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Article I.—THE AMERICAN MUSEUM CONGO EXPEDITION COLLECTION OF INSECTIVORA[1]

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PLATES I TO IV, AND 1 TEXT FIGURE

CONTENTS

[1]Scientific Results of The American Museum of Natural History Congo Expedition. Mammalogy, No. 5.

[2]This paper was in press at the time of Dr. Allen's death but the final proofs were not seen by him. —EDITOR.

INTRODUCTION

The collection of Insectivores obtained by the American Museum Congo Expedition[1] numbers about 377 specimens, of which 51 represent the Potamogalidæ, 140 the Macroscelididæ, 9 the Erinaceidæ, and 177 the Soricidæ. In the preparation of this paper the author has had the efficient coöperation of Mr. Herbert Lang, the leader of the American Museum Congo Expedition. The colored plate (Plate I), illustrating individual variation in coloration in *Rhynchocyon stuhlmanni claudi*, is by Charles R. Knight. The text illustrations are from excellent pen drawings by Mrs. Ziska.

In working up the material here recorded valuable assistance has been obtained through material loaned for comparison by the authorities of the United States National Museum, through the kindness of Mr. Gerrit S. Miller, Jr., Curator of Mammals, and from the Museum of Comparative Zoölogy at Harvard University, through the kindness of Director Samuel Henshaw and Dr. Glover M. Allen, Curator of Mammals.

The Soricidæ of the Congo Expedition were placed for determination in the hands of Mr. N. Hollister, Assistant Curator of Mammals at the United States National Museum, in 1916, he having then been for sometime engaged in a critical study of the African Soricinæ in the National Museum. His report on the shrews of the Congo Expedition was published in October 1916.[2]

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[1]Supplemental Note on *Hipposideros langi* Allen (Bull. Amer. Mus. Nat. Hist., XXXVII, pp. 434–438, text figs. 4–6. September 29, 1917).

Since the publication of the paper on the Congo Expedition Collection of Bats, I have had an opportunity to compare, through the kindness of Mr. Gerrit S. Miller, Jr., Curator of Mammals in the United States National Museum, three skins and four skulls identified as *Hipposideros cyclops* (Temminck), from Efulen, Cameroon. While these specimens are not from the type region of *cyclops* (Boutry River, Gold Coast), it is interesting to note that they are uniformly and strikingly different in coloration from the series on which *langi* was based, indicating at least considerable plasticity in the *cyclops* group. In *langi* the whole head is yellowish brown, in strong contrast with the upperparts of the body, while in the Efulen specimens it is uniform in color with the back and the upperparts are also much darker than in *langi*. The measurements, both external and cranial, indicate slightly larger size for the Efulen form. While *langi*, as stated in the original designation, is a member of the *cyclops* group, it should evidently be recognized as a well-marked geographic race, under the designation *Hipposideros cyclops langi*, and the Efulen specimens as *H. cyclops micaceus* (de Winton; type locality "Como River, 75 miles from Gaboon"), with the description of which the Efulen specimens agree and with which the *langi* series does not agree. Whether or not *micaceus* is referable in a strict sense to true *cyclops* I have not the means at present for determining.

[2]'Shrews Collected by the Congo Expedition of the American Museum.' By N. Hollister. Bull. Amer. Mus. Nat. Hist., XXXV, pp. 663–680, Pls. VII–XI. October 21, 1916.

List of Localities, with Names of the Species and Subspecies, and Number of Specimens Taken at Each Locality

Localities	Species and Subspecies	No. of Specimens	Totals
Akenge	*Rhynchocyon stuhlmanni claudi*	5	5
Avakubi	*Potamogale velox*	1	
"	*Rhynchocyon stuhlmanni stuhlmanni*	2	
"	*Crocidura nyansæ kivu*	3	
"	" *jacksoni denti*	6	
"	" *bicolor*	1	
"	" *oritis*	1	
"	" *latona*	1	15
Babeyru	*Crocidura jacksoni denti*	1	1
Bafwabaka	*Potamogale velox*	1	
"	*Crocidura jacksoni denti*	1	
"	*Scutisorex congicus*	2	4
Budongo Forest	*Rhynchocyon stuhlmanni stuhlmanni*	1	1
Faradje	*Potamogale velox*	2	
"	*Nasilio fuscipes*	21	
"	*Atelerix faradjius*	2	
"	" *langi*	6	
"	*Crocidura sururæ*	1	
"	" *lutrella*	1	
"	" *turba nilotica*	3	
"	" *jacksoni denti*	5	
"	*Sylvisorex gemmeus irene*	1	42
Gamangui	*Potamogale velox*	1	
"	*Crocidura nyansæ kivu*	1	
"	" *jacksoni denti*	2	4
Garamba	*Nasilio fuscipes*	1	
"	*Atelerix langi*	1	
"	*Crocidura sururæ*	1	3
Lubila	*Crocidura congobelgica*	1	1
Medje	*Potamogale velox*	30	
"	*Rhynchocyon stuhlmanni claudi*	20	
"	*Crocidura nyansæ kivu*	16	
"	" *caliginea*	1	
"	" *jacksoni denti*	51	
"	" *oritis*	4	
"	" *latona*	1	
"	" *ludia*	2	
"	" *polia*	1	
"	" *congobelgica*	1	
"	*Sylvisorex gemmeus irene*	18	
"	" *oriundus*	1	
"	*Scutisorex congicus*	42	188

Localities	Species and Subspecies	No. of Specimens	Totals
Nala	*Rhynchocyon stuhlmanni claudi*	1	
"	*Crocidura turba nilotica*	1	
"	" *jacksoni denti*	3	5
Ngayu	*Crocidura ludia*	1	1
Niangara	*Potamogale velox*	3	
"	*Nasilio fuscipes*	8	
"	*Crocidura jacksoni denti*	2	13
Niapu	*Potamogale velox*	13	
"	*Rhynchocyon stuhlmanni claudi*	79	92
Penge	*Rhynchocyon stuhlmanni stuhlmanni*	2	2

New Species and Subspecies, with Their Type Localities

1. *Atelerix faradjius* J. A. Allen. Faradje.
2. " *langi* J. A. Allen. Faradje.
3. *Crocidura caliginea* Hollister.[1] Medje.
4. " *oritis* Hollister.[1] Avakubi.
5. " *latona* Hollister.[1] Medje.
6. " *ludia* Hollister.[1] Medje.
7. " *polia* Hollister.[1] Medje.
8. " *congobelgica* Hollister.[1] Lubila.
9. *Sylvisorex oriundus* Hollister.[1] Medje.

General Summary

Families	Genera	Species and Subspecies	Specimens	Localities
Potamogalidæ	1	1	51	7
Erinaceidæ	1	2	9	2
Soricidæ	3	15	177	11
Macroscelididæ	2	3	140	10
	7	21	377	

POTAMOGALIDÆ

Potamogale velox Du Chaillu

Cynogale velox Du Chaillu, 1860, Proc. Boston Soc. Nat. Hist., VII (1859–61), November, pp. 361–363. Ogowe River, French Equatorial Africa. (*Potamogale* tentatively proposed on p. 363 in place of *Cynogale*.)

Mystomys velox Gray, 1861, Ann. Mag. Nat. Hist., (3) VIII, July, p. 61.

Mythomys velox Gray, 1861, Proc. Zool. Soc. London, p. 275. Believed to be a rodent.

Potamogale velox Du Chaillu, 1874, 'A Journey to Ashangoland,' p. 118. Further notes on the species, in defending himself against erroneous and unkind criticism.

[1]Described 1916, Bull. Amer. Mus. Nat. Hist., XXXV.

Potamogale velox ALLMAN, 1866, Trans. Zool. Soc. London, VI (1869), pp. 1–16, Pl. I (animal), Pl. II (skeleton), text figs. 1–9 (hair, head, ear, feet, anal glands, and sexual organs). A spirit specimen (dentition not complete, lacking the last molar) from Old Calabar.

Potamogale allmani JENTINK, 1895, Notes Leyden Mus., XVI, p. 234. Based on Allman's (as above) detailed account and figures of an immature specimen from Old Calabar, having only 36 teeth.

Potamogale allmani GRANDIDIER, 1904, Bull. Mus. d'Hist. Nat. Paris, X, p. 51. Two immature specimens, each with only 36 teeth, provisionally referred to Jentink's "espèce incertaine," "si son existence réelle était démontrée." Of 9 specimens in the Paris Museum (3 of them without skulls) 6 were yellowish beneath and each of the skulls, so far as available, had 40 teeth. These were referred to *P. velox*.

Potamogale velox argens THOMAS, 1915, Ann. Mag. Nat. Hist., (8) XVI, December, p. 470. Two specimens: Medje and Poko, Belgian Congo.

Represented by 51 specimens (with skulls and 7 skeletons), collected as follows:

Medje, 30 (19 males, 11 females): January 24, 25, March 2–31, April 10–17, May 9 and 13, August 31, and September 10, 1910; February 27, April 16, June 4, and July 18, 1914.

Bafwabaka, 1: January 9, 1910.

Gamangui, 1: February 20, 1910.

Niangara, 3: November 11–29, 1910; and June 20, 1913.

Faradje, 2: February 21 and May 22, 1911.

Avakubi, 1: December 9, 1913.

Niapu, 13 (10 males, 3 females): November 26–December 31, 1913.

The males number 36, the females 15. The number of fully adult specimens (of which measurements are given below) is 20 (16 males, 4 females). More than one half are immature, varying from those in which the third molar, or both the second and third molars, are undeveloped (number of teeth 32 or 36) to those with mature dentition (40 teeth).

In respect to seasonal distribution, one or more specimens were taken in each month of the year except October, but the greater part at two quite distinct seasons of the year—December and March (November 26–December 31, 13 specimens; March 2–31, 16 specimens). This would seem to afford opportunity for the study of the influence of season upon the coloration and character of the pelage, but unfortunately, this is not the case, since only the Niapu series (taken in December) and a few others were made up from fresh specimens while the greater part (including nearly all of the large series from Medje) were not made up till they were received at the Museum several years later, when it was found that the fatty matter left on the skins had stained the white underparts.

Collectors' measurements of 7 adult males and 3 adult females from Medje:

	Total Length		Head and Body	Tail Vertebræ	Hind Foot	Ear
♂	575	(555–610)	310 (298–325)	267 (250–290)	43.0 (41–46)	21.5 (21–23)
♀	603	(600–610)	323 (310–339)	284 (280–290)	41.7 (41–43)	21.5 (21–22)

Skull, same specimens, condyloincisive length: ♂, 63.8 (61.1–65.9); ♀, 64 (63.6–64.3).

Collectors' measurements of 5 adult males and 1 adult female from Niapu:

	Total Length		Head and Body	Tail Vertebræ	Hind Foot	Ear
♂	586	(542–610)	329 (297–347)	260 (245–273)	45 (43–48)	22 (22–22)
♀	585		330	255	41	21

Skull, same specimens, condyloincisive length: ♂, 65.5 (63.8–66.5); ♀, 63.5.

Collectors' measurements of 4 adult males from other localities (Bafwabaka 1, Gamangui 1, Niangara 2):

Total Length	Head and Body	Tail Vertebræ	Hind Foot	Ear
565 (550–583)	294 (279–312)	268 (260–272)	43.5 (43–44)	21.3 (20–22)

Skull, same specimens, condyloincisive length: 64.8 (62.7–66.7).

The above statistics indicate that there is no distinctive sexual difference in size. The smallest skulls in each series are, as a rule, the youngest, or skulls with full mature dentition but in which the teeth are wholly unworn and the cranial sutures still distinct. There is no skull young enough to show the milk dentition. In several skulls in which the first molars are fully developed, the condyloincisive length is 50–51 mm.; in those in which the second molars are fully up but the third molar is still enclosed in the gum it ranges from 53–55 mm.; during the development of the third molar the skull length increases to about 60–61.5.

Potamogale velox argens was based on two specimens, one from Medje and one from Poko. As no type locality was definitely indicated, Medje, the first locality mentioned in the description, is here designated as the type locality. Hence the present series of 31 specimens from Medje are topotypes. Poko and Niapu are both near Medje. The Niapu series of 13 specimens is in fine condition, the underparts being unstained, and agrees in a general way with the brief description of *argens;* it shows, however, that the white area of the underside varies in extension upward on the sides and that the development of brown-tipped hairs along its upper border is also a variable feature. The fore limbs are sometimes "almost wholly in the whitish area" and sometimes wholly brown above in specimens from the same locality and collected on the same day, show-

ing this alleged distinction to be subject to a wide range of individuality. Specimens taken at approximately the same date vary greatly in the condition of the pelage in respect to wear, but, on the whole, December specimens, taken near the close of the dry season, appear more worn than those taken in March–May, the rainy period. But doubtless the season of moult varies in different individuals and, like the birth of the young, may extend over a considerable part of the year.

