

**Article II.—SCIURIDÆ, ANOMALURIDÆ, AND IDIURIDÆ  
COLLECTED BY THE AMERICAN MUSEUM CONGO  
EXPEDITION<sup>1</sup>**

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INTRODUCTION

The Sciuridæ, Anomaluridæ and Idiuridæ of The American Museum of Natural History Congo Expedition, collected by Messrs. Herbert Lang and James P. Chapin during six years (1909–1915) of field work,

<sup>1</sup>Scientific Results of the Congo Expedition, Mammalogy, No. 6.

<sup>2</sup>After the author's demise the manuscript was arranged for publication by Herbert Lang.

number 480 specimens, representing 20 forms (16 species and 4 additional subspecies). The collection consists of many well-prepared skins with skulls, a number of skeletons, and a few specimens preserved in alcohol. The 315 specimens of Sciuridæ are referred to 14 forms (10 species and four additional subspecies), of which three subspecies are described as new. The 125 specimens of Anomaluridæ represent three genera and are referable to 3 forms, one of them new to science. The Idiuridæ are represented by 40 specimens of three quite different forms, two of which are here for the first time described. These far exceed the total number previously extant in all of the museums of the world, their nocturnal habits and secretive mode of life rendering their capture difficult.

This is a very valuable accession as The American Museum of Natural History had but little African material of this order previous to the reception of the Lang-Chapin Collection. Other museums of this country have generously placed at my disposal material for purposes of comparison. To Mr. Gerrit S. Miller, Jr., Curator of mammals in the United States National Museum, to Mr. Samuel Henshaw, Director, and to Dr. G. M. Allen, Curator of mammals, of the Museum of Comparative Zoölogy at Harvard University, I am indebted for the loan of many of their specimens.

The forms, and the number of specimens of each and their localities, are given in the subjoined lists.

SPECIES AND SUBSPECIES, WITH THEIR LOCALITIES AND NUMBER OF  
SPECIMENS FROM EACH LOCALITY

Species and Subspecies	Localities	Specimens
Sciuridæ		
1. <i>Æthosciurus poensis</i> (A. Smith)	Medje 2, Niapu 1	3
2. <i>Heliosciurus rufobrachium pasha</i> (Schwann)	Faradje 2, Niangara 10	12
3. <i>Heliosciurus rufobrachium medj- anus</i> , new subspecies	Akenge 1, Avakubi 1, Bosobangi 1, Gamangui 1, Medje 23, Niapu 9	36
4. <i>Heliosciurus rufobrachium rubri- catus</i> , new subspecies	Avakubi 7, Bafwasende 1, Lubila 1	9
5. <i>Heliosciurus multicolor lateris</i> Thomas	Aba 1	1
6. <i>Funisciurus anerythrur anery- thrur</i> (Thomas)	Avakubi 7, Gamangui 6, Medje 8, Ngayu 2, Niangara 5	28
7. <i>Funisciurus anerythrur niapu</i> , new subspecies	Niapu 22, Stanleyville 2	24

Species and Subspecies	Localities	Specimens
8. <i>Funisciurus pyrrhopus akka</i> de Winton	Akenge 3, Avakubi 1, Boyulu 1, Gamangui 4, Medje 7, Niangara 3, Niapu 13	32
9. <i>Funisciurus congicus congicus</i> (Kuhl)	Leopoldville 1	1
10. <i>Tamiscus emini emini</i> (Stuhlmann)	Avakubi 6, Bafwabaka 7, Batama 1, Faradje 2, Gamangui 1, Medje 10, Ngayu 4, Niangara 5, Niapu 12, Pawa 1, Poko 1, Stanleyville 13	63
11. <i>Tamiscus alexandri</i> (Thomas and Wroughton)	Avakubi 4, Faradje 3, Gamangui 5, Medje 2, Nala 1, Ngayu 2, Pawa 1, Rungu 1	19
12. <i>Protoxerus stangeri centricola</i> (Thomas)	Akenge 5, Avakubi 5, Bafwabaka 2, Faradje 1, Gamangui 4, Kamunionge 1, Medje 6, Ngayu 7, Niangara 2, Niapu 20, Stanleyville 1	54
13. <i>Protoxerus stangeri signatus</i> Thomas	Bolobo 1	1
14. <i>Euxerus erythropus lacustris</i> (Thomas)	Faradje 21, Niangara 10, Rungu 1	32
Anomaluridæ		
15. <i>Anomalurus jacksoni jacksoni</i> de Winton	Akenge 7, Avakubi 2, Gamangui 1, Medje 28, Niapu 16, Panga 4	58
16. <i>Anomalurella pusilla</i> (Thomas)	Akenge 4, Avakubi 1, Medje 36, Ngayu 2, Niapu 10	53
17. <i>Anomalurops beecrofti chapini</i> , new subspecies	Akenge 1, Medje 12, Poko 1	14
Idiuridæ		
18. <i>Idiurus zenkeri zenkeri</i> Matschie	Avakubi 1, Medje 27, Niapu 2	30
19. <i>Idiurus langi</i> , new species	Medje 6	6
20. <i>Idiurus panga</i> , new species	Panga 4	4

LOCALITIES, SPECIES AND SUBSPECIES, AND NUMBER OF SPECIMENS  
TAKEN AT EACH LOCALITY

Localities	Species and Subspecies	Specimens	Totals
Aba	<i>Heliosciurus multicolor lateris</i> Thomas	1	1
Akenge	<i>Heliosciurus rufobrachium medjanus</i> , new subsp.	1	
"	<i>Funisciurus pyrropus akka</i> de Winton	3	
"	<i>Protoxerus stangeri centricola</i> (Thomas)	5	
"	<i>Anomalurus jacksoni jacksoni</i> de Winton	7	
"	<i>Anomalurella pusilla</i> (Thomas)	4	
"	<i>Anomaluroops beecrofti chapini</i> , new subsp.	1	21
Avakubi	<i>Heliosciurus rufobrachium medjanus</i> , new subsp.	1	
"	<i>Heliosciurus rufobrachium rubricatus</i> , new subsp.	7	
"	<i>Funisciurus anerythrus anerythrus</i> (Thomas)	7	
"	<i>Funisciurus pyrropus akka</i> de Winton	1	
"	<i>Tamiscus emini emini</i> (Stuhlmann)	6	
"	<i>Tamiscus alexandri</i> (Thomas and Wroughton)	4	
"	<i>Protoxerus stangeri centricola</i> (Thomas)	5	
"	<i>Anomalurus jacksoni jacksoni</i> de Winton	2	
"	<i>Anomalurella pusilla</i> (Thomas)	1	
"	<i>Idiurus zenkeri zenkeri</i> Matschie	1	35
Bafwabaka	<i>Tamiscus emini emini</i> (Stuhlmann)	7	
"	<i>Protoxerus stangeri centricola</i> (Thomas)	2	9
Bafwasende	<i>Heliosciurus rufobrachium rubricatus</i> , new subsp.	1	1
Batama	<i>Tamiscus emini emini</i> (Stuhlmann)	1	1
Bolobo	<i>Protoxerus stangeri signatus</i> Thomas	1	1
Bosobangi	<i>Heliosciurus rufobrachium medjanus</i> , new subsp.	1	1
Boyulu	<i>Funisciurus pyrropus akka</i> de Winton	1	1
Faradje	<i>Heliosciurus rufobrachium pasha</i> (Schwann)	2	
"	<i>Tamiscus emini emini</i> (Stuhlmann)	2	
"	<i>Tamiscus alexandri</i> (Thomas and Wroughton)	3	
"	<i>Protoxerus stangeri centricola</i> (Thomas)	1	
"	<i>Euzerus erythropus lacustris</i> (Thomas)	21	29
Gamangui	<i>Heliosciurus rufobrachium medjanus</i> , new subsp.	1	
"	<i>Funisciurus anerythrus anerythrus</i> (Thomas)	6	
"	<i>Funisciurus pyrropus akka</i> de Winton	4	
"	<i>Tamiscus emini emini</i> (Stuhlmann)	1	
"	<i>Tamiscus alexandri</i> (Thomas and Wroughton)	5	
"	<i>Protoxerus stangeri centricola</i> (Thomas)	4	
"	<i>Anomalurus jacksoni jacksoni</i> de Winton	1	22
Kamunionge	<i>Protoxerus stangeri centricola</i> (Thomas)	1	1
Leopoldville	<i>Funisciurus congicus congicus</i> (Kuhl)	1	1
Lubila	<i>Heliosciurus rufobrachium rubricatus</i> , new subsp.	1	1
Medje	<i>Æthosciurus poensis</i> (A. Smith)	2	
"	<i>Heliosciurus rufobrachium medjanus</i> , new subsp.	23	
"	<i>Funisciurus anerythrus anerythrus</i> (Thomas)	8	
"	<i>Funisciurus pyrropus akka</i> de Winton	7	

Localities	Species and Subspecies	Specimens	Totals
Medje	<i>Tamiscus emini emini</i> (Stuhlmann)	10	
"	<i>Tamiscus alexandri</i> (Thomas and Wroughton)	2	
"	<i>Protoxerus stangeri centricola</i> (Thomas)	6	
"	<i>Anomalurus jacksoni jacksoni</i> de Winton	28	
"	<i>Anomalurella pusilla</i> (Thomas)	36	
"	<i>Anomaluroops beecrofti chapini</i> , new subsp.	12	
"	<i>Idiurus zenkeri zenkeri</i> Matschie	27	
"	<i>Idiurus langi</i> , new sp.	6	167
Nala	<i>Tamiscus alexandri</i> (Thomas and Wroughton)	1	1
Ngayu	<i>Funisciurus anerythrus anerythrus</i> (Thomas)	2	
"	<i>Tamiscus emini emini</i> (Stuhlmann)	4	
"	<i>Tamiscus alexandri</i> (Thomas and Wroughton)	2	
"	<i>Protoxerus stangeri centricola</i> (Thomas)	7	
"	<i>Anomalurella pusilla</i> (Thomas)	2	17
Niangara	<i>Heliosciurus rufobrachium pasha</i> (Schwann)	10	
"	<i>Funisciurus anerythrus anerythrus</i> (Thomas)	5	
"	<i>Funisciurus pyrropus akka</i> de Winton	3	
"	<i>Tamiscus emini emini</i> (Stuhlmann)	5	
"	<i>Protoxerus stangeri centricola</i> (Thomas)	2	
"	<i>Euzerus erythropus lacustris</i> (Thomas)	10	35
Niapu	<i>Æthosciurus poensis</i> (A. Smith)	1	
"	<i>Heliosciurus rufobrachium medjanius</i> , new subsp.	9	
"	<i>Funisciurus anerythrus niapu</i> , new subsp.	22	
"	<i>Funisciurus pyrropus akka</i> de Winton	13	
"	<i>Tamiscus emini emini</i> (Stuhlmann)	12	
"	<i>Protoxerus stangeri centricola</i> (Thomas)	20	
"	<i>Anomalurus jacksoni jacksoni</i> de Winton	16	
"	<i>Anomalurella pusilla</i> (Thomas)	10	
"	<i>Idiurus zenkeri zenkeri</i> Matschie	2	105
Panga	<i>Anomalurus jacksoni jacksoni</i> de Winton	4	
"	<i>Idiurus panga</i> , new sp.	4	8
Pawa	<i>Tamiscus emini emini</i> (Stuhlmann)	1	
"	<i>Tamiscus alexandri</i> (Thomas and Wroughton)	1	2
Poko	<i>Tamiscus emini emini</i> (Stuhlmann)	1	
"	<i>Anomaluroops beecrofti chapini</i> , new subsp.	1	2
Rungu	<i>Tamiscus alexandri</i> (Thomas and Wroughton)	1	
"	<i>Euzerus erythropus lacustris</i> (Thomas)	1	2
Stanleyville	<i>Funisciurus anerythrus niapu</i> , new subsp.	2	
"	<i>Tamiscus emini emini</i> (Stuhlmann)	13	
"	<i>Protoxerus stangeri centricola</i> (Thomas)	1	16

