crypturus* as defined by that author, this species is known so far only from localities in and south of the southern Congo and southern Tanzania, and, furthermore, in several of its dimensions this specimen exceeds the greatest size as yet recorded for *E. crypturus*. Measurements: length of forearm 77.9; greatest length of skull 50.3; condylobasal length 50.0; condylocanine length 48.3; median palatal length 27.7; post palatal length 12.3; rostral length 19.7; zygomatic width —; least inter-orbital width 7.5; post orbital width 9.4; width of braincase 16.8; mastoid width 17.2; $c^1 - c^1$ (alveoli) 8.9; $m^1 - m^1$ 13.6; $c - m^1$ 18.2; length of mandible 39.3; $c - m_2$ 19.6.

COLLECTION AND FIELD NOTES. As for *E. anurus*. If the present specimen really is a different species, it is surprising that it formed part of such a closely knit social group with *E. anurus*.

Micropteropus pusillus (Peters, 1868)

SPECIMENS. Two females and a foetus. Sirba, Blue Nile Gorge, 10° 05' N, 35° 30' E, alt. 800 m. 30 August 1968.

TAXONOMIC NOTES. There appears to have been hitherto no confirmed record of *Micropteropus* from Ethiopia, although *M. pusillus* occurs in the southern Sudan (Kock, 1969 : 24).

COLLECTION AND FIELD NOTES. Found at night between 20.00 hrs and 21.00 hrs flying around under large fig trees at the edge of the Nile. Both specimens caught in small hand-held mist nets. One animal was found to be pregnant with a well formed foetus, suggesting that breeding may coincide with the wet season (just ending at this time) and maximum availability of fruit such as figs.

ADDITIONAL MATERIAL. Apart from the specimens obtained by the Great Abbai Expedition, the collections of the British Museum (Natural History) include three further Ethiopian specimens (B.M. 28.I.II.5-7) obtained at the Donkam River, Great Abbai, 100 miles southwest of Lake Tana, at 5,000 feet, by R. E. Cheesman, which presumably led Ellerman, Morrison-Scott and Hayman (1953 : 49) to include Ethiopia in the distribution of the species.

Rhinopoma hardwickei sennaarinese Fitzinger, 1866

(Plate 3 (a))

SPECIMENS. (1) Three males, three females. North eastern slope of Mount Fantalle, Shoa. 08° 58' N, 39° 54' E, alt. 1,000 m. 28 September 1968.

(2) Two males, nine females. North bank of Awash River, Awash National Park, Shoa. 08° 30' N, 40° 01' E, alt. 1,000 m. 25-28 September 1968.

(3) Skulls from cave deposit. Near Metahara, Awash National Park, Shoa. 08° 50' N, 40° 01' E, alt. 1,000 m. 28 September 1968.

TAXONOMIC NOTES. Kock (1969 : 35) has reviewed *R. hardwickei* with particular reference to forms inhabiting northeastern Africa and has concluded that larger specimens from the Sudan, Mauretania, northwest Africa, Lower Egypt, Israel, Jordan, Aden and Sokotra should be referred to *R. h. sennaariense* Fitzinger, 1866, a name thought for many years referable to *R. microphyllum*. *Rhinopoma hardwickei cystops* Thomas, 1903, to which all specimens from Egypt, the Sudan and Ethiopia were formerly referred is considered by Kock to be a smaller subspecies inhabiting Middle Egypt and extending westwards to Hoggar and Air in the Sahara: the small *R. h. macinnesi* Hayman, 1937 is thought by Kock to extend from northern Kenya and the southern Sudan to Somalia and to Eritrea in Ethiopia. These specimens from eastern Ethiopia are similar in size (length of forearm in thirteen examples 52.9-56.6 (55.0)) to those which this author refers to *sennaariense* from Khartoum and are considerably larger than *macinnesi* (length of forearm 46.6-48.4, according to Kock (pp. 45, 50)).

COLLECTION AND FIELD NOTES. The living bats were all shot or netted inside some small lava blister caves in the middle of the day. These provided the only shade and cool shelter in an otherwise hot, dry and very open terrain, covered with sparse thorn scrub, boulders and dry grass. Large numbers of *Rhinopoma* were found in these caves, often hanging from the roof in small solid masses of a dozen or more individuals. A sample of the bats was collected at random: the colonies contained both sexes, but no signs of any young were seen. *Rhinopoma* was also well represented among skeletal material removed from the floors of two of the lava caves.

Taphozous perforatus haedinus Thomas 1915

SPECIMENS. (1) Thirteen males, eight females. "Forward Base Two", 10 km west of Mabil, Blue Nile Gorge. 10° 19' N, 36° 45' E, alt. c. 1,300 m. 19 August 1968.

(2) One male, three females. North Bank of Awash River, Awash National Park, Shoa. 08° 50' N, 40° 01' E, alt. 1,000 m. 25-27 September 1968.

TAXONOMIC NOTES. These specimens do not support the view (Harrison, 1961 : 150; 1962 : 763) that two closely related species of the *Taphozous perforatus* group exist in Africa, one, *perforatus*, with dark wings, the other, *sudani*, with pale or whitish wings, the two being separated also by a small difference in the size of the braincase, that of *sudani* being on the whole very slightly larger than that of *perforatus*. As noted by Kock (1969 : 74), who also rejects this view, the pigmentation of the wing membrane is variable. A number of the Ethiopian specimens have dusky wing membranes but in others the wing membranes are translucent, especially distally, and in this respect are closely similar to *sudani*. Similarly, the dimensions of the braincase in the Ethiopian specimens bridge the narrow interval separating *perforatus* from *sudani*. It is evident, therefore, that but a single species must be recognized, a course adopted by Rosevear (1965 : 151) and by Kock (1969 : 74) but counter to the opinion of Harrison (1961 : 150, 1962 : 763), who divided the group into two species, *perforatus* having a northern and eastern distribution in Africa, with *sudani* distributed from the Sudan to southern Africa.

