

No. 9. — *Bats from British East Africa.*

BY GLOVER M. ALLEN.

DURING the summer of 1909, I accompanied Dr. William Lord Smith and Mr. Gorham Brooks, of Boston, on a brief expedition to British East Africa. From Mombasa, we reached Nairobi by rail, a journey now accomplished within twenty-four hours, and here gathered together an outfit for a ten weeks' march to the region north and west of Mt. Kenia. From the plateau of Laikipia, we followed the course of the Guaso Nyiro to the east, and at length turned southeast, following up a small affluent, the Meru River, to a native town of that name, whence we shortly returned south to Nairobi.

Practically all the bats collected, were obtained in the arid plateau country through which the Guaso Nyiro makes its way. Along the river banks there is more or less verdure, bushes and vines, with occasional large trees, and at lower levels, a scattering of ivory-nut palms and other smaller species. Away from the immediate course of the stream, however, there are great stretches of dry open plain, more or less grass-grown, with scattered thorn trees, or large candelabra-like euphorbias of characteristic shape. This region is of especial interest as marking in some degree the southward extension of certain Abyssinian and Somaliland species. Thus the Grévy's Zebra of Abyssinia here meets the more southern Grant's Zebra, and the Beisa Oryx is found on the plains bordering this stream. It is therefore of much interest that we found *Petalia revoili* and *Eptesicus minutus somalicus*, species described from Somaliland, and here perhaps near their southward limits as species of this arid portion of northeast Africa.

The most remarkable discovery, however, was a specimen representing an undescribed species of *Nycticeius*, a genus hitherto believed to be confined to the southeastern United States and Cuba. I am indebted to Mr. Gerrit S. Miller, Jr., of the United States National Museum, for examining this specimen and calling my attention to the fact that it is in every way a typical *Nycticeius*. In addition to this species, a pallid white-winged *Eptesicus* is described as new.

PTEROPIDAE.

EPOMOPHORUS NEUMANNI Matschie.

Epomophorus neumanni Matschie, Megachiroptera des Berliner Mus. für Naturkunde, Berlin, 1899, p. 50.

On the Meru River where it flows through arid plains to the Guaso Nyiro, we found a small colony of fruit bats. There were about twenty in all, old and young of both sexes, all hanging from the midribs of the lowermost fronds of a large palm allied to the sago palm that grew here in the stream bed.

The pale brownish tint of the bats corresponded well with the color of the faded palm leaves, and the great fronds above cast a fair amount of shade. When disturbed they scattered and alighted again in different places, some on the higher twigs of the thorn trees by the brink of the stream, others among the green fronds of a younger palm. Several straddled the midrib of the palm leaf, clinging by the hind feet. Others, when more at ease, depended from one foot only. At all times, though resting, they seemed alert during the day, and were ready to fly if too closely approached. On the morning following the discovery of these bats, I again visited their roost and found some ten or more of them hanging side by side along the midrib of a palm frond. They were awake, but did not fly until I had approached almost within arm's length when simultaneously they scattered in every direction.

Those that were preserved seem a trifle larger than Matschie describes for *neumanni* from the coastal region of British and German East Africa, but otherwise they agree closely enough with his description. The forearm of the male measures 83.5 mm., of the females, 80, 81, as against 77-80 and 73-78 respectively as given by the describer.

EPOMOPHORUS PUSILLUS Peters.

Epomophorus pusillus Peters, Monatsb. K. Akad. Wissensch. Berlin, 1867, p. 870.

A single adult male was taken on the Meru River, about a day's march above its junction with the Guaso Nyiro. The stream here flows through an arid grassy plain, and its banks are choked with a dense growth of vines and small trees with here and there a palm allied

to the sago, whose long fronds attain often a length of twenty or thirty feet. This palm grows always in the bed of the stream itself, and it was from one of the lower fronds of such a palm that our specimen was taken. Its superficial resemblance in all but size, to *E. neumanni* is very striking, but the white shoulder patches are more prominent, their separate hairs longer than those of the latter, while the belly is slightly paler and the interfemoral membrane naked on its distal half above.

The range of this small species probably includes most of equatorial Africa, although the majority of recorded specimens are from the western part of the continent. Matschie in his monograph of the Megachiroptera (1899) records specimens from Ngoroine between Victoria Nyanza and the Guaso Nyiro of Massailand. These were two females collected by O. Neumann. He also includes Heuglin's *E. anurus*, based on Abyssinian specimens, as a synonym of *pusillus*.