Only two forms of *Potamogale*, in addition to the original *P. velox* Du Chaillu, appear to have been distinguished. These are *P. allmani* Jentink (1895), based on Allman's detailed description (*loc. cit.*) of a specimen preserved in spirits from Old Calabar, published some twenty-six years before. The second, *P. velox argens* Thomas, was added in December 1915, on the basis of two specimens from the Upper Congo. The large series of specimens collected by the American Museum Congo Expedition demonstrates that the characters relied upon for the discrimination of these two forms are without value and, for this reason, are subjected to comment.

As shown in the collectors' field notes on this species the genus *Potamogale* has a wide geographic range, and hence might be expected to have developed local phases. It is not the purpose of these remarks to discredit such a reasonable probability but merely to show that the evidence presented for the two forms above cited is far from adequate. Unfortunately, little material is available for direct comparison with that from the Upper Congo region, but the latter emphatically shows the trivial nature of the distinctions offered by their describers for the recognition of *allmani* and *argens*. Reference has already been made (p. 5) to the stained condition of the underparts due to treatment of the skins before they were made up. Apropos of this, and in response to my inquiries, the collectors have informed me that "all living or freshly killed specimens they saw had pure white, lustrous fur on the under side, if not soiled by the reddish clay of these regions"; and they add that "some of their own skins from the same places, when unpacked, were yellowish, due to a difference in the method of preservation." They also state that they "noticed that in many old, flat skins or portions of them from the same localities, which they saw in the possession of Europeans and natives, the originally white area was always yellowish or brown." It is also well known that in museum specimens the white underside of mammals long stored are apt to turn yellowish from fatty matter retained in the skin, or from other causes, and therefore are unsatisfactory as standards of comparison with freshly collected material.

While *Potamogale* is a rather common animal in its native haunts, it is one of the rarest in collections and, when present, is doubtless not safely comparable with freshly killed specimens.

Potamogale allmani was proposed on the basis of two (in part hypothetical) distinctions: (1) the presence of 36 teeth (owing to the immaturity of the specimen) instead of 40; (2) the "brownish yellow" instead of white underparts, due to discoloration by the preservative. *P. velox argens* was described from two apparently normal specimens in which the white of the underparts reached "higher up on the sides" of the body and on to the under surface of the basal portion of the tail than in *P. velox*, which features a large amount of topotype material shows to be inconstant and merely individual. Consequently *allmani*[1] and *argens* cannot be considered as entitled to recognition.[2]

It is hardly necessary to add that many forms, species as well as subspecies, have a similarly unsatisfactory basis, as they rest on slight differences shown by single specimens, or on characters of trivial importance. Their confirmation, it is obvious, rests on a comparison of adequate series of topotype material with similar series of their near allies; and the author who would discard them without such resources would take great risks, notwithstanding his strong conviction that the forms in question are merely names.

ERINACEIDÆ

STATUS OF *Erinaceus albiventris* AND *E. pruneri* WAGNER

The *Erinaceidæ* are represented in the Lang-Chapin Congo Collection by nine specimens (skins with skulls), all from Faradje except a third-grown female from Garamba, a nearby locality. They comprise three adult females and six young, from one-third to one-half grown, and unquestionably represent two distinct species, differing in important cranial characters and in external features. Both belong to the section of the family in which the hind feet are four-toed. Owing, however, to the unsatisfactory original descriptions of the first-named members of this group, and to lack of proper material for direct comparison with the Lang-Chapin specimens, their determination has been difficult. Thanks to the authorities of the Museum of Comparative Zoölogy at Harvard University and of the United States National Museum at Washington, I have in hand 14 additional specimens of the group with 4-toed hind

[1] In respect to the status of *P. allmani*, cf. Leche, who in 1907 (Zoologica, XX, Heft 49, pp. 6 and 129, footnote 1) regarded it as only "ein jugendliches Individuum" of *P. velox*.

[2] See above (p. 5) the citation of Grandidier's paper on the Paris Museum series of *Potamogale*

feet, making 23 in all, representing five easily recognizable forms. While their relationships *inter se* are obvious, the names properly applicable to the two forms from Faradje have raised a serious question of nomenclature. One of them should apparently be referred to *E. albiventris* Wagner, as that name has of late been employed, but which of them should be so recognized is indeterminable. This raises the further and more fundamental question of the availability of this name, considered with relation to its origin and history.

As is well known, Wagner, in 1841, described as new two species of *Erinaceus* (*albiventris* and *pruneri*) on consecutive pages of the same work,[1] for neither of which was given a definite type locality. *Erinaceus albiventris*, the first in sequence of the two species, was based on a single specimen obtained from a dealer, who stated that it was found in a collection from India ("befand er sich unter einer Sendung indischer Thiere"), Wagner himself saying: "Die Heimath kann ich nicht genau bestimmen." The original description of the species was inadequate, merely indicating that it had, like many other species of *Erinaceus* now known, white underparts, parti-colored spines, and other features of no distinctive significance. In later references[2] to the species he stated that the hind feet have only four toes. This fixed the "Heimath" as Africa, inasmuch as no species of this genus having 4-toed hind feet are known to occur elsewhere. Fortunately, the type remained available for examination by later investigators, confirming its African origin. *Erinaceus albiventris* Wagner thus became a "blanket name" for all the African species of *Erinaceus* with 4-toed hind feet. Various forms of the group later became segregated, one after another, under distinctive names as species, and the name *albiventris*, by some authors, was restricted (apparently rather informally) to a Sudan form.[3]

Erinaceus pruneri Wagner, synchronous in publication with his *E. albiventris*, was based on specimens received from Dr. Franz Pruner, from a locality not definitely stated in the original description, nor in Wagner's later references to the species,[4] where he gives its distribution as "Sennaar, nach Sundevall auch am Senegal." It is to be noted that he synonymized (in 1842 and 1855) *E. heterodactylus* Sundevall, based on specimens from the Bahr el Abiad (White Nile), Sennaar, with his *E.*

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[1]1841, 'Schreber's Säugthiere,' Suppl., II, pp. 22 and 23.
[2]1843, Wiegmann's Archiv für Naturg., IX, 2 Bd., p. 27; 1855, 'Schreber's Säugthiere,' Suppl., V, p. 587.
[3]Thomas and Wroughton, in describing their *Erinaceus spiculus*, from near Lake Chad, in 1907 (Ann. Mag. Nat. Hist., (7) XIX, p. 371), made comparison with "the Soudanese *albiventris*," and further state: "The nearest neighbors of *spiculus* are *albiventris*, Wagner, from the Soudan and *Adansoni*, Rochebrune, from Senegal."
[4]1855, 'Schreber's Säugthiere,' Suppl., V, p 587.

pruneri, a course followed by apparently nearly all subsequent authors. But not by all, since von Heuglin[1] in 1867 gave a list of the species of *Erinaceus* occurring in "Nordost Afrika" in which he included: "*Erinaceus pruneri* Wagner. Aus dem Sennaar." And Fitzinger[2] recognized it as not only distinct from *albiventris* but as the type and only species of his genus *Peroëchinus*. In the original description of *pruneri* it is stated merely that the specimens on which it was founded came in a collection of mammals sent by Dr. Pruner from "Kairo." It is known, however, that Dr. Pruner visited the Upper Nile region and there collected specimens of hedgehogs that were sent to Wagner,[3] among them those on which *pruneri* was originally based.

It may be noted further that Sundevall, about the same time (see below, p. 12), described his *Erinaceus heterodactylus*,[4] a species having 4-toed hind feet, based on specimens collected by Dr. Hedenborg in "Sennaar," and that this species has always been synonymized with *E. pruneri* by subsequent writers, both forms coming from "Sennaar." As both have been referred by most authors to *E. albiventris*, it may be that this fact has had an influence in the recognition of Sudan as the type region of *albiventris* (or, more definitely, Kordofan, in the case of *pruneri*).

To follow further the history of *E. albiventris*, from a geographic point of view, Fitzinger, in 1867,[5] gave its Vaterland as "nicht mit Sicherheit bekannt, wahrscheinlich aber Ost-Indien," and that of *pruneri* as Kordofan. Dobson, in 1882,[6] gave the range of *albiventris* as "Northern Tropical Africa (Senegambia, Sennaar)," and Anderson in 1895,[7] as extending from "Senegambia across Central Africa, southwards to Uganda and northwards to Somaliland." In 1902,[8] he stated: "The specimen upon which Wagner founded this species [*Erinaceus albiventris*] came, in all probability, from Senegambia,"[9] and adds: "The Nile Valley and East African specimens . . . may be more

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[1] 'Beitr. zur Fauna der Säuget. N. O. Afrika,' p. 22.
[2] 1867, Sitzungsb. math. nat. Cl. Akad. Wiss. Wien, LVI, p. 126.
[3] Cf. Anderson's 'Mammals of Egypt,' 1902, p. 162.
[4] 1841, Sven. Vet. Akad. Handl. Stockholm, (1842,) p. 227.
[5] Sitzungsb. math. nat. Cl. Akad. Wiss. Wien, LVI, p. 856.
[6] 'Monograph of the Insectivora,' p. 11.
[7] Proc. Zoöl. Soc. London, 1895, p. 420. Anderson included under *Erinaceus albiventris E. pruneri* Wagner, *E. heterodactylus* Sundevall, *E. adansoni* Rochebrune. He added: "This species [*albiventris*] has been obtained at the following localities: Senegal; Saint Louis; Cape Verd; Joal; MacCarthy's Island, River Gambia [collectively = range of *E. adansoni*]; Accra, Fantee; Porto Seguro, Togo; Gaboon; Kitui, Ukamba [type locality of *E. hindei* Thomas, 1907]; Tabora; Kasé; Kilima Njaro; Wakilomi, District of Maka; Central Somaliland; Sennaar [*E. heterodactylus*]; Kordofan [*E. pruneri*]; and region of Upper Nile."
[8] 'Mammals of Egypt,' p. 164.
[9] This statement, doubtless, was based on his personal examination of the type in the Munich Museum, as he states in another connection (1895, Proc. Zoöl. Soc. London, p. 414): "I may mention that I have examined all the Hedgehogs preserved in the Museums of Paris, Frankfort on the Main, Munich, Berlin, and London, and . . . some of the specimens described by Fitzinger in the Vienna Museum."

definitely registered as *Erinaceus albiventris* subsp. *pruneri.*" Again he says, later on the same page, referring to *albiventris:* "This species is found to the south of Khartum," and "ranges into Somaliland and as far south as Kilima-nyaro." Within this region, since 1902, two forms (*E. hindei* Thomas and *E. albiventris sotikæ* Heller) in addition to *pruneri* have been recognized,[1] and two more are added in the present paper, both from Faradje, northeastern Belgian Congo.

As stated above (p. 9, footnote), Thomas and Wroughton in 1907, in describing their *Erinaceus spiculus*, referred to Sudanese specimens as typical of *E. albiventris.* In view of the complications of the case, it seems to me preferable to place *Erinaceus albiventris* permanently in the list of unidentifiable species, it having no type locality and being specifically unidentifiable from the original description, although the type appears to have been preserved in the Munich Museum.[2] Senegal (or Senegambia) and Sudan (or Sennaar), the rival suggested type regions, are far apart, with *E. adansoni* representing the former and *E. pruneri* the latter as well established species. Under this ruling the two forms from Faradje are described as new.

ATELERIX POMEL

Since the foregoing was prepared for the press a paper by Oldfield Thomas, on 'The Generic Divisions of the Hedgehogs' (1918, Ann. Mag. Nat. Hist., (9) I, February, pp. 193–196) has appeared, respecting which a few notes are here appended. The old genus *Erinaceus* is divided by Thomas into five genera, which, with their designated genotypes, are as follows:

1. *Erinaceus* Linné, 1758. Genotype, *E. europæus* Linné.
2. *Æthechinus*, new genus. Genotype, *E. algirus* Duvernoy and Lereboullet.
3. *Atelerix* Pomel, 1848. Genotype, *E. albiventris* Wagner.
4. *Hemiechinus* Fitzinger, 1866. Genotype, *E. platyotis* Sundevall.
5. *Parechinus* Trouessart, 1879. Genotype, *E. micropus* Blyth.

Although each of these groups is represented in Africa, only *Atelerix* and *Æthechinus* come geographically within the scope of the present paper. *Atelerix* was proposed by Pomel (1848) as a subgenus of *Erinaceus*, with the statement "4 dactylus" as the entire diagnosis. No species was referred to it, and no geographic range was indicated for the

[1]Since this was written Thomas has added a third from Kilimanjaro as *Atelerix kilimanus* (1918, Ann. Mag. Nat. Hist., (9) I, March, p. 232.