Subspecific classification in *T. perforatus* is less clear, and final clarification must, it seems, await the advent of more material. The collections now available in the British Museum (Natural History) suggest that a pale subspecies (*T. p. perforatus* E. Geoffroy, 1818) occurring in northeastern Pakistan and in Egypt is replaced in the Sudan and Congo by a darker, slightly larger subspecies (*T. p. sudani* Thomas, 1915) which in turn in Ethiopia and Kenya gives way to an equally dark but slightly smaller subspecies (*T. p. haedinus* Thomas, 1915: according to Kock (1969 : 80) *Taphozous maritimus* Heuglin, 1877 may be a prior name) extending to Somalia, Eritrea and southwestern Arabia. Specimens from southwestern Arabia are generally referred to *T. p. haedinus* but on the whole are a little paler than are those from Ethiopia and Kenya and thus tend towards *T. p. perforatus*: a small number of specimens reported as *T. perforatus* by Harrison (1968 : 323) from Oman

TABLE I
Measurements of *Taphozous perforatus*

	Number of specimens	Length of forearm	Number of specimens	Condylocanine length	Number of specimens	Width of braincase	Number of specimens	c-m ³
<i>T. p. perforatus</i> India	18	58.5-63.2 (61.0)	16	18.3-19.3 (18.9)	16	9.2-9.5 (9.3)	17	8.0-8.6 (8.3)
<i>T. perforatus</i> Oman*	9	58.9-62.0 (60.7)	—	—	8	8.9-9.3 (9.1)	9	8.2-8.6 (8.4)
<i>T. p. perforatus</i> Egypt, Sudan	9	59.8-62.9 (61.4)	11	18.8-19.5 (19.0)	10	9.2-9.5 (9.4)	13	7.9-8.6 (8.3)
<i>T. p. haedimus</i> S. W. Arabia	13	60.6-65.4 (62.0)	11	18.6-19.5 (19.1)	11	9.0-9.6 (9.4)	12	8.2-8.8 (8.5)
<i>T. p. haedimus</i> Ethiopia	24	60.5-64.8 (62.7)	14	18.9-19.7 (19.4)	14	9.2-9.8 (9.5)	14	8.3-8.7 (8.6)
<i>T. p. haedimus</i> Kenya	8	60.5-64.2 (62.6)	7	18.9-19.6 (19.3)	6	9.3-9.8 (9.6)	8	8.4-8.9 (8.6)
<i>T. p. sudani</i> Sudan	7	62.0-65.7 (64.1)	6	19.3-20.0 (19.7)	7	9.7-10.1 (9.9)	7	8.5-9.0 (8.7)
<i>T. p. swirae</i> N. Nigeria**	11	60.2-63.2	11	18.3-19.1	11	9.0-9.3	11	7.8-8.2
<i>T. p. swirae</i> W. Africa	3	58.7-59.8 (59.3)	2	19.2	2	9.3-9.6	3	8.3-8.4 (8.4)
<i>T. p. rhodesiae</i> *** Rhodesia	4	61.2-62.8 (61.9)	—	—	6	9.3-9.8 (9.6)	8	8.7-8.8 (8.8)

* From Harrison (1968 : 324). ** From Harrison (1958 : 145). *** From Harrison (1962 : 765).

are said by that author to be distinctly paler than *T. p. haedimus* and hardly distinguishable in colour from material from Sudan and Cutch. Specimens from Northern Nigeria have been separated as a distinct subspecies, *T. p. swirae* Harrison, 1962, on account of their greyish coloration: Kock (1969 : 80) lists this as a synonym of *T. p. perforatus* but thinks that there is a possibility that there may exist a distinct western subspecies, for which *Taphozous senegalensis* Desmarest, 1820 would be the earliest name, with *swirae* in synonymy. Extending in West Africa to Senegal, Ghana, Mali and the Cameroon, *T. perforatus* is known also from Tanzania, Botswana and Rhodesia, whence Harrison (1962 : 763) has described a small form, *T. p. australis* (preoccupied: as a subspecies of *sudani*) subsequently renamed *T. p. rhodesiae* (Harrison, 1964a : 2) and considered a synonym of *T. p. sudani* by Kock (1969 : 81). Measurements of *T. perforatus* appear in Table 1.

COLLECTION AND FIELD NOTES. The specimens obtained near Forward Base Two all came from some small caves which lay at the head of a stream gully, high up the side of the Nile Gorge. The gully was steep, vertical in places, thickly over-grown and passed through dense thorn scrub covering the hillsides. The caves themselves were shallow and although dim light penetrated almost to their furthest extremities, they provided cool shelter from the sun.

Large numbers of *Taphozous* were found together with single specimens of *Nycteris thebaica* and *Hipposideros ruber*. The cave floor was thickly carpeted with guano, and in one area, littered with the wings of large insects. These are presumed to represent the remains of insect prey caught in flight by the bats and taken back to the roost where the thick bodies were eaten and the wings discarded. From their size and abundance it is assumed that these insects were the prey of *Taphozous*, rather than of the two smaller and less numerous bats. An endeavour was made to collect all wings in reasonable condition from the pile and these have been identified for the most part by Mr. Alan Brindle of the Manchester Museum, the remainder having been examined at the British Museum (Natural History): the species encountered are listed in Table 2, with their relative abundance.

An attempt was made to catch all the bats in the colony and in all, 40 *Taphozous* were obtained, leaving behind a few individuals that had retreated to inaccessible parts of the cave. All the bats were sexed and weighed in the field, then 21 of the *Taphozous* sample were released. The sex ratio in the full sample was 19 males: 21 females. Weights ranged from 17 gms to 23 gms, with only two animals exceeding 22 gms. The average weight was 19.5 gms with no significant sex difference. From the narrow size range, and the presence of both sexes in equal numbers and similar body weights it is evident that this was not a nursing colony and that breeding must occur at some other time of year, perhaps in a different place.

The *Taphozous* collected in the Awash National Park were just a small sample taken to record their presence in the lava bubble caves. Here again the cavities were light throughout, but provided shelter and shade in an otherwise very open habitat.

TABLE 2

Identities and abundance of insect wings from a roost of *Taphozous perforatus*

Species identified	Number obtained
Orthoptera	
Tettigoniidae	
<i>Diogena fausta</i> (Burmeister)	1
Mantodea	
<i>Tarachodes</i> sp.	1
<i>Polispilota aeruginosa</i> (Goeze)	1
Lepidoptera	
Saturnidae	
<i>Nudaurelea macrophthalma</i> Ky	2
<i>Gyanisa maja</i> Klug	1
Sphingidae	
<i>Agrius convolvuli</i> (Linnaeus)	35
<i>Hippotion eson</i> (Cramer)	7
<i>Hippotion osiris</i> (Dalman)	1
<i>Hippotion celerio</i> (Linnaeus)	1
<i>Nephele peneus</i> (Cramer)	1
<i>Platysphinx stigmatica</i> (Mabille)	2
<i>Euchloron megaera</i> (Linnaeus)	1

Nycteris thebaica labiata (Heuglin, 1861)

SPECIMENS. (1) One male, three females. Mabil, Blue Nile Gorge. 10° 20' N, 36° 45' E, alt. c. 1,200 m. 18 August 1968.

(2) Two females, one male. "Forward Base Two", 10 km west of Mabil, Blue Nile Gorge. 10° 19' N, 36° 45' E, alt. c. 1,000 m. 18-19 August 1968.

TAXONOMIC NOTES. These specimens are similar in size (length of forearm 41-45) to examples of *N. t. thebaica* from Egypt and from other localities (Gondar; Gallabat; Ghibbey Valley, 08° 15' N., 37° 55' E.) in western Ethiopia but are slightly greyer ventrally. For this reason they are referred provisionally to *N. t. labiata* from Keren. The subspecies of *N. thebaica* are discussed by Kock (1969 : 98).