## NEW SPECIES AND SUBSPECIES, WITH THEIR TYPE LOCALITIES

1. *Heliosciurus rufobrachium medjanus*. Medje
2. *Heliosciurus rufobrachium rubricatus*. Lubila
3. *Funisciurus anerythrus niapu*. Niapu
4. *Anomaluroops beecrofti chapini*. Medje
5. *Idiurus langi*. Medje
6. *Idiurus panga*. Panga

## GENERAL SUMMARY

Families	Genera	Species and Subspecies	Specimens	Localities <sup>1</sup>
Sciuridæ	6	14	315	23
Anomaluridæ	3	3	125	8
Idiuridæ	1	3	40	4
	10	20	480	

## SCIURIDÆ

**ÆTHOSCIURUS** Thomas

*Æthosciurus* THOMAS, 1916, Ann. Mag. Nat. Hist., (8) XVII, March, p. 271.  
Genotype, by original designation, *Sciurus poensis* A. Smith.

*Æthosciurus* (subgenus of *Heliosciurus*) HOLLISTER, 1919, U. S. Nat. Mus. Bull. 99, part 2, May 16, p. 9.

**Æthosciurus poensis** (A. Smith)

*Sciurus poensis* A. SMITH, 1835, South African Quart. Journ., II, p. 64. Fernando Po (Gray).

*Æthosciurus poensis* THOMAS, 1916, Ann. Mag. Nat. Hist., (8) XVII, p. 271.

Three specimens: Medje, 2 (♂ and ♀ adult), January 24, 1909; Niapu, 1 (♂ adult), November 28, 1913.

Collectors' measurements of the Medje specimens: Total length, ♂ 322 mm., ♀ 337; head and body, ♂ 144, ♀ 152; tail vertebræ, ♂ 178, ♀ 185; hind foot, ♂ 35, ♀ 35; ear, ♂ 14, ♀ 14.

Skull, same specimens: Greatest length, ♂ 37.3, ♀ 38.2; zygomatic breadth, not measurable.

The Niapu specimen is a little smaller and less mature.

Entire pelage, including feet and tail, olivaceous gray, except ventral surface, which is washed with ochraceous medially, the color of the sides extending over the lateral third of the ventral area from axillæ to loins.

Compared with two specimens of *Æthosciurus poensis* (No. 8639, Kribi, Cameroon, and No. 15667, Mus. Comp. Zoöl., Lolodorf, Cameroon), with which they closely agree. Larger series from the two regions (Cameroon coast and Upper Congo) might indicate an appreciable average difference not indicated by the material now available.

<sup>1</sup>The total number of localities at which these forms were collected is 24.

**HELIOSCIURUS** Trouessart

*Heliosciurus* (subgenus of *Sciurus*) Trouessart, 1880, Le Naturaliste, II, October, p. 292. Genotype, by subsequent designation (Thomas, 1909), *Sciurus gambianus* Ogilby. Trouessart originally designated *Sciurus annulatus* Desmarest as the type, but as this species is not positively identifiable Thomas has, with good reason, replaced it by *Sciurus gambianus* Ogilby.

The *Heliosciurus rufobrachium*<sup>1</sup> group is represented in the Lang-Chapin Collection by 57 specimens, collected in the region comprised between Avakubi and Bafwasende, south of the Ituri-Aruwimi River, northward to Niangara, on the Uele River, and eastward to Faradje. Three geographical areas are thus included—(1) the region south of the Ituri-Aruwimi covered with Rain Forest, (2) the forested area between the Ituri-Aruwimi and Bomokandi-Uele rivers, and (3) the Uele bushveldt district to the north. The specimens from these districts, when arranged serially, show well-marked differences in coloration in correlation with the varying conditions of the districts, the extremes represented—the Avakubi specimens on the one hand and the Niangara-Faradje specimens on the other—being so widely different that, without the connecting series from intermediate points, they might readily be considered as possibly specifically separable, especially if represented by a single specimen or even by a small series of specimens. The specimens from the intermediate localities show, however, unmistakable intergradation between the two extreme geographic phases. The differences are primarily the amount and intensity of rufous on both fore and hind limbs and the color of the whole ventral area, particularly of the throat and inside of the limbs. Also the northern pale veldt form is distinctly smaller than either of the two forest forms. The main feature of differentiation is the steadily increasing erythrism of the ventral surface and limbs from the northern veldt country to the heavy Rain Forest south of the Ituri.

In the coloration of the upper surface there is little to distinguish the specimens from the three areas, although the Niangara and Faradje specimens average somewhat paler than those from farther south.

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<sup>1</sup>Mr. Lang has called my attention to the fact that *Sciurus rufobrachium* Waterhouse has nearly three months priority over *S. rufobrachiatulus* of the same author and it should therefore be accepted in place of the latter. The species so long universally known as *Sciurus rufobrachiatulus* was named *Sciurus rufobrachium* by Waterhouse in an incidental reference to it in a footnote to a paper in the 'Annals and Magazine of Natural History' (X, p. 202) published in November 1842, but in his formal description of the species (Proc. Zool. Soc. London for 1842, p. 128, published January 1843) he changed the name to *Sciurus rufobrachiatulus*, without explanation or reference to the earlier name for the same species. Consequently the name *Sciurus rufobrachium* was used by just a few, Fitzinger (1867) being the last. All succeeding authors have either overlooked or ignored the earlier name till it was brought to light by Mr. Lang in the preparation of his paper on the bibliography and distribution of African members of this group.

It may be noted also that Waterhouse's *Sciurus leucogenys* has priority over his *Sciurus erythrogenys*, the two cases being parallel and dating from the same footnote.

Through individual variation in the general tone, specimens from either of the series can be selected which are mutually indistinguishable in the color of the upperparts. It is quite different, however, with the ventral surface. In the northern form (*H. r. pasha*) it is pale yellowish white, varying in different specimens from dull whitish to faintly yellowish on the median area from the throat to the anal region, with usually a large whiter pectoral area, the sides being darkened by the dark basal portion of the hairs showing through the superficial light tipping. The chin and throat are a little browner than the foreneck and breast, being sometimes dull yellowish brown, but rarely approaching rufous. The median portion of the extreme base of the under side of the tail has sometimes a slight rufous tone. The outer edge of the forearm and the upper surface of the manus vary from dark rufous to brownish rufous, but the inside of the forearm is pale like the ventral surface, usually without trace of rufous.

In specimens of the other extreme, taken south of the Ituri near Avakubi, the whole lower surface of the body has a strong rufous tone, the throat, foreneck, sides of breast, inguinal region, and entire inner surface of both fore and hind limbs are intense vivid rufous, as is also a conspicuous median patch at the base of the under side of the tail, and the upper surface of the fore and hind feet are also red. The median ventral area, from the chest to the lower abdomen, is pale rufous grizzled slightly with black.

The three forms may be characterized as follows.

1. Light northern form: Underparts superficially pale, the hair-tips whitish or pale yellowish, usually a rather distinct narrow median light band (often broadening at pectoral region) contrasting with a much darker and broader area on either side from axillæ to loins; throat and inside of limbs light, uniform in color with the central light portion of ventral surface, except wrists; outside of hind limbs like back; outer edge of forearm and upper surface of feet pale rufous. On hind limbs the brownish-rufous tone is usually restricted to upper surface of feet; in exceptionally erythric specimens it may extend to the lower leg and include the inner surface as well as the outer, thus forming a dull rufous band just above the ankle, and even extend up the inner side of the leg, with a similar extension of rufous on the inner surface of the lower forearm. . . . . *H. r. pasha* (Schwann).
2. Darker middle form: Underparts darker, nearly uniform except for a small sharply defined white pectoral area, the hairs ringed basally with black and buff-tipped; throat and inside of limbs pale or dull rufous, in contrast with abdominal region; outer surface of hind limbs like back; outer edge of fore limbs intense rufous, which encircles the lower forearms and lower legs and includes the upper surface of fore and hind feet.

*H. r. medjanius*, new subspecies.



3. Darker southern form: Underparts medially strongly suffused with pale rufous, usually without trace of a whitish pectoral area; throat, sides of head below eyes, entire inner side of fore and hind limbs, and extreme posterior part of abdomen intense dark rufous; outer edge of fore limb, lower forearm in front and upper surface of fore and hind feet, wrists and ankles chestnut-rufous, which also extends to the median basal underside of tail.

*H. r. rubricatus*, new subspecies.

Average External and Cranial Measurements of *Heliosciurus rufobrachium pasha*, *medjanius*, and *rubricatus*

	Number of Specimens	External					Cranial	
		Total Length	Head and Body	Tail Vertebra	Hind Foot	Ear	Greatest Length	Zygomatic Breadth
<i>H. r. pasha</i> , Niangara	10	473	223	251	56.2	18.3	52.2	30.6
<i>H. r. medji-</i> Medje and	12	497	239	258	58.2	18.0	52.9	30.5
<i>anus</i> , Niapu	6	507	239	268	58.3	17.5	53.4	30.8
<i>H. r. rubricatus</i> , Avakubi	6	501	234	262	59.3	18.3	53.4	31.9

The relation of these three forms is so obviously geographic, and reflects so strikingly the effect of environment, it seems desirable to recognize these facts nomenclaturally, as follows.

***Heliosciurus rufobrachium pasha* (Schwann)**

*Sciurus rufobrachiatius pasha* SCHWANN, 1904, Ann. Mag. Nat. Hist., (7) XIII, January, p. 72. Type locality, Bellima, Mombuttu, Belgian Congo.

*Heliosciurus rufobrachiatius pasha* THOMAS, 1915, Ann. Mag. Nat. Hist., (8) XVI, December, p. 473, (part). The Irumu specimen.

Represented by 12 specimens (7 males, 5 females), all adult, collected as follows:

Niangara, 10 (6 ♂, 4 ♀), November 9–20, 1910.

Faradje, 2 (♂, ♀), December 2, 1911.

The type locality of *Sciurus rufobrachium pasha* Schwann is given as "Bellima, Mombuttu," the type being an adult male collected by Emin Pasha, July 13, 1883. Bellima does not now exist, Mr. Lang informs me. It was long since abandoned by the natives. But its former site was about 25 miles southeast of the present Niangara. Hence the ten specimens in the Lang-Chapin Collection are practically topotypes, from which the two from Faradje are indistinguishable.