[2]As stated above (p. 10, footnote), the type was probably critically studied by Anderson prior to 1895, together with the type of *pruneri*, leading to his assignment of the type locality of *albiventris* to Senegambia, and to his later recognition of *pruneri* as an eastern subspecies of *albiventris*.

group. Neither is it indicated whether "4 dactylus" refers to the hind feet or to the fore feet, or to all the feet. It happens, however, that only one species of hedgehog had at that time been characterized as 4-dactylus in the original description of the species. This was *Erinaceus heterodactylus* Sundevall (1841, Sven. Vet. Akad. Handl. Stockholm, p. 227), which is characterized as, among other distinctions, "Pedibus posticis 4 dactylis," which is doubtless the original source of Pomel's "4 dactylus." At about the same date (1841) Wagner described *Erinaceus albiventris* and *E. pruneri* on consecutive pages of the same work, without specifying this character for either species. The first of these (*E. albiventris*) I consider specifically unidentifiable, for reasons already given in the present paper. This is the species now designated by Thomas as the type of *Atelerix*. Wagner, two years later, in his 'Bericht über die Naturgeschichte der Säugthiere während des Jahres 1842' (1843, Arch. für Naturg., Bd. 2, p. 27), claimed priority for his *pruneri* over *heterodactylus* Sundevall, to which he referred the latter as a synonym. He says he received a separate of Sundevall's paper from the editor of the Archiv, and that the volume in which it was printed was issued later, but, as he fails to state when Sundevall's paper was received, or what date it bore, we are left in doubt as to which paper has priority of publication, the date of his own publication being "15. Mai 1841."

In his comment on Sundevall's paper he says that "*E. heterodactylus* Sund. mit meinem *E. Pruneri* identisch ist; auch der hintere Daumen geht diesem wie jenem ganz ab." He says further that he had assumed the absence of the hallux in *E. pruneri* and *E. albiventris* to be the result of an injury and for that reason did not mention it; but, inasmuch as Sundevall had found the same suppression in his *E. heterodactylus*, he now considered it an important character for his *E. pruneri* and *E. albiventris*, to be included in the diagnosis. It is accordingly so included in his later revision of the hedgehogs (1855, 'Schreber's Säugt.,' V, p. 587).

The question of what name the genotype of *Atelerix* should bear is thus somewhat complicated, depending upon priority of publication of the names *E. heterodactylus* Sundevall, under which the expression "4 dactylus" (the sole diagnosis of *Atelerix*) was first employed for a hedgehog, and which was first recognized as a character of *E. pruneri* some two years later. In any case, by the consensus of authorities both names refer to the same species. Furthermore, *Peroëchinus* Fitzinger (1866), without diagnosis, included only *E. pruneri* (with *E. heterodactylus* Sundevall as synonym), which is, therefore, the genotype of *Peroëchinus*. As *Peroëchinus* is a substitute name for, or at all events a pure synonym

of, *Atelerix*, it thus determines under the peculiar conditions of the case the genotype of the latter as *E. pruneri*. (Cf. 'Internat. Code Zoöl. Nomen.,' Art. 30, II, *f.*)

In Thomas's synopsis of the hedgehogs, the sole distinctive character of *Atelerix* is: "Hallux absent;" and, so far as I can find, this is the only distinction between *Atelerix* and his new genus *Æthechinus*, defined as: "Coronal parting broad, conspicuous. Posterior palatal shelf broad. Third incisor two-rooted." The last two characters, in comparison with *Erinaceus* (as restricted by Thomas), are both present in *Atelerix;* the first is of less importance, depending upon the stress to be laid upon the words "broad, conspicuous," since in *Atelerix* there is a distinct coronal parting, although less developed than in *Erinaceus europæus* and its near allies.

As shown below (p. 17), the absence of the hallux is not constant, and therefore not an important character, since in different individuals of the same litter of young it may be present or absent, although absent as a rule in a number of forms of the *pruneri* (*heterodactylus ?*)-*adansoni* group, which is distributed over a wide geographical area. I agree with Thomas that both *Atelerix* and *Æthechinus* are separable from *Erinaceus*, *sensu stricto*, but collectively rather than as two generic groups, for which the rule of priority demands the earlier name, *Atelerix*.

The forms referred to *Atelerix* by Thomas are:

1. *albiventris* = *Erinaceus albiventris* Wagner, 1841.
2. *adansoni* = *E. adansoni* Rochebrune, 1882.
3. *hindei* = *E. hindei* Thomas, 1910.
4. *spiculus* = *E. spiculus* Thomas and Wroughton, 1907.
5. *spinifex* = *Atelerix spinifex* Thomas, March, 1918.
6. *kilimanus* = *A. kilimanus* Thomas, March, 1918.

To which may be added:

7. *hindei sotikæ* = *E. sotikæ* Heller, 1910.
8. *faradjius* = *A. faradjius* (described below).
9. *langi* = *A. langi* (described below).

And *pruneri* = *Erinaceus pruneri* Wagner, 1841 (= ?*E. heterodactylus* Sundevall, 1841), in place of "*albiventris*" as No. 1 of the above list, and also as type of *Atelerix* in place of *albiventris*.

Atelerix faradjius, new species

Type, No. 51006, ♀ ad., Faradje, northeastern Belgian Congo, July 7, 1911; Herbert Lang and James P. Chapin. American Museum Congo Expedition. Orig. No. 1660. Topotype (♀ very old), No. 51007.

Represented by two adult females from Faradje, of the so-called "*albiventris*" type.

General coloration of the upperparts strongly yellowish white superficially, the broad light tips of the spines being of this color and nearly concealing the dark subterminal zone. Head in front of eyes, including sides of nose, dull tawny-brown; also ears and feet the same in general effect; a broad frontal band, cheeks, sides of neck, sides of shoulders and forearms, thighs and hind legs, rump and whole underparts uniform dull yellowish white (possibly white slightly stained yellowish); upper surface of fore feet slightly clothed with yellowish-white hairs, hind feet more heavily clothed with longer yellowish-white hairs, through which the pale tawny color of the skin determines the general effect; tail similar in coloration to the feet. Spines broadly tipped (for about 4–5 mm.) with yellowish white (without darker tips); subapical band (about 5 mm.) dark tawny-brown, passing proximally into dull yellowish white on the basal half. Longest head spines about 17 mm. in length, body spines about 15 mm.

Collectors' measurements: total length (type), 249 mm.; head and body, 230; tail, 19; hind foot, 29; ear, 30. Topotype (very old female with greatly worn teeth): total length, 205; head and body, 180; tail, 25; hind foot, 26; ear, 30.

Skull measurements: condyloincisive length, (type) 45.1, (topotype) 43.6; length of nasals, 16.5, 15; palatal length (to front of premaxillæ) 25.4, 24.7; zygomatic breadth, 27.7, 26.3; interorbital breadth, 11.8, 11.5; breadth of braincase, 19.5, 19.9; postglenoid breadth, 22, 20; mastoid breadth, 15.5, 16.5; palatal breadth (outside to outside of m^1), 17.6, 16.8; breadth of rostrum at base of front incisor, 6, 5.4; breadth of palate at ridge behind m^3, 9.7, 8.5; tip to tip of alisphenoid processes, 11.2, 11.3; tip to tip of pterygoids, 6.1, 6.7; length of mesopterygoid fossa, 10.7, 10.2; breadth between pterygoids, 2.8, 2.7; length of upper toothrow (i^1–m^3), 21.5, 21.5; upper molars, 8.1, 8.1; lower toothrow (to tip of i^1), 9.7, 8.2; lower molars, 9.9, 9.8; length of mandible (front of symphysis to posterior border of condyle), 34.5, 34.2; depth, angle to coronoid, 17.7, 16.7.

The skull is large and heavy; the nasals are long and narrow, the premaxillæ greatly extended posteriorly, meeting the frontals and excluding contact of the maxillæ with the nasals; zygomatic arches narrow as in *A. pruneri;* mesopterygoid fossa very broad, the pterygoids and alisphenoids heavily developed and widespreading as in *A. hindei* (the reverse of what is seen in *A. pruneri*[1]); dentition heavy, as in *A. langi* and *A. hindei.*

The pattern of coloration is as in *A. pruneri,* differing from that of *langi* and *hindei* in having the space below the eye white instead of blackish. The spines are as in *pruneri*—short and fine instead of long and coarse, and those of the frontal border not conspicuously lengthened as in the *hindei* group. The general coloration of both spine-tips and hair is more yellowish and less clear white than in *pruneri;* the nose and basal color of the feet and ears is tawny instead of blackish as in *pruneri* and in *hindei.* This however may be subject to considerable variation through seasonal and other conditions.

[1]The specimen of *A. pruneri* here employed in comparison is No. 14446, Mus. Comp. Zoöl., a young adult male (teeth unworn), collected at Fazogli, Blue Nile, by Dr. G. M. Allen and recorded by him (Bull. Mus. Comp. Zoöl, LVIII, p. 342, July, 1914) as *Erinaceus albiventris pruneri.*

Atelerix langi, new species

Type, No. 51000, ♀ ad., Faradje, northeastern Belgian Congo, March 22, 1911; Herbert Lang and James P. Chapin. American Museum Congo Expedition. Orig. No. 1544.

Represented by 7 specimens, the type, an old female, and her litter of five young (3 males and 2 females), about one-third grown, taken March 22, 1911, at Faradje, and another third-grown young collected at Garamba, May 1, 1912.

A dark-colored species, allied to *Erinaceus hindei* Thomas of British East Africa.

TYPE.—Upperparts dark brown, the spines over the greater part of the back uniform blackish brown from base nearly to tip, the extreme tips tending to lighter brown or even whitish; front of head, flanks and posterior margin of back lighter than the mid-dorsal area, the spines distinctly whitish-tipped, especially on the lower back where all are conspicuously whitish terminally. Ventral surface white, the white area extending along sides of body, shoulders and forearms, and joining the broad white frontal band between the eyes and base of the ears. A narrow line of dusky brown borders the white band in front, broadening laterally to include the cheeks below the eye and extending forward to the naked portion of the face, which, with the chin, is also dark brown. Upper surface of fore and hind feet dark brown, but much lighter than the cheeks. Ears and tail dull brown, the former nearly naked.

YOUNG.—The five third-grown young differ uniformly from the adult type specimen in the dark markings of the face being more intensely black, in vivid contrast with the clear white frontal band. The upper surface of the feet is also deep blackish brown, as is also the tip of the inconspicuous tail. The spines of the dorsal area are all conspicuously and uniformly tipped with white, through which the blackish brown proximal portion of the spines is more or less visible. The young specimens have a tendency to a narrow blackish median area on the posterior part of the ventral surface, in some of them strongly developed. They agree strictly with the mother in the color pattern, but have the black on face and feet more intense and more sharply defined, and the white or whitish tips to the spines longer. The slightly younger specimen from Garamba is indistinguishable from the Faradje specimens in coloration and details of structure.

Collectors' measurements of the type: total length, 195 mm.; head and body, 175; tail, 20; hind foot, 28; ear, 21.

Skull: condyloincisive length, 43.3; length of nasals, 15.4; palatal length (to front of premaxillæ), 24.3; zygomatic breadth, 29.4; interorbital constriction, 11.7; breadth of braincase, 18.3; postglenoid breadth, 21.7; mastoid breadth, 14.7; palatal breadth (outside to outside of m^1), 17.9; breadth of rostrum at i^1, 6.6; breadth of palate at ridge behind m^3, 8.2; tip to tip of alisphenoid processes, 9.2; tip to tip of pterygoids, 5.4; length of mesopterygoid fossa, 10.5; breadth of fossa between pterygoids, 3; length of upper toothrow (i^1–m^3), 21.3; upper molars, 9; lower toothrow (tip of i_1–m_3), 20.2; lower molars, 10.2; length of mandible (front of symphysis to posterior border of condyle), 33.5; angle to condyle, 17.5.

In pattern of coloration *A. langi* agrees with *A. hindei*, in both the dark color of the face extending over the cheeks, which are white in *faradjius* and *pruneri;* indeed, the series of young specimens of *langi* are almost indistinguishable in external features from a corresponding

series of young *sotikæ* (a slightly differential form of *hindei*). The dorsal coloration in both is superficially dark brown in general effect but the single adult of *langi* is much darker than any of the four adults of *hindei* available for comparison,[1] while the white tipping of the spines is conspicuous and uniform in *hindei* and nearly absent in *langi*. The spines in *langi* are blackish brown from tip to base, lacking the light median band present in the *hindei* group. The interaural spines in both are much longer than those of the body, forming a decidedly lengthened frontal crest, absent in the *pruneri* ("*albiventris*") group.