COLLECTION AND FIELD NOTES. The Mabil specimens were shot in the roof of a disused hut standing on a hilltop in open cultivated ground. One of the Forward Base Two specimens was taken from the same small caves as the large sample of *Taphozous* (above), the others from a similar little rock shelter lower down the same river gully.

ADDITIONAL SPECIMENS. The Sandhurst Ethiopian Expedition, 1966 also obtained *N. thebaica* at a locality northeast of Lake Chamo, southern Ethiopia,

where specimens were found sleeping separately in deep, shady pits in the ground. Skulls of *Nycteris* sp. were also present among the cave floor bone debris collected from certain lava blister caves in the Awash National Park in September 1968.

Cardioderma cor (Peters, 1872)

SPECIMENS. Skeletal material. Awash National Park, Shoa. 08° 50' N, 40° 01' E, alt. c. 1,000 m. 28 September 1968.

COLLECTION AND FIELD NOTES. Collected among large numbers of mammal bones found on the floor of the lava blister caves.

ADDITIONAL SPECIMEN. A skin, thought to be *Cardioderma*, formed part of a small collection of local mammals held at the HQ of the Awash National Park.

Rhinolophus clivosus acrotis Heuglin, 1861

SPECIMENS. Skeletal material. Awash National Park, Shoa. 08° 50' N, 40° 01' E, alt. c. 1,000 m. 28 September 1968.

COLLECTION AND FIELD NOTES. Subfossil cave remains, as for previous species.

Rhinolophus landeri dobsoni Thomas, 1904

SPECIMEN. One male. Temporary Base, mouth of Azir River, Blue Nile Gorge. 10° 29' N, 36° 25' E. alt. 1,000 m. 20 August 1968.

TAXONOMIC NOTES. This specimen agrees in size with the type specimen of *dobsoni* from Kordofan and with a small series from the Sudan and western Ethiopia in the collections of the British Museum (Natural History). The series as a whole confirms the measurements of Kock (1969 : 175) and shows that specimens from the Sudan and from Ethiopia are generally smaller (length of forearm in 12 examples 41.5-44.6 (42.8) than those from Malawi (*R. l. lobatus*: length of forearm in 16 examples 42.4-46.6 (44.8)), or from Tanzania (length of forearm in 5 examples 44.4-46.0 (45.1)). Specimens from Zambia are slightly larger than those from Malawi (length of forearm in 11 examples 42.5-47.8 (45.5)) but from Kenya are smaller (length of forearm in 10 examples 41.1-45.8 (43.9)), approaching the northern subspecies in size.

COLLECTION AND FIELD NOTES. Caught in hand-held mist net, 20.05 hrs on open river bank beside tall trees.

Rhinolophus hipposideros minimus Heuglin, 1861

SPECIMEN. One female. Lake Baa-sa-ka, Awash, Shoa. 08° 50' N, 40° 01' E, alt. c. 1,000 m. 26 September 1968.

TAXONOMIC NOTES. This specimen appears to be the second of *R. h. minimus* to be recorded from Ethiopia, the subspecies being known in northeastern Africa from Keren (the type locality) and from Sennaar, Sudan (Andersen, 1904 : 455). The

specimen from Shoa agrees with the Sennaar example excepting only that it has narrower zygomata and has the anterior upper premolar (pm^2) smaller, more rounded and less angular in cross-section. Measurements (the Sennaar example in parentheses): length of forearm 36.7 (35.7); total length of skull to canine 14.4 (14.5); condylocanine length 12.6 (12.7); rostral width 3.4 (3.3); zygomatic width 6.7 (7.5); least interorbital width 1.4 (1.5); width of braincase 6.2 (6.3); mastoid width 6.9 (7.1); $c - m^3$ 5.0 (5.0); $c - m_3$ 5.3 (5.3).

COLLECTION AND FIELD NOTES. Caught after dark (20.00 hrs) in a hand-held mist net as it flew low over the open, muddy lake shore.

Rhinolophus simulator Anderson, 1904

SPECIMEN. One female; B.M. 64.854. Three miles south of Goba, Bale Province, (presumably about $5^\circ 30' N$, $40^\circ 05' E$ —P.M.) c. 3,000 m. 1962.

TAXONOMIC NOTES. This specimen was first identified in 1964 on accession to the collections of the British Museum (Natural History) as an example of *R. hipposideros minimus*, but further examination in the course of reporting the Great Abbai material shows that although in the features of the noseleaf it clearly resembles this taxon, it is much too large, particularly cranially, to represent it. It is referred to the rather larger *R. simulator*, not hitherto reported from any more northerly locality than southern Tanzania, although Dr. K. Koopman (in litt.) of the American Museum of Natural History has identified specimens from western Kenya and the southern Sudan with this species.

The Ethiopian specimen agrees closely with *simulator* in the structure of the sella, which is wide and very slightly constricted at a point a little above its centre and in its low, rounded connecting process which rises slightly above the rounded tip of the sella. The lateral margins of the lancet are slightly concave and the lancet itself is rounded towards the tip to form a broad point. Apart from its generally smaller size, the skull agrees closely with that of *simulator*, with prominent rostral swellings, a shallow rostral sulcus, the anterior upper premolar (pm^2) in the toothrow and with the second lower premolar (pm_3) minute and extruded. Like *simulator*, it differs from *R. swinnyi* and *R. denti* (perhaps conspecific) in larger rostral swellings, the presence of a rostral sulcus and in having a longer supraorbital region. *Rhinolophus alticolus* Sanborn, 1936 from the Cameroon is also very like *simulator*, differing chiefly in slightly larger size, rather less acuminate lancet and in having the mesopterygoid fossa a little wider. There can be little doubt that *simulator* and *alticolus* are conspecific: the single specimen from Ethiopia points to the possible existence of a generally smaller montane subspecies in that region, a matter to be resolved by further specimens. The prior name is *simulator* by many years: *alticolus*, first described as a subspecies of *R. alcyone*, has evidently no close affinity with that species. Measurements of *R. simulator* are compared in Table 3.

COLLECTION AND FIELD NOTES. Collected by P. M. Barrer and presented by the Imperial College (University of London) Ethiopian Expedition 1962.