Collectors' measurements of the Niangara series (6 males, 4 females):

	Total Length	Head and Body	Tail Vertebrae	Hind Foot	Ear
♂	478 (470-488)	223 (216-235)	250 (245-260)	57.3 (54-59)	18.7 (17-19)
♀	467 (455-479)	217 (215-227)	250 (242-257)	55.0 (53-56)	18.5 (17-20)

Skulls, same specimens:

	Greatest Length (=occipito-nasal length)	Zygomatic Breadth (=greatest breadth)
♂	52.4 (51.0-54.0)	30.3 (29.1-31.3)
♀	51.7 (49.2-55.7)	30.8 (28.8-32.0)

This form is readily distinguishable from those recorded below from localities more to the southward, including Medje, Niapu, and Avakubi, by its much paler general coloration and very much lighter underparts.

### ***Heliosciurus rufobrachium medianus*, new subspecies**

*Heliosciurus rufobrachius pasha* THOMAS, 1915, Ann. Mag. Nat. Hist., (8) XVI, December, p. 473, (part). The Medje and "Poko" specimens. "Poko" = south of Poko, in forest probably nearer Niapu than Poko.

Type, No. 50761, ♀ adult, Medje, Belgian Congo, January 17, 1910; Herbert Lang and James P. Chapin. Orig. No. 487.

Larger and darker than *H. r. pasha*, the underparts very much darker, the white tips of tail hairs much shorter, inside of limbs with much more rufous. Differs from *H. r. rubricatus* in lacking the strong rufous suffusion of the underparts and the intense rufous of inside of limbs, throat and anal region.

Collectors' measurements of type: Total length, 502 mm.; head and body, 224; tail vertebrae, 278; hind foot, 59; ear, 20.

Skull (type): Greatest length (=occipito-nasal length), 53.6; condyloincisive length, 49.3; least interorbital breadth, 15.8; tip to tip of postorbital processes, 23.7; postorbital breadth, 16.1; breadth of braincase, 22.2; zygomatic breadth, 30.7; length of nasals, 16.1; breadth of nasals anteriorly, 8.4, do. at posterior border, 5; length of maxillary toothrow, 10.

Represented by 36 specimens (of which 23 are topotypes), taken as follows:

Avakubi, north side of Ituri River toward Bosobangi, 1 (♂ adult), April 11, 1914.

Bosobangi, 1 (♀ adult), December 24, 1909.

Gamangui, 1 (♂ adult), February 7, 1910.

Medje, 23 (13 adult, 10 immature): 9 (6♂, 3♀, all adult), January 15-20, 1910; 10 (5♂, 5♀, all immature, ranging in age from nurslings to half-grown), April 10, August 3-September 14, 1910; 4 (2♂, 2♀; adults—1 ♂ complete skeleton), March 22, 1910; February 28, April 2, 6, 1914.

Niapu, 9 (7♂, 2♀, of which 6 are adult and 3 immature), November 14-December 8, 1913.

Akenge, 1 (♀ adult), October 16, 1913.

Collectors' measurements of 13 adults (8♂, 5♀) from Medje:

	Total Length	Head and Body	Tail Vertebrae	Hind Foot	Ear
♂	497 (441-534)	241 (225-254)	256 (211-292)	58.4 (55-62)	18.5 (17-20)
♀	495 (475-502)	231 (224-238)	264 (246-278)	57.5 (56-59)	18.2 (17-20)

Skulls, same specimens:

	Greatest Length	Zygomatic Breadth
♂	53.0 (50.7-54.9)	30.7 (28.9-31.9)
♀	52.5 (51.4-53.6)	30.5 (29.4-31.6)

Collectors' measurements of 6 adult specimens (4 ♂, 2 ♀) from Niapu:

Total length, 507 (487-524); head and body, 239 (229-247); tail vertebrae 268 (255-280); hind foot, 58.3 (53-61); ear, 17.5 (17-18).

Skull (5 of the same specimens, 4 ♂, 1 ♀): Greatest length, 53.4 (52.4-54.2); zygomatic breadth, 31.0 (29.8-31.6).

Collectors' measurements of 4 specimens (2 ♂, 2 ♀) from other localities near Niapu (Bosobangi 2, Gamangui 1, Akenge 1):

Total length, 493 (452-542); head and body, 237 (225-251); tail vertebrae, 265 (248-291); hind foot, 54.5 (53-56); ear, 18 (16-19).

Skull (same specimens): Greatest length, 52.8 (51.9-53.9); zygomatic breadth, 30.3 (29.7-31.8).

The specimens from Niapu and other localities near Niapu agree closely in coloration and other features with the type series from Medje. The large series from Medje is especially interesting from the fact that it contains a large number of young specimens, ranging in age from nurslings to nearly half grown. Of six nurslings (the only teeth present are the incisors) one was taken April 10, and five August 3, 5, and 24, three of them being from the same litter. Four others are a week or two older (taken September 2, 9, 13, 14) with the first cheek-teeth just breaking through the gums. The coloration of these young specimens differs from that of adults of the same series in no material respect in either pattern or color. The pelage is, of course, much softer with more underfur, and the ventral surface is more heavily clothed, and hence the color areas are more sharply outlined. The hair of the dorsal surface differs from that of adults in the annulations being apparently narrower, an effect due probably to the shorter pelage. The hairs on the sides of the body are minutely tipped with whitish passing gradually into buffy or pale fulvous toward the midline of the back, as is the case with adults, so that the surface effect is exactly as in the latter. On the ventral surface the color areas are more sharply defined than in adults, owing to the thinner and less complete condition of the coat in the latter. All have the pectoral white patch indicated, and in nearly all it is pure white and forms a conspicuous mark, although varying greatly in size in different individuals. Those in which it is largest have also a small tuft of pure white soft hairs at the axillæ, which is obsolete in those that have the pectoral mark only slightly developed. The sides of the nose, chin, and upper throat are dull yellowish brown, becoming paler posteriorly. The inside of the fore and hind limbs is pale yellowish rufous,

which deepens on the lower hind limbs and anal region to a much darker tone, and is more or less strongly diffused over the basal portion of the underside of the tail. The mid-abdominal region (axillæ to loins) is a grizzle of dull brown and pale buffy, with a tendency to a lighter median line. The upper surface of the fore and hind feet is mixed dark rufous and black, the black basal portion of the hairs showing more or less at the surface.

Individual color variation in adults is due primarily to the amount of rufous suffusion present, varying from a strong rufous tone throughout the pelage to its almost entire absence. Specimens of either of these types, however, are exceptional. The specimen selected as type of *medjanius* represents the average condition. The extreme rufous examples strongly approach *rubricatus* and indicate intergradation between the two forms. The specimens recorded by Thomas from Medje and Poko as referable to *H. r. pasha* (*loc. cit.*) should doubtless be referred to *medjanius*, since these localities are in the type region of the latter.

***Heliosciurus rufobrachium rubricatus*, new subspecies**

Type, No. 50748, ♂ adult, near the Lubila River, an affluent of the Tshopo River, about 50 miles southwest of Avakubi (south of the Ituri River), Belgian Congo, September 20, 1909; Herbert Lang and James P. Chapin, Orig. No. 123.

Similar to *H. r. medjanius* in size and color of upperparts; underparts more strongly suffused with rufous; inside of fore and hind limbs and anal region intense dark rufous; upper surface of feet, wrists and ankles, and median basal underside of tail chestnut-rufous.

Collectors' measurements of type: Total length, 552 mm.; head and body, 255; tail vertebræ, 297; hind foot, 61; ear, 19.

Skull (type): Greatest length (=occipito-nasal), 55.4; condyloincisive length, 51.2; least interorbital breadth, 16.7; tip to tip of postorbital processes, 25.6; postorbital breadth, 14.4; breadth of brain-case, 23.1; zygomatic breadth, 31.5; length of nasals, 17.6; breadth of nasals anteriorly, 8.3, do. at posterior border, 6.6; length of maxillary toothrow, 10.9.

Represented by 9 specimens, as follows:

Avakubi, 7 (3 ♂, 3 ♀, all adult, 1 in alcohol), October 1, 13, December 8, 1909, January 12, 24, June 22, and August 26, 1914.

Bafwasende (35 miles south of Avakubi), 1 (♂ adult), September 23, 1909.

Lubila, 1 (♂ adult), September 20, 1909.

Collectors' measurements of 6 specimens (3 ♂, 3 ♀) from Avakubi: Total length, 501 (482-525); head and body, 234 (226-253); tail vertebræ, 262 (251-279); hind foot, 59.3 (54-63); ear, 18.3 (17-20).

Skull (4 of same specimens—2 too much broken for measurement): Greatest length, 53.4 (52.4-54.8); zygomatic breadth, 31.9 (29.7-33.4).

The relation of the present form to *medjanius* has been indicated in the detailed comparison already given (pp. 45 to 47) of the three forms

of the *rufobrachium* group represented in the present collection. The differences that distinguish *medjanius* from *pasha* are greatly intensified in *rubricatus*, the northward range of which appears to be limited by the Ituri River.

*Heliosciurus multicolor* Group

***Heliosciurus multicolor lateris* Thomas**

*Heliosciurus multicolor lateris* THOMAS, 1909, Ann. Mag. Nat. Hist., (8) IV, August, p. 102. Type locality, Lado, Mongalla.

Represented by one specimen, subadult female, Aba, Belgian Congo, December 12, 1911.

Collectors' measurements: Total length, 390 mm.; head and body, 185; tail vertebrae, 205; hind foot, 45 (s. u. 42.5); ear, 15.

Skull: Greatest length, 45.4; condyloincisive length, 40.7; zygomatic breadth, 36.

Provisionally referred to this subspecies, with the description of which it well agrees.

**FUNISCIURUS Trouessart**

*Funisciurus* (subgenus of *Sciurus*) TROUESSART, 1880, Le Naturaliste, II, No. 37, October 1, p. 293. Genotype, by monotypy, *Sciurus isabella* Gray = *Funisciurus lemniscatus isabella* (Gray). A few weeks later (idem, 1880, II, No. 40, November 15, p. 315) he designated *Sciurus lemniscatus* LeConte as type of *Funisciurus*, on the assumption that *S. isabella* Gray was a strict synonym of the earlier *S. lemniscatus*.

***Funisciurus anerythrus anerythrus* (Thomas)**

*Sciurus pyrrhopus anerythrus* THOMAS, 1890, Proc. Zool. Soc. London, pp. 447, 448, Pl. XL, animal. Two specimens. Type locality, Buguera.

*Funisciurus anerythrus* THOMAS, 1915, Ann. Mag. Nat. Hist., (8) XVI, December, p. 473. Mawambi (1), Avakubi (1), Medje (6), Poko (15 specimens).

Represented by 28 specimens, taken at five localities, as follows:

Avakubi, 7 (2 ♂, 1 adult, 1 immature; 5 ♀, all adult), October 7, November 5, 24, 1909, February 11, April 8, 1914.

Ngayu, 2 (2 ♀—1 adult, 1 immature), December 17, 1909.