Our specimen is a trifle larger than most of the measurements seen: forearm, 57 mm.; tibia, 23.5; hind foot, 17; head and body, 93.

PETALIIDAE.

PETALIA REVOILI (Robin).

Nycteris revouli Robin, Bull. Soc. Philom. France, 1881, ser. 7, 5, p. 90; Ann. Sci. Nat., Zool., Apl. 1881, ser. 6, 13, art. 2, p. 3.

Near our second camp on the Guaso Nyiro there stood at the edge of the stream a large spreading tree whose trunk was hollow. At the ground on one side was an opening large enough to admit a man; and farther up at about ten feet from the roots, a smaller hole in the side of the trunk where a big limb had been broken off. A small colony of bats lived in this hollow tree and just at dusk they emerged one by one from the hole in the trunk and flitted silently away through the gathering gloom. An examination of the interior by means of a lantern in the daytime showed that no bats were clinging to the parts of the hollow within sight, but the discharge of a small-bore shotgun into the narrowing recess at the highest part of the decayed trunk brought down a few specimens in a shower of dust. They had apparently sought the darkest and most remote portion of their retreat. But four individuals were thus obtained for the rest of the colony had evidently withdrawn beyond reach, and subsequent visits on following days showed that they had summarily deserted their resting-place.

It is only after much deliberation that I have decided to refer these specimens to *revoili* described by Robin from Somaliland. They seem to be smaller than Dobson's *aethiopica*, a species to which they are apparently closely related. The type locality of the latter is Kordofan in the Sudan Province, whence Dobson had three skins. No complete measurements of *aethiopica* are available. Dobson's specimens seem to have lacked the forearm bones, and his subsequent details of a Zanzibar specimen (Rept. Brit. Assoc. Adv. Sci., 1881, p. 14) refer in reality to the race *luteola* Thomas. The type of this last is from Kitui, British East Africa, but Thomas states that Zanzibar specimens are identical. It is slightly larger and yellower than typical *aethiopica*. Such measurements as Dobson gives for the type of the latter (Cat. Chiroptera Brit. Mus., 1878, p. 165) are all larger than those of our specimens, and his statement that the fur of the chest and abdomen varies from "yellowish white to pure snow-white" is hardly applicable, for in our series of three skins these parts are uniformly pale drab, with darker gray bases to the hairs. Robin says of his *revoili* that the belly is whitish. His detailed measurements, however, agree very closely with those of our bat, and are certainly much less than those of the East African *luteola*, the type locality of which is hardly 150 miles from the Guaso Nyiro. Probably this is another instance of a species of the Abyssinian fauna reaching its southern limit along this stream.

The cranial measurements, of which none are published, are as follows, from no. 8274: greatest length, 19; basal length, 15; palatal length, 4.3; greatest frontal width, 7.8; mastoid width, 8.3; upper tooth-row, exclusive of incisors, 6.5; lower tooth row, exclusive of incisors, 7; mandible, 12.3. The upper incisors are bifid, and a space separates the pairs of opposite sides from each other and from the canines.

The forearm measures (no. 8871) 42 mm.; tibia, 22; calcar, 15.5; Robin gives 44, 22, 17 respectively for these dimensions in *revoili*. The tail in our three specimens measured in the flesh, varies from 51 to 53 mm.; Robin gives 51.

MEGADERMIDAE.

LAVIA FRONS FRONS (Geoffroy).

Megaderma frons E. Geoffroy, Ann. Mus. Nat. Hist. Paris, 1810, **15**, p. 192.

Messrs. Andersen and Wroughton (Ann. Mag. Nat. Hist., 1907, ser. 7, **19**, p. 138) consider *Lavia rex* Miller, based on German East

African specimens, as synonymous with *L. frons* whose range they give as including the whole of equatorial Africa from Nigeria and Gambia to Uganda and British East Africa. At the same time they describe from the White Nile a race *affinis* which is separated on the basis of very small average differences in size.

In the arid country along the Guaso Nyiro we found this bat in some numbers. A large candelabra-like *Euphorbia* is common over large tracts of the plains bordering the river, and wherever a thorn tree and a *Euphorbia* grew close together and were partly overrun by vines, was found to be a likely resting place for these bats by day. They are very alert, and often the first intimation of their presence on looking up into such a tangle, is the nervous motions of their long ears that at once catch the eye. They easily become alarmed and flit from their covert to another leafy tangle a few yards distant, their wings flashing bright orange in the sunshine. Sometimes several are found together or in close proximity among thorn-bushes, but never more than four or five. On one occasion near midday as I was standing under a large tree in the midst of an open field at Meru, a bat of this species was seen flying, and shortly it came towards the tree and alighted among the middle branches, where it was watched for some while as it hung from a small twig. The diurnal habits of this species are also attested by other observers.