The type skull agrees in general dimensions with those given for the type of *hindei*, but differs from it in the nasals being much longer; the short nasal border of the premaxillæ, with a naso-maxillary junction as long or longer than the nasal contact with the premaxillæ—quite the reverse of the conditions in *hindei*, in which the premaxillæ are "slanted backwards, touching the tips of the frontal processes and shutting off the maxillæ from the nasals." The postpalatal region is also much narrower, the pterygoid and alisphenoid processes weaker and much less everted, thus giving to this region a quite different aspect. All of the 6 young skulls (of which the type is the mother of 5 of them) agree with the type skull in the short naso-premaxillary suture and the long naso-maxillary suture, and the narrow postpalatal region and weak development of its processes.[2]

Of 12 skulls of the *hindei* group (5 of *hindei* and 7 of *sotikæ* [*E. albiventris sotikæ* Heller], the latter all from the Guaso Nyiro River) all but one have the nasal border of the premaxillæ extended posteriorly ("slanted backwards"), and in all but two they nearly or quite reach the frontal processes, the maxillæ not reaching the nasals or barely touching them for usually less than a millimetre.

The skull of the type of *hindei* (a female) appears to have been exceptionally large ("greatest length 44; zygomatic breadth 30 mm."), none of the four adult male skulls before me exceeding a total length of 43 mm., with an average of 42.1, and a maximum zygomatic breadth of 27.6, with an average of 26.7, although the teeth are worn and one (total skull length 41.7) is very old. The author's suggestion that when

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[1]The specimens of *hindei* available for comparison are: Nos. 16096 Mus. Comp. Zcöl., subadult ♂, Upper Ura River; 16097 Mus. Comp. Zoöl.; ad. ♀ (skin only); No. 161699 Nat. Mus., ad. ♂, Kapiti Plains; Nos. 164022 and 164023 Nat. Mus., both ad. ♀, Ulucania Hills; No. 182652 Nat. Mus., very old ♂ (teeth greatly worn), Lololokwi. All the localities are in British East Africa, not far from the type locality of *hindei* (Kitui, about 75 miles southeast of Mt. Kenia). The Mus. Comp. Zoöl. specimens (both *ex* Wulsin Coll.) are labeled *Erinaceus hindei*; the Nat. Mus. specimens, *Erinaceus albiventris hindei*.

[2]In respect to this latter feature comparison is made with skulls of *hindei* from the type region of the species.

males are available for examination they would prove to be larger than the type is thus not confirmed by the present material.

The hind feet in the type of *A. langi* show no vestige of a hallux. The slight taxonomic significance of its presence or absence in this genus is well indicated by the series of 6 young specimens of which the type of *langi* is the mother of 5. Of the 6 young ones 3 have a vestigial hallux and the other 3 are without it. It is also much more developed in one of the three in which it is present than in the other two. It is also present in one of the 3 young *sotikæ* specimens (No. 181441 Nat. Mus.), and absent in the other two and in 12 adults of the *hindei-sotikæ* series.

SORICIDÆ

As stated above (p. 2), the shrews of the Congo Expedition were early assigned to Mr. Hollister, of the United States National Museum, for determination, and his report on them was published in this Bulletin in October, 1916.[1] The following statement in respect to the extent and character of the collection is made in the introduction to his paper:

> The shrews collected by Herbert Lang and James P. Chapin on the American Museum Congo Expedition number 183 specimens, of 15 species and 3 genera. Almost one half of the species are new. This is not altogether surprising when it is considered how few shrews have been described from the Congo as compared with other parts of Africa. It nevertheless seems remarkable that five of these new species should be members of the small group of "naked-tailed" *Crocidura* of which only about ten forms were heretofore known. Five forms of *Crocidura* which have been recorded from the general region are not represented in this collection. These are *Crocidura turba turba* Dollman, *C. t. tarella* Dollman, *C. poensis attila* Dollman, *C. boydi* Dollman, and *C. nigrofusca* Matschie. Races of *C. hildegardeæ* and *C. fumosa*, as well as representatives of several west coast species also might reasonably be expected.

In order to complete the record of the Congo collection of insectivores, the shrews obtained are here listed, as determined by Mr. Hollister.

Crocidura nyansæ kivu Osgood

Plate IV

Crocidura nyansæ kivu HOLLISTER, 1916, Bull. Amer. Mus. Nat. Hist., XXXV, p. 663, Pl. x, fig. 1 (animal).

Crocidura nyansæ kivu ALLEN, 1917, Bull. Amer. Mus. Nat. Hist., XXXVII, pp. 769–774, figs. 1 and 2 (skull), figs. 5–8 (skeleton), Pl. XCII (animal, from photograph). Skull, skeleton, and external appearance, in comparison with *Scutisorex congicus*.

Specimens, 20: Avakubi, 3 (1 alcoholic); Gamangui, 1; Medje, 16.

[1] 'Shrews Collected by the Congo Expedition of the American Museum.' By N. Hollister, Bull. Amer. Mus. Nat. Hist., XXXV, pp. 663–680, Pls. VII–XI. October 21, 1916.

Crocidura sururæ Heller

Crocidura sururæ HOLLISTER, 1916, Bull. Amer. Mus. Nat. Hist., XXXV, p. 664.

Specimens, 2: Faradje, 1 (skin and skull); Garamba, 1 (alcoholic).

Crocidura lutrella Heller

Crocidura lutrella HOLLISTER, 1916, Bull. Amer. Mus. Nat. Hist., XXXV, p. 664.

Specimens, 1: Faradje (skin only).

Crocidura turba nilotica Heller

Crocidura turba nilotica HOLLISTER, 1916, Bull. Amer. Mus. Nat. Hist., XXXV. p. 664.

Crocidura turba nilotica ALLEN, 1917, Bull. Amer. Mus. Nat. Hist., XXXVII, p. 784, Pls. LXXXIX and XC (skiagraphs of skeleton, in comparison with skeleton of *Scutisorex congicus*).

Specimens, 4: Faradje, 3 (2 alcoholic); Nala, 1 (alcoholic).

Crocidura caliginea Hollister

Crocidura caliginea HOLLISTER, 1916, Bull. Amer. Mus. Nat. Hist., XXXV, p. 664, Pl. VII, fig. 1 and Pl. VIII, figs. 1, 1*a* (skull).

"Type, No. 48555, Amer. Mus. Nat. Hist., skin and skull of adult ♀ (teeth moderately worn and basal suture closed) collected at Medje, Belgian Congo, July 8, 1914, by Herbert Lang and James P. Chapin. Orig. No. 2451."

Crocidura jacksoni denti Dollman

Plate II, Figure 1

Crocidura jacksoni denti HOLLISTER, 1916, Bull. Amer. Mus. Nat. Hist., XXXV, p. 665, Pl. X, fig. 2.

Specimens, 71: Avakubi, 6; Babeyru, 1 (alcoholic); Bafwabaka, 1; Faradje, 5; Gamangui, 2; Medje, 51; Nala, 3 (alcoholic); Niangara, 2.

Crocidura bicolor Bocage

Crocidura bicolor HOLLISTER, 1916, Bull. Amer. Mus. Nat. Hist., XXXV, p. 666.

Specimens, 1: Avakubi (alcoholic).

Crocidura oritis Hollister

Crocidura oritis HOLLISTER, 1916, Bull. Amer. Mus. Nat. Hist., XXXV, p. 666, Pl. VII, fig. 2 and Pl. VIII, figs. 2, 2*a* (skull).

"Type, No. 48510, Amer. Mus. Nat. Hist., skin and skull of adult ♂ (basal suture closed; teeth moderately worn) collected at Avakubi, Ituri River, Belgian Congo, July 6, 1914, by Herbert Lang and James P. Chapin. Orig. No. 2530."

This species is based on five specimens, four from Medje and one (the type) from Avakubi.

Crocidura latona Hollister

Crocidura latona HOLLISTER, 1916, Bull. Amer. Mus. Nat. Hist., XXXV, p. 667, Pl. VII, fig. 3 and Pl. VIII, figs. 3, 3*a* (skull).

"Type, No. 48610, Amer. Mus. Nat. Hist., skin and skull of adult ♂ (basal suture closed; teeth moderately worn) collected at Medje, Belgian Congo, March 17, 1910, by Herbert Lang and James P. Chapin. Orig. No. 773."

Besides the type there is a single skin without skull, from Avakubi.

Crocidura ludia Hollister

Crocidura ludia HOLLISTER, 1916, Bull. Amer. Mus. Nat. Hist., XXXV, p. 668, Pl. VII, fig. 4 and Pl. IX, figs. 1, 1*a* (skull).

"Type, No. 48566, Amer. Mus. Nat. Hist., skin and skull of adult ♂ (teeth slightly worn and basal suture not closed) collected at Medje, Belgian Congo, May 16, 1914, by Herbert Lang and James P. Chapin. Orig. No. 2366."

There are three specimens of this species in the collection, two from Medje (one the type) and one from Ngayu.

Crocidura polia Hollister

Crocidura polia HOLLISTER, 1916, Bull. Amer. Mus. Nat. Hist., XXXV, p. 669, Pl. VII, fig. 5 and Pl. IX, figs. 2, 2*a* (skull).

"Type, No. 48559, Amer. Mus. Nat. Hist., skin and skull of adult ♂ (basal suture closed; teeth moderately worn) collected at Medje, Belgian Congo, July 1, 1914, by Herbert Lang and James P. Chapin. Orig. No. 2442."

Crocidura congobelgica Hollister

Crocidura congobelgica HOLLISTER, 1916, Bull. Amer. Mus. Nat. Hist., XXXV, p. 670, Pl. VII, fig. 6 and Pl. IX, figs. 3, 3*a* (skull).

"Type, No. 48512, Amer. Mus. Nat. Hist., skin and skull of adult ♂ (teeth little worn) collected at Lubila, near Bafwasende, Belgian Congo, September 20, 1909, by Herbert Lang and James P. Chapin. Orig. No. 122."

There are only two specimens of this species in the collection, the type from Lubila and a specimen from Medje.

Sylvisorex gemmeus irene Thomas

Sylvisorex gemmeus irene HOLLISTER, 1916, Bull. Amer. Mus. Nat. Hist., XXXV, p. 671. Table of measurements of 12 specimens.

Specimens, 19: Medje, 18 (including 4 young in alcohol); Faradje, 1.

Sylvisorex oriundus Hollister

Plate II, Figure 2

Sylvisorex oriundus HOLLISTER, 1916, Bull. Amer. Mus. Nat. Hist., XXXV, p. 672, Pl. VII, fig. 7 and Pl. IX, figs. 4, 4*a*; Pl. XI, fig. 1 (animal).

"Type, No. 48554, Amer. Mus. Nat. Hist., skin and skull of adult ♀ (teeth little worn) collected at Medje, Nava River, Belgian Congo, May 20, 1914, by Herbert Lang and James P. Chapin. Orig. No. 2368."

Scutisorex congicus Thomas

Plate III

Scutisorex congicus HOLLISTER, 1916, Bull. Amer. Mus. Nat. Hist., XXXV, p. 673, Pl. XI, fig. 2 (animal). Table of measurements of 15 specimens.

Scutisorex congicus ALLEN, 1917, Bull. Amer. Mus. Nat. Hist., XXXVII, pp. 769–784, figs. 1–8, Pls. LXXXIX–XCII. Skull and skeleton (Pl. XCI, animal). *Scutisorex* raised to the rank of a subfamily Scutisoricinæ.

Scutisorex (*congicus*) SCHULTE, 1917, Bull. Amer. Mus. Nat. Hist., XXXVII, November 26, pp. 785–792. The lumbar vertebræ of *Scutisorex*.

Specimens, 44: Bafwabaka, 2 (skin and 1 complete skeleton); Medje, 42, including 1 in alcohol and 5 more or less complete skeletons.

The highly specialized vertebral column of *Scutisorex* has been made the subject of two special papers already published in this Bulletin (*loc. cit., supra*), one of them, by the author of the present paper, on the remarkable specialization of the vertebral column—unique, or without a known counterpart, in mammals—with numerous illustrations; the other, by Dr. H. von W. Schulte, on the lumbar vertebræ from the morphogenetic viewpoint. In order to emphasize the taxonomic importance of this surprising specialization the genus *Scutisorex* was raised to subfamily rank under the name SCUTISORICINÆ. To the first of these papers Mr. Lang contributed several pages of field notes.

MACROSCELIDIDÆ

Rhynchocyon stuhlmanni stuhlmanni Matschie

Rhynchocyon stuhlmanni MATSCHIE, 1893, Sitzber. Gesells. naturf. Freunde Berlin, pp. 66–68. Andundi, Semliki River, two specimens, adult and young.