Gamangui, 6 (1 ♂, 5 ♀—2 ♀ immature), January 30, February 7, 15, 19, 1910.

Medje, 8 (3 ♂, 5 ♀—2 ♂, 2 ♀ immature), January 18–24, September 26, October 5, 1910, April 3, May 25, June 15, 1914.

Niangara, 5 (1 ♂ adult, 4 ♀—2 immature), November 7, 15, 20, 1910.

Collectors' measurements of 14 adult specimens (4 males, 10 females, all middle-aged to adult) from Ngayu, 1 (♀); Avakubi, 4 (1 ♂, 3 ♀); Gamangui, 4 (1 ♂, 3 ♀); Medje, 2 (1 ♂, 1 ♀); Niangara, 3 (1 ♂, 2 ♀).

	Total Length	Head and Body	Tail Vertebrae	Hind Foot	Ear
♂	355 (346-368)	186 (183-193)	165 (163-175)	46.5 (46-48)	18.0 (17-19)
♀	356 (348-365)	189 (181-195)	168 (160-183)	47.1 (45-49)	17.4 (16-19)

The above measurements indicate a slightly greater size for the females, as is the case also in *F. pyrropus akka* from about the same localities.

The underparts vary considerably in the amount of buffy or ochraceous wash on the ventral surface, independently of season or locality, the palest being nearly white and a few (four out of twenty-eight) closely approaching the average of the Niapu series of twenty-two described below.

#### ***Funisciurus anerythrus niapu*, new subspecies**

Type, No. 50877, ♂ adult, Niapu, Belgian Congo, November 9, 1913; Herbert Lang and James P. Chapin, Orig. No. 2120.

Similar to typical *anerythrus*, but underparts averaging much darker and more ochraceous, the ochraceous tips of the hairs being longer and brownish ochraceous, often wholly concealing the dark basal portion of the pelage.

Collectors' measurements of the type: Total length, 359 mm.; head and body, 190; tail vertebrae, 169; hind foot, 47; ear, 18.

Skull (type): Greatest length (=occipito-nasal), 45.7; condyloincisive length, 40.7; least interorbital breadth, 11.7; tip to tip of postorbital processes, 19.2; postorbital breadth, 16.1; breadth of brain-case, 20.1; zygomatic breadth, 25.5; length of nasals, 12.2; breadth of nasals anteriorly, 4.6, do. posteriorly, 5.9; length of maxillary toothrow, 8.1.

Represented by 24 specimens collected as follows:

Niapu, 22 (10 ♂, 12 ♀—3 ♂ and 4 ♀ immature) all collected November 9-30, 1913, except one taken at same locality a month later (December 25).

Stanleyville, 2 (♂, ♀ in alcohol), September 6, 1909, January 18, 1915.

Collectors' measurements of 13 adult specimens from Niapu (6 males, all adult; 7 females, of which 3 are young adults):

	Total Length	Head and Body	Tail Vertebrae	Hind Foot	Ear
♂	356 (337-390)	195 (181-226)	162 (155-169)	45.7 (45-47)	17.3 (17-19)
♀	350 (340-364)	199 (178-205)	163 (157-165)	46.0 (45-47)	17.3 (16-18)

Skulls, same specimens:

	Greatest Length	Zygomatic Breadth
♂	46.5 (43.6-49.0)	25.7 (24.7-26.7)
♀	46.9 (44.9-49.7)	25.2 (24.4-26.3)

It is clearly evident that the marked difference in the coloration of the underparts, which alone distinguishes strongly the Niapu specimens from all of those from the other six localities to the eastward, is not seasonal rather than geographic, the fact being that the greater part of the adults from the other localities were taken at the same season (most of them during the same month) as those from Niapu. A series of five from

Niangara were all taken in November; five others from Avakubi were taken October 7 to November 24; five from Medje were also taken near the same season (September 26, October 5, and January 18-24). When laid out in two series, the specimens from Niapu in one and those from the other localities in the other, it is seen that only a few of the most heavily colored specimens from the eastern localities equal the palest of the Niapu series in either the extent or intensity of the ochraceous wash of the ventral surface. While a few of the lighter colored specimens in the Niapu series can be matched by a few of the darkest specimens in the other, and thus indicate intergradation, the average difference is striking, particularly when the palest specimens of the two series are compared. It seems desirable therefore to recognize the Niapu series in nomenclature as a saturate type of the group, especially since a pale form of *anerythrus* (*F. a. bandarum* Thomas) has been designated from the upper Shari River.

In the present connection it may be of interest to give the results of a comparison, especially in respect to size, of the *F. pyrropus akka* series of thirty-two specimens with the fifty-two of the *F. anerythrus* group, since both were collected at the same time at about the same localities. First it may be stated that the two forms of *anerythrus* show no difference in size, and the same is true also of the *akka* and *anerythrus* series, in either external or cranial measurements. Nor am I able to distinguish the skull of *akka* by any feature from the skull of *anerythrus*. In the coloration of the upperparts there is also a close resemblance, the chief distinction being the color of the lateral line, which is pale buffy in *akka* and white in *anerythrus*, often indistinct in both. The tail is also alike in both, on both surfaces. But the difference in the color of the outside of the limbs (including the upper surface of the feet) and the ventral surface is striking. In *anerythrus* the legs and feet externally and the sides and front of the head are brown with a dull cinnamon-rufous suffusion; in *akka* intense brownish rufous, particularly on the hind limbs and feet. In *anerythrus* the whole ventral surface and inside of limbs is heavily washed with ochraceous (ochre-yellow to ochraceous rufous), the basal third of the hairs pale plumbeous; in *akka* everywhere clear white to the base of the hairs.<sup>1</sup> As both *anerythrus* and *akka* live together abundantly at all localities from which either is represented in the

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<sup>1</sup>The Niangara series, as might be expected, is the palest of all, but the Avakubi specimens merge with them; the palest specimen is an old male from Avakubi, taken October 7, which is white below with a slight buffy wash over the thoracic region.

present collection, with not a single intermediate in a joint series of eighty-four specimens, it is evident that their status is that of distinct species. Yet in measurements and proportions and in the coloration of the upperparts (front and sides of head and lateral line excluded) the two forms are practically indistinguishable. In respect to measurements, two series of adults, comprising 13 specimens of *niapu* and 14 of *akka*, afford the following data:

#### External Measurements

	Total Length	Head and Body	Tail Verte- bræ	Hind Foot	Ear
<i>F. anerythrus niapu</i>	345	184	161	45.9	17.4
<i>F. pyrropus akka</i>	345	186	159	46.7	17.5

#### Skull Measurements

	Greatest Length	Zygomatic Breadth
<i>F. anerythrus niapu</i>	47.4	25.2
<i>F. pyrropus akka</i>	46.8	24.2

The measurements and proportions are thus practically identical in the two forms, the averages in external measurements (taken from specimens in the flesh by the collectors) varying from 0 to 2 mm., and those of the skulls from 0.6 to 1 mm.

#### ***Funisciurus pyrropus akka* de Winton**

*Sciurus pyrrhopus* THOMAS, 1888, Proc. Zool. Soc. London, p. 9. Two specimens. Type locality, Tingasi, Monbuttu, Belgian Congo.

*Sciurus emini* DE WINTON, 1895, Ann. Mag. Nat. Hist., (6) XVI, August, p. 197. Not *Sciurus emini* Stuhlmann, 1894.

*Funisciurus akka* DE WINTON, 1899, Ann. Mag. Nat. Hist., (7) IV, December, p. 357. To replace *Sciurus emini* de Winton, preoccupied.

*Funisciurus akka* THOMAS, 1915, Ann. Mag. Nat. Hist., (8) XVI, December, p. 473. Medje (4), Poko (7 specimens).

Represented by 32 specimens, taken at 7 localities, as follows:

Boyulu, 1 (♂ adult), September 22, 1909.

Avakubi, 1 (♂ adult), July 16, 1914.

Gamangui, 4 (3 ♂ adult, 1 ♀ immature), January 28, February 7, 18, 1910.

Medje, 7 (2 ♂, 5 ♀—4 immature), January 23, March 25, April 1, 4, September 4, 29, 1910, June 24, 1914.

Niapu, 13 (5 ♂, 8 ♀, all adult), November 12–30, December 27, 1913.

Akenge, 3 (1 ♂, 2 ♀), September 29, October 10, 11, 1913.

Niagara, 3 (1 ♂, 2 ♀, all adult), November 9, 10, 1910.



Collectors' measurements of 13 youngish adults from Niapu (5 males, 8 females):

	Total Length	Head and Body	Tail Vertebrae	Hind Foot	Ear
♂	337 (317-355)	186 (176-201)	151 (141-159)	47.6 (47-48)	18.2 (18-19)
♀	349 (322-371)	189 (165-206)	160 (145-173)	47.6 (45-49)	17.5 (16-18)

Skulls, same specimens:

	Greatest Length	Zygomatic Breadth
♂	46.2 (45.4-48.1)	25.5 (24.7-26.2)
♀	45.7 (45.2-47.9)	25.4 (25.0-26.8)

Only three of the thirteen Niapu specimens of which measurements are given above are old adults (1 ♂, 2 ♀), as indicated by the condition of the teeth and sexual organs (scrotum present in the male, mammæ conspicuous in the females); in the other ten the dentition is complete but the teeth are unworn or only slightly worn, and no mammæ are distinguishable in the females. The measurements below of thirteen specimens from other localities (all that are available) include only adults of middle age or older, and thus average, as would be expected, larger than the Niapu series, which consists almost entirely of rather young adults.

Collectors' measurements of 13 specimens (6 males, 7 females, all middle aged or old) from other localities (Akenge, Avakubi, Boyulu, Ngayu, 1 each; Niangara, 2; Gamangui, 3; Medje, 4):

	Total Length	Head and Body	Tail Vertebrae	Hind Foot	Ear
♂	335 (322-351)	190 (184-208)	148 (136-156)	48.5 (48-49)	18.7 (18-20)
♀	344 (317-340)	193 (187-202)	151 (130-161)	47.0 (46-48)	18.4 (18-20)

Skulls, same specimens:

	Greatest Length	Zygomatic Breadth
♂	47.5 (46.4-48.5)	25.7 (24.9-27.1)
♀	47.9 (46.4-48.5)	26.3 (24.9-26.7)

The above measurements of two series of specimens, totaling 11 males and 15 females, indicate that the females are slightly larger than the males, but the difference is too small to be diagnostic.

The thirty-two specimens of *F. p. akka* are exceedingly constant in coloration, season and age making very little difference in this respect. The underparts, including the inside of both fore and hind limbs, are pure white to the base of the fur. Immature and September-November adult specimens show a tendency to a faint pinkish wash on the inside of the hind limbs and (exceptionally—in two or three specimens only) on the middle of the belly. The pale buff lateral line running from the shoulder to the hip varies little in color, but is much better defined in

some specimens than in others, the posterior half occasionally becoming almost obsolete. The dark color of the back extends laterally to a little below the lateral line, which thus appears to be bordered along the lower side by a narrow dark band, the flanks being lighter and more suffused with yellowish than the dorsal area. The rufous of the outside of the limbs and upper surface of the feet varies considerably in tone, from light intense rufous to dull brownish rufous. The red on the sides and front of the head shares this variability of tone.