TABLE 3

Measurements of *Rhinolophus simulator*

Registration Number	Sex	Length of forearm	Greatest length of skull to canine	Condylacanine length	Rostral width	Zygomatic width	Least interorbital width	Width of braincase	Mastoid width	m ³ - m ³	Length of mandible	c - m ³	Locality
<i>R. s. simulator</i>													
95.7.1.4	♂	43.9	—	—	4.3	—	—	—	—	6.4	11.6	6.9	Rhodesia
95.7.1.5	♂	44.2	—	—	4.5	8.7	2.0	—	—	6.7	11.5	7.0	"
4.12.1.4	♀	43.8	—	—	4.3	8.8	2.2	—	—	6.6	—	7.0	"
4.12.1.5	♀	42.7	—	—	—	—	—	—	—	—	—	—	"
5.12.9.89	♀	—	—	—	4.8	9.1	2.2	—	—	6.9	11.8	7.3	Transvaal
59.355	♂	42.5	18.8	16.6	4.5	9.1	2.3	8.9	9.4	6.7	—	7.0	Zambia
66.5445	—	44.5	—	—	4.7	—	2.4	—	—	6.7	—	7.1	"
68.999	♂	44.2	18.7	16.5	4.8	8.8	2.2	8.7	9.2	6.6	11.8	7.0	"
68.1000	♀	44.5	18.8	16.4	4.4	9.0	2.2	8.6	9.2	6.5	11.7	6.9	"
68.1001	♂	42.9	18.3	16.1	4.6	8.9	2.2	8.4	9.1	6.4	11.5	6.7	"
68.1002	♂	42.9	18.5	16.4	4.5	9.0	2.2	8.3	9.0	6.5	11.3	6.9	"
14.6.13.2	♂	43.0	—	—	4.3	—	—	—	—	6.6	—	7.0	Malawi
11.4.23.1	—	44.2	18.0	15.9	4.4	—	2.2	8.4	9.0	6.2	—	6.5	Tanzania
<i>R. simulator</i>													
64.854	—	42.6	17.5	15.4	4.3	8.5	2.0	7.7	8.4	6.0	—	6.4	Ethiopia
<i>R. s. alticolus</i>													
56.187	♂	46.3	18.7	16.7	4.9	—	2.2	—	9.1	6.8	—	7.3	Cameroon
56.188	♀	46.5	18.6	16.3	4.8	8.9	2.3	8.1	9.0	6.6	—	7.0	"
68.895	♂	45.5	—	—	—	—	—	—	—	—	11.8	7.2	"
68.896	♂	45.8	19.1	16.9	4.9	9.3	2.2	8.3	9.3	6.9	11.9	7.2	"
68.897	♂	46.2	18.8	16.7	4.9	9.3	2.3	8.3	9.3	6.7	11.7	7.3	"
68.898	♂	44.9	18.8	—	4.9	8.9	2.3	—	—	6.8	11.7	7.2	"

Rhinolophus fumigatus fumigatus Rüppell, 1842

SPECIMENS. (1) One female. Mouth of Fincha River, Blue Nile Gorge, 10° 03' N, 37° 20' E, alt. 1,000 m. 12 August 1968.

(2) One male. About 30 km southeast of "Portuguese Bridge", near Mota, Blue Nile Gorge, 11° 20' N, 38° 10' E, alt. c. 1,300 m. 22 September 1968.

COLLECTION AND FIELD NOTES. Both specimens shot; the Fincha River one coming from a small rock fissure on a rocky hillside covered with thorn scrub and the other from a cave in a cliff beside the Nile.

Hipposideros caffer caffer (Sundevall, 1846)

SPECIMEN. One male. "Forward Base Two", 10 km west of Mabil, Blue Nile Gorge, 10° 19' N, 36° 45' E, alt. c. 1,000 m. 18 August 1968.

TAXONOMIC NOTES. Hitherto, many authors have followed Andersen (1906 : 275) in maintaining *H. caffer* as a polytypic species with a number of subspecies among which wide intergradation occurred. However, Hollister (1918 : 85) considered that two species, readily separable by size, were to be found together in East Africa, and, more recently, Lawrence (1964 : 1) has suggested that the relative sizes of the narial compartments can be used as a specific distinction between these, the putative subspecies *caffer* and *ruber*. This author did not, however, attempt to allocate the various named forms hitherto ascribed to *caffer* beyond suggesting that *centralis* should be associated with *ruber* rather than with *caffer*. Kock (1969 : 130, 133) also discusses the classification of the group and concludes that two species can be recognized. Specimens from the Great Abbai Expedition and others from Ghana examined recently confirm the views of these authors and have prompted a further examination of the entire complex as it is represented in the collections of the British Museum (Natural History). The majority of specimens can be allocated readily to one or other of two groups, as Koopman (1966 : 158) has noted. One (*caffer*, *angolensis*, *tephrus*, ?*nanus*) is composed of smaller (length of forearm usually less than 48), generally more greyish (in the dull phase) forms with small median posterior narial compartments and wide lateral inflations. Those allocated to the second group (*ruber*, *centralis*, *guineensis*, *niapu*) are generally larger (length of forearm usually greater than 48), browner (in the dull phase) and have larger median posterior narial compartments with narrow lateral inflations. There is evidently an ecological preference as is indicated by Verschuren (1957 : 354, 373 for *centralis* and *nanus*), Lawrence (1964 : 4) and Koopman (1966 : 158), the members of the first group occurring in the drier woodland and savannah regions, those of the second group in wetter, densely forested areas, as suggested by Brosset (1968 : 338). There exist, however, wide areas of sympatry on the fringes of the forest areas and this has led to the difficulties encountered when all of the named forms are considered to be subspecies of a single polytypic species (Hill, 1963 : 63). Members of either group may be readily recognized over most of Africa but in northern Angola and the Lower Congo the local representative (*centralis*) of the larger group is reduced in size and distinction from that (*angolensis*) of the smaller group is difficult. This circumstance led Koopman (1966 : 158) to retain the concept of a single polytypic species. Both species occur in two colour phases: in the dull phase *caffer* is greyish and *ruber* brownish, while the bright phase of *caffer* is some shade of orange, of *ruber* more rufous.

Hipposideros caffer is distributed throughout most of Africa excluding the central forested region from Morocco to Senegal, Sierra Leone, Ghana, Senegambia, Nigeria, northeastern Congo, Sudan, Ethiopia, Somalia, Kenya, Tanzania (including Zanzibar), Pemba Island, Zambia, Rhodesia, Malawi, Natal, Transvaal, Cape Province, South West Africa, Angola and Gabon: outside Africa the species extends to the Yemen. The following subspecies may prove valid:

Hipposideros caffer caffer (Sundevall, 1846)

Mainly northeastern, eastern and southern Africa.

Hipposideros caffer angolensis (Seabra, 1898)

South West Africa; Angola; Gabon; Lower Congo.

Hipposideros caffer tephurus Cabrera, 1906

Northern and northwestern Africa; drier regions of West Africa.

Hipposideros caffer nanus J. A. Allen, 1917

Northeastern Congo.

It seems that *aurantiacus* de Beaux, 1924 from Somalia is based on an example of *H. c. caffer* in the red or brighter phase, while apparently *braima* Monard, 1939 from Portuguese Guinea should be synonymized with *H. c. tephurus* (Aellen, 1956 : 26; Rosevear, 1965 : 226). Lawrence (1964 : 3) and Koopman (1965 : 10, 1966 : 158) agree that *nanus* J. A. Allen, 1917 is a subspecies of *H. caffer*.