Rhynchocyon stuhlmanni nudicaudata LYDEKKER, 1906, Proc. Zoöl. Soc. London, April 1907, p. 995. Mawambi district, Ituri Forest, Belgian Congo. One specimen.

Represented by 5 specimens: Penge, 2 (1 skin and skull; 1 alcoholic), April 21, 1914; Avakubi, 2, November 13, 1913, and May 22, 1914. All are females, of which 2 are adult and 1 with the milk dentition. Also a fœtus in alcohol.

The Museum Collection contains also an unsexed specimen of this form from the Budongo Forests, east of Lake Albert; February 1911.

The collectors' measurements of the two adults are: total length, 515 mm. (Penge), and 501 (Avakubi); head and body, 268, 259; tail, 247, 242; hind foot, 84, 84; ear, 30, 30. Skulls: total length, 69.5 (Penge), —(Avakubi); condyloincisive length, 62.3, 65; zygomatic breadth, 36, 35. They thus agree in measurements with average specimens of *R. s. claudi* from localities farther west, as recorded below (Tables 1–4, pp. 23–26).

This fact has, however, little significance since the range in size of adults of *R. s. claudi* covers all forms of the genus *Rhynchocyon* of which measurements have been published. In coloration they closely resemble extremely dark examples of *claudi*, from which they are not satisfactorily distinguishable. Placed at the end of the dark series of *claudi*, they completely merge with it. It seems preferable, however, to recognize them as a darker geographical race of the same specific group.

Rhynchocyon stuhlmanni nudicaudata Lydekker, however, based on a single specimen from the Mawambi district of the Ituri Forest, seems scarcely entitled to serious consideration. The description indicates that the type was not unlike the dark phase of the *R. stuhlmanni* group, with which the author was at the time wholly unacquainted except through the description of *stuhlmanni*. The "generally dark color and wholly white tail" are not distinctive in view of the variations shown, and described below, in the *claudi* series; nor are there any geographical reasons that would seem to require its recognition, the type locality of *nudicaudata* being less than fifty miles southeast from Penge, in the same environment as the latter, and represented in the present collection by specimens of *stuhlmanni*, while the type of *stuhlmanni* came from a locality equally near that of *nudicaudata*. The characters of naked ears and tail, dwelt upon as important distinctions, have no real significance, as such conditions are not infrequent in the *claudi* series; while a white tail, at least in dry skins, is a prevailing condition. The hairs of the tail are also so minute that they are often apparent only on very close inspection, giving the impression of a naked tail, especially in comparison with examples of the *cirnei* group, with which the author compared his specimen.

Rhynchocyon stuhlmanni claudi Thomas and Wroughton

Plate I; Text Figure 1

Rhynchocyon claudi Thomas and Wroughton, 1908, Ann. Mag. Nat. Hist., (7) XIX, May, p. 370. "Beritio, Welle River."

Rhynchocyon claudi Thomas, 1915, Ann. Mag. Nat. Hist., (8) XVI, November, p. 470. Medje, 1 specimen; Poko, 12 specimens.

Represented by 105 specimens, of which 99 are skins with skulls; 6 fœtal and young specimens in alcohol, and several skeletons, collected as follows:

Medje, 20: May and August–October 1910; November 8, 1913; March 17–20, 1914.

Nala, 1 (alcoholic): July 1913.

Akenge, 5: September 29–October 19, 1913.

Niapu, 79: November 8–December 26, 1913.

The 99 specimens represented by skins and skulls consist of 56 males and 43 females, of which 76 are adult and 23 more or less immature. The latter range in age from one specimen in which the milk teeth had not pierced the gum to those with the deciduous dentition fully developed (a series of 11 specimens), and the other 12 specimens fully illustrate the transition from the deciduous to the permanent teeth. It has hence seemed desirable to utilize this abundant material for the illustration of the tooth development of this interesting genus of insectivores. (Text figure 1, stages 1 to 8.)

The large series of adults from Niapu (43 males, 25 females) affords the basis for a study of sex, age, and individual variation. In the following tables (Tables 1–3, pp. 23-25) the external measurements, carefully taken by the collectors before skinning, have been combined with three measurements of the skull (total length, condyloincisive length, and zygomatic breadth). Table 1 gives the measurements of the males, Table 2, of the females, and Table 3 is a summary of Tables 1 and 2. In these tables the specimens are arranged in four categories, according to age as indicated by the amount of wear shown by the teeth, the purpose being to determine the influence of age upon the general size of the animal after the permanent dentition has been fully acquired. Table 4 is designed to show the correlation of growth with the tooth development. Of the 18 specimens included in this table, 5 are from Medje and 13 from Niapu, those from Medje being indicated by an asterisk.

Sexual Variation

There is no appreciable difference in size or coloration due to sex. The average total length (tip of nose to end of tail) in 43 adult males is 515 mm., in 25 adult females, 516 mm. The average total length of the skull for the same specimens is, males 68.1, females 68.5; condyloincisive length, males 62.3, females 63.5; zygomatic breadth, males 36.3, females 36.2.

TABLE 1.—EXTERNAL AND CRANIAL MEASUREMENTS OF 43 ADULT MALES OF *Rhynchocyon s. claudi*, FROM NIAPU, BELGIAN CONGO

	External Measurements					Cranial Measurements			
Cat. No.	Total Length	Head and Body	Tail	Hind Foot	Ear	Total Length	Condylo-incisive Length	Zygom. Breadth	Condition of Teeth
49442	500	265	235	84	29	64.8	64.1	33.5	Unworn
49443	509	269	240	84	31	67.0	61.6	36.2	"
49444	505	265	240	86	31	67.3	62.1	35.7	"
49445	556	291	265	89	34	67.3	63.5	36.3	"
49446	480	260	220	81	31	65.6	60.7	35.7	"
49447	482	250	232	83	32	67.2	60.9	36.4	"
49448	531	286	245	86	33	66.1	61.4	34.8	"
49456	540	277	263	85	31	68.5	61.5	36.5	"
49458	555	303	252	87	31	——	——	35.6	"
49459	521	281	240	88	30	68.3	62.9	35.3	"
49461	504	277	252	90	31	67.1	63.6	37.5	"
49473	512	275	237	83	31	66.6	62.5	35.0	"
49474	458	260	——	83	31	62.2	61.4	36.9	"
49475	469	244	225	82	31	66.9	60.8	34.3	"
49477	522	273	249	88	31	66.7	60.7	34.4	"
49478	510	278	232	87	31	67.7	62.0	35.0	"
49489	465	242	223	83	30	66.1	61.2	33.6	"
49492	496	259	237	86	31	67.3	61.5	35.2	"
49495	512	270	242	87	30	68.5	62.5	35.6	"
49497	522	274	248	86	30	68.5	62.9	36.8	"
49506	502	259	243	87	31	68.5	63.3	36.0	"
49509	518	274	244	84	30	66.8	61.6	35.7	"
49512	502	267	235	87	30	69.2	62.0	36.6	"
49515	514	275	239	85	31	68.4	63.1	36.1	"
49527	516	262	254	86	29	66.3	62.2	36.3	"
49449	517	271	246	84	31	69.0	61.9	36.4	Slightly worn
49450	535	290	245	88	31	70.8	63.6	37.4	"
49462	527	275	252	90	31	68.3	62.4	36.9	"
49466	508	268	240	88	31	67.9	63.2	——	"
49471	532	279	253	86	33	67.9	62.4	36.5	"
49496	504	269	235	84	30	68.3	61.5	35.6	"
49451	512	266	246	83	33	70.5	63.3	36.2	Much worn
49452	535	287	248	89	31	66.7	63.6	38.0	"
49463	537	273	264	86	32	67.1	63.1	37.1	"
49482	510	267	243	84	32	68.4	62.1	36.3	"
49455	485	261	224	89	32	——	63.0	38.1	Greatly worn
49470	520	291	229	87	32	67.7	63.1	37.9	"
49476	522	273	249	88	31	69.2	62.7	37.2	"
49481	515	270	245	85	29	69.4	62.6	36.5	"
40491	505	270	235	83	29	67.9	61.6	36.3	"
49516	500	262	238	82	30	65.6	60.1	36.5	"
49524	530	274	256	91	32	69.2	65.0	37.5	"

TABLE 2.—EXTERNAL AND CRANIAL MEASUREMENTS OF 25 ADULT FEMALES OF *Rhynchocyon s. claudi* FROM NIAPU, BELGIAN CONGO

	External Measurements					Cranial Measurements			
Cat. No.	Total Length	Head and Body	Tail	Hind Foot	Ear	Occipito-nasal Length	Condylo-incisive Length	Zygom. Breadth	Condition of Teeth
49460	532	281	251	85	31	68.4	63.6	36.7	Unworn
49464	530	272	258	86	31	67.6	62.3	34.5	"
49479	529	271	258	85	32	67.6	61.8	34.3	"
49480	516	279	237	88	31	69.5	63.0	36.0	"
49485	525	266	259	84	30	67.9	63.3	36.1	"
49486	522	276	246	89	29	66.9	62.1	——	"
49487	523	274	249	87	32	68.0	63.5	36.5	"
49488	514	276	238	85	30	68.4	63.7	35.4	"
49490	535	283	252	84	29	66.1	62.2	36.6	"
49500	522	277	245	85	30	68.8	62.6	36.1	"
49504	517	262	255	85	31	68.8	63.6	34.2	"
49507	511	270	241	86	31	67.5	61.9	33.6	"
49511	530	277	253	87	30	70.6	63.3	36.7	"
49526	513	272	241	86	31	68.7	63.7	35.6	"
49502	512	271	241	86	31	67.6	62.5	35.8	Slightly worn
49508	492	255	237	81	31	66.4	61.3	35.4	"
49453	517	277	240	85	31	68.5	63.1	36.5	Much worn
49469	528	293	235	87	31	70.6	64.0	36.7	"
49483	539	294	245	86	31	69.6	63.6	35.3	"
49494	511	266	245	87	31	69.2	63.1	37.4	"
49501	540	292	248	87	31	68.0	63.5	37.0	"
49503	520	278	242	85	32	71.1	64.8	37.4	Greatly worn
49454	532	285	247	86	31	69.0	63.3	36.8	"
49472	505	272	233	83	32	68.8	61.8	35.7	"
49525	499	273	226	83	33	69.1	64.0	36.2	"

TABLE 3.—SUMMARY OF MEASUREMENTS OF 43 MALES AND 25 FEMALES GIVEN IN TABLES 1 AND 2

		External Measurements						Cranial Measurements		
Condition of Teeth		Sex and No. of Spec.	Total Length	Head and Body	Tail	Hind Foot	Ear	Total Length	Condylo-incisive Length	Zygom. Breadth
Unworn	Avg.	♂25	508.0	269.7	240.5	85.4	30.8	67.2	62.1	35.6
"	Min.	♂25	458	242	220	81	29	64.8	60.7	33.5
"	Max.	♂25	556	303	265	90	34	69.2	64.1	37.5
Slightly worn	Avg.	♂ 6	519.3	274.0	245.3	86.1	31.6	68.9	62.5	36.5
"	Min.	♂ 6	504	266	235	83	30	67.8	61.5	35.6
"	Max.	♂ 6	535	290	253	90	33	70.8	63.6	37.4
Much worn	Avg.	♂ 4	523.5	273.2	250.2	85.5	32.0	68.2	63.0	36.9
"	Min.	♂ 4	510	266	243	83	31	66.7	62.1	36.2
"	Max.	♂ 4	535	287	264	89	33	70.5	63.6	38.0
Greatly worn	Avg.	♂ 7	511.0	271.6	239.4	86.3	30.7	68.2	62.6	37.1
"	Min.	♂ 7	430	261	224	82	29	65.6	60.1	36.3
"	Max.	♂ 7	485	291	256	91	32	69.4	65.0	38.1
Unworn	Avg.	♀14	522.8	278.6	248.6	85.9	30.6	68.1	64.2	35.5
"	Min.	♀14	511	262	237	84	29	66.1	61.8	33.6
"	Max.	♀14	535	283	259	89	32	70.6	63.7	36.7
Slightly worn	Avg.	♀ 2	502.0	263.0	239.0	83.5	31.0	67.0	61.9	35.6
"	Min.	♀ 2	492	255	237	81	31	66.4	61.3	35.8
"	Max.	♀ 2	512	271	241	86	31	67.6	62.5	35.4
Much worn	Avg.	♀ 5	525.8	281.7	242.5	86.2	31.2	69.5	63.5	36.7
"	Min.	♀ 5	511	266	235	85	31	68.0	63.1	35.3
"	Max.	♀ 5	540	294	248	87	32	71.1	64.0	37.4
Greatly worn	Avg.	♀ 4	512.0	276.7	235.3	84.0	32.0	69.0	63.4	36.2
"	Min.	♀ 4	499	272	226	83	31	68.8	61.8	35.7
"	Max.	♀ 4	532	285	247	86	33	69.1	64.8	36.8