Fully adult specimens are also very constant in size, the chief variation being in the length of the tail, which may be somewhat shorter or longer than the normal length, thus contributing a variable element in the total length. The tail vertebræ are considerably shorter than the head and body, forming about 46 per cent of the total length, and about 84 per cent of the head and body length. The two pairs of mammæ are both inguinal.

*Funisciurus p. akka* differs from typical *pyrropus* in slightly smaller size and in the rufous of the limbs and head being less vivid and of a browner tone, but several specimens of the present series closely approach specimens of *pyrropus* from the Cameroon coast region.

#### **Funisciurus congicus congicus** (Kuhl)

*Sciurus congicus* KÜHL, 1820, Beitr. Zoöl., part 2, p. 66. Congo.

Represented by one specimen, adult male, Leopoldville, July 6, 1909.

Collectors' measurements: Total length, 320 mm.; head and body, 253; tail vertebræ, 167; hind foot, 39.

Skull: Greatest length, 39.1; zygomatic breadth, 26.

This specimen is referable to the *F. congicus* group, but whether it represents the typical form is not now determinable. It is evidently not *F. congicus interior* Thomas, from Inkongo.

#### **TAMISCUS** Thomas

*Tamiscus* THOMAS, 1918, Ann. Mag. Nat. Hist., (9) I, p. 33. Genotype, by original designation, *Sciurus emini* Stuhlmann.

*Tamiscus* (subgenus of *Paraxerus*) HOLLISTER, 1919, U. S. Nat. Mus. Bull. 99, part 2, May 16, p. 14.

#### **Tamiscus emini emini** (Stuhlmann)

*Sciurus emini* STUHLMANN (*ex* Matschie Ms.), 1894, 'Mit Emin Pasha,' I, part 1, p. 320 (footnote), p. 321, fig. animal. NEUMANN, 1902, Sitzungs. Ges. naturf. Fr. Berlin, p. 180; "Länder zwischen Albert Edward und Albert Nyansa und nordwestlich des Albert Nyansa bis Monbuttu."

*Paraxerus boehmi emini* THOMAS, 1915, Ann. Mag. Nat. Hist., (8) XVI, December, p. 473. Medje (4), Mawambi (4), Poko (9 specimens).

*Tamiscus emini emini* THOMAS, 1918, Ann. Mag. Nat. Hist., (9) I, January, p. 34.

Represented by 57 specimens (32 ♂, 25 ♀, of which 8 are immature, including 3 nurslings), from eleven localities, extending from Stanleyville to Faradje, as follows:

Stanleyville, 10 (6 ♂, 4 ♀, three of them immature), collected August 11–28, 1909.

Batama, near Stanleyville, 1 (♂ adult), September 16, 1909.

Avakubi, 6 (3 ♂, 3 ♀, all adult), October 8, 12, 13, 22, November 9, 1909, and January 22, 1914.

Ngayu, 3 (1 ♂, 2 ♀, all adult), December 16–24, 1909.

Bafwabaka, 7 (4 ♂, 3 ♀, all adult), December 28–31, 1909, and January 5, 7, 1910.

Medje, 10 (6 ♂, 4 ♀, of which 4 are immature, including 2 nurslings), January 15–20, 1910 (7, all adult but one), March 24, 1914 (a nursling), and September 4, 9, 1914 (both immature, 1 a nursling).

Gamangui, 1 (♀ adult), February 4, 1910.

Pawa, 1 (♂ adult), October 20, 1910.

Niangara, 5 (3 ♂, 2 ♀, all adult), November 7–15, 1910, and May 18, 1913.

Faradje, 1 (♂ adult), December 2, 1911.

Niapu, 12 (8 ♂, 4 ♀, all adult), November 14–25, 1913.

#### Collectors' Measurements of Thirty-five Adults

Locality	No. of Specimens	Total Length	Head and Body	Tail Vertebrae	Hind Foot	Ear
Stanleyville	7	284(271–300)	127(119–135)	158(150–170)	35.0(34–36)	13.0(12–14)
Avakubi	5	277(269–287)	125(122–128)	156(147–165)	34.5(33–37)	13.3(12–14)
Niapu	12	276(267–292)	127(120–137)	148(130–159)	32.6(31–35)	13.6(12–15)
Medje	6	282(275–283)	126(123–130)	154(152–158)	34.0(33–36)	13.6(13–14)
Niangara	5	275(252–294)	128(121–141)	149(141–156)	33.4(31–35)	13.0(12–14)

#### Skull Measurements (Thirty-three of the Specimens in Table Above)

Locality	No. of Specimens	Greatest Length	Zygomatic Breadth
Stanleyville	6	35.0 (34.3–35.9)	19.5 (19.1–19.7)
Avakubi	5	33.8 (33.1–34.8)	19.4 (19.1–19.7)
Niapu	12	34.4 (33.1–35.0)	19.1 (18.3–19.6)
Medje	5	34.2 (33.7–34.9)	19.3 (18.6–19.7)
Niangara	5	34.2 (32.9–34.9)	19.2 (18.5–19.8)

The discrepancies in the average size at the different localities given in the table is doubtless ascribable to differences in the average age of the specimens.

This large series, from a wide range of localities, is astonishingly uniform in coloration, Stanleyville and Niangara specimens being indistinguishable. Season and age appear to exert little influence on coloration of adults, excluding a few specimens in obviously worn pelage. In two nurslings the general coloration of the upperparts is slightly more yellowish than in adults and the black dorsal stripes are more sharply defined, owing to the shortness of the pelage.

***Tamiscus alexandri* (Thomas and Wroughton)**

*Funisciurus alexandri* THOMAS AND WROUGHTON, 1907, Ann. Mag. Nat. Hist., (7) XIX, May, p. 376. Type locality, Gudima, Iri River, Upper Uele (2 specimens).

*Paraxerus alexandri* THOMAS, 1915, Ann. Mag. Nat. Hist., (8) XVI, December, p. 473. Medje (4), Poko (1 specimen).

*Tamiscus alexandri* THOMAS, 1918, Ann. Mag. Nat. Hist., (9) I, January, p. 37.

Represented by 19 specimens (8 ♂, 11 ♀), from 8 localities (Avakubi to Faradje), collected as follows:

Avakubi, 4 (1 ♂, 3 ♀, 3 adult, 1 ♀ embryo in alcohol), November 23, 1913, and January 3, February 22, September 3, 1914.

Ngayu, 2 (♀, ♂, adult), December 22, 24, 1909.

Gamangui, 5 (1 ♂, 4 ♀), January 28, February 8–11, 1910.

Medje, 2 (♂, ♀), April 1, May 25, 1914.

Pawa, 1 (♂ adult), October 10, 1910.

Nala, 1 (♀ in alcohol), July 1913.

Rungu, 1 (♀ adult), October 28, 1910.

Faradje, 3 (♂, all adult), November 29, December 2, 1911.

Collectors' measurements of 4 adults (1 ♂, 3 ♀) from Gamangui: Total length, 215 (214–217); head and body, 105.5 (105–107); tail vertebræ, 110 (109–112); hind foot, 30 (29–31); ear, 14 (all 14).

Skulls of the same specimens and one other from same locality: Greatest length, 29.5 (29.3–29.9); zygomatic breadth, 17.8 (17.3–18.3).

Collector's measurements of 3 adult males from Faradje: Total length, 219 (212–226); head and body, 107 (104–109); tail vertebræ, 112.3 (108–117); hind foot, 29.7 (29–30); ear, 13 (12–14).

Skulls of the same specimens: Greatest length, 29.7 (29.5–29.9); zygomatic breadth, 17.9 (17.4–18.6).

Collectors' measurements of 9 specimens from other localities (Avakubi, 3; Pawa, 1; Rungu, 1; Medje, 2; Ngayu, 2): Total length, 217 (210–230); head and body, 104 (96–107); tail vertebræ, 112 (103–118); hind foot, 29.9 (29–31); ear, 13.5 (12–15).

Skulls, 8 of the same specimens: Greatest length, 28.9 (28.1–29.4); zygomatic breadth, 17.4 (16.9–17.7).

The middle of the back between the dark stripes is pale fulvous, yellower than the sides of body, bordered on each side by a black and a dull yellowish white stripe, and in many specimens indistinct traces of a short blackish stripe outside of the whitish one. In the November, December, January, and February specimens the black and white stripes are sharply defined but in April, May, and October they are usually much less distinct owing to fading and wear. The white border of the ears is at all times a conspicuous feature.

### **PROTOXERUS Major**

*Protoxerus* (subgenus of *Xerus*) MAJOR, 1893, Proc. Zool. Soc. London, (June 1), p. 189, Pl. VIII, figs. 7, 8, Pl. IX, figs. 7, 8. Genotype, by subsequent designation (Thomas, 1897), *Sciurus stangeri* Waterhouse.

### **Protoxerus stangeri centricola (Thomas)**

*Sciurus stangeri centricola* THOMAS, 1906, Ann. Mag. Nat. Hist., (7) XVIII, October, pp. 295, 297. Type locality, Katabi, Entebbe, Uganda (6 specimens).

*Protoxerus stangeri centricola* THOMAS, 1915, Ann. Mag. Nat. Hist., (8) XVI, December, p. 473. Moera (3), Alimasi (2), Mawambi (2), "Poko"<sup>1</sup> (13 specimens), Belgian Congo.

Represented by 54 specimens (30 males, 24 females); all adult but 4; among them 2 skeletons and 2 alcoholic; taken as follows:

Stanleyville, 1 (♂), September 30, 1914.

Kamunionge, southeast of Bafwasende, 1 (♂), September 21, 1909.

Avakubi, 5 (1 ♂, 2 ♀), June 4, August 11, 26, 1914; (2 ♂, alcoholic), August 20, 24, 1914.

Ngayu, 7 (3 ♂, 4 ♀), December 11–23, 1909.

Bafwabaka, 2 (♂, ♀), December 30, 1909, and January 7, 1910.

Gamangui, 4 (3 ♂, 1 ♀), January 29, and February 8, 9, 20, 1910.

Medje, 6 (2 ♂, 4 ♀), January 20, 23, March 15, September 10, 15, 1910, and February 27, 1914.

Niapu, 20 (12 ♂, 8 ♀), November 14–30, December 2, 19, 1913, and January 2, 1914.

Akenge, 5 (2 ♂, 3 ♀), October 1–17, 1913.

Niangara, 2 (♂, ♀), November 12, 19, 1910.

Faradje, 1 (♂), November 30, 1911.

<sup>1</sup>Mr. Lang believes that Dr. Christy's specimens recorded as from "Poko" were really taken in the forest belt, farther south, toward Niapu.

As indicated above, 20 of the 54 specimens were taken at Niapu, all but three during the last half of the month of November; all were adults in fresh pelage. Niapu is about 60 miles south of Poko, from which locality a large series collected by Dr. Christy has been referred by Thomas (*loc. cit.*, 1915, p. 473) to this subspecies.