VESPERTILIONIDAE.

PIPISTRELLUS DESERTI Thomas.

Pipistrellus deserti Thomas, Proc. Zool. Soc. London, 1902, 2, p. 4.

This species is known from but a single specimen, described by Thomas from Tripoli, ten years ago. It is therefore of especial interest to record a second from the arid country of British East Africa, thus extending its known range southward to the equator. The specimen in question is a female and was taken August 11, 1909, near a small stream (the Meru River) that flows through the arid grassy plains to the northeast of Mt. Kenia and joins the Guaso Nyiro. This stream, near its junction with the latter, is bordered by a scattered growth of ivory-nut palms and here, just after dusk, numbers of small bats appeared, flitting low over the water or about the reeds growing along the bank. Most of these were probably *Eptesicus m. somalicus*, though owing to the gathering darkness and their low irregular flight

I was unable to shoot specimens. One, however, was knocked down with a stick as it flew past me, and proves to be identical in every way with the description of Mr. Thomas's specimen. The fur is pale buffy above, slightly paler below, the bases of the hairs everywhere blackish slate. The hinder margins of the wings and interfemoral membrane are conspicuously edged with white, recalling *P. kuhli*, from which, however, it is doubtless specifically distinct. The forearm measurement in the dried skin is 29.5 mm., exactly as given for the type, but the same dimension taken in the flesh was 30. Other dimensions follow, and in parentheses, the corresponding measurements as given by Thomas: head and body, 45 (43); tail, 32 (33); ear, 11 (10); 3d finger, metacarpal, 29 (29); first phalanx, 10 (10); second phalanx, 8.5 (8.5); tibia, 11.5; calcar, 12. Skull, greatest length, 11.5 (11.6); median length above, 10 (10); interorbital constriction, 3 (3.1); breadth of braincase, 6.5 (6.2); front of canine to back of molar³, 4 (4.3).

EPTESICUS MINUTUS SOMALICUS (Thomas).

Vespertilio minutus somalicus Thomas, Ann. Mag. Nat. Hist., 1901, ser. 7, 8, p. 32.

Two specimens obtained along the Guaso Nyiro are identical in measurements with those given for this race by Thomas, who says that it is to be distinguished from *minutus*, chiefly by its paler coloring, and by the conspicuous white edge of the wings and interfemoral membrane. The skull is also slightly smaller than that of South African examples. In the alcoholic specimen in our collection, the white edge is plainly evident, but in the dried skin does not appear. The latter specimen may be slightly darker than Thomas's description implies, and there is a sprinkling of pure white hairs in the fur of the lower back, which, however, may be albinistic. Since the Guaso Nyiro region seems to be the southern limit of a number of Abyssinian forms, it is probable that these bats are referable to *somalicus*, rather than typical *minutus*. The type of the former is from Hargaisa, Somaliland, at 3,500 feet, and Thomas mentions additional specimens from Berbera. The forearm measurement is 30.8 mm. in our alcoholic specimen and 31 mm. in the dried skin. Thomas gives 31 mm. for the type specimen.

EPTESICUS PHASMA, sp. nov.

Type.—Skin and skull, male, no. 8279, M. C. Z., collected August 6, 1909, on the Meru River, British East Africa, by Glover M. Allen.

General characters.—A small pallid species (forearm 34), with white membranes; possibly related to *E. tenuipinnis*.

Description.—Color of fur above from nose to root of tail pale dust color, between buff and cream-buff of Ridgway's Nomenclature (1886), slightly darker about the muzzle. Below, the hairs of the chin are buff to the bases paling on the throat to cream-buff and on the belly to pure white. The extreme bases of the hairs of the back, chest, and belly are dark slaty but those of the flanks ventrally are pure white throughout.

Wing membranes from the base of the first metacarpal, extremely thin and delicate; both interfemoral membrane and the wings are whitish throughout, the latter, however, becoming slightly clouded at their tips. Ears, forearms, feet, and tibia pale brownish. The hair of the body extends on to the dorsal side of the interfemoral membrane and on the base of the tail slightly beyond a line joining the knees. Calcar long and slender with a well-marked low and elongate lobe; the calcar does not terminate in a lobule. Tail vertebrae entirely included within the membrane.