Specimens from the Sudan are referred to *H. c. tephurus* by Koopman (1965 : 10) and Kock (1969 : 130). The Ethiopian specimen from the Great Abbai collection, however, has a generally slightly larger skull than *tephurus* and consequently is referred to *H. c. caffer*. Measurements; length of forearm 46.9; greatest length of skull to canine 17.2; condylocanine length 14.9; rostral width 4.4; zygomatic width —; least interorbital width 2.8; width of braincase 8.6; mastoid width 9.4; $c^1 - c^1$ 4.0; $m^3 - m^3$ 5.8; $c - m^3$ 5.8; length of mandible 10.1; $c - m^3$ 6.4.

COLLECTION AND FIELD NOTES. The single specimen was caught after dark (20.45 hrs) in a hand-held mist net as it flew low over a flat riverside sandbank in an area of thick bush.

Hipposideros ruber centralis Andersen, 1906

(Plate 3 (b))

SPECIMENS. (1) One female. Mouth of Fincha River, Blue Nile Gorge. 10° 03' N, 37° 20' E, alt. 1,000 m. 12 August 1968.

(2) Two males and two females. "Forward Base Two", 10 km west of Mabil, Blue Nile Gorge. 10° 19' N, 36° 45' E, alt. 1,000 m. 15-19 August 1968.

(3) One male. "Forward Base Three", mouth of Didessa River, Blue Nile Gorge. 10° 05' N, 35° 38' E, alt. c. 1,000 m. 26 August 1968.

TAXONOMIC NOTES. Reasons for regarding *ruber* as a distinct species rather than a subspecies of *caffer* are discussed above. It is of interest to note that specimens (B.M. 67.1135-1140) collected by the Sandhurst Ethiopian Expedition, 1966 at the southwest corner of Lake Abaya are also referable to *H. r. centralis* which clearly extends some distance into Ethiopia.

Hipposideros ruber is distributed through the forests and savannahs of Ethiopia, the Sudan, Uganda, Kenya, Tanzania, Zambia, Angola, Gabon, Congo (Kinshasa), Congo (Brazzaville), Cameroon, Fernando Poo, Nigeria, Ghana, Gambia, Sierra Leone, Liberia, Spanish Guinea, Senegal, São Tomé Island and Principe Island. Possible subspecies are:

Hipposideros ruber ruber (Noack, 1893)

Tanzania, Zambia, Angola (Sanborn, 1950 : 58).

Hipposideros ruber centralis Andersen, 1906

Ethiopia, Sudan, Uganda, Kenya.

Hipposideros ruber guineensis Andersen, 1906

West Africa.

Hipposideros ruber niapu J. A. Allen, 1917

Northeastern Congo.

Specimens reported by Aellen and Brosset (1968 : 447) as *H. caffer* from Congo (Brazzaville) seem likely to represent *ruber* (possibly *H. r. centralis*): others reported from the Cameroon by Aellen (1952 : 72, 73) as *H. c. caffer* and *H. c. angolensis* seem from measurements to be referable to *H. ruber*. Aellen (loc. cit., pp. 74, 75) also records *guineensis* and *ruber* from the Cameroon, as subspecies of *H. caffer*.

COLLECTION AND FIELD NOTES. The Fincha River specimen, and three of those from Forward Base Two were all caught after dark in a hand-held mist net as they flew low over riverside sand banks in thick scrub habitat. The specimen from the Didessa River was in rather less open habitat, flying around among riverside bushes at 21.05 hrs. The remaining *H. ruber* from Forward Base Two was netted in the same small caves as large numbers of *Taphozous perforatus* (q.v.).

Two sharply contrasted colour phases are represented in the collection—grey/brown and bright orange/red, with both forms being encountered at a single locality (Forward Base Two).

Asellia tridens tridens (E. Geoffroy, 1818)

SPECIMEN. Skeletal material. Awash National Park, Shoa. 08° 50' N, 40° 01' E, alt. c. 1,000 m. 28 September 1968.

COLLECTION AND FIELD NOTES. Part of a collection of mammal bones removed from the floor of a lava blister cave.

Asellia patrizii de Beaux, 1931

SPECIMEN. One male. North bank of Awash River, Awash National Park, Shoa. $08^{\circ} 50' N$, $40^{\circ} 01' E$, alt. c. 1,000 m. 25 September 1968.

TAXONOMIC NOTES. This species has been known hitherto only from Danakil, Ethiopia (the type locality) and from two other locations in Ethiopia, namely Assab, Eritrea and Entebibir Island, near Dahlak Kebir Island, off Massawa, Eritrea, the specimen recorded now from the Awash National Park being in fact the first to be received at the British Museum (Natural History). It demonstrates effectively the much smaller skull of *patrizii* when compared with *tridens* which has been obtained (vide supra) in cave remains from the same area. Harrison (1965 : 4) noted that specimens from Entebibir Island are slightly smaller than those recorded from the mainland and thought therefore that they might prove to be subspecifically separable. However, the specimen from the Awash National Park is very similar in size to those reported by Harrison and does not support this view. Measurements: length of forearm 40.1; greatest length of skull 14.7; condylobasal length 13.1; condylocanine length 12.7; zygomatic width 7.6; least interorbital width 1.9; width of braincase 6.1; mastoid width 7.1; $c^1 - c^1$ 3.9; $m^3 - m^3$ 5.2; $c - m^3$ 5.1; $c - m_3$ 5.7.

COLLECTION AND FIELD NOTES. Shot hanging from the roof of a lava blister cave in very dry open, rocky terrain, 1500 hrs.

Triaenops persicus afer Peters, 1877

(Plate 3 (c))

SPECIMENS. (1) One male and one female. "Forward Base Three", mouth of Didessa River, Blue Nile Gorge. $10^{\circ} 05' N$, $35^{\circ} 38' E$, alt. c. 1,000 m. 28 August 1968.

(2) One female. Awash National Park, Shoa. $08^{\circ} 50' N$, $40^{\circ} 01' E$, alt. c. 1,000 m. 28 September 1968.

TAXONOMIC NOTES. Although recorded from Somalia and Kenya, these specimens appear to be the first of *Triaenops* to be reported from Ethiopia. A rather larger subspecies, *T. p. majusculus*, has been described by Aellen and Brosset (1968 : 450) from the Congo (Brazzaville).

COLLECTION AND FIELD NOTES. Both specimens obtained at Forward Base Three were caught with a hand-held mist net. The male was flying low over a maize plot on the bank of the Nile at 19.50 hrs, the female was flying low over the river itself at 22.00 hrs. The habitat is dense trees and bush with areas of maize cultivation, sharply contrasting with the dry, open Awash locality where the other specimen was shot in one of the lava blister caves in the middle of the day.

ADDITIONAL SPECIMEN. A further specimen (B.M. 69,875) collected by Mr. C. Buer and presented by Dr. M. J. Largen has been examined recently. It was obtained on the main road between Lake Langano and Addis Ababa.