Collectors' measurements of the Niapu series (12 males, 8 females):

	Total Length	Head and Body	Tail	Vertebræ	Hind Foot	Ear
♂	587 (551-628)	284 (271-309)	301 (270-350)		69.8 (65-75)	22.3 (21-24)
♀	591 (584-611)	283 (277-297)	307 (300-314)		69.8 (65-73)	22.0 (21-23)

Skulls, same specimens:

	Greatest Length (=occipito-nasal length)	Zygomatic Breadth (=greatest breadth)
♂	67.23 (64.8-68.7)	37.5 (35.8-38.5)
♀	66.6 (64.6-68.7)	37.6 (36.3-38.1)

Collectors' measurements of 15 adults (8 males, 7 females) from other localities (Avakubi 3, Bafwabaka 1, Stanleyville 1, Gamangui 3, Kamunionge 1, Medje 3, Ngayu 1, Niangara 2):

	Total Length	Head and Body	Tail	Vertebræ	Hind Foot	Ear
♂	577 (557-590)	280 (261-296)	290 (277-314)		69.0 (68-71)	22.0 (21-24)
♀	586 (570-610)	290 (284-296)	292 (280-315)		68.4 (65-71)	21.7 (20-23)

Skulls, same specimens:

	Greatest Length (=occipito-nasal length)	Zygomatic Breadth (=greatest breadth)
♂	66.5 (64.6-67.0)	36.7 (35.5-37.8)
♀	66.2 (64.5-68.5)	36.8 (35.4-38.0)

The external measurements of the head, body, and tail<sup>1</sup> of the type of *centricola* (an old female from Entebbe), "taken on the skin," considerably exceed the averages given above, but the foot, allowing 5 or 6 mm. for the claws, is about equal to the smallest records of our specimens measured in the field, and the greatest length of the skull (66.5 mm.) differs less than a millimeter from the average of the 35 adult specimens from the Belgian Congo given above.

The coloration of this large series is rather uniform, half-grown specimens differing scarcely at all from the adults. A few of the latter, in somewhat worn pelage, are a little pale from evident bleaching. The extension of the gray of the dorsal region forward upon the head varies somewhat, in some specimens gray-tipped hairs covering the crown as far as the eyes, in others only as far as the front base of the ears.

<sup>1</sup>"Head and body (overstretched) 310 mm.; tail, 330; hind foot, 61."

**Protoxerus stangeri signatus** Thomas

*Protoxerus stangeri signatus* THOMAS, 1910, Ann. Mag. Nat. Hist., (8) V, January, p. 85. Type locality, Lodja, Upper Lukenie River, Belgian Congo.

A single specimen from Bolobo (skin without skull), presented to the Expedition by Dr. Gerling, is apparently referable to this form which, as indicated by the description based on the type specimen from Lodja, it closely resembles. The type locality is some 400 miles east of Bolobo. The differences from the series of *P. s. centricola* as recorded above are slight and it is here recognized mainly on geographical grounds.

**Euxerus** Thomas

*Euxerus* THOMAS, 1909, Ann. Mag. Nat. Hist., (8) III, June, p. 473. Genotype, by original designation, *Sciurus erythropus* Geoffroy.

**Euxerus erythropus lacustris** (Thomas)

*Xerus erythropus lacustris* THOMAS, 1905, Ann. Mag. Nat. Hist., (7) XV, April, p. 388. Masindi, Unyoro.

*Euxerus erythropus lacustris* THOMAS, 1915, Ann. Mag. Nat. Hist., (8) XVI, December, p. 474. "Panga" (near Poko) (3), Poko (8 specimens).

Represented by 30 specimens, collected as follows:

Faradje, 20 (2 ♂ and 10 ♀ adults, 1 nursling, 7 one-fourth to one-third grown), February 20, 22, 26, March 4, 5, 14, 31, April 3, 11, 29, 30, May 27, June 29, September 3, 11, 1911, October 16, December 14, 1912, January 10, 12, 1913.

Niangara, 9 (2 adult, 7 immature, of which 5 are nurslings), November 12-28, December 22, 1910, and January 2, 1911.

Rungu, 1 (♂ adult), January 30, 1913.

Collectors' measurements of 11 adults (2 males, 9 females) from Faradje: Total length, 492 (474-515); head and body, 282 (259-297); tail vertebræ, 209 (189-230); hind foot, 72 (68-75); ear, 18.8 (18-20).

Skulls, same specimens: Greatest length, 65.1 (63.6-67.2); zygomatic breadth, 34.2 (33.7-34.6).

The three localities at which specimens were taken are all in the open districts of the savannah in the northeastern Belgian Congo.

Young specimens a few weeks old are similar in coloration to the adults, the pattern being the same, but a little lighter in tone, the light tips to the hairs of the upperparts, owing to the shortness of the pelage, concealing the darker basal portion. The tail, however, is externally white, the long white tips of the hairs usually wholly concealing the broad subapical black zone of the tail hairs. Later, as the animal increases in size, the black base of the hairs forms a narrow black median line on both

the upper and the lower surfaces of the tail; still later, in specimens one-third to half grown, both surfaces of the tail are grizzled black and white, with the sides and tip white, and the body pelage, in texture and coloration, has become like that of adults, the juvenal coat having been replaced by molt.

### ANOMALURIDÆ

The one hundred and twenty-five specimens of Anomaluridæ represent three of the four superspecific groups of this family proposed by Matschie in 1914,<sup>1</sup> and are referable to three forms.

#### ANOMALURUS Waterhouse

*Anomalurus* WATERHOUSE, 1842, Ann. Mag. Nat. Hist., X, pp. 201, 202; 1842, Proc. Zoöl. Soc. London, (January 1843), pp. 124-127. Genotype, by monotypy (also by original designation), *Anomalurus fraseri* Waterhouse.

*Aroæthrus* WATERHOUSE, 1842, Proc. Zoöl. Soc. London, (January 1843), p. 124, footnote. Substitute name to replace *Anomalurus* Waterhouse in case the latter is found to be preoccupied.

*Anomalurus*, as restricted by Matschie (*loc. cit.*, 1914), includes about a dozen forms, the greater part of which are subspecies of *A. fraseri*.

#### *Anomalurus jacksoni jacksoni* de Winton

*Anomalurus jacksoni* DE WINTON, 1898, Ann. Mag. Nat. Hist., (7) I, March, p. 251. Ntebe (=Entebbe), Uganda.

*Anomalurus jacksoni* THOMAS, 1915, Ann. Mag. Nat. Hist., (8) XVI, December, p. 472. Moera (1), Medje (2), Poko (5 specimens).

Represented by 58 specimens (25 males, 29 females, all adult but 3, including 4 in alcohol, 4 skeletons, and a skull), collected as follows:

Avakubi, 2 (♂, ♀ in alcohol), March 31, April 14, 1914.

Medje, 28 (12 ♂, 13 ♀; 2 in alcohol, 4 skeletons), January 20-24, March 6-21, April 9-26, May 2, August 1, 3, September 9, 16, October 6, 1910.

Gamangui, 1 (skull only), February 1, 1910.

Niapu, 16 (10 ♂, 6 ♀), November 12-18, December 2-19, 1913.

Akenge, 7 (♂, 6 ♀—1 ♀, embryo in alcohol), September 29-30, October 9, 11, 28, 31, 1913.

Panga, 4 (♂, 3 ♀), September 14-18, 1914.

Collectors' measurements of 16 adult specimens (9 ♂, 7 ♀) from Medje:

	Total Length	Head and Body	Tail	Vertebrae	Hind Foot	Ear
♂	549 (518-563)	317 (296-332)	237	(228-250)	61 (58-63)	38.5 (36-41)
♀	582 (559-621)	331 (319-342)	258	(240-280)	63 (62-65)	40.0 (39-41)

<sup>1</sup>'Ein neuer *Anomalurus* von der Elfenbeinküste.' Von Paul Matschie. 1914, Sitzungsber. Ges. naturf. Freunde Berlin, No. 7, July, pp. 349-351. (1) *Anomalurus* Waterhouse, (2) *Anomalurodon*, (3) *Anomalurops*, (4) *Anomalurella*.



## Skulls, same series:

Occipito-nasal Length	Zygomatic Breadth
♂ 55.6 (53.5-57.3)	36.9 (35.0-38.0)
♀ 57.1 (53.5-58.8)	38.3 (35.0-39.8)

Collectors' measurements of 15 adult specimens (8 ♂, 7 ♀) from Niapu:

	Total Length	Head and Body	Tail Vertebrae	Hind Foot	Ear
♂	559 (540-570)	313 (298-323)	248 (222-267)	60.4 (58-65)	37.6 (35-39)
♀	582 (554-628)	311 (301-3)	261 (252-284)	61.3 (62-64)	38.1 (36-40)

## Skulls, same series:

Occipito-nasal Length	Zygomatic Breadth
♂ 56.3 (55.2-57.8)	37.5 (36.1-38.0)
♀ 57.2 (56.0-58.9)	37.5 (36.8-38.4)

The three adults (1 ♂, 2 ♀) from Panga agree in proportions and measurements with the Medje and Niapu specimens. The single specimen from Avakubi is a young adult male.

In compiling the measurements given above only specimens in which the dentition was fully mature were used; but while the relative number with unworn teeth varies in the different categories, and tends to lower the average for the series when they predominate, this factor, in the present series, does not account for the slightly larger average size of the females in the above statistical summaries. In the discarded specimens the last molar was not fully developed, varying in different specimens from just breaking the alveolus to one-half to two-thirds full height, but still unpigmented. In such specimens the total length of the skull ranges from 50 to 53 mm., as against 55 to 58 mm. in adults.

**ANOMALURELLA Matschie**

*Anomalurella* MATSCHIE, 1914, Sitzungsber. Ges. naturf. Freunde Berlin, July, p. 351. Genotype, by original designation, *Anomalurus pusillus* Thomas.

***Anomalurella pusilla* (Thomas)**

*Anomalurus pusillus* THOMAS, 1887, Ann. Mag. Nat. Hist., (5) XX, December, p. 440; 1888, Proc. Zool. Soc. London, p. 8, Pl. I, animal. Bellima, 1 ♀ (type); Tingasi, 1 ♂.

*Anomalurus pusillus* THOMAS, 1915, Ann. Mag. Nat. Hist., (8) XVI, December, p. 472. Moera (1), Medje (4), Poko (7 specimens).

Represented by 53 specimens (21 ♂, 29 ♀), of which 5 are immature (but none very young), 2 are skulls only, 4 skeletons, and 2 in alcohol, collected as follows:

Avakubi, 1 (♀), September 18, 1913.

Ngayu, 2 (2 ♀), December 17, 20, 1909.

Medje, 36 (12 ♂, 21 ♀—2 ♂, 2 ♀ immature, 2 skulls, 4 skeletons, 1 embryo in alcohol), January 16–26, March 8–26, April 4–27, May 14, June 30, August 18, October 7, 1910, March 23, June 25, 1914.

Niapu, 10 (7 ♂, 3 ♀), November 19, 24, 26, December 4–9, 16, 1913.

Akenge, 4 (2 ♂, 2 ♀), September 30, October 14, 16, 1913.