Ears small, triangular, their apical margins nearly straight, narrowly rounded at the tips; a prominent basal lobe at nearly right angles to the long axis of the ear at its inner margin; externally the basal notch is well developed and marks off a low rounded basal lobe. Tragus short, of nearly equal breadth throughout, bluntly tapering at its apex; its inner margin straight, its outer margin with a slight notch about opposite the inner base, thus producing two minute lobes at this point. Muzzle with rather conspicuous glandular swellings.

Measurements.—The following measurements of the type were taken in the flesh:—total length, 94 mm.; tail, 40.5; hind foot, 6; ear, 11.5; tragus, 5; forearm, 34; tibia, 12.5; calcar, 14. Skull: greatest length, 13.5; basal length, 10.5; palatal length, 5.4; interorbital constriction, 3.8; zygomatic width, 9; mastoid width, 7.8; upper cheek teeth, front of canine to back of m^3 , 4.8; lower cheek teeth, 5.2; mandible, 10.

Skull.—The skull is rather broad, with the anterior edges of the orbits conspicuously ridged so as to produce a rather squarish rostrum. Upper incisors directed sharply inward; the inner is simple, about twice the length of the outer; outer incisor with a conspicuous cingu-

lum cusp externally. The two teeth are placed in a line nearly at right angles to the long axis of the skull. Canine with an antero-internal cingulum cusp. Crowns of the lower incisors trifold, slightly overlapping; first lower premolar about three fourths the length of the second.

Remarks.—This white-winged bat does not seem referable to any of the described species. It is possibly related to *E. tenuipinnis* of West Africa, but is larger, paler, the tail is entirely included in the membrane, and the tragus has two minute pointed lobules. It is equally distinct from *E. rendalli* (Thomas) from Gambia, which also has white membranes. The latter has large hind-foot pads, the calcar ends in a projecting point, and there is a penis bone present, which *E. phasma* does not have. The upper incisors are also different, being provided with two cusps in *rendalli*.

This bat was first noticed on the Guaso Nyiro at its junction with the stream from Meru, in the arid country to the northwest of Mt. Kenia. Here it was seen but once, when at dusk a single individual, conspicuous for its white coloration, was observed flying about over the river in company with numbers of small dark bats, probably *E. minutus somalicus*. A few miles farther up the Meru River (above the ivory-nut palm region) it was much commoner. At our camp by the side of this small stream numbers were observed and several were shot in the early evening as they flew past following the course of the rivulet, which here flows through a sun-baked plain with few trees except along the water course. Its flight is very steady, direct and rather slow, so that it was easily shot. In the gathering dusk, however, the white wing membranes were almost invisible against the sky, thus producing a curious ghostly effect, as only the body and forearms could be clearly seen.

NYCTICEIUS AFRICANUS, sp. nov.

Type.—Skin and skull, male, no. 8272, M. C. Z., collected August 11, 1909, on the Meru River, British East Africa, by Glover M. Allen.

General characters.—A typical *Nycticeius*, slightly smaller and much paler than the *N. humeralis* of the southeastern United States, with shorter closer fur. Postcalcaral lobe well developed.

Description.—Fur of the upper surface of head and body, short and close, about 4 mm. long on the lower part of the back, of a uniform pale wood-brown quite to the bases of the hairs; below cream-buff

to the bases of the hairs. The muzzle in front of the eyes is nearly naked.

Wing membranes dark, and attached at the base of the first digit of the foot. Ears pale brownish. Hair of the body does not extend on to the interfemoral membrane. Calcar well developed with a conspicuous, low, rounded lobe at about 3 mm. behind the heel. Tragus with a distinct external basal lobe. Tip of tail free from the interfemoral membrane.

Skull.—The skull of the type is scarcely to be differentiated from that of the American species, *N. humeralis*, except by its slightly smaller size. The upper incisors, however, are set much more nearly at right angles to the long axis of the skull, so that viewed from above they hardly project beyond the premaxillae, whereas in *humeralis* they extend prominently forward.

Measurements.—The following measurements were taken in the flesh: total length, 85 mm.; tail, 35; hind foot, 6.5; tibia, 13; calcar, 17.5; ear, 12; forearm, 33. Third metacarpal, 29.7.