Pipistrellus kuhlii fuscatus Thomas, 1901

SPECIMEN. One female. Ghimbi, Wollega. $09^{\circ} 10' N$, $35^{\circ} 50' E$, alt. 2,150 m. 31 September 1968.

TAXONOMIC NOTES. Mertens (1925 : 22) pointed out that *africanus* Rüppell, 1842 from Shoa is very similar to *fuscatus* Thomas, 1901 from Kenya, for which it is considered a prior name by Kock (1969 : 168).

COLLECTION AND FIELD NOTES. This specimen was obtained "from a house" (presumably in the town of Ghimbi), no further information is available.

Pipistrellus nanus (Peters, 1852)

SPECIMENS. (1) One male and two females. Sabeta, Shoa. $08^{\circ} 55' N$, $38^{\circ} 40' E$, alt. 2,500 m. August 1968.

(2) One male. Ghimbi, Wollega. $09^{\circ} 10' N$, $35^{\circ} 50' E$, alt. 2,150 m. 2 September 1968.

COLLECTION AND FIELD NOTES. The Sabeta specimens were collected by local children from the axils of banana leaves. The Ghimbi animal was found by a local boy, but no further details are available.

Eptesicus somalicus somalicus (Thomas, 1901)

SPECIMENS. (1) One male and one female. Mouth of Fincha River, Blue Nile Gorge. $10^{\circ} 03' N$, $37^{\circ} 20' E$, alt. c. 1,000 m. 12 August 1968.

(2) One immature female. "Forward Base Two", 10 km west of Mabil, Blue Nile Gorge. $10^{\circ} 19' N$, $36^{\circ} 45' E$, alt. c. 1,000 m. 15 August 1968.

COLLECTION AND FIELD NOTES. All specimens caught flying low over riverside sandbanks in thick bush habitat, between 20.00 hrs and 20.30 hrs using hand-held mist nets.

ADDITIONAL SPECIMEN. A further specimen (B.M. 67.2164) collected northeast of Lake Abaya by the Sandhurst Ethiopian Expedition 1964 is referable to the rather larger species *E. capensis*.

Glauconycteris variegata variegata (Tomes, 1861)

SPECIMEN. One female, "Forward Base Two", 10 km west of Mabil, Blue Nile Gorge. $10^{\circ} 19' N$, $36^{\circ} 45' E$, alt. c. 1,000 m. 18 August 1968.

TAXONOMIC NOTES. This specimen is the first of *Glauconycteris* to be recorded from Ethiopia. It has large, massive canines and cheek teeth which agree closely with *G. v. variegata* rather than with the Sudanese *G. v. phalaena* in which the dentition is less massive.

COLLECTION AND FIELD NOTES. By chance this specimen was found dead before being eaten by scavengers. It was lying at the river's edge among boulders which are subject to frequent inundation. The surrounding habitat consists of tall trees and dense scrub.

The following new species is described below by the senior author:

Myotis morrisi Hill, sp. nov.

(Plates 1, 2 (a, b))

SPECIMEN. HOLOTYPE. B.M. 70.488. Adult female. A flat, card-mounted skin with skull; collector's number A107. "Forward Base Three", mouth of Didessa River, Blue Nile Gorge. 10° 05' N, 35° 38' E, alt. c. 1,000 m. 28 August 1968.

OTHER MATERIAL: none.

TAXONOMIC NOTES. DIAGNOSIS. Similar to *Myotis tricolor* (Temminck, 1832) of eastern Africa but differing from this species in its generally more orange dorsal coloration; unicolored and not bicolored ventral pelage; elongate, narrower skull with uninflated braincase and supraorbital region, the braincase shorter, more globular and markedly narrower than in *M. tricolor*, the rostrum proportionately longer and less broadened than in that species. Dentition less massive than in *M. tricolor*; second upper premolar (pm³) relatively larger and incompletely intruded from the toothrow; second lower premolar (pm₃) relatively larger, not compressed between pm₂ and pm₄; posterior upper premolar (pm⁴) with narrower lingual shelf, separated from the lingual shelf of m¹ by a wider interspace.

DESCRIPTION. Of moderate size (length of forearm 45.4) for the genus; anterior margin of ear smoothly convex, posterior margin concavely emarginated in its distal half, the proximal half convex. Tragus long, its length equal to one half of the length of the ear, tapered, with slender, rounded tip directed slightly posteriorly; anterior margin faintly convex, especially distally, posterior margin concave distally, convex proximally, slightly serrated, a small rounded lobe at base beneath an acute, angular emargination just below widest point of tragus. Wing inserted at base of first toe; calcar strongly developed, extending along almost one half of the posterior margin of the tail membrane; no obvious post-calcareal lobe.

Pelage woolly, dorsally overall orange brown, individual hairs tricolored, the basal quarter blackish brown, most of remainder creamy white, hairs tipped terminally with bright orange brown. Dorsal pelage extending narrowly on to the wing membrane and on to the tail membrane for nearly one half of its width. Ventral pelage unicolorous dull creamy white, tinged faintly with brown on chin and flanks. Wing membrane generally black but antebrachium and endopatagium pale orange yellow, a narrow band of the same colour extending across the membrane immediately behind the forearm; anterior edge of membrane and area between first and second metacarpals and tail membrane similarly coloured. Tibia flanked by a narrow band of orange hairs on wing membrane and a wider band of similar hairs on tail membrane. Toes with a sparse covering of long orange hairs.

Skull (Plates 1, 2(a)) elongate, the braincase not especially inflated; rostrum narrow, the supraorbital region not expanded, the supraorbital ridge forming an uninterrupted curve; a shallow, narrow median rostral depression. Narial emargination narrow, V-shaped posteriorly, its apex rounded. Palate long, narrow, anterior palatal emargination rounded posteriorly, extending almost to a line joining the centres of the canines; narrow post-palatal extension; shallow basi-occipital pits. Inner upper incisor (i^2) longer than wide, bicuspid, with strong angular anterior cusp; smaller posterior cusp extending for two thirds of the height of the anterior cusp. Outer upper incisor (i^3) wider than long, bicuspid, closely appressed to inner tooth, cusps lying transversely to line of toothrow. Outer cusp the larger, rising from a narrow cingulum shelf to a height equal to that of the posterior cusp of inner tooth; supported internally by a smaller secondary cusp for two thirds of its height, the tooth somewhat hollowed internally, separated from the canine by a short diastema. Anterior upper premolar (pm^2) about as high as i^3 , a little larger at base, in contact with canine, a slender pointed cusp with wide, strong cingulum. Second upper premolar (pm^3) rising slightly above cingulum of pm^2 , slightly less than one half its basal area, visible externally, a simple cusp rising from a narrow cingulum, slightly intruded from row but separating pm^2 and the posterior upper premolar (pm^4), in contact with these teeth. Posterior upper premolar (pm^4) with strong cusp and short, narrow lingual shelf with a wide interspace, separating it from the lingual shelf of the first upper molar (m^1). Lower incisors imbricated, first (i_1) and second (i_2) with four cusps, outer cusp of i_1 incipient, of i_2 well developed but lower than inner cusps. Lower premolars not especially compressed: second (pm_3) rather more than one half the height of anterior tooth (pm_2) and approximately one half its basal area, in contact with pm_2 and posterior lower premolar (pm_4), but not compressed or displaced, its length and width equal. The measurements of the new species are compared with those of *M. tricolor* in Table 4.