Collectors' measurements of 23 adults (7 ♂, 16 ♀) from Medje:

	Total Length	Head and Body	Tail Vertebrae	Hind Foot	Ear
♂	371 (359–390)	227 (210–242)	144 (138–152)	43.0 (40–46)	29.8 (30–32)
♀	373 (357–401)	230 (212–246)	148 (141–157)	44.5 (40–47)	30.0 (30–32)

Skulls (10 ♂, 14 ♀), same series:

	Occipito-nasal Length	Zygomatic Breadth
♂	44.8 (43.6–46.6)	29.8 (28.0–30.9)
♀	45.2 (43.6–47.6)	29.9 (28.0–30.8)

Collectors' measurements of 9 adults (7 ♂, 2 ♀) from Niapu: Total length, 371 (353–382); head and body, 219 (213–227); tail vertebrae, 143 (130–147); hind foot, 43.7 (42–46); ear, 29.2 (28–30).

Skulls, same specimens: Occipito-nasal length, 45.1 (43.5–46.3); zygomatic breadth, 29.7 (28.3–30.2).

Very few of the specimens of the present series conform very closely in the coloration of the upperparts to the original description and accompanying colored plate of the species, of which it is said: "General colour above uniform dark grizzled gray, the tips of the hairs forming a terminal band of pale gray or olivaceous." In many specimens of the present series this "terminal band" is near ochraceous rufous, intensified in exceptional specimens to pale tawny. One specimen from Akenge may be noted as having the pelage of the back hazel for the terminal half or more of the hairs, recalling forcibly the dorsal region in *A. beldeni* Du Chaillu (= ? *erythronotus* Milne-Edwards) but the red is browner. This specimen, however, is probably abnormal, as the new coat, coming in in patches, conforms to that of normal specimens.

### ANOMALUROPS Matschie

*Anomalurops* MATSCHIE, 1914, Sitzungsab. Ges. naturf. Freunde Berlin, No. 7, July, p. 351. Genotype, by original designation, *Anomalurus beecrofti* Fraser.

This group includes six described forms, the greater part of which appear to be subspecies of *A. beecrofti*. The type locality of *A. beecrofti chapini*, described below, is far to the eastward of any previously known locality for the *beecrofti* group.

**Anomalurops beecrofti chapini**, new subspecies

Type, No. 50480, ♂ adult, Medje, Belgian Congo, May 6, 1910; Herbert Lang and James P. Chapin. American Museum Congo Expedition. Orig. No. 861. Named for James P. Chapin.

Smaller and much lighter in color than *A. beecrofti citrinus* Thomas,<sup>1</sup> from Benito River, Spanish Guinea.

General color above (including membranes), yellowish gray; middle of back from occiput to sacral region with an irregular broad band of ochraceous orange, varied with black, the hairs individually (about 20 mm. in length) mouse-gray basally, passing gradually into a broad band of dull black, followed by a subapical band (5-6 mm. wide) of ochraceous orange and conspicuously tipped with black; hairs of upper surface of membrane for the antero-lateral fourth of the border rigid and intense black; a well-defined patch of white or buffy white at lateral base of ears, indistinctly merging by a downward sweep with the white or whitish half collar in front of shoulders, and the usual small tuft of partly concealed white hairs on occiput; front and sides of head dull gray or buffy gray, extending laterally to sides of throat; general color below (including membranes) ochraceous buff to base of hairs (varying in some specimens to light buff or even whitish), except on the throat and a broad median band thence to anal region (usually narrowing posteriorly) and the inside of thighs, which parts are intense orange-rufous in high-colored specimens, paler in others; basal third of tail and caudal membrane below like ventral surface, above like the lower back; apical two-thirds of tail dull brown, varying in different specimens from dark brown to pale fulvous brown and even cinnamon-brown; upper surface of feet dull grayish with a slight buffy suffusion; soles and palms naked, pale brown, as are the nose and apical two-thirds of ears.

Collectors' measurements of type: Total length, 512 mm.; head and body, 310; tail vertebræ, 202; hind foot, 59; ear, 29.

Measurements of skull (type): Greatest (occipito-nasal) length, 54.5; condyloincisive length, 51.4; zygomatic breadth, 34.4; least interorbital breadth, 18.4; breadth of brain-case, 26.3; length of upper toothrow, 11.9.

Collectors' measurements of 10 adults (5 ♂, 5 ♀), of which 8 are from Medje and 1 each from Poko and Akenge:

	Total Length	Head and Body	Tail Vertebræ	Hind Foot	Ear
♂	512 (501-518)	301 (278-323)	211 (195-223)	59 (56-62)	31 (29-32)
♀	510 (475-555)	297 (277-330)	213 (198-226)	59 (58-60)	31 (29-32)

Represented by 14 specimens (8 ♂, 6 ♀, all adult but 2), collected as follows:

Medje, 12, (6 ♂, 6 ♀), March 13, April 9, 13, 27, 30, May 6, 8, September 24, October 12, 1910, February 28, 1914.

Poko, 1 (♂), August 22, 1913.

Akenge, 1 (♂), October 1, 1913.

*Anomalurops beecrofti chapini* is geographically nearest *A. beecrofti citrinus* Thomas (type from "Benito River, Spanish Guinea," collected by G. L. Bates), from which it differs in considerably smaller size and much less intense coloration. Fortunately I am able to make

<sup>1</sup>*Anomalurus beecrofti citrinus* Thomas, 1916, Ann. Mag. Nat. Hist., (8) XVIII, August, p. 236. 'About a dozen specimens examined.'

direct comparison of the Congo series with four topotypes<sup>1</sup> of *citrinus* also collected by Mr. Bates. As shown in the accompanying tabulated measurements, *A. b. citrinus* exceeds *A. b. chapini* in total length by about 50 mm., and about the same in head and body length, while there is very little difference in the length of the tail. (It is probable that these latter measurements were not taken by the same method in the two cases.) In skull length *citrinus* exceeds *chapini* by about 4 mm., with the other skull measurements proportionately different. The impression given by comparison of the two series is a greater size difference than the measurements indicate, the *citrinus* skulls being more heavily ossified, with stronger ridges for muscular attachment in skulls of equal age than is the case in *chapini*. The color differences are strongly marked. The "ochraceous olive" or "citrine drab" effect above in *citrinus* is replaced by light clear gray, or slightly yellowish gray, in *chapini*, with a corresponding difference in the tone of the median dorsal band; below the ferruginous tone is much darker in the former, approaching chestnut-red on the throat and median line in *citrinus* in place of orange-rufous in *chapini*.

The series of 14 specimens of *A. b. chapini* presents the usual wide range of individual variation in both size and coloration. The smallest specimen in cranial measurements is a female (skull,  $51.8 \times 32.9$ ) in which all the cheek-teeth have attained full development but are unworn; in external measurements it is the largest of the females except one, which is much the largest specimen of the entire series (skull,  $58.5 \times 36.8$ ) in both external and cranial measurements.

The color above varies from clear light gray to yellowish gray, and the rufous dorsal line is in some weakly developed or nearly obsolete, in others heavy and continuous from the crown to the hips. The broad rufous zone of the median underparts likewise varies greatly in extent and intensity—from orange-rufous to dark ferruginous, and the adjoining lateral parts from ochraceous orange to pale buff. Young specimens are much paler below than the adults. The white crown spot is nearly always plainly distinguishable and usually forms a distinct mark which is occasionally conspicuous. In one specimen it is a transversely-oval patch,  $15 \times 25$  mm. in area. There is apparently no sexual difference in size or color.

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<sup>1</sup>Borrowed from the United States National Museum through the kindness of Mr. G. S. Miller, Jr., Curator of Mammals.

## Collectors' Measurements

	Locality	Sex	Total Length	Head and Body	Tail Vertebrae	Hind Foot
Type <sup>1</sup> <i>A. b. citrinus</i>	Benito River, Spanish Guinea	♀	582	357	225	60 s.u.
84546 N. M. <i>A. b. citrinus</i>	" "	♀	565	350	215	57 "
84547 " " "	" "	♂	540	355	185	53 "
84548 " " "	" "	♀	585	380	205	56 "
<b>Average, 4 specimens</b>			<b>568</b>	<b>361</b>	<b>208</b>	<b>56.5</b> "
50477 <i>A. b. chapini</i>	Medje, Upper Congo	♀	515	305	210	58 c.u.
50480 " "	" "	♂	512	310	205	59 "
50481 " "	" "	♀	555	330	225	60 "
50482 " "	" "	♂	517	298	219	62 "
50483 " "	" "	♀	490	282	208	60 "
50610 " "	" "	♂	518	323	195	60 "
50485 " "	Poko	♂	510	298	212	59 "
<b>Average, 7 specimens</b>			<b>517</b>	<b>305</b>	<b>211</b>	<b>60</b> "

## Measurements of Skulls

	Locality	Sex	Greatest Length	Zygom. Breadth	Upper Tooththrow
Type <sup>1</sup> <i>A. b. citrinus</i>	Benito River, Spanish Guinea	♀	58.5	38.0	12.8
84546 N. M. <i>A. b. citrinus</i>	" "	♀	59.5	38.3	13.0
84547 " " "	" "	♂	60.5	38.4	13.2
84548 " " "	" "	♀	59.7	38.3	13.0
84512 " " "	" "	♀	58.0	37.4	11.5 <sup>2</sup>
<b>Average, 5 specimens</b>			<b>59.2</b>	<b>38.1</b>	<b>13.0</b>
50477 <i>A. b. chapini</i>	Medje, Upper Congo	♀	55.2	35.8	12.6
50480 " "	" "	♂	54.3	33.8	12.2
50481 " "	" "	♀	58.5	36.8	12.7
50482 " "	" "	♂	56.4	36.2	12.5
50483 " "	" "	♀	52.6	35.5	12.0
50610 " "	" "	♂	55.0	36.3	11.7
50485 " "	Poko	♂	55.1	33.8	11.8
<b>Average, 7 specimens</b>			<b>55.3</b>	<b>35.4</b>	<b>12.2</b>

<sup>1</sup>From the author's description (*loc. cit.*).<sup>2</sup>Tooththrow abnormally short and omitted from the average.

**IDIURIDÆ**

The Idiuridæ, recently separated from the Anomaluridæ as a distinct family group by Miller and Gidley,<sup>1</sup> are represented by three quite different forms, two of which are here for the first time described.

**IDIURUS Matschie**

*Idiurus* MATSCHIE, 1894, Sitzungs. Ges. naturf. Freunde Berlin, No. 8, August, pp. 194-200, 1 text-fig. Genotype, by monotypy, *Idiurus zenkeri* Matschie.

***Idiurus zenkeri zenkeri* Matschie**

*Idiurus zenkeri* MATSCHIE, 1894, Sitzungs. Ges. naturf. Freunde Berlin, No. 8, October 16, p. 197, text fig. p. 198 (animal). Type locality, Yaunde Station, Cameroon District, West Africa. One specimen.

Represented by 30 specimens (22 skins with skulls, 8 in alcohol), collected as follows:

Medje, 27 (14 ♂, 13 ♀; 21 skins and skulls, 6 in alcohol), January 21, 25, March 9, 16, 1910.