Skull: greatest length, 13.6; basal length, 10; palatal length, 5; interorbital width, 4; zygomatic width, 9.4; mastoid width, 8; upper cheek teeth, front of canine to back of m^3 , 4.5; lower cheek teeth, 5.3; mandible, 10.2.

Remarks.—The discovery in East Africa of this genus hitherto known only from the southeastern United States and Cuba is one of the most important and interesting results of our expedition. Mr. Gerrit S. Miller, Jr., who examined the specimen, first called my attention to the fact that it is in all respects a typical *Nycticeius*, agreeing with the American species in all essential characters. The postcalcaral lobe is well developed in the African but scarcely at all in the American bat, and the incisors of the former are less projecting, but otherwise they differ hardly at all except in color and size.

The single specimen on which this species is based was shot shortly after sunset as it was circling about in an open space among the ivory-nut palms by the Meru River. The river here runs through a dry plain, and no doubt the pale coloration of the species is due to the arid conditions under which it lives.

From a zoögeographic point of view the discovery of this genus in Africa is of extraordinary interest. Its case is somewhat paralleled by that of *Mormopterus* which occurs in Cuba, South America, Africa, and Madagascar. Possibly *Nycticeius* may yet be found to occur in South America.

SCOTOECUS HINDEI Thomas.

Scotoecus hindei Thomas, Ann. Mag. Nat. Hist., 1901, ser. 7, 7, p. 264.

The type of this little-known species was taken at Kitui, British East Africa, 3,500 feet altitude. What appears to be the third recorded specimen is an adult male collected August 2, 1909, by our expedition. It was found under a loose flake of bark on a large tree growing by the bank of the Guaso Nyiro a few miles above its junction with the Meru River, a small stream which, like the former flows through a semi-desert country. The specimen (no. 8870) agrees in all essential respects with the description of *S. hindei*, except that on each side of the upper jaw there are two premolars instead of the single large p^4 typically present in the genus. The extra tooth is a very minute spicule, visible only with a hand lens, and is crowded into the internal angle between the canine and the large premolar. Its height is less than that of the cingulum of the adjacent teeth, and it must have been practically functionless. Wroughton (Mem. and Proc. Manchester Lit. and Phil. Soc., 1907, pt. 2, no. 5, p. 4) has recorded the second known specimen of this species. It was taken far to the south of the type locality, at Petauke, Rhodesia. This specimen likewise had a minute second premolar in the upper jaw, described as "fitting into a notch in the inner side of the cingulum of the canine." A similar notch is said to be present in the type, but there is no trace of the minute premolar, nor is there either tooth or notch in the known examples of *S. albofuscus* and *S. hirundo*. In our specimen of *S. hindei* there is no notch in the canine for the reception of the minute premolar. In a fourth species of the genus, *S. albigula*, recently described from Mt. Elgon by Thomas (Ann. Mag. Nat. Hist., 1909, ser. 8, 4, p. 544) this minute tooth, considered by Thomas to be p^1 , is present on either side, in or close behind a deep notch in the cingulum of the canine.

The genus *Scotoecus* is doubtless in process of losing the first premolar and those specimens in which it is lacking are to be looked on as progressive variations in which it has dropped out altogether. This tendency to condensation of the molar series is found in many bats, and is seen for example, in an interesting specimen of the red bat, *Nycteris* [= *Lasiurus*] *borealis*, no. 9736, M. C. Z., from Martha's Vineyard, Massachusetts. In the skull the small anterior premolars are absent on each side of the upper jaw, and the large p^4 quite fills the space between canine and molars. It represents a progressive

variation in the development towards the condition in which there will be normally but the single large premolar present.

MOLOSSIDAE.

CHAEREPHON HINDEI (Thomas).

Nyctinomus hindei Thomas, Ann. Mag. Nat. Hist., 1904, ser. 7, **13**, p. 210.

This beautiful white-winged bat was originally described from Fort Hall, an outpost to the south of Mt. Kenia. While passing through this place we were shown a colony of bats, doubtless of this species, that inhabited the interspace between roof and ceiling of a house. Ingress was had through a small crack at the corner of the roof. No specimens were obtained here, but at Mombasa, on the coast, a single one was captured by the Swahili boys on the hotel veranda at night. Its forearm measurement is slightly smaller than that given for the type, namely 37 as against 40 mm. Moreover, the wing membranes are whitish to the tips and there is no noticeable white flecking on the back.



Allen, Glover M. 1911. "Bats from British East Africa." *Bulletin of the Museum of Comparative Zoology at Harvard College* 54, 321–331.

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