REMARKS. In some respects *M. morrisoni* resembles *M. bocagei* but is larger, has unicolorous and not bicolorous ventral pelage, a relatively longer rostrum lacking supraorbital inflation, narrower narial and anterior palatal emarginations and relatively narrower palate. Dentally the two species are closely similar but the teeth of *M. morrisoni* are more generally massive than are those of *M. bocagei* and *M. morrisoni* lacks a protoconule on the anterior ridge of the first and the second upper molars (described in *M. bocagei* by Harrison (1964b : 135).)

Tate (1941 : 539) reviewed the subgenera of *Myotis* and (p. 552) referred *tricolor* to the subgenus *Selysius*. However, both *tricolor* and *morrisoni* approach the subgenus *Chrysopteron* in dichromatic wing pattern, although this is less evident in *tricolor*, and in the presence of four lobes on the inner (i_1) and second (i_2) lower incisors, but retain a relatively high braincase and concave frontal profile. I have much pleasure in associating with this new species the name of my co-author, Dr. Pat Morris, of Royal Holloway College, University of London, in recognition of his many services to the study of the Ethiopian fauna while with the Great Abbai Expedition.

TABLE 4
Measurements of *Myotis morrisoni* and *M. tricolor*

Registration Number	Sex	Length of forearm	Greatest length of skull	Condylbasal length	Condylacanine length	Width across ante-orbital foramina	Lachrymal width	Zygomatic width	Least interorbital width	Width of braincase	Mastoid width	c1 - c1	m3 - m3	c - m3	Length of mandible	c - m3	Locality
<i>M. morrisoni</i>																	
70.488	♂	45.7	17.5	16.2	15.3	4.3	5.4	—	3.8	7.9	8.6	4.2	6.4	6.8	12.3	7.2	Ethiopia
<i>M. tricolor</i>																	
1937.2.24.13	♀	49.5	18.1	16.7	15.6	4.7	5.9	—	4.2	8.6	9.0	4.7	7.4	6.6	12.5	7.2	Ethiopia
40.738	♀	49.1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	Uganda
40.739	♂	46.9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	Uganda
40.740	♂	49.8	17.7	16.4	15.8	4.6	5.7	11.1	3.9	8.4	8.9	4.6	7.4	6.8	12.3	7.2	Uganda
40.741	♀	49.1	18.0	16.3	15.5	4.8	6.0	11.6	4.3	8.7	9.2	4.5	7.6	6.7	12.3	7.1	Uganda
64.172	♀	49.8	17.7	16.3	15.4	4.6	5.6	—	4.1	8.7	9.0	4.5	7.2	6.6	12.5	7.2	Uganda
14.5.4.2.	♀	47.6	18.0	17.1	16.1	4.8	6.0	11.4	4.2	8.6	9.0	4.8	7.5	7.0	12.7	7.5	Natal
51.17	♂	50.3	19.1	18.0	17.0	4.7	6.1	12.2	4.0	8.8	9.8	4.9	7.9	7.2	13.7	8.0	Uganda
51.18	♂	48.5	19.1	17.9	17.3	5.0	6.0	12.2	4.3	8.8	9.5	4.8	8.3	7.5	13.7	8.2	Uganda
51.19	♂	50.8	18.9	17.6	16.8	5.0	6.3	12.3	4.3	8.8	9.5	4.9	8.0	7.2	—	7.8	Uganda
51.20	♂	49.7	18.7	17.3	16.5	4.9	6.2	11.6	4.4	8.8	9.1	4.9	7.7	7.3	—	7.8	Uganda

COLLECTION AND FIELD NOTES. The specimen was caught by Messrs. Yalden, Largen and King of the Great Abbai Expedition, using a hand-held mist net. The bat was flying after dark over the river Nile, near its north bank, at a height of about one metre. The surrounding habitat comprises mainly maize plots and thick bush. The specimen was photographed whilst still alive (Plate 2 (b)).

Scotophilus sp.

SPECIMENS. (1) One subadult male. Mouth of Fincha River, Blue Nile Gorge, 10° 03' N, 37° 20' E, alt. 1,000 m. 11 August 1968.

(2) One subadult male. "Forward Base Two", 10 km west of Mabil, Blue Nile Gorge, 10° 19' N, 36° 45' E, alt. c. 1,000 m. 15 August 1968.

TAXONOMIC NOTES. No attempt has been made to allocate these subadult specimens to any of the named forms of *Scotophilus* in northeastern Africa.

COLLECTION AND FIELD NOTES. Both individuals were found flying over riverside sandbanks at a height of about 2 metres, the surrounding habitat consisting mainly of dense scrub. The Fincha River specimen was shot in flight (with a pistol!) at 19.15 hrs, the other animal was the only bat caught in a fixed, stationary mist net (19.30 hrs) on the whole Expedition, except for bats caught at their roosts.

Miniopterus inflatus africanus Sanborn, 1936

SPECIMEN. One female. North bank of Awash River, Awash National Park, Shoa. 08° 50' N, 40° 01' E, alt. c. 1,000 m. 23 September 1968.

COLLECTION AND FIELD NOTES. The bat was flying fairly high (6-8 metres) among widely spaced acacia trees in open thorn scrub and grassland. It was shot in flight at 23.00 hrs.

Otomops martiensseni martiensseni (Matschie, 1897)

SPECIMEN. One female, B.M. 69.1256. French Somaliland (Territory Afars and Issas). 11° 46' N, 42° 39' E, alt. 1,471 m. 8 August 1967.

TAXONOMIC NOTES. This specimen, collected by the Sandhurst French Somaliland Expedition, records *O. martiensseni* for the first time from French Somaliland and represents a wide extension of range from Kenya.

Tadarida pumila (Cretzschmar, 1830)

SPECIMENS. (1) One male and eight females (three of them immature). North bank of Awash river, Awash National Park, Shoa. 08° 50' N, 40° 01' E, alt. c. 1,000 m. 25-26 September 1968.

(2) Two males and four females. Ghimbi, Wollega. 09° 10' N, 35° 50' E, alt. 2,150 m. 1-4 September 1968.

COLLECTION AND FIELD NOTES. The Awash specimens formed part of a roost of bats, living behind the loose bark of a dead tree. A sample of the animals was collected in the late afternoon using a mist net fixed to the tree trunk. Four of the Ghimbi animals (two females and two males) were living in the eaves and under the corrugated iron sheeting of the Mission Church roof, one of the others is recorded as coming from a house and the exact origin of the sixth Ghimbi specimen is not known, though it is likely to have been collected with the rest.