Avakubi, 1 (♀, skin and skull), January 22, 1914.

Niapu, 2 (1 ♂, 1 ♀, in alcohol), January 27, 1914.

Collectors' measurements of 19 adults (10 males, 9 females) from Medje:

	Total Length	Head and Body	Tail Vertebrae	Hind Foot	Ear
♂	170 (165-175)	71 (64-78)	99 (93-104)	17.0 (16-18)	13.6 (12-14)
♀	173 (160-187)	73 (65-86)	101 (95-108)	17.3 (16-18)	13.4 (12-14)

Measurements of 14 skulls (7 males, 7 females), from the same series:

	Greatest (=occipito-nasal) Length	Zygomatic Breadth
♂	21.0 (20.5-21.3)	12.2 (11.5-12.8)
♀	21.4 (21.1-21.8)	12.4 (11.9-12.8)

This fine series, particularly the 21 skins from Medje, throws much light upon questions of individual, sexual, and seasonal variation. The measurements, both external and cranial, indicate a slightly larger average size for females than males, but there is no recognizable sexual difference in coloration.

The range of color variation is considerable in the Medje specimens taken at the same date, due largely to the condition of the pelage in respect to wear, the general tone of the coloration becoming darker as the tips of the hairs wear off, showing more of the basal fur, while the hair-tips become paler by fading. Comparison of the twelve specimens

<sup>1</sup> 'Synopsis of the supergeneric groups of Rodents.' Gerrit S. Miller, Jr., and James W. Gidley, 1918, Journ. Washington Acad. Sci., VIII, No. 13, July 19, p. 422.

taken March 16 with the eight taken January 25, shows that the latter average darker in general effect and the hair-tips paler, yet certain specimens of the January series can be matched exactly by the paler specimens of the March series. The hair-tips on the back of the brighter colored examples of the March series are near snuff-brown, varying in intensity in different individuals, and about cinnamon-buff on the ventral surface, but often nearly wanting through wear, as in the single Avakubi specimen taken January 22, the most worn of any of the entire series of twenty skins.

A single skin and skull<sup>1</sup> of *I. zenkeri*, from the southern Cameroon, and thus practically a topotype, is rather darker than the average of the Medje series, but differs so little from some of them that they are provisionally referred to this species. Their relationship to *I. zenkeri kivuensis*, recently described by Lönnberg,<sup>2</sup> is not at present determinable. It appears to be a much darker form than typical *zenkeri*.

#### ***Idiurus langi*, new species**

##### Plate V

Type, No. 50542, ♂ adult, Medje, Belgian Congo, March 16, 1910; Herbert Lang and James P. Chapin, American Museum Congo Expedition. Orig. No. 737. Named for Herbert Lang, leader of the American Museum Congo Expedition.

Size of and proportions nearly as in *Idiurus macrotis* Miller, but very different in coloration.

Upperparts (type, in fresh, unworn pelage) washed with clay-color (Ridgway, 1912), strongest on middle of back, less heavily on lower back and sides; in worn pelage much paler (about cinnamon-buff), the light hair-tips partly worn off (almost wholly on lower back and sides); pelage of middle of back (in fresh coat), 11.5 mm. in length, the buffy tips about 2 mm. long, followed by a dark zone of about equal width, the basal two-thirds "mouse-gray." Underparts heavily washed with warm buff, almost wholly concealing the light neutral gray of the basal fur (varying in different specimens, especially when worn) to a faint wash of lighter tone); a conspicuous pale yellowish white patch on sides of nose extending from base of rictal bristles to the naked nose pad, about 4 × 6 mm. in extent; chin and interramal region white or pale yellowish white; upper surface of membranes thinly clothed with brownish black hairs, under side nearly naked; membranes and ears pale brownish (ears in some specimens slightly darker brown); feet and greater part of tail yellowish brown, the long tail hairs dark brown with a faint tone of chestnut, much less dark than in *I. macrotis*. The scale pad on the ventral base of the tail is much longer than in *macrotis* (given as 17 mm.), varying from 20 to 25 mm. in length, and the scales are larger and tend to form regular rows, and beyond what may be considered as the "scale pad" proper, the annulations on the lower surface of the tail are conspicuous and roughened, so that in some specimens it is difficult to determine what should be regarded as the

<sup>1</sup>No. 125438, U. S. Nat. Mus., ♀, Efulen, Bulu Country, Cameroon, July 21, 1903, coll. G. L. Bates.

<sup>2</sup>1917, Kungl. Svens. ventensk. Akad. Handl., LVIII, No. 2, September, p. 67. Masisi, Belgian Congo, about forty miles northwest of Lake Kivu. Two specimens, adult and young.

apical end of the pad, as distinguished from the annulations. The fringes on outer edge of both fore and hind feet, the small tufts of whitish bristly hairs at tarsal and metatarsal joints, the tail fringes, and the scattered long hairs in the dorsal pelage, are evidently generic characters, being common to the three forms of *Idiurus* here under consideration.

Collectors' measurements of the type<sup>1</sup>: Total length, 224 mm.; head and body, 94; tail vertebræ, 130; hind foot, 20; ear, 18.

Collectors' measurements of type and 4 topotypes (all adult males): Total length, 218 (207–224); head and body, 91 (86–94); tail vertebræ, 129 (124–133); hind foot, 21 (20–22); ear, 15.7 (14–18).

Skull (measurements of type<sup>1</sup>): Greatest length, 26; zygomatic breadth, 16; least breadth of frontals,<sup>2</sup> 6.6; greatest breadth of nasals,<sup>2</sup> 3.2; upper toothrow, 3.5; distance between inner bases of m<sup>3</sup>, 1.4; do. m<sup>1</sup>, 1.1; greatest length of mandible, 16.4; greatest depth (at coronoid), 10.2; lower toothrow, 4.

Skull (type and same 4 topotypes): Greatest length, 25.8 (25.1–26.2); zygomatic breadth, 15.5 (15.0–16.0).

Represented by 6 adult males, all of which are skins with skulls, and 1 adult female in alcohol, all taken at Medje, January 25 (5 specimens) and March 16 (2 specimens), 1910.

The type is the only specimen in fresh, wholly unworn pelage. All the others show more or less wear, especially on the lower back and sides, and they vary much in the amount of buffy wash, both above and below, and form a graduated series from clay-color to a pale tone of buff on the upperparts, and on the lower parts from a strong yellowish wash to only a faint pale tone where the hair-tips are least worn. The two March 16 specimens differ greatly from each other in coloration and amount of wear; the January series of skins (all taken January 25) differs similarly in respect to amount of wear and consequent tones of color on both upper and lower surfaces.

*Idiurus langi* is smaller than *I. macrotis* in external measurements, but the cranial measurements are practically the same. It differs, however, strikingly in coloration, both above and below, the general color being much lighter, especially in respect to the basal fur, ears, and membranes. *I. langi* differs from *I. panga* in much larger size and in coloration, especially of the ventral surface, which has a pinkish tone in *panga* instead of yellowish, and the upper surface is much more heavily washed with buff. The yellowish white, sharply defined nose spot of *langi* will alone readily distinguish it at a glance from either *macrotis* or *panga*.

#### ***Idiurus panga*, new species**

Type, No. 50605, ♀ adult, Panga, Belgian Congo, September 18, 1914; Herbert Lang and James P. Chapin. American Museum Congo Expedition. Orig. No. 2552.

Similar to *Idiurus macrotis* Miller<sup>3</sup>, but much smaller and considerably paler throughout, including the basal fur.

<sup>1</sup>For measurements of *I. macrotis* see p. 71, where they are given in comparison with *I. panga*.

<sup>2</sup>Fronto-nasal sutures solidly ankylosed and indistinguishable, so that length of frontals and nasals cannot be given.

<sup>3</sup>*Idiurus macrotis* MILLER, 1898, Proc. Biol. Soc. Washington, XII, pp. 73–76, figs. 15–19 (skull, ear, foot, and tail). Efulen, Cameroon District, West Africa.



Upperparts (in comparison with a para-topotype of *I. macrotis*) with the hairs narrowly tipped with light drab (instead of "sepia"), forming a slight wash of this tone, strongest on middle of back and sides of neck, darkened by the deep neutral gray (instead of dark plumbeous) underfur, which color predominates over the lower back and flanks; underparts superficially pale vinaceous buff (instead of yellowish wood-brown), the basal fur dark gull-gray (instead of plumbeous); upper surface of membranes thinly clothed with dusky brown hairs (less dark than in *macrotis*, as are also the membranes themselves); ears, feet, and base of tail also much lighter than in *macrotis*.

Collectors' measurements of type: Total length, 209 mm.; head and body, 73; tail vertebræ, 126; hind foot, 20 (20.5 in dry skin); ear, 18.

Collectors' measurements of the type and 3 topotypes (1 male, 3 females): Total length, 206 (199–212); head and body, 80.5 (73–87); tail vertebræ, 123 (117–128); hind foot, 20.5 (18–21); ear, 17.3 (17–18).

Corresponding measurements of the type and topotype (2 males) of *macrotis*, as given by the author (*loc. cit.*): Total length, type 241, topotype, 228; head and body, 108, 105; tail vertebræ, 133, 123; hind foot, 21, 22; ear, 16, 15.5.

Skull (measurements of type, with measurements of type and topotype of *macrotis* in parentheses): Greatest length, 25 (26, 27); zygomatic breadth, 14.9 (15, 16); length of frontals,—<sup>1</sup> (96, 98); least width of frontals, 6.5 (7, 7); length of nasals,—<sup>1</sup> (7, 7); greatest breadth of nasals, 3.1 (3.25, 3.3); upper toothrow, 3.5 (3.8, 4); greatest distance between molars at m<sup>3</sup>, 1.5 (2.2, 2); least distance between molars at m<sup>1</sup>, 1 (1.2, 1.2); greatest length of mandible, 14.9 (15, 16); greatest depth (at coronoid), 9.7 (10, 10.6); lower toothrow, 3.7 (4, 4).

Skull (type and 3 topotypes): Greatest length, 25.0 (24.–25.6); zygomatic breadth, 14.5 (14.2–14.9).

Represented by 4 specimens (1 ♂, 3 ♀), all from Panga and all collected the same day, September 18, 1914. All are old adults, with the dentition fully mature and the fronto-nasal sutures fully ankylosed and wholly indistinguishable.

*Idiurus panga* is a member of the *I. macrotis* group and is so different from the *I. zenkeri* group as to need no comparison with it. It differs from *macrotis* in smaller general size, much less heavy skull and correspondingly weaker dentition. Also in the much paler hair-tips above, the decidedly pinkish tone of the underparts, and the lighter color of ears, membranes and feet, and also of the basal underfur, both above and below. The ears appear to be decidedly larger than in *macrotis*, as indicated by the field measurements and by direct comparison with the para-topotype loaned me for examination through the kindness of the describer of the species.

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<sup>1</sup>Fronto-nasal sutures fully ankylosed and indeterminate.



Drawn by Richard Deckert

*Idiurus langi* J. A. Allen. Medje  
(About one-half natural size)