TABLE 4.—EXTERNAL AND CRANIAL MEASUREMENTS OF 12 IMMATURE SPECIMENS OF *Rhynchocyon stuhlmanni claudi* FROM NIAPU AND MEDJE,[1] BELGIAN CONGO

		External Measurements					Cranial Measurements			
	Cat. No.	Sex	Total Length	Head and Body	Tail	Hind Foot	Ear	Total Length	Condylo-incisive Length	Zygom. Breadth	Condition of Upper Teeth
	*49434	♂	170	51	119	52	15	39.6	36.4	——	Teeth not through gums.
	*49427	♀	332	174	158	68	20	47.0	41.4	——	Cusps of dp^2, ^{3}, ^{4}, canines and incisors just appearing.
	*49518	♀	368	181	187	73	23	51.0	44.5	——	Same as No. 49427.
	*49413	♀	382	196	186	75	25	53.5	50.3	——	Slightly more advanced than No. 49427.
	49523	♀	371	211	160	78	26	50.0	46.5	——	Entire milk set of 6 teeth fully developed.
	*49436	♀	440	227	213	82	27	58.8	——	——	Same as 49523.
Entire milk set present	49513	♂	423	223	200	81	26	57.6	52.3	29.7	Milk teeth only.
	49514	♀	463	238	225	80	28	60.4	54.9	29.2	
	49510	♀	470	242	228	80	28	62.1	56.3	31.2	
	49493	♂	457	231	226	82	28	65.2	57.8	31.3	
	49499	♀	455	247	245	85	30	66.1	60.1	34.1	
	49498	♀	483	243	240	82	30	63.6	57.5	32.6	Milk teeth+m^1 and p^1 half up.
	49465	♂	502	255	247	86	29	67.9	61.8	34.9	Milk teeth+m^1 fully up.
	49467	♂	502	274	228	87	31	66.3	60.7	34.9	
	49505	♀	502	261	241	—	30	66.7	61.6	33.3	Milk teeth + m^1 fully up and m^2 can be seen.
	49484	♀	515	268	247	86	30	65.8	60.7	34.4	Milk teeth + m^1, m^2 one-third up, and p^4, p^3, and p^2 can be seen under their milk predecessors.
	49468	♂	494	261	233	85	29	65.4	60.5	34.7	Same as No. 49484 in which, however, milk canines are still preserved.
	49488	♂	514	276	238	85	30	68.5	63.6	35.5	M^1, m^2, p^4, p^3 fully up, p^2 and canine seen beneath their milk predecessors.

[1]An asterisk (*) is prefixed to the catalogue number of those from Medje.

Age Variation

COLORATION.—Coloration is only slightly affected by age. In young specimens in the first pelage, the tones are practically the same as in adults; the light and dark markings of the upperparts are not quite so sharply defined, but the pattern is strictly the same. In very old specimens the dorsal pelage has sometimes a more grayish cast than is usual in younger animals, due perhaps to less prompt renewal. As will be shown later, the wide variation in color seen in a series of specimens has no relation to sex or age.

SIZE.—Tables 1–4 have been compiled with special reference to the effect of age upon the general size of the animal and upon the size of the skull, since species and subspecies are sometimes based on adolescent specimens, and frequently on "young adults." Table 4 shows that in 6 specimens having only the full deciduous set of teeth the total length (tip of nose to end of tail vertebræ) ranges from about 440 to 460 mm. as compared with the average adult length of about 515 mm., and a condyloincisive length[1] of about 50 to 60 mm., as compared with about 63 mm. in middle-aged specimens. During the period of the replacement of the deciduous by the permanent teeth the size increases to about the minimum for adults, the total length averaging about 500 mm. and the condyloincisive length about 60 mm.

The average total length of the animal in 38 specimens (24 males, 14 females) with unworn teeth is 514 mm. (males 509, females 524); average condyloincisive length of skull, 62.3 (males 62.1, females 62.8).

In 8 specimens (6 males, 2 females) slightly more advanced in age (the teeth appreciably worn) the average total length is 516 mm. (males 520, females 501); condyloincisive length of skull, 62.3 (males 62.5, females 61.5). In this case the number of specimens is too small to be satisfactory, especially in relation to sex difference in size.

In 9 specimens (4 males, 5 females) still older (teeth much worn), the average total length is 524.4 mm. (males 523, females 527); condyloincisive length of skull, 63.27 (males 63.25, females 63.5). Again the series is too small for satisfactory results, but is not wholly without interest.

The old-age (senile) series is represented by 11 specimens (7 males, 4 females). The average total length is 512 mm. (males 511, females 514); condyloincisive length, 62.9 (males 62.6, females 63.5).

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[1]The condyloincisive length is a better standard than total length of skull, the ossification of the nasal cartilage being a variable element, sometimes terminating at or a little behind the tip of the premaxillæ but usually extending several millimeters beyond this point. Hence, total length and occipitonasal length are undesirable measurements for skulls of *Rhynchocyon*.

The results of the foregoing analysis of variation in size as affected by age and sex are collated in the following tabular résumé (Table 5).

The results derivable from the above tabulation would possess greater interest if the number of specimens in each of the six categories had comprised a more nearly equal number of specimens—if each had been as large as in Table 3. It seems safe to assume (1) that size is not diagnostic of sex, although the above statistics indicate a slight superiority

TABLE 5.—RELATION OF AGE AND SEX TO SIZE

Condition of Teeth	No. of Specimens	Total Length Animal	Condylo-incisive Length. Skull
1. Entire milk set only	6	451	56.3
2. Entire milk set plus $\frac{m^1}{m_1}$ more or less developed	5	501	60.5
3. Permanent set, unworn	38	514	62.3
	24 ♂	509	62.1
	14 ♀	524	62.8
4. Permanent set, slightly worn	8	516	62.3
	6 ♂	520	62.5
	2 ♀	501	61.5
5. Permanent set, much worn	9	524.4	63.27
	4 ♂	523	63.25
	5 ♀	527	63.5
6. Permanent set, greatly worn	11	512	62.9
	7 ♂	511	62.6
	4 ♀	514	63.5

for the females. The largest specimen of the entire series is a "young adult" male (No. 49445), with a total length of 556 mm., a tail length of 265, length of hind foot 89, and condyloincisive length 63.5, dimensions not reached by any female, except the skull length in a few old females, which again is exceeded by a few old males. (2) There is a slight increase in size, both externally and of the skull, in the old-age period, but insufficient to antagonize the selection of young adult specimens as types of new forms, since individualism in any age class more than bridges the differences that can properly be ascribed to age after approximate maturity is reached.

Individual Variation

SIZE.—As already noted incidentally above, the variation in total length (tip of nose to end of tail) in the series of 25 young males with unworn teeth from Niapu covers the entire range of variation in the whole series of the 68 adults from Niapu, all of which were taken within a period of about six weeks in November and December of the same year, and all within a radius of about six miles in strictly uniform environment. Leaving out of consideration a single specimen (No. 49474, ♂), obviously a dwarf, the average total length is 510 mm., the two extremes being 465 and 556, a difference of 91 mm., 17 per cent of the mean. Even this is exceeded in the old-age series of 7 males, where the range is 19.6 per cent. This illustration applies equally to length of tail, where the range of variation is 18.7 per cent of the mean, but not to hind foot and ear, where the range is respectively 10 and 2 per cent. It is also much less in the skull, in which the mean condyloincisive length in the 25 young adults in question is 62.1 mm., and the extremes 60.7 and 64.1, and the difference 3.4 mm., or only about one-half of 1 per cent. This, however, is nearly equal to the variation due to age, where the average condyloincisive length in the old-age series of 11 specimens is 62.9 mm. (minimum 60, maximum 65 mm.). The variation in zygomatic breadth parallels that of the skull length.

COLORATION.—*Rhynchocyon s. claudi* may be said to have, in a general way, a light phase and a dark phase of coloration, but a large proportion of the specimens in the present large series are in such varying degrees intermediate that no line of demarcation can be even approximately assigned. As the extremes of light and dark specimens belong to the same sex and prove to have been taken on the same day at the same place, it must be assumed that this wide range of color variation is purely individual. Yet, should single specimens of the extremes of the light and dark types of coloration be received by a systematist from even the same locality, he might be pardoned for considering them as nameable forms. Some of the East African forms of *Rhynchocyon* have been found to be notably prone to melanism, but among the hundred examples of the *claudi* type collected by the American Museum Congo Expedition not one shows such tendency, notwithstanding the large amount of color variation they present.

The light or reddish phase (Plate I, upper figure) may be indicated as follows, beginning with the ventral area:

Chin, throat, fore neck and pectoral region entirely and nearly uniform buff, varying from pale buff to ochraceous buff (in different specimens), abruptly con-

stricted at axillæ and pectoral area to about the median third or fourth of thorax, thence expanding to cover the lower abdomen and inside of thighs, usually darkest on middle of breast and lighter on throat, middle of thorax and mid-lower abdomen. In extreme specimens this portion of the ventral surface has a decided rufous tone. Sides of head from base of rostrum, expanding upward to enclose the ears, sides of neck and sides of body to base of tail (encroaching deeply on sides of abdomen and nearly meeting over thorax), brownish rufous or chestnut slightly varied with black-tipped hairs. Top of head and mid-region of back to base of tail more varied with black-tipped hairs, which from the withers posteriorly take the form of four longitudinal blackish bands, which from middle of back to base of tail are broken by four or six transverse rows of whitish spots, which vary in tone (in different specimens) from clear white to pale buffy white. Over this area the general effect is that of alternating transverse rows of rather sharply defined black and white spots, about five of each being rather distinctly defined, with an additional posterior row of two white spots at the base of the tail, and an ill-defined anterior row of small, less distinct, whitish spots. There is also a tendency to an additional lateral row of indistinct or subobsolete whitish or pale buffy spots on each side of the usual four distinct median rows of spots. Counting all the rows of white or whitish spots they form six longitudinal rows, the outer rows separated from the others by dark chestnut instead of blackish intervals.

No. 49463, Niapu, November 24, 1913, adult ♂, and No. 49477, Niapu, December 1, 1913, adult ♂, may be taken as typical of the light or reddish phase. In general tone No. 49477 is lighter, with the dorsal spots clearer white, than No. 49463.

The dark phase (Plate I, lower figure) may be thus indicated:

Light portion of the underparts much paler, or faintly yellowish white; the sides of head, neck, and body dull dark brownish, almost without trace of rufous except around ears and on sides of neck; top of head and mid-region of back grizzled yellowish gray with most of the hairs broadly black-tipped; the back from the posterior part of thoracic region to base of tail with deep black predominating, the whitish spots reduced in size and usually rather clear white, and the longitudinal and transverse bands indistinct or blended into a black or blackish general ground color, the black most concentrated along the median line.

This phase is typically represented by No. 49487, Niapu, December 4, 1913, adult ♀. No. 49490, adult ♀, same locality and date, has more rufous suffusion on sides of neck, nape, and shoulders.

Each phase is typically represented by both males and females taken on consecutive days, or sometimes on the same day, at the same locality. Other specimens collected actually or approximately at the same date and place, equally representative of both sexes and strictly comparable as to age, fill every gradation between the two extremes. Hence the types of coloration above described can scarcely be considered as representing respectively a definable red and dark phase, but merely the extremes of a wide range of purely individual variation, shown in the accompanying colored plate.

CRANIAL VARIATIONS.—Matschie[1] and others apparently believe that the relative length of the frontal and nasal sutures is of specific value in *Rhynchocyon*. Specimens of *Rhynchocyon s. claudi* in our series show that the frontal suture may be as long as, or longer or shorter than, the nasal suture, and in some cases one of the nasals is fully 4 mm. shorter than the other. The following measurements[2] illustrate variations in specimens taken in the same locality at Niapu:

		Frontal Suture	Nasal Suture
No. 49445	♂	24 mm.	24 mm.
49479	♀	27.25 mm.	19 mm.
49443	♂	27 mm.	20 mm.
49459	♂	28 mm.	20.5 mm.
49448	♂	22 mm.	25 mm.

Rhynchocyon claudi Thomas and Wroughton was based originally on a specimen in the light or reddish phase of coloration from Beritio, near Angu, on the Uele River. Later a single specimen from Medje and twelve others from Poko were referred to this species by Thomas. The present collection contains 20 specimens taken at Medje, 5 collected at Akenge, and 79 at Niapu. The two last-named localities are within about thirty miles of Medje and Poko and have the same environment. There can be little doubt therefore of the correct reference of all these specimens to *R. s. claudi*.