These two localities for *T. pumila* (Awash and Ghimbi) could not be more contrasting and suggest a lack of strict habitat requirements for this bat. The Awash locality was very hot, dry, open bush whereas Ghimbi is 1,200 m higher on the cool, wet, heavily cultivated highland plateau. The only similarities between the two roosts are that the bats were living close together in a narrow, cramped space and both sexes were present in each colony.

Tadarida nigeriae nigeriae (Thomas, 1913)

(Plate 3 (d))

SPECIMEN. One male. North bank of Awash River, Awash National Park, Shoa. $08^{\circ} 50' N$, $40^{\circ} 01' E$, alt. c. 1,000 m. 26 September 1968.

TAXONOMIC NOTES. There is but one previous record of *T. nigeriae* from Ethiopia (Ingersol, 1968 : 60), from the Gota River in the eastern part of the country. The species has been known hitherto from no locations nearer to Ethiopia than the northeastern Congo and southeastern Tanzania.

COLLECTION AND FIELD NOTES. This single specimen was among a sample taken from the roost of *T. pumila* mentioned above. It seems peculiar that two species should be living behind the same small piece of tree bark in a mixed colony.

Tadarida africana (Dobson, 1876)

SPECIMEN. (1) One male B.M. 28.1.11.40. Fatam river, Great Abbai (=Blue Nile), c. 70 km south of Lake Tana, approx. $10^{\circ} 25' N$, $37^{\circ} 00' E$. alt. c. 1,900 m. 17 March 1927.

(2) One specimen B.M. 69.884. ? Vicinity of Addis Ababa.

TAXONOMIC NOTES. These specimens are the first of this large molossid to be reported from Ethiopia, reported hitherto from no nearer locality than southwestern Kenya.

COLLECTION AND FIELD NOTES. The Fatam River specimen was collected by Major R. E. Cheesman during one of his survey visits to the Nile Gorge. The other individual was found dead on a telegraph wire by employees of the Imperial Highway Authority and presented by Dr. M. Lagen of the Haile Selassie University, Addis Ababa.

Tadarida acetabulosus natalensis (A. Smith, 1847)

SPECIMEN. One female B.M. 6.11.1.9. Given on the specimen label as "between Shoa and Lake Rudolf" Southern Ethiopia.

TAXONOMIC NOTES. This single specimen represents a wide extension of range for *T. acetabulosus*, known hitherto from Madagascar, Mauritius, Réunion and Natal, the latter record by A. Smith being hitherto the only evidence of the occurrence of the species on the African mainland. Although Thomas identified the specimen correctly upon its arrival at the British Museum (Natural History) in 1906 the record has remained unpublished and the specimen undisturbed in the collections until it was noted by Mr. R. W. Hayman in 1965.

SUMMARY

The Great Abbai Expedition obtained 115 specimens of bats (including cave remains), chiefly from the Blue Nile Gorge or from the Awash National Park. One specimen from the Blue Nile Gorge proves to represent a new species closely allied to *Myotis tricolor*, for which the name *Myotis morrisoni* is proposed. Specimens in the collections of the British Museum (Natural History) and also others collected by the Expedition confirm the presence of *Micropteropus pusillus* in Ethiopia; *Triaenops persicus afer* and *Glauconycteris variegata variegata* were obtained for the first time in Ethiopia by the Great Abbai Expedition, which also obtained further specimens of *Asellia patrizii* and *Talarida nigeriae nigeriae*; a few specimens in the British Museum (Natural History) obtained from other sources and reported in this paper furnish the first Ethiopian records of *Rhinolophus simulator*, *Tadarida africana* and *Tadarida acetabulosus*, and of *Otomops martiensseni* in French Somaliland (Territory Afars and Issas). The classification of *Taphozous perforatus*, *Hipposideros caffer* and *Hipposideros ruber* is reviewed. *Rhinolophus simulator* Andersen, 1904 and *Rhinolophus alticolus* Sanborn, 1936 are considered to be conspecific.

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J. E. HILL,
Department of Zoology,
 BRITISH MUSEUM (NATURAL HISTORY),
 CROMWELL ROAD,
 LONDON S.W.7.

P. MORRIS, Ph.D.,
Department of Zoology,
 ROYAL HOLLOWAY COLLEGE (UNIVERSITY OF LONDON),
 ENGLEFIELD GREEN, SURREY.

PLATE I

Myotis morrisi. Skull and mandible ×7.5

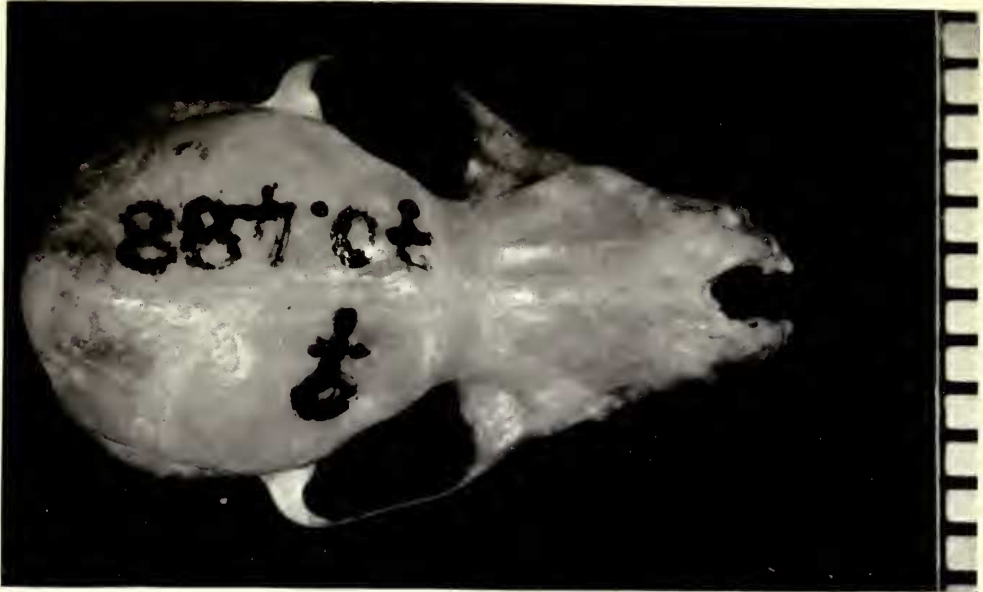


PLATE 2

- (a) *Myotis morrisoni*. Skull and mandible $\times 7.5$
(b) *Myotis morrisoni*.



PLATE 3

- (a) *Rhinopoma hardwickei sennaariense*
- (b) *Hipposideros ruber centralis*
- (c) *Triaenops persicus afer*
- (d) *Tadarida nigeriae nigeriae*



(a)



(b)



(c)

(d)