DENTITION OF *Rhynchocyon*

Text Figure 1

The present large series of skulls of *Rhynchocyon s. claudi* affords material fully disclosing the character of the dentition of *Rhynchocyon* from its early stages to old age. In the youngest skull (No. 49434—see Table 4, p. 26) of the series the teeth are wholly enclosed in the gum; in a slightly older specimen (No. 49427) the tips of the principal cusps of the deciduous teeth (canines and premolars 2, 3, 4) have broken through. Other specimens, more advanced, show the gradual development of the milk teeth and the order of their displacement by permanent teeth. In a succeeding table (Table 5, p. 28) measurements are given to show the correlation of the size of the individual with tooth development, from the stage just prior to the appearance of any of the teeth

[1] 1893, Sitzber. Gesell. naturf. Freunde Berlin, p. 66.

[2] Other cranial variations are indicated in the tables of measurements and need not be especially emphasized, as they present no unusual features.

above the gum to full maturity of the permanent set. Several stages of development are also shown in the accompanying text figure (Stages 1–8).

Deciduous Dentition

The milk dentition, strictly construed, consists of 24 teeth: $I\frac{1-1}{3-3}$, $C\frac{1-1}{1-1}$, $P\frac{3-3}{3-3}=\frac{10}{14}=24$. The first premolar (p $\frac{1-1}{1-1}$) is not present till later and has no successor.

Upper or Maxillary Series.—The single upper incisor (i^3 by position) is a minute spicule inserted at the extreme posterior border of the premaxilla and has no successor. Although small and frail, it often persists through life, being frequently present in the senile stage. In 46 adult skulls, taken at random for the investigation of this point, 15 (33 per cent) were found to retain one or both upper incisors, both being present in 6 skulls and one in each of 9 skulls, most frequently on the right side. When these teeth are absent their alveoli often remain, indicating the recent presence of the teeth.

The canine is a small bicuspid tooth, with a slender-pointed central cusp, and a small slender-pointed posterior cusp, about one-third as high as the main cusp. The canine is shed at the same time as the premolars, but its successor is long in maturing, and, when fully developed, is long, slender, and saber-like. The second, third, and fourth premolars (dp^2, dp^3, dp^4) arise simultaneously. Dp^2 has a basal length slightly exceeding its height, with two pointed cusps, the anterior one considerably exceeding the other in size and height, and a low anterior and a low posterior cusplet, both arising from the cingulum. Dp^3 is subtriangular in basal outline, the anterior half narrow, the posterior broad, with a main central cusp, a smaller one behind it, and a still smaller one in front, on the cingulum. There is also a low, broad postero-internal cusp, and, behind this, a slight cusplet from the cingulum. Of these five cusps, three are external and two internal. Dp^4 is subquadrate and distinctly molariform, with four prominent cusps, the outer much higher than the inner, the four cusps collectively enclosing two deep basin-shaped cavities. There is also an anterior cusplet from the cingulum.

Lower or Mandibular Series.—The anterior four milk teeth in the lower jaw are all incisiform, similar in size and general form, and have their axes directed forward. The two middle teeth are tricuspid, the first and fourth bicuspid. They are separated from dp_2 by a long convex diastema. The first three incisiform teeth are shed singly at intervals. The three posterior milk premolars (dp_2, dp_3, dp_4) increase successively

in size, dp_2 being less than half the size of dp_3, and dp_3 is less than one-third the bulk of dp_4. Dp_2 has a high-pointed central cusp and a small, low, sharp-pointed one before and behind it, and a cusplet on the posterior cingulum. Dp_3 is similar in structure to dp_2, but is a much larger tooth. Dp_4 consists of two sections, each of which encloses a deep basin from the borders of which arise four cusps, of which two are antero-external, the other two internal, one of which is median and the other posterior. The medio-internal cusp is usually minutely bipointed when unworn.

The above conditions are represented, essentially or exactly, by 7 skulls (Nos. 49523, 49436, 49513, 49514, 49510, 49499, 49493, of Table 4).

Permanent Dentition

The permanent dentition comprises 36 teeth: $I\frac{1-1}{3-3}$, $C\frac{1-1}{1-1}$, $P\frac{4-4}{4-4}$, $M\frac{2-2}{2-2}=\frac{16}{20}=36$. In this enumeration the minute upper incisor is assigned as a permanent tooth, although, as already explained (p. 32), it is often absent in adults, though frequently persisting through life, and has no successor. The first premolar in both jaws has also no successor and is developed later than the other premolars which have successors.

Upper or Maxillary Series.—The canine is a long, slender, laterally compressed, 2-rooted tooth, with a conspicuous longitudinal groove on its antero-internal face. The first premolar (p^1) does not pierce the gum till the milk premolars (dp^2, dp^3, dp^4) are fully developed and functional, and has, as already said, no predecessor. It is a small unicuspid, 2-rooted tooth, about as long antero-posteriorly as high. It is separated from both the permanent canine and the permanent p^2 by diastemata nearly equal in length to the basal length of the tooth. P^2 and p^3 are similar in form to their respective predecessors, from which they differ mainly in larger size. P^4 is more completely molariform than dp^4, and differs from m^1 only in being larger and slightly more quadrate. M^1 is subquadrate, the anterior half of the tooth broader than the posterior half, with higher cusps, which are situated at the four corners of the tooth. M^2 is trigonal, with three cusps, and is about one-third the size of m^2. Thus, in the permanent dentition, the last three maxillary teeth are typically molariform and, on the basis of structure and position, would be classified as molars, but the first one of the three has a milk predecessor.

Lower or Mandibular Series.—The three permanent incisors all have bifid crowns, are close-set, directed obliquely forward, and differ from their predecessors mainly in their larger size. The canine is a small 2-rooted tooth, separated from i_3 and p_1 by slight diastemata. Its axis

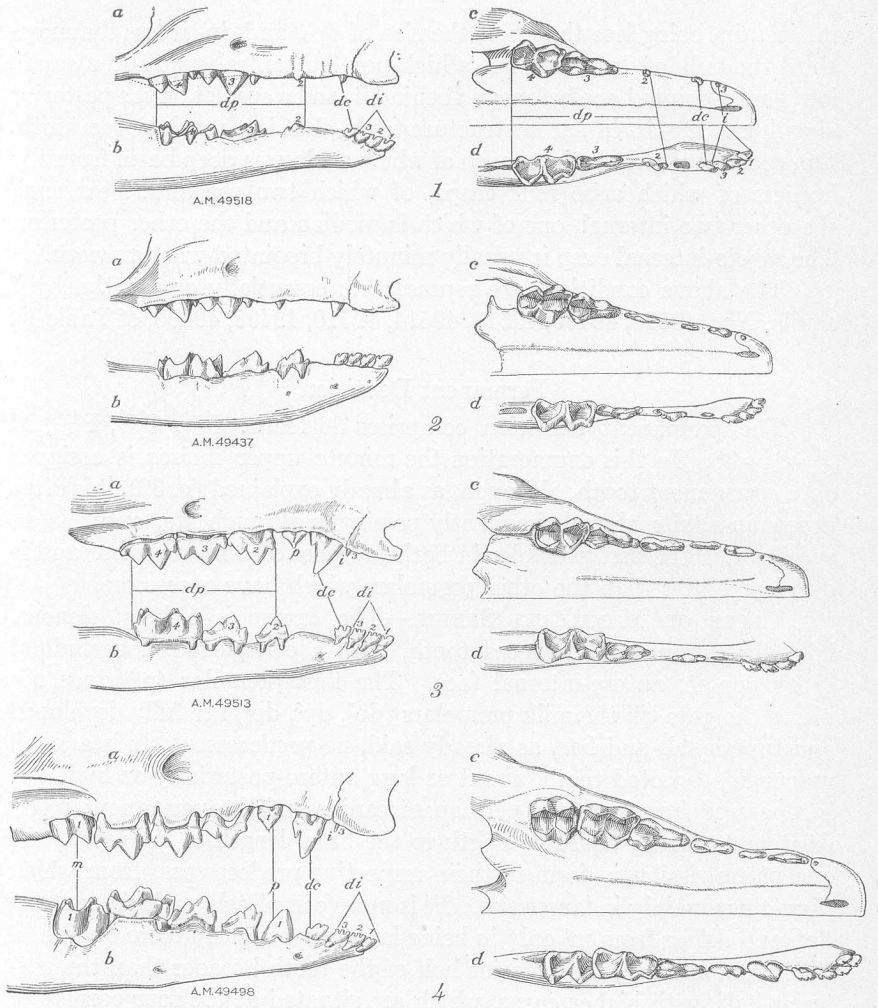
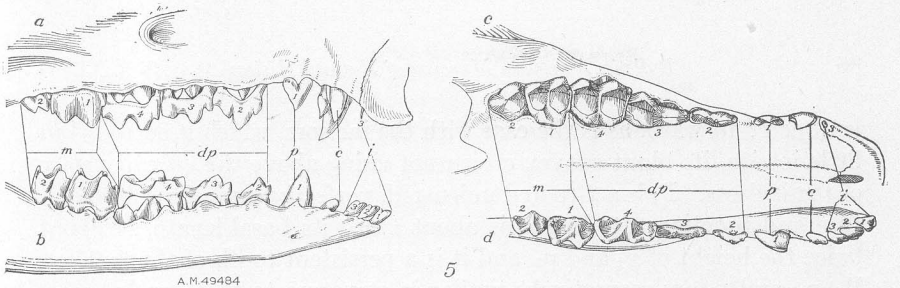


Fig. 1. Development of the dentition in *Rhynchocyon stuhlmanni claudi* Thomas. All ×⅔; *a* and *b*, side views; *c* and *d*, crown views. From specimens taken in the Belgian Congo by The American Museum of Natural History Congo Expedition, 1909–1915.

Stage 1. Milk teeth breaking through gums. No. 49518, ♀ juv., Medje, June 3, 1914.
Stage 2. Milk teeth more advanced; alveolus of p^1 fissured. No. 49437, ♀ juv., Medje, September 8, 1910.
Stage 3. Milk teeth fully developed, and p^1 nearly so; convex diastema where p_1 is forming beneath. No. 49513, ♂ juv., Niapu, December 17, 1913.
Stage 4. Upper milk dentition p^1, and crown of m^1 just through gum; lower jaw: milk teeth, p_1 well advanced, m_1 half up, and tip of permanent i_1 in sight. No. 49498, ♀ juv., Niapu, December 6, 1913.



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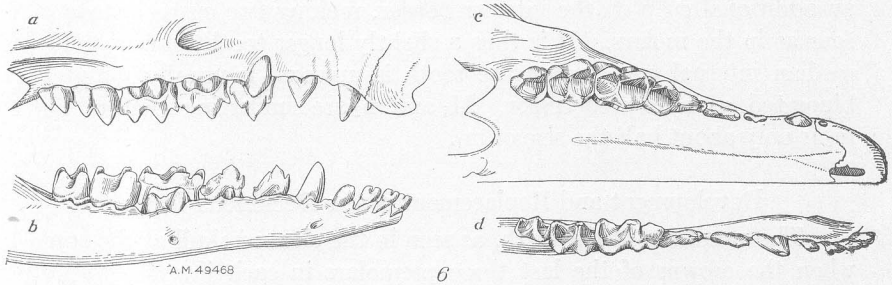

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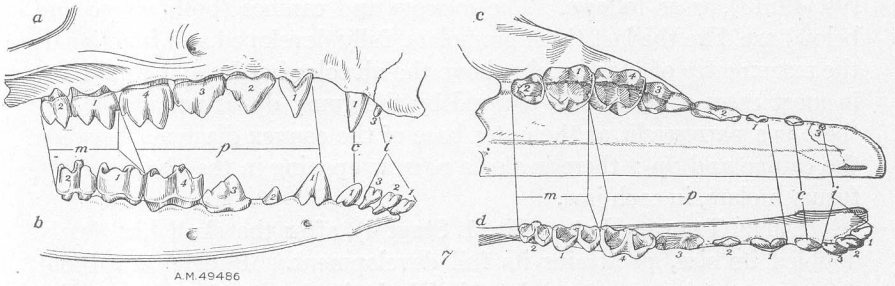

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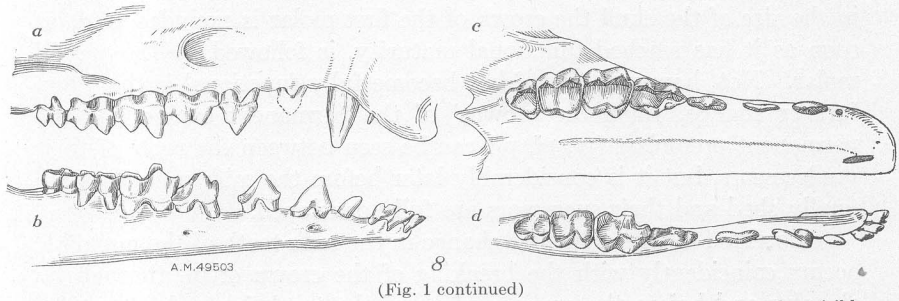

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(Fig. 1 continued)

Stage 5. First molarfully up and second molar half up in both jaws; permanent premolars visible between the roots of their predecessors; permanent lower incisors and lower canine fully developed. No. 49484, ♀ juv., Niapu, December 4, 1913.

Stage 6. Slightly more mature, the molars being full-grown, but premolars of permanent set still covered by the milk teeth in both jaws; caniniform p_1 nearly mature; upper milk canine has been shed. No. 49468, ♂, Niapu, November 25, 1913.

Stage 7. Mature permanent dentition, but upper canine not fully grown. No. 49486, ♀, Niapu, December 6, 1913.

Stage 8. Senile stage to show wear of teeth. In old age the first premolar becomes greatly worn in both jaws, sometimes only the roots of p^1 remaining. No. 49503, old ♀, Niapu, December 8, 1913.

is directed forward, as is the case with the incisors, which it exceeds but little in size, its blunt-convex crown not rising above the crown surface of the incisors. P_1 is a 2-rooted unicuspid, perfectly caniniform in structure and function; its height is about twice its basal length, or about twice the height of p_2 and p_3, and it is a persistent tooth of the first set. P_2, p_3, and p_4 are respectively similar in structure to their predecessors but more massive. P_4 conforms in plan with the molars except in having an additional cusp on the interior border, making five cusps instead of four as in the molars. It is thus a slightly longer tooth than m_1. The median internal cusp, when the tooth is unworn, is usually minutely bipointed, as in its predecessor. M_1 and m_2 are similar in structure, but m_2 is only about half the size of m_1.

Development and Replacement of the Deciduous Teeth

The condition of the teeth, as seen in the cleaned skull at the stage when the crowns of the last three premolars in each jaw ($\frac{dp^2, dp^3, dp^4}{dp_2, dp_3, dp_4}$) are fully excluded and the teeth have become functionally effective (skull No. 49513), is as follows. The incisors and canines (both above and below) are, like the last three premolars, fully developed and functional; the extreme tip of p^1 is barely above the alveolar border and would be, in most cases at least, still covered by the gum; dp_2 is not visible but there is a narrow slit at the outer base of the convex diastema between the canine and dp_2; there is also a narrow opening in the alveoli of the future molars, in each jaw.

Upper Teeth.—Later (Fig. 1, Stage 4), after the skull has nearly doubled its size, p^1 attains its full development. P^1 persists without change except by wear, and, later in life, is the first tooth to become inefficient through excessive attrition. After considerable further increase in the size of the skull the crown of the first molar is excluded and, as soon as it has reached functional maturity, is followed by the second molar. Not, however, till m^2 has become fully functional is there any further change, when the crowns[1] of the permanent canine and the permanent premolars (p^2, p^3, p^4) can be seen between the roots of their predecessors, but it is considerably later before the milk premolars are finally shed and their successors are fully developed.

Lower Teeth.—The first change in the milk teeth of the mandible occurs coincidently with the breaking of the crown of m_1 through its alveolus and before the crown surface of the tooth is much above the

[1]In skull No. 49428 the crown of the right canine is double, consisting of two equal slender stiles in close contact.

alveolar border. At this stage (represented by No. 49499) the four incisiform teeth are still unchanged, but the tip of the caniniform p_1 is just above the alveolar plane, or practically at the same stage as m_1. At the next stage (represented by No. 49498, Fig. 1, Stage 4), m_1 is about two-thirds grown but not as yet at full height, and p_1 is evenly keeping pace with it in development. None of the other milk teeth shows any indication of approaching replacement. In skull No. 49428 this molar is fully developed, as is also p_1, but the milk premolars (p_2, p_3, p_4) are still firmly in place, with no trace of their successors between their roots. The first incisor (i_1), however, has been renewed, and the crowns of the successors of i_2 and i_3 can be seen pushing up at their inner bases, and the same condition is also true of the canine. It would seem, therefore, that the renewal of the milk incisiform series just precedes that of the milk premolars. In No. 49484 a somewhat later stage is shown, in which m_1 is not only fully mature but the crown of m_2 has reached about one-half its full height. In this skull (Fig. 1, Stage 5) the permanent canine has attained to about half the height of its predecessor, coming up at its outside base, and the crowns of the milk premolars can be seen between their roots, these four teeth, like the same teeth in the maxillary series, developing coincidently. The permanent incisors and the permanent canine are also now fully matured.

To complete the series of illustrations a figure of the unworn dentition of a youngish adult (Fig. 1, Stage 7) and of an old-age adult (Fig. 1, Stage 8) are here included.

Nasilio fuscipes (Thomas)

Macroscelides fuscipes Thomas, 1894, Ann. Mag. Nat. Hist., (6) XIII, January, p. 68. "N'doruma [Doruma], Niam-Niam country (about 5° N. and 27° 30′ E.)." Based on a young female "having still its milk-dentition in place."

Represented by 30 specimens (28 skins and skulls, 2 in alcohol), collected as follows:

Niangara, 8: November 18–December 19, 1910.

Faradje, 21: February 8, 1910; February 20–May 6 (mostly February 2–March 1), 1911; December 25, 1912; January 3–8, 1913.

Garamba, 1 (in alcohol): March 1912.

Males and females are equally represented. All are adult except 9, which are one-half to two-thirds grown, with the permanent dentition incomplete. These form a series showing all the stages of change from the deciduous to the permanent dentition, confirming Thomas's determination of the dental formula in *Macroscelides*.[1]

[1] 1890, Proc. Zoöl. Soc. London, pp. 445, 446. Milk dentition of *Petrodromus* figured, p. 445.

The adult males have a short-haired, glandular pectoral area, the short hairs of which, and the longer enclosing pelage, are cream-color, due possibly to staining. In some males this area has an axial extent of 20 mm. or more and a breadth of 10 mm., thus forming a conspicuous feature of the ventral surface, but it is less developed in females.

The Niangara series, taken at the close of the rainy season, are rather brighter colored—more rufescent and less gray above—than those from Faradje collected some two or three months later. The difference is not wholly constant and may be seasonal, as some specimens of the Niangara series are indistinguishable in coloration from some of the Faradje specimens.

Collectors' measurements of 7 adult males and 10 adult females from Faradje:

	Total Length	Head and Body	Tail Vertebræ	Hind Foot	Ear
♂	204 (200–207)	115 (109–128)	91.3 (84–96)	29.3 (28–31)	21.0 (20–22)
♀	210 (201–224)	120 (114–129)	91.0 (85–99)	29.2 (28–30)	22.2 (20–23)

Skulls, 5 males, 9 females, Faradje series:

	Total Length	Zygomatic Breadth
♂	34.4 (34 –34.7)	17.1 (16.4–18.1)
♀	34.9 (36.6–36.4)	17.4 (16.6–18.1)

The minima are all from rather young adults, the maxima from obviously very old skulls. The females show a slightly larger average size than the males, both in external and cranial dimension.

These specimens agree satisfactorily with the description of the type of *fuscipes* when those corresponding with it in age ("a somewhat immature female. . . having still its milk dentition in place") are considered. Geographical conditions may be taken as confirmatory of this identification, the type locality (Doruma) of *fuscipes* being about 100 miles north of Niangara and some 160 miles west of Faradje and Garamba. These four localities, Mr. Lang assures me, are in regions of similar environment. The present series, if here correctly referred, shows that *Macroscelides fuscipes* Thomas belongs to the genus *Nasilio* Thomas and Schwann[1] (type *Macroscelides brachyrhynchus* A. Smith), the molars being $\frac{2}{3}$. The type of *fuscipes* was so young that it could give no hint of the number of the molars, but it is described as "most nearly allied to *M. brachyurus* Boc.," of which the author says: "Sa mâchoire inférieure porte chaque côté une molaire de plus, onze dents au lieu de dix."[2]

[1] 1906, Proc. Zoöl. Soc. London, II, p. 578.
[2] Bocage, 1889, Journ. Sci. math. phys. nat. Acad. Madrid, (2) I, No. 1, p. 24, Marco.

PLATE I

Rhynchocyon stuhlmanni claudi Thomas and Wroughton. Two males, taken in the same locality within a week, showing an extreme light rufous and an extreme dark phase. Drawn by Charles R. Knight from skins, Amer. Mus. Nos. 49495 and 49477, Niapu, December 1 and 6, 1913.

PLATE II

Fig. 1. *Crocidura jacksoni denti* Dollman. Female adult, Amer. Mus. No. 48520, Medje, May 28, 1914.

Fig. 2. *Sylvisorex oriundus* Hollister. Type. Female adult, Amer. Mus. No. 48554, Medje, May 20, 1914. Photographs from specimens in the flesh. Both natural size.

PLATE III

Scutisorex congicus Thomas. Male adult, Amer. Mus. No. 48475, Medje, May 30, 1914. Photograph from specimen in the flesh. Natural size.

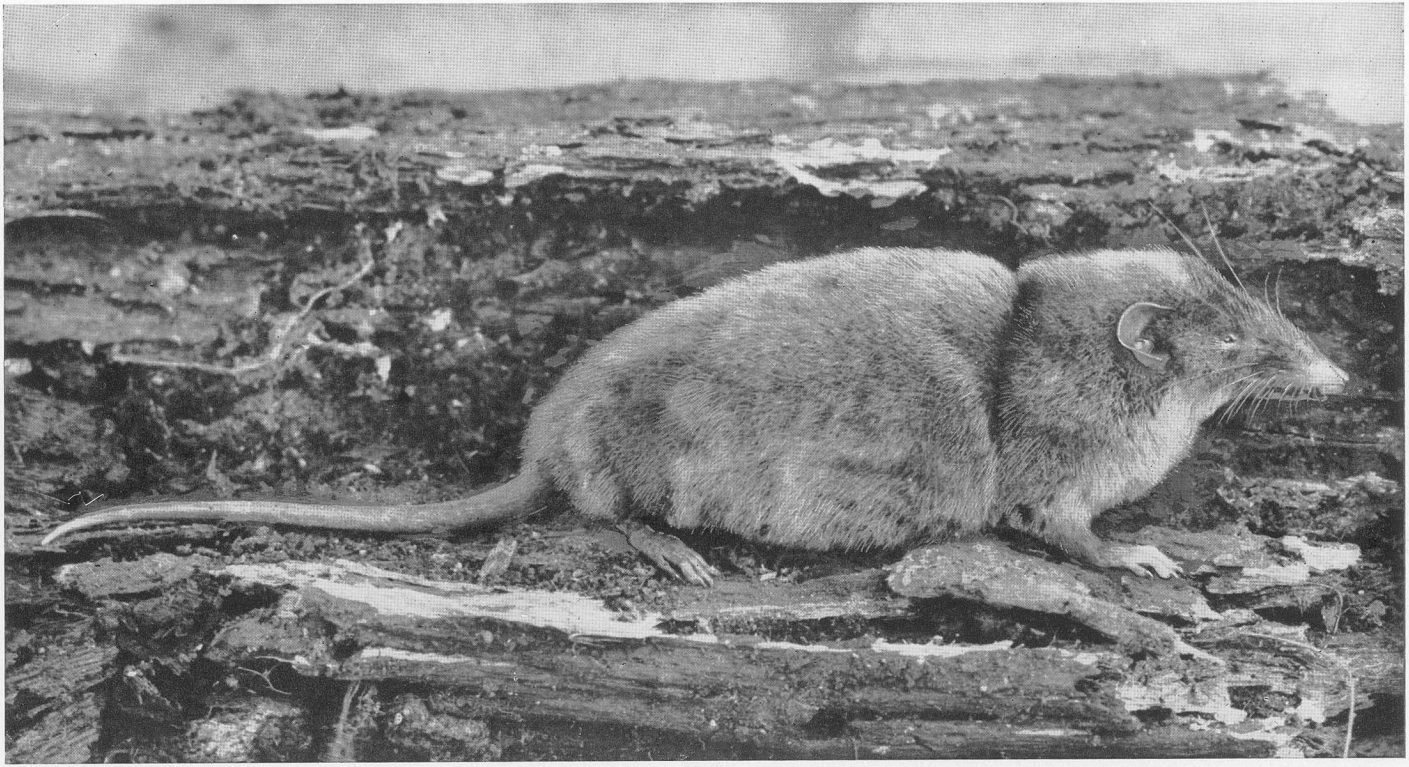

PLATE IV

Crocidura nyansæ kivu Osgood. Male adult, Amer. Mus. No. 48501, Medje, June 13, 1914. Photograph from specimen in the flesh. Natural size.